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Environmental and Social
 Impact Assessment (ESIA)
 for

New Gamasa GIS Substation
 and its interconnecting
 Overhead Transmission lines

Final

June 2019

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**Environmental and Social Impact Assessment (ESIA) for
New Gamasa GIS Substation and its interconnecting overhead
Transmission Lines**

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LIST OF ABBREVIATIONS

EEAA	Egyptian Environmental Affairs Agency
EEHC	Egyptian Electricity Holding Company
EETC	Egyptian Electricity Transmission Company
EIB	European Investment Bank
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FGD	Focus Group Discussion
IEA	International Energy Agency
MW	Mega Watt
NGO	Non-Governmental Organization
PS	Pumping Station
ARAP	Abbreviated Resettlement Action Plan
ROW	Right of Way
SS	Substation
SSI	Semi Structured Interview
ToR	Terms of Reference
WW	Wastewater

Technical Executive Summary

I. Project Background

Egypt is witnessing a rapid expansion in urbanization and population, paralleled with a surge in demand for electricity. The rate of electricity coverage in 2009 was approximately 99.6 percent; according to International Energy Agency (IEA). This rate is among the highest rates in Africa with 100 percent connection rates at urban areas and 99.3 percent at rural areas. However, with the growing population, it is expected that the demand for energy will rise over the coming years. It is calculated that the demand for energy has risen by 30% from 2007 to 2012; from 19,738 MW to 25,705 MW. Moreover, the number of the customers has increased from 23.8 million to 28.1 million during the same period. The total transformers capacity reached 99.6 thousands MVA in middle of 2014 compared to 95.9 thousand MVA during 2013 with a percentage rate 3.9%.

In order to meet the forecasted demand on electricity, secure electrical stability and to meet the commitment of supplying electricity to slum areas and informal buildings (based on the approval of the Cabinet (2005) and the Council of Governors approval (2005)), the EETC together with the distribution companies need to provide additional substations(SSs) and their interconnections lines/cables. The European Investment Bank (EIB) is funding the construction of several substations and interconnecting lines in cooperation with the EETC.

The Egyptian Electricity Transmission Company (EETC) is one of sixteen affiliated Companies under the Egyptian Electricity Holding Company (EEHC). The main role of the EETC is the management, operation and maintenance of electric power transmission grids of high voltage and extra-high voltage capacity all over the country, for the optimal economic usage of those grids. EEHC goal is to meet the growth in electricity demand while optimizing the use of all resources and maximizing the profit.

In line with EIB environmental and social standards, EETC is committed to carrying out an Environmental and Social Impact Assessment (ESIA) for construction of New Gamasa substation and its interconnecting Over Head Transmission Lines (OHTLs) and a Resettlement Action Plan (RAP) which should trigger the Egyptian legislations and/or EIB Environmental and Social Standards instruments relevant to resettlement. The RAP will be prepared when all needed information related to the transmission lines is ready. The ESIA and the RAP represent components of a consolidated document. This document will be subject to review and acceptance as whole.”

EcoConServ environmental services has been contracted to carry out the ESIA study and RAP in accordance with national legislations as well as EIB standards; which aims to investigate the potential impact of the project activities on the environmental parameters and the project affected persons (PAPs) and communities livelihood in the project’s area. In addition, the management and monitoring plan, including the mitigation measures during construction, operation and maintenance phases are described within the ESIA report.

II. The ESIA Methodology

The ESIA focused on identifying and assessing the negative and positive impacts of the project on the environment and the socioeconomic characteristics of the impacted groups in addition to developing necessary mitigations for the negative impacts. The identifications and assessments were conducted for each of the project components during construction and operation phases. The mitigation measures were developed and presented in Environmental and Social Management Plan matrix. In addition, the monitoring plan was developed to monitor implementation of the ESMP as well as identifying the necessary capacity building activities for the implementation team. The consultant proposed the necessary budget, to implement the ESMP and the monitoring plan. Similarly, the monitoring plan is presented in the form of a matrix.

The ESIA methodology included reviewing the secondary data sources from previous reports and studies about the environmental and socio-economic characteristics of the project area. The literature review (included both reports provided by the client as well as web based resources), contributed to elaborating the ESIA study's objectives mentioned above by assessing:

- The environmental and socio-economic characteristics of the project areas
- Project background and proposed interventions
- The legal, institutional and organizational framework and background of the electricity sector and the historical background
- Environmental and social standards and guidelines for related environmental and social issues

In addition to the literature review, structured site visits were undertaken to collect primary data from the site. The visits also were used as a tool to identify stakeholders' perceptions regarding some issues (especially social issues), such as:

- The current environmental and socioeconomic characteristics on the site and at the surrounding area
- The current electricity supply at the area and its impact on the families' livelihoods particularly on the vulnerable groups (children, women, the poor),
- Gender issues related to energy management on the level of household,
- The perception of the local community towards the existing electricity service provider,
- The environmental and socioeconomic short and long term impacts predicted from the project,
- Ideas for maximizing the positive benefits especially on people's livelihoods and the economic development of the project,
- Consult with project-affected groups and local non-governmental organizations about potential resettlement issues, and take their views into account.

The RAP Methodology

Preparation of a RAP for the entire line including complete census, identification and valuation of affected assets in the 50-meter right of way (RoW) determined by the coordinates presented in the Detailed Line Route Report of 2013 and publication of the cut-off date. The RAP should be a full and detailed planning report in compliance with the latest applicable Egyptian regulations regarding resettlement and World Bank OP4.12 and the principles and objectives of the “EIB environmental and Social Practices handbook 2013 and the standards of IFC, particularly the book 5 on the preparation of a resettlement action plan RAP report.. The RAP should take all the relevant data from the ESIA and RPF.

All man-made structures such as roads, buildings, drainages, culverts, bridges located within the Right of Way (ROW) shall be 50 meters (divided into 25 meters each from the center of the transmission lines). Also all potential sensitive natural habitat, natural features will be captured such as rivers, creeks, canals, etc. as well as all terrain conditions and vegetation types. At surface crossings, such as roads, creeks and so on, the survey shall be conducted in such a manner as to determine the crossing width, elevation, direction and the name of the crossing. For above ground crossings such as power and high-tension lines, their elevation, type, direction of crossing shall be determined. Appropriate consideration will be given to vulnerable social groups, such as women, children, the elderly, poor and ethnic minorities, all of whom are susceptible to environmental and social impacts, and who may have little access to the decision-making process within society. Disclosure of information was conducted at an early stage and the outcomes of public consultations activities have been incorporated into the contents of this ESIA.

III. Legislative and Regulatory Framework

Egyptian Laws, Regulations and Policies

- Electricity Law 87/2015
- Environmental Law 4/1994
- Law 38/1967 on Public Cleanliness
- law 93/63 on Discharge of Liquid Waste
- Law 63/1974 on Electricity Installation
- Law 67/2006 Electricity Law for protecting the consumers

EIB Guidelines

- Environmental Statement, 1996
- Environmental Statement 2004
- Environmental and Social Handbook – 2013 EIB
- Environmental and social standards overview, EIB 07/2014
- Environmental and social practices Handbook, 2010
- IFC book 5, handbook for preparing a resettlement action plan
- EU Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora
- EU Directive 2009/147/EC on the conservation of wild birds

- EIA Directive 2011/92/EU of 13 December 2011, amended by Directives DIRECTIVE 2014/52/EU in 2014
- EIB Sourcebook on EU Environmental Law
- EIB Social Guidance Notes

IV. Project Objectives

The construction of New Gamasa GIS Substation 220/66/11 kV (2x125+2x40 MVA+ future transmitter) and its overhead transmission lines interconnection (220 kV and 66 kV networks) will improve power capacity at Delta Zone Area ,North region with minimum losses of transferred power. The project aims to fulfill the following five main objectives:

- Evacuate the generated power from New West Damietta Power plant;
- Feeding 80MW to TIBA steel plant near Gamasa city;
- Relieving the loading of the neighboring Substations in Delta zone such as (Mansoura, Gamalia, Damietta);
- Improve the voltage profile and system stability in Delta Zone area; and
- Reinforce the 200kV and 66 kV national electricity network.

Those objectives are in accordance to the EEHC and its affiliated companies' mission toward the society, to provide a continuous and safe supply of electricity to all type of consumers. In addition, as the EEHC and its affiliated companies' long term goals, all the implementation of their project is in accordance with international performance standards and taking into consideration all the environmental, social and economic determinants.

As part of the current project, the new substation in Gamasa will be connected to the national electricity network through 220 kV and 66/11 kV overhead transmission line, in addition to improving the 220 kV network through construction of new 220 kV network, modifying and extending current ones.

V. Project Overview

The proposed SS will be located in Gamasa city, Dakahlia governorate, on the international coastal road in Isis area. The site will be constructed in arid area with no vegetation covers; the proposed substation has an irregular rectangular shape with area of approximately 38.424057 m² (198.3 m x 195.66m x 197.05m x 193.11 m) as determined in the following coordinates:

Proposed New Gamasa GIS SS coordinates

Coordinates	
31°25'54.12"N	31°31'28.50"E
31°25'54.95"N	31°31'21.10"E
31°26'1.20"N	31°31'22.33"E
31°26'0.20"N	31°31'29.54"E

The map of the proposed New Gamasa GIS SS and conceptual line diagram is presented in Figure 0-1.

As part of the current project, the New Gamasa GIS 220 kV Substation will be connected to the national electricity network through the following:

1. Construction of 220 kV overhead transmission line network with the following scope:
 - 220 kV, construction of OHTL double circuit Gamasa \ West Damietta power plant with approximately 10.5 kilometer (IN/OUT)
 - 220 kV, construction of OHTL double circuit Gamasa \ TIBA Steel with approximately 3.5 kilometer (IN/OUT)
2. Construction of 66 kV overhead transmission line network with the following scope:
 - 66 kV, OHTL double circuit AAAC 405 mm² Gamasa SS (the old one)/ Balteem and extending its length by approximately 2x 0.15 kilometers(2x150 meters) (IN/OUT)

This is the only OHTL of 66kV associated to New Gamasa SS. It is exist and Its route is passing through state-owned land. The line consists of 2 towers which are constructed on allocated areas of the industrial zone, on which there is no economic activity. Consequently, No RAP study anticipated for this OHTL.



Figure 0-1. Map of proposed SS for New Gamasa GIS SS and its surroundings

The following table presents the boundaries of the proposed area for the SS site location:

North	200 m long facing to a vacant area and then new drinking water plant
South	200m long facing to the international coastal road
East	150 m long facing to an youth residential area
West	150m long facing to a road and then a dedicated vacant area for schools

Overhead transmission lines

220 kV OHTL New Gamasa SS \ West Damietta power

The OHTL from west Damietta power plant, originates from Damietta power plant crosses the international coastal road heading to the new Gamasa SS crosses over drainage. It is clear from the coordinates and the map of the route that OHTL will pass by several agriculture lands and the towers will be constructed on these lands. Construction of the towers may require cut off some crops or tall trees if exist on these lands. Accordingly, a resettlement action plan (RAP) is prepared with full detailed about the types of these crops and the acquired compensations.



Figure 0-2. The route of 220 kV OHTL from Damietta power plant to New Gamasa SS

220 kV OHTL New Gamasa SS \ Tiba Steel plan

The OHTL originates from new Gamasa SS on a state-owned land, then it crosses the international coastal road, then it will pass in cultivated lands heading TIBA Steel. The OHTL is of 3.5 km total distance where 12 electric towers are to be established. All of the OHTL passes in Dakahlia Governorate. Construction of the towers may require cut off some crops or tall trees if exist on these lands. Accordingly, a resettlement action plan (RAP) is prepared with full detailed about the types of these crops and the acquired compensations.



Figure 0-3. The route of 220 kV OHTL New Gamasa SS \ Tiba Steel plan

66 kV OHTL Gamasa SS (the old one)/ Balteem

The OHTL Gamasa 66 SS(the old one) / Balteem is the only OHTL of 66kV associated to New Gamasa SS and had been constructed before the arrangement to commence the proposed New Gamasa SS.

Its route is passing through state-owned land. The line consists of 2 towers which are constructed on allocated areas of the industrial zone, on which there is no economic activity. Consequently, No RAP study anticipated for this OHTL.

The first tower is located 50 meters far from the fence of New Gamasa SS then it crosses the international coastal road between Alexandria and Damietta to reach the second tower with total length of 150 meters(2x150 meters (IN/OUT)) to connect it to the existing dismantled and renovated OHTL Kafr el Bateekh/Gamasa 66kv (the old one)



Figure 0-4 The route of 66 kV OHTL Gamasa SS (the old one)/ Balteem

VI. Project Components

The main components of the project according to EETC technical specifications on 14/09/2014 are as following:

New Gamasa GIS Substation SS 220/66/11 kV (2x125+2x40 MVA), with the following scope:

- 10 cells of 220 kV GIS;
- 15 cells of 66 kV GIS ;
- 3 sections of 11 kV;
- 2 transmitters;
- 2 compressors units; and
- Future expansion with 3rd transmitter 220/66 kv, 125 MVA and 3rd transmitter 66/11 kv, 40MVA.

I. Description of Activities during Construction Phase of SS

- **Site preparation:** including but not limited to: site clearance (limiting ground disturbance to existing networks during site preparation), fences construction, preparing site camp, preparing access road (if needed) for moving construction material and machineries and temporary storage of construction materials, machineries, etc.
Besides the site preparation, the approvals or the permissions from the competent authorities and surrounding establishments shall be obtained.
- **Construction of concrete works:** (footing, foundations, SS framework, support structures and equipment) and other concrete construction for OHTL path, etc.
- **Construction of Supporting buildings:** including administration building and facilities, control room, etc.
- **Erection of the equipment:** including transformers, switches yards, electrical panel, etc.
- **Waste management:** including generated domestic and construction waste (hazardous and non-hazardous). This activity will include waste identification, temporary storage, handling and transportation to the designated landfill. Temporary storage of wastes includes on site sanitation before the proper connection to the existing sewage network is installed. The common practice in Egypt that the wastes are segregated and they can be sold to a contractor for reuse or recycling depends on the classification of the wastes.
The disposal method for the construction wastes should be included in the ToR for the Contractor for waste management during construction.

For the hazardous waste (e.g., lubricating oils, hydraulic fluids, coolants, solvents, and cleaning agents), it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities (EEAA). Besides all activities described above, the training for operation and maintenance, including the emergency plans is required to be conducted by the contractors who supply, erect and start up the transformers and their accessories. The capacity building activities shall be held during the warranty period.

II. Description of Activities during Construction Phase of OHTL

- **Identifying the right of way (ROW):** the Electricity Law 87/2015 has identified the limits of distances to be measured from the axis of the OHTL routes in order to identify the Right of Way (ROW) zone. A distance of 25 meters from both sides for OHTL (of 500 kV and 220 kV) will be kept as a Right of Way (ROW) or buffer zone for maintaining the public safety from electric hazards.
- **Tower erection:** The depth of drilling is about 4.5 m per base and the average area required to implement the base tower from 22 m X 22 m to 33 m X 33 m.
- **Installation of tower suspension accessories:** they are erected manually by hauling the accessory using chain pulley
- **Stringing of pulling line over each stringing block for the conductor:** the pilot wire is manually strung over valley which is **attached to power cable. The pilot wire is sometimes shot using winch or through drones.**
- **Tensioning and sagging of conductor:** tension and sag corrected using manual winch, chain pulleys, bull wheel type pullers and other associated equipment
- **Waste management:** for generated domestic and construction waste (hazardous and non-hazardous). This activity will include waste identification, temporary storage, handling and transporting to the designated landfill, etc. Temporary storage of wastes includes on site sanitation before the proper connection to the existing sewage network is installed. The common practice in Egypt that the wastes are segregated and they can be sold to a contractor for reuse or recycling depends on the classification of the wastes. The disposal method for the construction wastes should be included in the ToR for the Contractor for waste management during construction.

For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities (EEAA).

III. Description of Activities during Operation Phase of SS

- **General check:** for the fitting, oil quality, performance of the transformers, gas insulation quality and quantity etc.
- **Oil filtration:** Please note that during the operation and maintenance, it is expected to generate limited amounts of the rejected oil (from machines at the SS site), since oil is generally filtered using the oil filter machine available at the SS site.
- **Transformer replacement:** Due to the increased power demand at some areas, EETC may change the transformer. Please note that the current practice of the EETC is to replace the transformer. The old transformer is reused at other SS with less demand on electricity.
- **Replacement of cables and insulators:** the old and rejected insulators, OHTL cables, etc.

- **Waste management:** including the generated domestic waste and rejected waste (rejected cables and spare parts). The waste management will include waste identification, temporary storage, handling and transporting to the designated landfill. In general, the disposal method for the operation wastes should be included in the ToR for the Contractor for waste management during operation phase.

For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities (EEAA). Besides all activities mentioned above, to ensure the knowledge and the skill of the operator of the SS, the regular training, including regular simulation during the emergency shall be organized and provided by EETC to the operators of the SS.

IV. Description of Activities during Operation Phase of OHTLs

On the other hand, regular maintenance and monitoring activities along the transmission lines are minimum, it involves periodically inspecting the OHTLs to ensure that the safety clearances are maintained.

VII. Project Alternatives No Go Option

The main objective of the project is to meet the steady increase in energy demand and evacuate the power generated from the new West Damietta power plant. Environmental and social impacts from the project are assessed and no significant impacts are anticipated. Other objectives of the proposed project includes feeding 80MW to TIBA steel plant near Gamasa city, relieving the loading of the neighboring Substations in Delta zone such as (Mansoura, Gamalia, Damietta), improve the voltage profile and system stability in Delta Zone area, and reinforce the 220kV and 66kV national electricity network. Recently Egypt has suffered from an energy crisis across the country because of the energy capacity.

If the SS and the OHTLs were not built, the consequences would be as follows:

- Energy capacity will not increase,
- Secure the demand of the new establishment as well as to cope with the demand increased from the residential / housings will not be achieved,
- The power supply to the consumers will not be improved,
- The consumers' financial losses from low quality power supply will increase, and
- As a result, an increase in the economic activities in the region would not be possible.

The site of the proposed SS at Gamasa city is far by 25 meters from the youth residential area and which is the required safe distance of the ROW according to the Electricity Law 87/2015. Therefore, the “No Go Option” alternative is not an environmental/social requirement.

Technology Limitation

The substation is based on GIS technology with SF6 gas insulated is the most appropriate technology to be used based on economically acceptable standards for similar SSs. SF6 physical

properties indicates that it is non flammable and with lower thermal conductivity compared to air. Moreover, it requires limited space, occupies only 1/10 compared to the conventional SS (due to the aesthetic landscape as the SS will be indoor) and more reliable than conventional SS are the priorities to select the GIS system in this project. In addition, to reducing the risk of flammable materials, having long lifetime and less operation and maintenance compared to the conventional SS, the SF6 gas insulated system is selected for this substation at Gamasa.

However, if SF6 is released to the environment will increase the impact on ozone depletion and global warming. Therefore, the check of the insulated gas has to be done properly and periodically in accordance to the specification and operation manuals.

Location/Routes Alternatives

New Gamasa Substation

The selection of the SS location and the OHTL routes should be undertaken according to criteria that fulfills technical, environment as well as socioeconomic objectives in order to achieve the most feasible application. The SS location is in the best location for interconnection with neighboring SS in Delta Zone such as Mansour, Gamalia, and Damietta...etc. The selection of the SS location has considered length optimization thus reducing the cost as much as possible and easy GIS access during construction and maintenance.

220 kV OHTL New Gamasa SS \ West Damietta power

It is clear from the coordinates that the route is not crossing any of the protectorates and it crosses over drainage with minimal biodiversity that would have minor impact over any receptors given mitigation measures set forth in chapter 7 are followed.

However, it will pass by several agriculture lands and the towers will be constructed on these lands. Construction of the towers may require cut off some crops or tall trees if exist on these lands. Accordingly, a resettlement action plan (RAP) is prepared with full detailed about the types of these crops and the acquired compensations.

220 kV OHTL New Gamasa SS \ Tiba Steel plan

It is clear from the coordinates that the route is not crossing any of the protectorates. Construction of the towers may require cut off some crops or tall trees if exist on these lands. Accordingly, a resettlement action plan (RAP) is prepared with full detailed about the types of these crops and the acquired compensations.

66 kV OHTL Gamasa SS (the old one)/ Balteem

The OHTL Gamasa 66 SS(the old one) / Balteem had been constructed before the arrangement to commence the proposed New Gamasa SS. Its route is passing through state-owned land. The line consists of 2 towers which are constructed on allocated areas of the industrial zone, on which there is no economic activity. Consequently, No RAP study anticipated for this OHTL.. Due to the short length of the route, there are limited possibilities of alternatives routes.

Conclusion

Generally, there are few environmental constraints for construction of the Substation which requiring a set of mitigations described in ESMP (Chapter 8 of this ESIA). If necessary measures will be followed during the implementation (construction and operation phase) of the project, there will be no environmental/social objection with regard to site selection for SS.

VIII. Baseline Environmental and Social Conditions

The baseline shall provide separate description to SS and OHTL whenever the baseline condition varies considerably (e.g. geology) as for baseline conditions that exhibits common characteristics the description shall encompass the zone (e.g. weather). The substation is located in area planned for facilities and services in the strategic planning in Gamasa City, Dakahlia governorate with 220kV and 66kV interconnection OHTL.

The description of socio-economic baseline is on the concerned communities that are anticipated to be impacted from the project activities that are subject of the ESIA study. The mitigation and monitoring plans are developed with respect to the baseline condition covering the construction and operation of the SS and OHTL project. Environmental and social baseline conditions are assessed through a combination of a desk-based study, site visits, previous projects conducted in the area, and consultation with relevant authorities and stakeholders.

IX. Impact Assessment during Construction and Operation of SS and OHTL

Positive Impacts

Creation of Job Opportunities and Flourishing Economies of Construction Sites

The project can benefit from the opportunity of the construction activities to have a better relation with the surrounding community, facilitating later the acceptance of the project operation in the area. The project may participate in creating job opportunities for local people from the neighboring residential areas as construction workers and guards during the construction process. The job opportunities offered during the construction phase represent a temporary high positive impact, as it will add to the benefits of nearby resettlements from the project

Negative Impacts

The following tables present significance of expected impacts during construction, operation and maintenance phase of New Gamasa GIS Substation and 220 kV OHTLs. But as the 66kV is already constructed and existed, the impacts of this line will be presented during operation phase only. However, the environmental and social impacts during operation of this line is limited due to its short length.

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of New Gamasa GIS Substation			
Noise	High likelihood to occur – short term and temporary - Highly sensitive receptors includes construction workers and staff of wastewater pumping station. Receptors with low sensitivity include nearby projects/settlements (residential areas and a newborn hospital away from the proposed SS by 500 m)	Medium Impact	Application of the normal precautions normally taken by construction workers. For example, Personal precaution equipment (PPE) Notification to the surrounding establishment prior to the construction of the SS Time management and construction schedule according to the IFC regulation (Residential, Institutional, educational: 55 dB (A) daytime from 07:00 to 22:00; and 45 dB (A) nighttime from 22:00 to 07:00, Industrial, commercial: 70 55 dB (A) daytimes and 70 55 dB (A) nighttime) will be provided by the contractor prior to the construction phase
Traffic	High likelihood to occur – short term, temporary and localized only on the main road	Low to medium impact	Time management for transporting the materials, equipment, debris, etc Clear sign surrounding construction site and the enter / exit gate Coordination with traffic department (ministry of interior) for vehicles routes and movement.
Air Quality	High likelihood to occur – short term, temporary and localized - Highly sensitive receptors include construction workers. Receptors with low sensitivity include nearby projects/settlements.	Medium impact on construction workers Low impact on the residents, surrounding establishment and pedestrians passing by the construction site	Spraying the sandy soil with water (if needed, especially during the dry period). Maneuver area and the parking area should be well paved Management of the number of vehicles at the same time for specific location and the scheduling the intensity of vehicles
Vibration	Low likelihood to occur	Minor impact	Schedule and time plan for vehicles movements and construction activities

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of New Gamasa GIS Substation			
Hazardous materials and waste generation	Uncertain likelihood – Uncertain impact duration - Highly sensitive receptors include soil pollution and workers. Receptors with low sensitivity include nearby projects/settlements. Physical environment receptors with low sensitivity include groundwater, surface water and drinking water	Low to Medium impact	Agreement should be reached prior to commencing construction work between the contractor and a licensed waste collector for officially assigning a location for the disposal of construction waste. Waste management submitted by the contractor for waste management (upon the agreement with the licensed waste collector). •For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities, the Egyptian Environmental Affairs Agency (EEAA).” Protection from spillage includes paved site for workshop or maintenance of vehicles Temporary storage of wastes includes on site sanitation before the proper connection to the existing sewage network is installed. It is preferable to include the temporary onsite waste management in the ToR of the contractor.

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of New Gamasa GIS Substation			
Health and Safety	<p>High likelihood to occur for the construction workers</p> <p>Low likelihood to occur for the surrounding establishment and sensitive receptors.</p> <p>Highly sensitive receptors include workers. Receptors with low sensitivity include nearby residents and existing establishments</p>	<p>Minor impact for sensitive receptors and medium to high / major impact for the workers</p>	<p><u>Community Health and Safety</u></p> <p>Standard protection by placing clear project signs.</p> <p>Time management for vehicles movement; especially avoiding the peak hours</p> <p><u>Occupational Health and Safety</u></p> <p>Standard protection for the workers especially working at elevated heights as following:</p> <p>a) The Contractor shall be responsible to ensure that its personnel are protected from the risk of falling from any height by applying the following general guidelines.</p> <p>b) The Contractor shall provide training and maintain training records for safe working at height procedures and for the use of any equipment that enables working at height to its personnel assigned to work at height based on risk assessment and Applicable Laws.</p> <p>c) The Contractor shall ensure that all personnel assigned to work at height are physically and medically fit to do so.</p> <p>d) Collective fall protection – guard rails, scaffolds, mobile platform ladders, mobile elevating work platforms (MEWP) or cherry-pickers, safety nets, etc., has priority over individual fall protection.</p> <p>e) When collective fall protection measures are not possible to implement then individual protection, such as a safety harness and life-lines, etc., is compulsory.</p> <p>f) Safe access to all work stations at height must be assured.</p> <p>g) No person is obliged to place themselves at risk of falling; they retain the right to withdraw from any situation, without prejudice, where the risk of falling exists.</p>
visual Resources and landscaping	<p>Low likelihood to occur</p>	<p>Minor impact, localized and temporary</p>	<p>Following the standard protection for the ground and soil disturbance, air quality (and dust) measures and proper waste management described on the section of waste management measures</p> <p>Clear sign of the construction activities</p>

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of New Gamasa GIS Substation			
water resource (ground water, surface water and drinking water)	Low likelihood to occur	Minor impact on groundwater, surface water and drinking water	Following standard protection for the ground and soil and proper waste management described on the section of waste management measures
Ecological Resources (Fauna and Flora and bird migration)	Low likelihood to occur- The plant species on site, most were common and abundant in the area, none is protected, rare or of particular biodiversity value	Negligible impact (no impact)	No mitigation measures are needed.
landscape	Low likelihood to occur	Negligible or no impacts	No mitigation measures is prepared
land use and Involuntary resettlement	Low likelihood to occur	Very low or no impacts	No mitigation measures is prepared
archeological and cultural sites	Low likelihood to occur	Very low or no impacts	No mitigation measures is prepared

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of 220 kV West Damietta Power OHTL			
Noise	High likelihood to occur – short term and temporary -	Medium Impact	General measures should be applied by the construction workers to reduce the impact of construction to surrounding establishments nearby the construction. (See chapter 8) Notification to the surrounding establishment prior to the construction of the SS Time management and construction schedule according to the IFC regulation (Residential, Institutional, educational: 55 dB (A) daytime from 07:00 to 22:00; and 45 dB (A) nighttime from 22:00 to 07:00, Industrial, commercial: 70 55 dB (A) daytimes and 70 55 dB (A) nighttime) will be provided by the contractor prior to the construction phase
Traffic	High likelihood to occur – short term, temporary and localized only on the main road	Low to medium impact	Time management for transporting the materials, equipment, debris, etc Clear sign surrounding construction site and the enter / exit gate Coordination with traffic department (ministry of interior) for vehicles routes and movement.
Air Quality	High likelihood to occur – short term, temporary and localized - Highly sensitive receptors include construction workers. Receptors with low sensitivity include nearby projects/settlements.	Medium impact on construction workers Low impact on the residents, surrounding establishment and pedestrians passing by the construction site	Spraying the sandy soil with water (if needed, especially during the dry period). Maneuver area and the parking area should be well paved Management of the number of vehicles at the same time for specific location and the scheduling the intensity of vehicles
Hazardous Materials and Waste Management	Likely to occur - short term – Highly sensitive receptors include soil at protectorate areas and workers. Receptors with medium sensitivity include nearby settlements. Receptors with low sensitivity include groundwater.	Medium	Agreement should be reached prior to commencing construction work between the contractor and landfill for officially assigning a location for the disposal of construction waste. Waste management submitted by the contractor for waste management upon the agreement with the licensed waste collector. For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of 220 kV West Damietta Power OHTL			
			<p>under the control of the Environmental authorities, the Egyptian Environmental Affairs Agency (EEAA).”</p> <p>Protection from spillage includes paved site for workshop or maintenance of vehicles</p> <p>Temporary storage of wastes includes on site sanitation before the proper connection to the existing sewage network is installed. It is preferable to include the temporary onsite waste management in the ToR of the contractor.</p>
Health and Safety	Low likelihood of major or medium impacts for workers– high likelihood of minor impact for sensitive recipient	Minor	<p>Standard protection by placing clear project signs.</p> <p>Time management for vehicles movement; especially avoiding the peak hours</p> <p>Standard protection for the workers especially working at elevated heights</p>
Removing trees on ROW	Low likelihood of major or medium impacts	Medium to Major	<ul style="list-style-type: none"> • Reduce impact significance to minor following RAP • Avoiding of trees is essential • Plantation of trees near removed trees • Agriculture association should orient the farmers about the best strategy to move their trees
Land use	Medium and direct impact to livelihood	Medium	Reduce impact significance to minor following recommendations of RAP preparation
Visual intrusion	Low likelihood of major or medium impacts and localized	Minor	<p>Following the standard protection for the ground and soil disturbance, air quality (and dust) measures and proper waste management described on the section of waste management measures</p> <p>Clear sign of the construction activities</p>
Ecological resources(Fauna and Flora)	Medium likelihood to occur – short term	Minor	<p>Following the standard protection for the fauna and flora and proper waste management described on the section of waste management measures.</p> <p>The preferred route was selected on parameters like:</p> <ul style="list-style-type: none"> • Study Area Identification: Identifying major features in the study area like main roadways, residential and commercial areas to help identify constraints during the selection of the routes

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of 220 kV West Damietta Power OHTL			
			<ul style="list-style-type: none"> Mapping the resources: Existing linear corridors include major streets, waterways, railroads, and utility lines. Existing linear corridors are considered opportunity areas for routing because they have already been developed and therefore are generally considered a compatible land use. In addition, these linear corridors generally provide existing access for construction and maintenance requirements.
Water Resources	Medium likelihood to occur – short term	Minor	Standard prevention or precaution measures shall be prepared by the contractor prior to the construction. It is preferable to include the waste management plan in the ToR of the contractor.
Cultural resources	Low likelihood of major or medium impacts	Insignificant	No mitigation measures is needed
Noise	High likelihood to occur – short term and temporary -	Medium Impact	<p>General measures should be applied by the construction workers to reduce the impact of construction to surrounding establishments nearby the construction. (See chapter 8)</p> <p>Notification to the surrounding establishment prior to the construction of the SS</p> <p>Time management and construction schedule according to the IFC regulation (Residential, Institutional, educational: 55 dB (A) daytime from 07:00 to 22:00; and 45 dB (A) nighttime from 22:00 to 07:00, Industrial, commercial: 70 55 dB (A) daytimes and 70 55 dB (A) nighttime) will be provided by the contractor prior to the construction phase</p>

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of 220kV Tiba Steel Plant OHTL			
Noise	High likelihood to occur – short term and temporary -	Medium Impact	<p>General measures should be applied by the construction workers to reduce the impact of construction to surrounding establishments nearby the construction. (See chapter 8)</p> <p>Notification to the surrounding establishment prior to the construction of the SS</p> <p>(Residential, Institutional, educational: 55 dB (A) daytime from 07:00 to 22:00; and 45 dB (A) nighttime from 22:00 to 07:00, Industrial, commercial: 70 55 dB (A) daytimes and 70 55 dB (A) nighttime)</p>

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of 220kV Tiba Steel Plant OHTL			
			nighttime) will be provided by the contractor prior to the construction phase
Traffic	High likelihood to occur – short term, temporary and localized only on the main road	Low to medium impact	Time management for transporting the materials, equipment, debris, etc Clear sign surrounding construction site and the enter / exit gate Coordination with traffic department (ministry of interior) for vehicles routes and movement.
Air Quality	High likelihood to occur – short term, temporary and localized - Highly sensitive receptors include construction workers. Receptors with low sensitivity include nearby projects/settlements.	Medium impact on construction workers Low impact on the residents, surrounding establishment and pedestrians passing by the construction site	Spraying the sandy soil with water (if needed, especially during the dry period). Maneuver area and the parking area should be well paved Management of the number of vehicles at the same time for specific location and the scheduling the intensity of vehicles
Hazardous Materials and Waste Management	Likely to occur - short term – Highly sensitive receptors include soil at protectorate areas and workers. Receptors with medium sensitivity include nearby settlements. Receptors with low sensitivity include groundwater.	Medium	Agreement should be reached prior to commencing construction work between the contractor and landfill for officially assigning a location for the disposal of construction waste. Waste management submitted by the contractor for waste management upon the agreement with the licensed waste collector. For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities the Egyptian Environmental Affairs Agency, (EEAA).” Protection from spillage includes paved site for workshop or maintenance of vehicles Temporary storage of wastes includes on site sanitation before

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of 220kV Tiba Steel Plant OHTL			
			the proper connection to the existing sewage network is installed. It is preferable to include the temporary onsite waste management in the ToR of the contractor.
Health and Safety	Low likelihood of major or medium impacts for workers– high likelihood of minor impact for sensitive recipient	Minor	Standard protection by placing clear project signs. Time management for vehicles movement; especially avoiding the peak hours Standard protection for the workers especially working at elevated heights
Removing trees on ROW	Low likelihood of major or medium impacts	Medium to Major	<ul style="list-style-type: none"> Reduce impact significance to minor following RAP Avoiding of trees is essential Plantation of trees near removed trees Agriculture association should orient the farmers about the best strategy to move their trees
Land use	Medium and direct impact to livelihood	Medium	Reduce impact significance to minor following recommendations of RAP preparation
Visual intrusion	Low likelihood of major or medium impacts and localized	Minor	Following the standard protection for the ground and soil disturbance, air quality (and dust) measures and proper waste management described on the section of waste management measures Clear sign of the construction activities
Ecological resources(Fauna and Flora)	Medium likelihood to occur – short term	Minor	Following the standard protection for the fauna and flora and proper waste management described on the section of waste management measures. The preferred route was selected on parameters like: <ul style="list-style-type: none"> Study Area Identification: Identifying major features in the study area like main roadways, residential and commercial areas to help identify constraints during the selection of the routes Mapping the resources: Existing linear corridors include major streets, waterways, railroads, and utility lines. Existing linear corridors are considered opportunity areas for routing

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of 220kV Tiba Steel Plant OHTL			
			because they have already been developed and therefore are generally considered a compatible land use. In addition, these linear corridors generally provide existing access for construction and maintenance requirements.
Water Resources	Medium likelihood to occur – short term	Minor	Standard prevention or precaution measures shall be prepared by the contractor prior to the construction. It is preferable to include the waste management plan in the ToR of the contractor.
Cultural resources	Low likelihood of major or medium impacts	Insignificant	No mitigation measures is needed
Noise	High likelihood to occur – short term and temporary -	Medium Impact	<p>General measures should be applied by the construction workers to reduce the impact of construction to surrounding establishments nearby the construction. (See chapter 8).</p> <p>Notification to the surrounding establishment prior to the construction of the SS</p> <p>Time management and construction schedule according to the IFC regulation (Residential, Institutional, educational: 55 dB (A) daytime from 07:00 to 22:00; and 45 dB (A) nighttime from 22:00 to 07:00, Industrial, commercial: 70 55 dB (A) daytimes and 70 55 dB (A) nighttime) will be provided by the contractor prior to the construction phase</p>

The following tables present significance of expected impacts during operation phase of New Gamasa GIS Substation

Impact	Likelihood and severity	Significance	Mitigation Measures
During operation and maintenance of New Gamasa GIS Substation			
Noise	Low likelihood to occur.	Low impact on settlement and nearby establishment :Low impact on permanent workers Insignificant impact	Application of the Egyptian and Safety regulations and standards for energy sector, the best practices on workplace are applicable such as planting trees. Besides reducing the visual impact, the green environment will be achieved as well. Standard protection for the workers provided at the substation.
Traffic	Low likelihood to occur	Low impact	No mitigation identified
Air quality	Low likelihood to occur	Low impact	No mitigation identified
Vibration	Minor or very low likelihood to occur	Very minor	No mitigation identified
Hazardous and non-hazardous, solid and liquid wastes	Uncertain likelihood – Uncertain impact duration - Highly sensitive receptors include soil pollution and workers. Receptors with low sensitivity include nearby projects/settlements. Physical environment receptors with low sensitivity include groundwater, surface water and drinking water	Medium impact on industrial wastes generated (hazardous and non-hazardous) Low impact on domestic wastes (solid and liquid wastes)	Agreement should be reached prior to commencing construction work between the contractor and landfill for officially assigning a location for the disposal of construction waste. Waste management submitted by the contractor for waste management upon the agreement with the licensed waste collector. For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities, the Egyptian Environmental Affairs Agency (EEAA).”
Soil contamination	High likelihood to occur, only during the incident of oil spillage from the transformers and possible vehicles.	Low to medium impact	Standard design of precaution for the site of transformers Paved within surrounding site of substation especially at the area for parking and movement of vehicles

Impact	Likelihood and severity	Significance	Mitigation Measures
During operation and maintenance of New Gamasa GIS Substation			
Health and Safety	High likelihood to occur for the permanent workers Low likelihood to occur for the surrounding establishment and sensitive receptors. High risk likelihood impact during the emergency and accident	Minor impact for sensitive receptors (public and residents as well as existing establishment) and medium impact for the workers High risk likelihood impact during the emergency and accident	Standard protection by placing clear project signs. Time management for vehicles movement; especially avoiding the peak hours Standard protection for the workers especially working at elevated heights. Please refer to Annex 1 for the health and safety guide
Natural disaster risks	Low likelihood to occur	Negligible impact	No mitigation identified Technical specifications of the equipment is include the standard measures for natural disaster risks
Visual Resources	Low likelihood to occur	Very low impact or negligible impact	No mitigation measure is prepared
Ecological Resources	Low likelihood to occur	No significant impact	No mitigation identified

The following tables present significance of expected impacts during operation phase of OHTLs

Impact	Likelihood and severity	Significance	Mitigation Measures
During operation and maintenance of 220 kV West Dameitta Power OHTL			
Risk of Waste generated	Likely to occur - short term – Highly sensitive receptors include soil and workers. Receptors with medium sensitivity include nearby projects/settlements. Receptors with low sensitivity include groundwater.	Medium	Waste management implemented according to the Egyptian Environmental Affairs Agency (EEAA) regulations, especially for industrial hazardous wastes (solid and liquid wastes) Regular monitoring for domestic sewage network and provision of waste bins for temporary storage before collected by municipality. Disposal means of the hazardous wastes will be according to the Egyptian laws and regulations regarding the disposal.
Exposure to EMFs	Likely to occur - long term impact	Medium	Keeping track of EMF values in substations and at the edge of OHTL ROW. Applying the ICNIRP guideline figure that public exposure to EMF should not exceed 830 mG and occupation exposure should not exceed 4,150 mG, these figures for electric fields are 4.2 and 8.3 kV/m for public and occupational exposure respectively.
Risk of soil contamination	Low likelihood of occurrence - short term impact	Minor	Following standard protection for the soil and proper waste management described on the section of waste management measures
Impacts on ambient noise level	Low likelihood of occurrence - short term impact	Minor	Noise levels under OHTL towers should be measured once annually for each selected towers. In case of recording irregular high noise levels under OHTLs, maintenance department should be informed to take necessary maintenance/repair measures.
Cultural resources	Low likelihood of major or medium impacts	insignificant	Standard mitigation measures of recording and reporting

Impact	Likelihood and severity	Significance	Mitigation Measures
Health and Safety	Low likelihood of minor impact for the sensitive recipient and medium to major for the workers	Medium to Major	Standard protection for the workers especially working at elevated heights
Natural disaster risks	Low likelihood to occur	Negligible impact	No mitigation identified Technical specifications of the equipment include the standard measures for natural disaster risks
Visual Resources	Low likelihood to occur	Very low impact or negligible impact	No mitigation measure is prepared
Ecological Resources	Low likelihood to occur	No significant impact	No mitigation identified
Creation of Job opportunities	Increasing the opportunity for opening small business and shops as a result of having a stable electricity service	Moderate positive impact	No mitigation measures is prepared Awareness campaigns for community members to rationalize consumption of electricity service

Impact	Likelihood and severity	Significance	Mitigation Measures
During operation and maintenance of 220kV Tiba Steel Plant OHTL			
Risk of Waste generated	Likely to occur - short term – Highly sensitive receptors include soil and workers. Receptors with medium sensitivity include nearby projects/settlements. Receptors with low sensitivity include groundwater.	Medium	Waste management implemented according to the Egyptian Environmental Affairs Agency (EEAA) regulations, especially for industrial hazardous wastes (solid and liquid wastes) Regular monitoring for domestic sewage network and provision of waste bins for temporary storage before collected by municipality. Disposal means of the hazardous wastes will be according to the Egyptian laws and regulations regarding the disposal.
Exposure to EMF's	Likely to occur - long term impact	Medium	Keeping track of EMF values in substations and at the edge of OHTL ROW. Applying the ICNIRP guideline figure that public exposure to EMF should not exceed 830 mG and occupation exposure should not exceed 4,150 mG, these figures for electric fields are 4.2 and 8.3

Impact	Likelihood and severity	Significance	Mitigation Measures
			kV/m for public and occupational exposure respectively.
Risk of soil contamination	Low likelihood of occurrence - short term impact	Minor	Following standard protection for the soil and proper waste management described on the section of waste management measures
Impacts on ambient noise level	Low likelihood of occurrence - short term impact	Minor	Noise levels under OHTL towers should be measured once annually for each selected towers. In case of recording irregular high noise levels under OHTLs, maintenance department should be informed to take necessary maintenance/repair measures.
Cultural resources	Low likelihood of major or medium impacts	insignificant	Standard mitigation measures of recording and reporting
Health and Safety	Low likelihood of minor impact for the sensitive recipient and medium to major for the workers	Medium to Major	Standard protection for the workers especially working at elevated heights
Natural disaster risks	Low likelihood to occur	Negligible impact	No mitigation identified Technical specifications of the equipment is include the standard measures for natural disaster risks
Visual Resources	Low likelihood to occur	Very low impact or negligible impact	No mitigation measure is prepared
Ecological Resources	Low likelihood to occur	No significant impact	No mitigation identified

Impact	Likelihood and severity	Significance	Mitigation Measures
During operation and maintenance of 66 kV OHTL Gamasa SS (the old one)/ Balteem			
Risk of Waste generated	Likely to occur - short term – Medium sensitive receptors include workers. No significant receptors around the line. The line is too short and it is started near the fence of the SS (desert area) and crosses the international road which is empty	Low	Waste management implemented during maintenance of the OHTL according to the Egyptian Environmental Affairs Agency (EEAA) regulations, especially for industrial hazardous wastes (solid and liquid wastes)
Exposure to EMFs	Likely to occur - long term impact	Medium	Keeping track of EMF values in substations and at

Impact	Likelihood and severity	Significance	Mitigation Measures
			the edge of OHTL ROW. Applying the ICNIRP guideline figure that public exposure to EMF should not exceed 830 mG and occupation exposure should not exceed 4,150 mG, these figures for electric fields are 4.2 and 8.3 kV/m for public and occupational exposure respectively.
Risk of soil contamination	Low likelihood of occurrence - short term impact	Minor	Following standard protection for the soil and proper waste management described on the section of waste management measures
Impacts on ambient noise level	Low likelihood of occurrence - short term impact	Minor	Noise levels under OHTL towers should be measured once annually for each selected towers. In case of recording irregular high noise levels under OHTLs, maintenance department should be informed to take necessary maintenance/repair measures.
Health and Safety	Low likelihood of medium to major for the workers	Medium to Major	Standard protection for the workers especially working at elevated heights
Natural disaster risks	Low likelihood to occur	Negligible impact	No mitigation identified Technical specifications of the equipment is include the standard measures for natural disaster risks
Visual Resources	Low likelihood to occur	Very low impact or negligible impact	No mitigation measure is prepared

English Non-Technical Executive Summary

In order to meet the forecasted demand on electricity, secure electrical stability and to meet the commitment of supplying electricity to slum areas and informal buildings (based on the approval of the Cabinet (2005) and the Council of Governors approval (2005)), the EETC together with the distribution companies need to provide additional substations(SSs) and their interconnections lines/cables. The European Investment Bank (EIB) is funding the construction of several substations and interconnecting lines in cooperation with the EETC.

In line with EIB environmental and social standards, EETC is committed to carrying out an Environmental and Social Impact Assessment (ESIA) for construction of New Gamasa substation and its interconnecting Over Head Transmission Lines (OHTLs) and a Resettlement Action Plan (RAP) which should trigger the Egyptian legislations and/or EIB Environmental and Social Standards instruments relevant to resettlement. The RAP will be prepared when all needed information related to the transmission lines is ready. The ESIA and the RAP represent components of a consolidated document. This document will be subject to review and acceptance as whole.”

EcoConServ environmental services has been contracted to carry out the ESIA study and RAP in accordance with national legislations as well as EIB standards.

V. ESIA & RAP Objectives

The studies aims at examining all aspects and activities of the project in terms of influencing the environmental elements and affected people. Moreover, providing the best alternatives for preserving the environment and avoiding possible negative impacts during the establishment and operation of the project.

The studies also aims to comply with the legal requirements, regulations and general guidelines that define the methods of sustainable development.

VI. ESIA & RAP Methodology

Many methods have been used to identify and assess environmental and social impacts. These include conducting field surveys of the terrestrial and geological environment and interviews with relevant authorities. Environmental and social references covering the study area were reviewed. In addition, a team of environmental and social experts, as well as an environmental impact assessment expert, an environmental law expert had been involved to assess the environmental and social impacts. Preparation of a RAP for the entire line including complete census, identification and valuation of affected assets in the 50-meter right of way (RoW) (divided into 25 meters each from the center of the transmission lines) determined by the coordinates presented in the Detailed Line Route 2017 (See Annex 2) and publication of the cut-off date.

This executive report will include a non-technical summary of the full study to describe project components, activities and expected impacts on the environment and community includes ways of mitigate or minimize these impacts.

VII. Legislative and Regulatory Frameworks

Egyptian Laws, Regulations and Policies

- Electricity Law 87/2015
- Environmental Law 4/1994
- Law 38/1967 on Public Cleanliness
- law 93/63 on Discharge of Liquid Waste
- Law 63/1974 on Electricity Installation
- Law 67/2006 Electricity Law for protecting the consumers

EIB Guidelines

The EIB environmental and social handbook also refers to the following directives as references to consider during the preparation of an ESIA:

- The EU EIA Directive 2011/92/EU ammended by Directive 2014/52/EU
- The Habitats Directive and 92/43/EEC
- The Birds Directive 2009/147/EC
- The EU Water Framework Directive (2000/60/EC)
- The SEA Directive 2001/42/EC
- The SEA Protocol under the UN ECE Espoo Convention

VIII. Project Overview

As part of the current project, the New Gamasa GIS 220 kV Substation will be connected to the national electricity network through the following:

3. Construction of 220 kV overhead transmission line network with the following scope:
 - 220 kV, construction of OHTL double circuit Gamasa \ West Damietta power plant with approximately 10.5 kilometer (IN/OUT)
 - 220 kV, construction of OHTL double circuit Gamasa \ TIBA Steel with approximately 3.5 kilometer (IN/OUT)
4. Construction of 66 kV overhead transmission line network with the following scope:
 - 66 kV, OHTL double circuit AAAC 405 mm² Gamasa SS/ Balteem and extending its length by approximately 2x 0.15 kilometers(2x150 meters) (IN/OUT)

IX. Project's Site location

The proposed SS will be located in Gamasa city, Dahaklia governorate, on the international coastal road in Isis area. The site will be constructed in arid area with no vegetation covers; the proposed substation has an irregular rectangular shape with area of approximately 38.424057 m² (198.3 m x 195.66m x 197.05m x 193.11 m) as determined in the following coordinates:

Proposed New Gamasa GIS SS coordinates

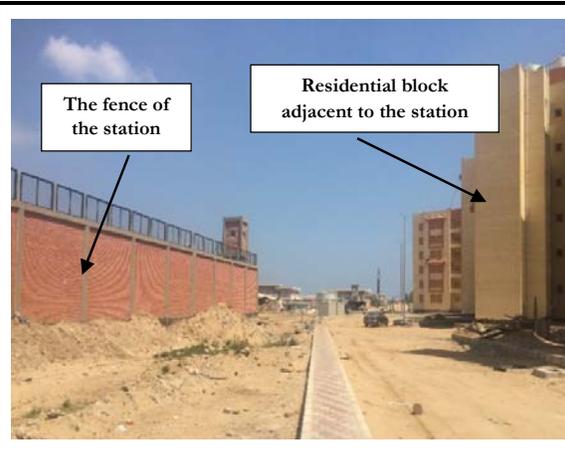
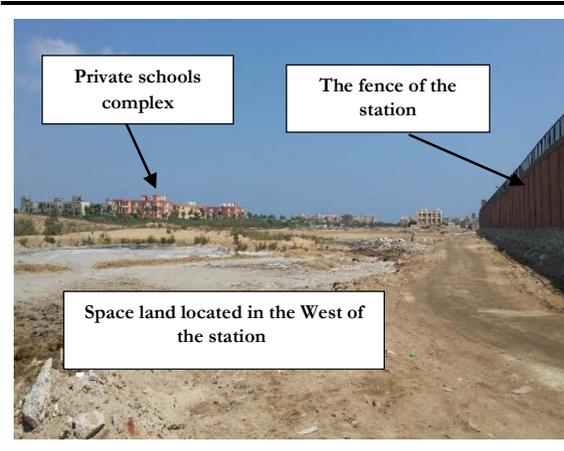
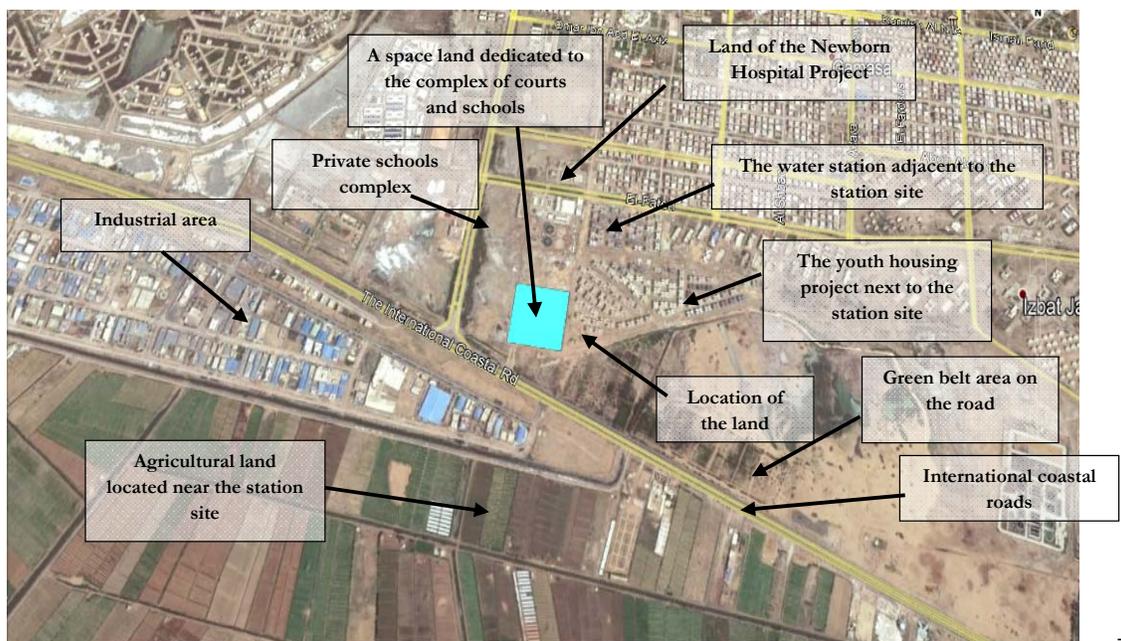
UTM Coordinates	
31°25'54.12"N	31°31'28.50"E
31°25'54.95"N	31°31'21.10"E
31°26'1.20"N	31°31'22.33"E
31°26'0.20"N	31°31'29.54"E

The proposed location for SS for New Gamasa GIS SS and its surroundings



The Site visits to the project area showed that the land surrounding the substation site varied between space lands devoid of structures, residential blocks and farm lands. The boundaries and geographical surroundings of the substation according to the site visit will be described below:

- The project land is located in the area allocated for facilities and services in the strategic planning of Gamasa City. The area is devoid of facilities excluding the water station which is adjacent to the project site from the north and about 125 meters away from it.
- There are Industrial area, and agricultural area adjacent to the project site from South. The agricultural area is cultivated of corn crops, wheat and some types of vegetables. The nearest agricultural land to the project area is about 500 meters away from it.
- The Field visits showed that the area located in the West of the project is devoid of facilities. The strategic planning for this area is school complex affiliated to the Educational Buildings Authority and the Courts Complex,
- The nearest residential block to the project site is located in the East and it is about 35 meters away from the project site, the area represents Social Housing Project for Youth.





The Nearest Structures to the Substation Location

Overhead transmission lines

220 kV OHTL New Gamasa SS \ West Damietta power

The OHTL from west Damietta power plant, originates from Damietta power plant crosses the international coastal road heading to the new Gamasa SS crosses over drainage. It is clear from the coordinates and the map of the route that OHTL will pass by several agriculture lands and the towers will be constructed on these lands. Construction of the towers may require cut off some crops or tall trees if exist on these lands. Accordingly, a resettlement action plan (RAP) is prepared with full detailed about the types of these crops and the acquired compensations.



The route of 220 kV OHTL from Damietta power plant to New Gamasa SS

220 kV OHTL New Gamasa SS \ Tiba Steel plan

The OHTL originates from new Gamasa SS on a state-owned land, then it crosses the international coastal road, then it will pass in cultivated lands heading TIBA Steel. The OHTL is of 3.5 km total distance where 12 electric towers are to be established. All of the OHTL passes in Dakahlia Governorate. Construction of the towers may require cut off some crops or tall trees if exist on these lands. Accordingly, a resettlement action plan (RAP) is prepared with full detailed about the types of these crops and the acquired compensations.



The route of 220 kV OHTL New Gamasa SS \ Tiba Steel plan

66 kV OHTL Gamasa SS (the old one)/ Balteem

The OHTL Gamasa 66 SS(the old one) / Balteem is the only OHTL of 66kV associated to New Gamasa SS and had been constructed before the arrangement to commence the proposed New Gamasa SS.

Its route is passing through state-owned land. The line consists of 2 towers which are constructed on allocated areas of the industrial zone, on which there is no economic activity. Consequently, No RAP study anticipated for this OHTL.

The first tower is located 50 meters far from the fence of New Gamasa SS then it crosses the international coastal road between Alexandria and Damietta to reach the second tower with total length of 150 meters(2x150 meters (IN/OUT)) to connect it to the existing dismantled and renovated OHTL Kafr el Bateekh/Gamasa 66kv (the old one)



Figure 0-4 The route of 66 kV OHTL Gamasa SS (the old one)/ Balteem

X. Environmental Baseline Conditions

Climate

The climate of Dakahleya is "semi-arid"; annual rainfall averages less than 100mm and decreases

Southwards. Winters are mild with rain, followed by hot dry summers. Meteorological data, based on Mansoura Station records for the past 50 years, are as follows:

Parameter	Annual Mean
Air Temperature	21.3° C
Relative Humidity	62.0 %
Evapo-transpiration	100.0 mm
Rainfall	60.0 mm

Dakahleya is part of a climatic province which can be sub-divided into a coastal belt under the maritime influence of the Mediterranean, with a shorter dry summer, and the inland area with a longer dry period. Reflecting this, the Governorate can be classified into two main sub-regions - the Deltaic Mediterranean coast and the Nile System.

Wind speed

The average of wind speed in the governorate in general about 7.5 note/hours; the wind speed vary seasonally; the highest during winter is about 11 km/hour and during summer it is about 7.5 km/hours. The following table presents the wind speed the proposed area of the SS.

Table 0-1 wind speed at Dakahleya Governorate

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov	Dec.
Km/h	7.8-11.1	8.1-11.1	9.3-10.6	9.3-10	8.7-9.3	7.8-9.3	7.2-8.9	7-9.3	6.1-10.3	6.5-10.6	6-11.1	8.1-11.1

Source : <http://www.weatherbase.com/>

Air

It is reported (No weir, K & Youssef, A-F. 1995) that "the quality of air in Dakahleya is not satisfactory, although about 20 years ago this Governorate was known as a pleasant district in which to live". The seriousness of air pollution in the Governorate as a whole is evidenced by the following average statistics for the period 1989-94: Total Suspended Particles (TSP) (micrograms per cubic meter) have risen from 2.5 times the WHO standard to almost 3.5 times; in relation to 2 smoke the corresponding figures are 2.3 and 2.0 times, i.e. a slight reduction. In the case of sulphur dioxide, there has also been some reduction (from 2.4 times to 1.6 times), but still the WHO standard continues to be exceeded. In short, particulates generally represent the main ambient air pollutant in the Governorate. These are emitted as a

result of a whole array of activities: fuel combustion, industrial processes (especially those used in brick kilns, foundries and workshops), construction works and the fly-tipping and burning of solid wastes in open areas. However, in some cities, such as Mit Ghamr, sulphur dioxide is the main pollutant.

The causes for this deterioration in air quality are many: "the rapid growth of industrialization, greater dependence on fossil fuels, high rates of construction, poor pollution control and other human activities".

Air quality monitoring has been carried out as part of the Environmental air and noise quality measurements of new Gamasa Substation – Gamasa city at Al-Dakahlia Governorate.

Air quality monitoring has been undertaken for the pollutants of primary concerns (NO₂, SO₂, CO, T.S.P and PM₁₀); in order to better characterize the ambient air quality, as part of the environmental measurements required. Where, a one-hour average measurements were conducted for carbon monoxide (CO), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), total Suspended Particulates (T.S.P) and particulate matter (PM₁₀), for two specific locations, where the air quality complies with the national guidelines for all the analysed parameters. The site-specific air quality measurements had conducted using Standard ambient air quality monitoring instruments under the supervision of experienced specialists.

Results of air sampling

The air qualities at the current site of the project site in the location are exhibiting acceptable levels of classic air pollutants in fact the levels are way below the national guidelines. Generation and dispersion of dust from increased vehicle traffic, especially during the daily activities, may reduce visibility, relative to baseline levels, and, together with combustion engine emissions, may affect ambient air quality. Concentration of dust particles, both total suspended particulate and respirable particulate matter and other pollutants from open burning, emissions from equipment and machinery used in transportation, the nearby plant operations and emissions from vehicles used to transport passengers also contribute to air pollution. These impacts may affect the human environment and, typically, arise during the ordinary daily activities and, to a much lesser extent, during the operation phase, requiring monitoring and assessment of the natural and man-made air pollutants.

Analysis of air quality Results

In general, there are two main factors affecting the ambient air concentration of a certain pollutant emitted from a certain source or sources in a selected area:

- The intensity of the emissions (e.g. concentration and flow rate) from the source or sources.
- The uncontrollable atmospheric dispersion conditions, which include but not limited to (wind speed, wind direction, temperature, humidity, rainfall, atmospheric turbulence, solar radiation intensity and atmospheric pressure).

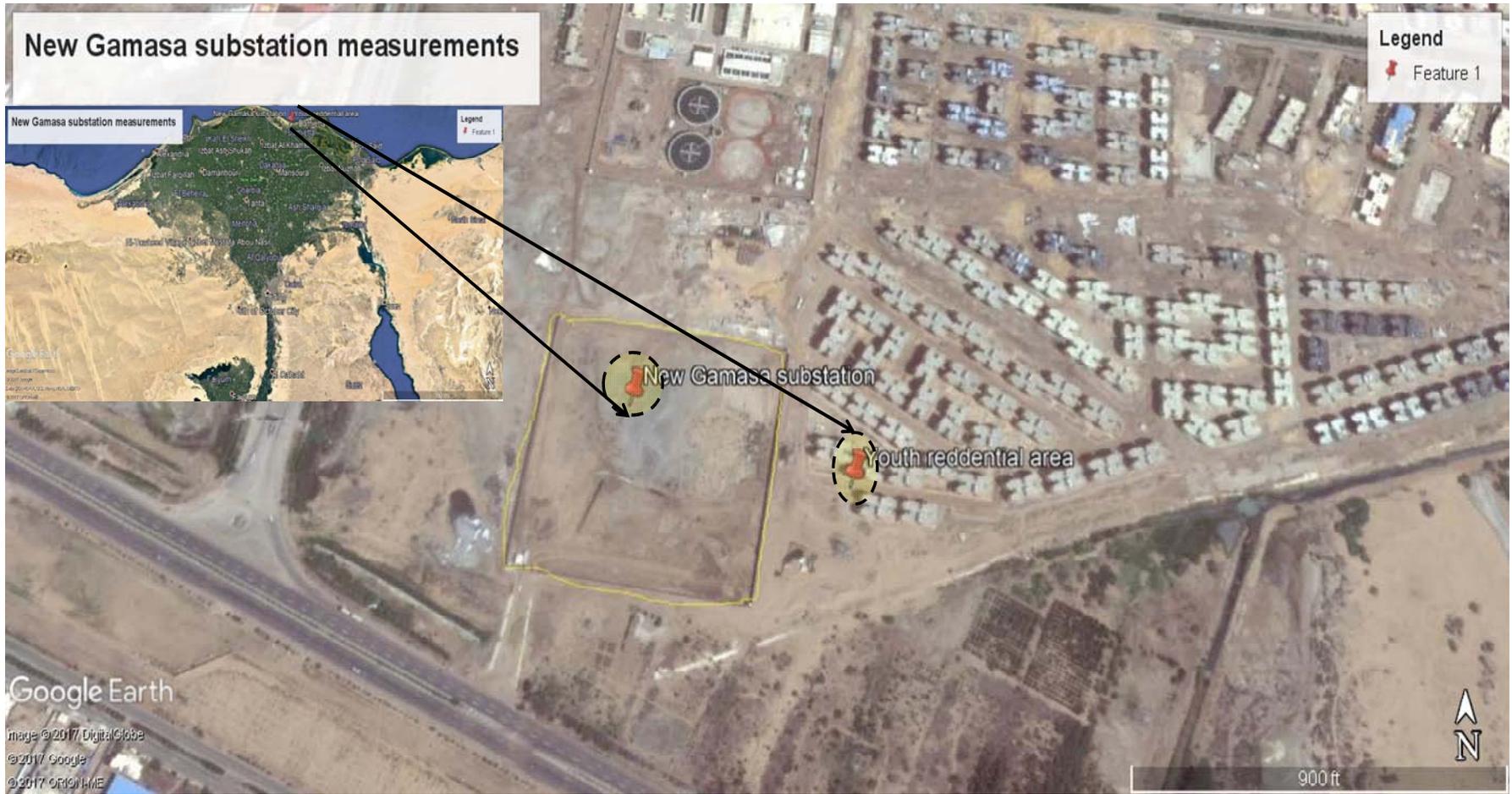
All the recorded results compared by the national and international limits and the stringent limits were followed except for SO_x, the national limits is higher than the international limit. The comparison showed compliance with the national and international guidelines for ambient air quality moreover, most of the data recorded were way below the guidelines, which indicates

that the ambient air quality in this area are matching with guidelines of emissions released from proposed sources.

Noise

Noise measurements had been carried out in the same location where air measurements took place.

The results of ambient noise measurements were compared to the national permissible limits and shown that the limits of noise are in general within the international limits but higher than the national limits therefore good mitigation measures should be taken. However, the noise generated during construction of the SS will be for a short and temporary period. The locations where the noise and air samples were collected are presented in the below figure.



New Gamasa Substation measurements

Water

Surface Water

The surface water resources of the Governorate comprise the River Nile (Dumyat Branch), the main irrigation canals, the irrigation-drainage network and open ditches. In total, under the 1959 Treaty, the Nile contributes approximately 55.5 billion m³/year. Groundwater resources (sand dune water, subsoil water and groundwater) by comparison amount to only 4.5% of that figure, of which about 50% is infiltration water from the Nile.

Ground Water

The groundwater source is a confined aquifer, which has an average thickness of more than 700 meters. The aquifer is dominated by permeable sands and gravels with minor clay lenses. Deep percolation from flooded irrigation fields plays a major role in aquifer re-charge. The depth to groundwater resources varies across the Governorate. As will be observed, the water table in the Governorate, particularly in its northern half, is close to ground level. As a result evaporation rates are high, leading to capillary rise and progressive

Salinization/deterioration of both soils and groundwater resources.

Land resources and soils

Generally, the Governorate is flat, with a gentle slope to the north. The topography has been described thus: "elevation varies from about 12 meters above sea level in the south to less than 1 meter near the shore. The cultivated lands possess a network of irrigation and drainage channels related to the Dumyat Branch of the Nile. It contains wide areas, which are less than 1 meter. Some parts in the north, including the coastal lagoons, are below sea level. High sand dunes protect some localities, but others are flooded by winter surges". The coastal belt consists of 3 units: extensive back-shore flats, flooded low lands (sabkhas, salinas and marshes) and coastal, fore- and back-shore sand dunes (which are low and narrow). Much of the land within the Governorate, especially along the eastern and western banks of the Dumyat Branch, is based on fine deltaic deposits of silt and clay. It is high in both organic matter and nitrogen. Good fertility is thus assured. Furthermore, most of these soils are non-saline. The land resources are classified according to their suitability for cultivation. In total, 636,970 feddans or nearly 79% of the total land area of the Governorate (3,471 km²) is presently cultivated. Of the suitable agricultural land, the classification - based on potential productivity.

Ecology & Biodiversity

Sensitive Habitats

No particularly sensitive habitats are known to be present within the study area. Habitats here are thought to have been previously degraded by human activities.

Fauna and Flora

The plant species on site, most were common and abundant in the area, none is protected, rare or of particular biodiversity value. There are four common species of amphibians known in the wider study area, i.e. the Nile Frog *Bufo regularis*, *Ptychadena mascareniensis* and the green toad *Bufo viridis*, and *Rana ridibunda*. A total of 27 species of reptiles in the study site were recorded in this area (Saber, 1999) plus 19 species of lizards and 8 species of snakes.



Fauna and Flora found within the SS area and OHTLs route

Archaeology and Cultural Heritage

There are many archaeological sites in Dakahlia Governorate, most of which are concentrated in Tamei Al-Amadid city, where there are many archaeological sites such as Tal Al-Rub'a, Tal Mendis, Tal Al-Balamoun, and Tal Ibn Salam. The Geographical data from Gamasa City Information Center and Dakahleya Governorate showed that there are no archaeological sites or heritage areas in the project areas, and the nearest tourist archaeological areas are more than 45 km away from the project areas.

XI. Baseline Socioeconomic Conditions

The SS is located in Dakahleya Governorate, which is forms the base of the Nile Delta. It is bordered from the East by Sharqiyah Governorate, from the West by Gharbyah and Kafr El Sheikh Governorates, from the North by the Mediterranean Sea, Damietta and Port Said to the north, and from the South by Qalyubiya Governorate. Al Mansoura city is the capital of Dakahleya.

Dakahleya Governorate is one of the main agricultural governorates, which is rich in water resources and fish production. It is also famous for production of meat, poultry and dairy products. It hosts industries that spread all over the governorate, such as large and diversified industries, the most important of which are chemicals, spinning and weaving, garments, hydrogenated oils, soap, rice milling, grain mills, cotton ginning, milk, and printing and publishing, in addition to small and environmental industries that exist in the villages and hamlets (*Egyptian description by information - Dakahleya Governorate 2014*).

The Governorate total area is around 3538.23 km², forming 0.4% of the country's total area. The populated area is 3538.23 km²; the percentage of the populated area is 100% of the governorate total area. The following table shows the total area and populated total area within Dakahleya Governorate, and Gamasa city (*Egyptian description by information - Dakahleya Governorate 2014*).

Dakahleya Governorate is divided into 16 centers (Marakez), 19 cities, 2 districts, and 120 rural local units with 366 affiliated villages. Gamasa city is affiliated to Dakahleya Governorate on

Dakahleya Governorate total population reaches 5692.11 thousands persons. For Gamasa city the total population reaches 56987 persons. The following table shows the distribution of population in Gamasa city according to type, urban and rural areas, in addition to no. of households.

XII. Project Alternatives

No Go Option

If the SS and the OHTL not built, the consequences would be as follows:

- Energy capacity will not increase,
- Secure the demand of the new establishment as well as to cope with the demand increased from the residential / housings will not be achieved,
- The power supply to the consumers will not be improved,
- The consumers' financial losses from low quality power supply will increase, and
- As a result, an increase in the economic activities in the region would not be possible.

The site of the proposed SS at Gamasa city is far by 25 meters from the youth residential area and which is the required safe distance of the ROW. Therefore, the “No Go Option “ alternative is not an environmental/social requirement.

Technology Limitation

The substation is based on GIS technology with SF6 gas insulated is the most appropriate technology to be used based on environmentally and economically acceptable standards for similar SSs. It requires limited space, occupies only 1/10 compared to the conventional SS (due to the aesthetic landscape as the SS will be indoor) and more reliable than conventional SS are the priorities to select the GIS system in this project. In addition, to reducing the risk of flammable materials, having long lifetime and less operation and maintenance compared to the conventional SS, the SF6 gas insulated system is selected for this substation at Gamasa.

However, if SF6 is released to the environment will increase the impact on ozone depletion and global warming. Therefore, the check of the insulated gas has to be done properly and periodically in accordance to the specification and operation manuals.

Location/Routes Alternatives

New Gamasa Substation

The selection of the SS location and the OHTL routes should be undertaken according to criteria that fulfills technical, environment as well as socioeconomic objectives in order to achieve the most feasible application. The SS location is in the best location for interconnection with neighboring SS in Delta Zone such as Mansour, Gamalia, and Damietta...etc. The selection of the SS location has considered length optimization thus reducing the cost as much as possible and easy access during construction and maintenance.

220 kV OHTL New Gamasa SS \ West Damietta power

It is clear from the coordinates that the route is not crossing any of the protectorates and it crosses over drainage with minimal biodiversity that would have minor impact over any receptors given mitigation measures set forth in chapter 7 are followed.

However, it will pass by several agriculture lands and the towers will be constructed on these lands. Construction of the towers may require cut off some crops or tall trees if exist on these lands. Accordingly, a resettlement action plan (RAP) is prepared with full detailed about the types of these crops and the acquired compensations.

220 kV OHTL New Gamasa SS \ Tiba Steel plan

It is clear from the coordinates that the route is not crossing any of the protectorates. Construction of the towers may require cut off some crops or tall trees if exist on these lands. Accordingly, a resettlement action plan (RAP) is prepared with full detailed about the types of these crops and the acquired compensations.

66 kV OHTL Gamasa SS (the old one)/ Balteem

The OHTL Gamasa 66 SS(the old one) / Balteem had been constructed before the arrangement to commence the proposed New Gamasa SS. This line constructed onto 2 towers. The 2 towers are constructed in allocated areas of the industrial zone which is state property with no economic activities and total length of 150 meters. Consequently, No RAP study anticipated for this OHTL. Due to the short length of the route, there are limited possibilities of alternatives routes.

XIII. Environmental impacts and mitigation measures

The report presents the potential arise from the project activities on environmental and social impacts and proposed mitigation measures should be followed during the construction and operation phase of the SS and 220 kV OHTLs. However, 66kV OHTL its impacts are presented during the operation phase only as the line is constructed and existing.

Example of the impacts; noise generated by vehicles / equipment during construction and drilling, air emissions from vehicles / equipment and soil transfer during construction, impact on cultural resources and ecological resources, handling of waste (hazardous and non-hazardous). In addition; Impacts on occupational health and safety of workers, and use, archaeological and cultural sites, social impacts, traffic, flora and fauna, groundwater sources, aviation and Telecom, the loss of some environmental advantages as a result of cutting trees to establish OHTLs, the path and patterns of bird migration. The impact of the project on society through job creation and economic prosperity is also studied.

The following tables present significance of expected impacts during construction phase of New Gamasa substation and OHTLs

Assessed significance of expected impacts during construction phase of New Gamasa500 GIS substation

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of New Gamasa SS			
Noise	High likelihood to occur – short term and temporary -	Medium Impact	General measures should be applied by the construction workers to reduce the impact of construction to surrounding establishments nearby the construction. (See chapter 8)Notification to the surrounding establishment prior to the construction of the SS Time management and construction schedule according to the IFC regulation (Residential, Institutional, educational: 55 dB (A) daytime from 07:00 to 22:000; and 45 dB (A) nighttime from 22:00 to 07:00, Industrial, commercial: 70 55 dB (A) daytimes and 70 55 dB (A) nighttime) will be provided by the contractor prior to the construction phase
Traffic	High likelihood to occur – short term, temporary and localized only on the main road	Low to medium impact	Time management for transporting the materials, equipment, debris, etc Clear sign surrounding construction site and the enter / exit gate Coordination with traffic department (ministry of interior) for vehicles routes and movement.
Air Quality	High likelihood to occur – short term, temporary and localized - Highly sensitive receptors include construction workers. Receptors with low sensitivity include nearby projects/settlements.	Medium impact on construction workers and on the residents, surrounding establishment and pedestrians passing by the construction site	Spraying the sandy soil with water (if needed, especially during the dry period). Maneuver area and the parking area should be well paved Management of the number of vehicles at the same time for specific location and the scheduling the intensity of vehicles
Vibration	Low likelihood to occur	Minor impact	Schedule and time plan for vehicles movements and construction activities

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of New Gamasa SS			
<p>Hazardous materials and waste generation</p>	<p>Uncertain likelihood – Uncertain impact duration - Highly sensitive receptors include soil pollution and workers. Receptors with low sensitivity include nearby projects/settlements. Physical environment receptors with low sensitivity include groundwater, surface water and drinking water</p>	<p>Low to Medium impact</p>	<p>Agreement should be reached prior to commencing construction work between the contractor and a licensed waste collector for officially assigning a location for the disposal of construction waste.</p> <p>Waste management submitted by the contractor for waste management (upon the agreement with the licensed waste collector.</p> <p>•For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities, the Egyptian Environmental Affairs Agency (EEAA).”</p> <p>Protection from spillage includes paved site for workshop or maintenance of vehicles</p> <p>Temporary storage of wastes includes on site sanitation before the proper connection to the existing sewage network is installed. It is preferable to include the temporary onsite waste management in the ToR of the contractor.</p>

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of New Gamasa SS			
Health and Safety	<p>High likelihood to occur for the construction workers Low likelihood to occur for the surrounding establishment and sensitive receptors. Highly sensitive receptors include workers. Receptors with low sensitivity include nearby residents and existing establishments</p>	<p>Minor impact for sensitive receptors and medium to high / major impact for the workers</p>	<p>Community Health and Safety Standard protection by placing clear project signs. Time management for vehicles movement; especially avoiding the peak hours</p> <p>Occupational Health and Safety Standard protection for the workers especially working at elevated heights as following:</p> <p>a) The Contractor shall be responsible to ensure that its personnel are protected from the risk of falling from any height by applying the following general guidelines.</p> <p>b) The Contractor shall provide training and maintain training records for safe working at height procedures and for the use of any equipment that enables working at height to its personnel assigned to work at height based on risk assessment and Applicable Laws.</p> <p>c) The Contractor shall ensure that all personnel assigned to work at height are physically and medically fit to do so.</p> <p>d) Collective fall protection – guard rails, scaffolds, mobile platform ladders, mobile elevating work platforms (MEWP) or cherry-pickers, safety nets, etc., has priority over individual fall protection.</p> <p>e) When collective fall protection measures are not possible to implement then individual protection, such as a safety harness and life-lines, etc., is compulsory.</p> <p>f) Safe access to all work stations at height must be assured.</p> <p>g) No person is obliged to place themselves at risk of falling; they retain the right to withdraw from any situation, without prejudice, where the risk of falling exists.</p>
Visual Resources and landscaping	<p>Low likelihood to occur</p>	<p>Minor impact, localized and temporary</p>	<p>Following the standard protection for the ground and soil disturbance, air quality (and dust) measures and proper waste management described on the section of waste management measures Clear sign of the construction activities</p>
water resource (ground water, surface water and drinking water)	<p>Low likelihood to occur</p>	<p>Minor impact on groundwater, surface water and drinking water</p>	<p>Following standard protection for the ground and soil and proper waste management described on the section of waste management measures</p>

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of New Gamasa SS			
Ecological resources(Fauna and Flora and bird migration)	Low likelihood to occur	Negligible impact (no impact)	No mitigation measures are needed.
Impact on natural disaster risks	Low likelihood to occur	No significant impact	No mitigation measures is prepared Technical specifications of the equipment is include the standard measures for natural disaster risks
Land use and Involuntary resettlement	Low likelihood to occur	Very low or insignificant	No mitigation measures is prepared (it will be discussed in details in the RAP study includes the involuntary resettlement related to the construction activities.
Archeological and cultural sites	Low likelihood to occur as no archeological and cultural sites are located within SS site.	Very low or insignificant	No mitigation measures is prepared

Assessed significance of expected impacts during construction phase of 220 kV West Damietta Power OHTL

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of OHTL			
Noise	High likelihood to occur – short term and temporary -	Medium Impact	General measures should be applied by the construction workers to reduce the impact of construction to surrounding establishments nearby the construction. (See chapter 8) Notification to the surrounding establishment prior to the construction of the SS Time management and construction schedule according to the IFC regulation (Residential, Institutional, educational: 55 dB (A) daytime from 07:00 to 22:00; and 45 dB (A) nighttime from 22:00 to 07:00, Industrial, commercial: 70 55 dB (A) daytimes and 70 55 dB (A) nighttime) will be provided by the contractor prior to the construction phase
Traffic	High likelihood to occur – short term, temporary and localized only on the main road	Low to medium impact	Time management for transporting the materials, equipment, debris, etc Clear sign surrounding construction site and the enter / exit gate Coordination with traffic department (ministry of interior) for vehicles routes and movement.
Air Quality	High likelihood to occur – short term, temporary and localized - Highly sensitive receptors include construction workers. Receptors with low sensitivity include nearby	Medium impact on construction workers Low impact on the residents, surrounding establishment and	Spraying the sandy soil with water (if needed, especially during the dry period). Maneuver area and the parking area should be well paved Management of the number of vehicles at the same time for specific location and the scheduling the intensity of vehicles

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of OHTL			
	projects/settlements.	pedestrians passing by the construction site	
Hazardous Materials and Waste Management	Likely to occur - short term – Highly sensitive receptors include soil at protectorate areas and workers. Receptors with medium sensitivity include nearby settlements. Receptors with low sensitivity include groundwater.	Medium	<p>Agreement should be reached prior to commencing construction work between the contractor and landfill for officially assigning a location for the disposal of construction waste.</p> <p>Waste management submitted by the contractor for waste management upon the agreement with the licensed waste collector. For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities, the Egyptian Environmental Affairs Agency (EEAA).”</p> <p>Protection from spillage includes paved site for workshop or maintenance of vehicles</p> <p>Temporary storage of wastes includes on site sanitation before the proper connection to the existing sewage network is installed. It is preferable to include the temporary onsite waste management in the ToR of the contractor.</p>
Health and Safety	Low likelihood of major or medium impacts for workers– high likelihood of minor impact for sensitive recipient	Minor	<p>Standard protection by placing clear project signs.</p> <p>Time management for vehicles movement; especially avoiding the peak hours</p> <p>Standard protection for the workers especially working at elevated heights</p>
Removing trees on ROW	Low likelihood of major or medium impacts	Medium to Major	<ul style="list-style-type: none"> • Reduce impact significance to minor following RAP • Avoiding of trees is essential • Plantation of trees near removed trees <p>Agriculture association should orient the farmers about the best strategy to move their trees</p>
Land use	Medium and direct impact to livelihood	Medium	Reduce impact significance to minor following recommendations of RAP preparation
Visual intrusion	Low likelihood of major or medium impacts and localized	Minor	<p>Following the standard protection for the ground and soil disturbance, air quality (and dust) measures and proper waste management described on the section of waste management measures</p> <p>Clear sign of the construction activities</p>
Ecological resources(Fauna and Flora)	Medium likelihood to occur – short term	Minor	<p>Following the standard protection for the fauna and flora and proper waste management described on the section of waste management measures.</p> <p>The preferred route was selected on parameters like:</p> <ul style="list-style-type: none"> • Study Area Identification: Identifying major features in the study area

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of OHTL			
			like main roadways, residential and commercial areas to help identify constraints during the selection of the routes • Mapping the resources: Existing linear corridors include major streets, waterways, railroads, and utility lines. Existing linear corridors are considered opportunity areas for routing because they have already been developed and therefore are generally considered a compatible land use. In addition, these linear corridors generally provide existing access for construction and maintenance requirements.
Water Resources	Medium likelihood to occur – short term	Minor	Standard prevention or precaution measures shall be prepared by the contractor prior to the construction. It is preferable to include the waste management plan in the ToR of the contractor.
Cultural resources	Low likelihood of major or medium impacts	Insignificant	No mitigation measures is needed

Assessed significance of expected impacts during construction phase of 220 kV Tiba Steel Plant OHTL

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of OHTL			
Noise	High likelihood to occur – short term and temporary -	Medium Impact	General measures should be applied by the construction workers to reduce the impact of construction to surrounding establishments nearby the construction. (See chapter 8) Notification to the surrounding establishment prior to the construction of the SS Time management and construction schedule according to the IFC regulation (Residential, Institutional, educational: 55 dB (A) daytime from 07:00 to 22:00; and 45 dB (A) nighttime from 22:00 to 07:00, Industrial, commercial: 70 55 dB (A) daytimes and 70 55 dB (A) nighttime) will be provided by the contractor prior to the construction phase
Traffic	High likelihood to occur – short term, temporary and localized only on the main road	Low to medium impact	Time management for transporting the materials, equipment, debris, etc Clear sign surrounding construction site and the enter / exit gate Coordination with traffic department (ministry of interior) for vehicles routes and movement.
Air Quality	High likelihood to occur – short term, temporary and localized - Highly sensitive receptors include construction workers. Receptors	Medium impact on construction workers Low impact on the residents, surrounding	Spraying the sandy soil with water (if needed, especially during the dry period). Maneuver area and the parking area should be well paved Management of the number of vehicles at the same time for specific location and the scheduling the intensity of vehicles

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of OHTL			
	with low sensitivity include nearby projects/settlements.	establishment and pedestrians passing by the construction site	
Hazardous Materials and Waste Management	Likely to occur - short term – Highly sensitive receptors include soil at protectorate areas and workers. Receptors with medium sensitivity include nearby settlements. Receptors with low sensitivity include groundwater.	Medium	<p>Agreement should be reached prior to commencing construction work between the contractor and landfill for officially assigning a location for the disposal of construction waste.</p> <p>Waste management submitted by the contractor for waste management upon the agreement with the licensed waste collector. For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities , the Egyptian Environmental Affairs Agency (EEAA).”</p> <p>Protection from spillage includes paved site for workshop or maintenance of vehicles</p> <p>Temporary storage of wastes includes on site sanitation before the proper connection to the existing sewage network is installed. It is preferable to include the temporary onsite waste management in the ToR of the contractor.</p>
Health and Safety	Low likelihood of major or medium impacts for workers– high likelihood of minor impact for sensitive recipient	Minor	<p>Standard protection by placing clear project signs.</p> <p>Time management for vehicles movement; especially avoiding the peak hours</p> <p>Standard protection for the workers especially working at elevated heights</p>
Removing trees on ROW	Low likelihood of major or medium impacts	Medium to Major	<ul style="list-style-type: none"> • Reduce impact significance to minor following RAP • Avoiding of trees is essential • Plantation of trees near removed trees <p>Agriculture association should orient the farmers about the best strategy to move their trees</p>
Land use	Medium and direct impact to livelihood	Medium	Reduce impact significance to minor following recommendations of RAP preparation
Visual intrusion	Low likelihood of major or medium impacts and localized	Minor	Following the standard protection for the ground and soil disturbance, air quality (and dust) measures and proper waste management described on the section of waste management measures Clear sign of the construction activities
Ecological resources(Fauna and Flora)	Medium likelihood to occur – short term	Minor	Following the standard protection for the fauna and flora and proper waste management described on the section of waste management measures. The preferred route was selected on parameters like:

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of OHTL			
			<ul style="list-style-type: none"> Study Area Identification: Identifying major features in the study area like main roadways, residential and commercial areas to help identify constraints during the selection of the routes Mapping the resources: Existing linear corridors include major streets, waterways, railroads, and utility lines. Existing linear corridors are considered opportunity areas for routing because they have already been developed and therefore are generally considered a compatible land use. In addition, these linear corridors generally provide existing access for construction and maintenance requirements.
Water Resources	Medium likelihood to occur – short term	Minor	Standard prevention or precaution measures shall be prepared by the contractor prior to the construction. It is preferable to include the waste management plan in the ToR of the contractor.
Cultural resources	Low likelihood of major or medium impacts	Insignificant	No mitigation measures is needed

Assessed significance of expected impacts during operation phase of New Gamasa 500 GIS substation

Impact	Likelihood and severity	Significance	Mitigation Measures
During operation and maintenance of New Gamasa substation			
Noise	Low likelihood to occur –receptors include nearby settlements (Low impact on settlement and nearby establishment :Low impact on permanent workers Insignificant impact	Application of the normal precautions normally taken such as planting trees. Besides reducing the visual impact, the green environment will be achieved as well. Standard protection for the workers provided at the substation.
Traffic	Low likelihood to occur	Low impact	No mitigation identified
Air quality	Low likelihood to occur	Low impact	No mitigation identified
Impact on Vibration	Minor or very low likelihood to occur	Very minor	No mitigation identified

Impact	Likelihood and severity	Significance	Mitigation Measures
During operation and maintenance of New Gamasa substation			
Hazardous and non-hazardous, solid and liquid wastes	Uncertain likelihood – Uncertain impact duration - Highly sensitive receptors include soil pollution and workers. Receptors with low sensitivity include nearby projects/settlements. Physical environment receptors with low sensitivity include groundwater, surface water and drinking water	Medium impact on industrial wastes generated (hazardous and non-hazardous) Low impact on domestic wastes (solid and liquid wastes)	Agreement should be reached prior to commencing construction work between the contractor and landfill for officially assigning a location for the disposal of construction waste. Waste management submitted by the contractor for waste management upon the agreement with the licensed waste collector. For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities, the Egyptian Environmental Affairs Agency (EEAA).”
Soil contamination	High likelihood to occur, only during the incident of oil spillage from the transformers and possible vehicles.	Low to medium impact	Standard design of precaution for the site of transformers Paved within surrounding site of substation especially at the area for parking and movement of vehicles
Health and Safety	High likelihood to occur for the permanent workers Low likelihood to occur for the surrounding establishment and sensitive receptors. High risk likelihood impact during the emergency and accident	Minor impact for sensitive receptors (public and residents as well as existing establishment) and medium impact for the workers High risk likelihood impact during the emergency and accident	Standard protection by placing clear project signs. Time management for vehicles movement; especially avoiding the peak hours Standard protection for the workers especially working at elevated heights. Please refer to Annex 1 for the health and safety guide
Natural disaster risks	Low likelihood to occur	Negligible impact	No mitigation identified Technical specifications of the equipment is include the standard measures for natural disaster risks
Visual Resources	Low likelihood to occur	Very low impact or negligible impact	No mitigation measure is prepared
Ecological Resources	Low likelihood to occur	No significant impact	No mitigation identified

Assessed significance of expected impacts during operation phase of West Damietta 220 kVOHTL

Impact	Likelihood and severity	Significance	Mitigation Measures
During operation and maintenance of OHTL			
Risk of Waste generated	Likely to occur - short term – Highly sensitive receptors include soil and workers. Receptors with medium sensitivity include nearby projects/settlements. Receptors with low sensitivity include groundwater.	Medium	Waste management implemented according to the Egyptian Environmental Affairs Agency (EEAA) regulations, especially for industrial hazardous wastes (solid and liquid wastes) Regular monitoring for domestic sewage network and provision of waste bins for temporary storage before collected by municipality. Disposal means of the hazardous wastes will be according to the Egyptian laws and regulations regarding the disposal.
Exposure to EMFs	Likely to occur - long term impact	Medium	Keeping track of EMF values in substations and at the edge of OHTL ROW. Applying the ICNIRP guideline figure that public exposure to EMF should not exceed 830 mG and occupation exposure should not exceed 4,150 mG, these figures for electric fields are 4.2 and 8.3 kV/m for public and occupational exposure respectively.
Risk of soil contamination	Low likelihood of occurrence - short term impact	Minor	Following standard protection for the soil and proper waste management described on the section of waste management measures
Noise emissions	Low likelihood of occurrence - short term impact	Minor	Minimizing impact significance
Cultural resources	Low likelihood of major or medium impacts	insignificant	Standard mitigation measures of recording and reporting
Health and Safety	Low likelihood of minor impact for the sensitive recipient and medium to major for the workers	Medium to Major	Standard protection for the workers especially working at elevated heights
Natural disaster risks	Low likelihood to occur	Negligible impact	No mitigation identified Technical specifications of the equipment is include the standard measures for natural disaster risks
Visual Resources	Low likelihood to occur	Very low impact or negligible impact	No mitigation measure is prepared
Ecological Resources	Low likelihood to occur	No significant impact	No mitigation identified

Assessed significance of expected impacts during operation phase of 220 kV Tiba Steel Plant OHTL

Impact	Likelihood and severity	Significance	Mitigation Measures
During operation and maintenance of OHTL			
Risk of Waste generated	Likely to occur - short term – Highly sensitive receptors include soil and workers. Receptors with medium sensitivity include nearby projects/settlements. Receptors with low sensitivity include groundwater.	Medium	Waste management implemented according to the Egyptian Environmental Affairs Agency (EEAA) regulations, especially for industrial hazardous wastes (solid and liquid wastes) Regular monitoring for domestic sewage network and provision of waste bins for temporary storage before collected by municipality. Disposal means of the hazardous wastes will be according to the Egyptian laws and regulations regarding the disposal.
Exposure to EMFs	Likely to occur - long term impact	Medium	Keeping track of EMF values in substations and at the edge of OHTL ROW. Applying the ICNIRP guideline figure that public exposure to EMF should not exceed 830 mG and occupation exposure should not exceed 4,150 mG, these figures for electric fields are 4.2 and 8.3 kV/m for public and occupational exposure respectively.
Risk of soil contamination	Low likelihood of occurrence - short term impact	Minor	Following standard protection for the soil and proper waste management described on the section of waste management measures
Noise emissions	Low likelihood of occurrence - short term impact	Minor	Minimizing impact significance
Cultural resources	Low likelihood of major or medium impacts	insignificant	Standard mitigation measures of recording and reporting
Health and Safety	Low likelihood of minor impact for the sensitive recipient and medium to major for the workers	Medium to Major	Standard protection for the workers especially working at elevated heights
Natural disaster risks	Low likelihood to occur	Negligible impact	No mitigation identified Technical specifications of the equipment is include the standard measures for natural disaster risks
Visual Resources	Low likelihood to occur	Very low impact or negligible impact	No mitigation measure is prepared
Ecological Resources	Low likelihood to occur	No significant impact	No mitigation identified

Impact	Likelihood and severity	Significance	Mitigation Measures
During operation and maintenance of 66 kV OHTL Gamasa SS (the old one)/ Balteem			
Risk of Waste generated	Likely to occur - short term – Medium sensitive receptors include workers. No significant receptors around the line as the line is too short and it is started near the fence of the SS (desert area) and crosses the international road which is empty	Low	Waste management implemented during maintenance of the OHTL according to the Egyptian Environmental Affairs Agency (EEAA) regulations, especially for industrial hazardous wastes (solid and liquid wastes)
Exposure to EMFs	Likely to occur - long term impact	Medium	Keeping track of EMF values in substations and at the edge of OHTL ROW. Applying the ICNIRP guideline figure that public exposure to EMF should not exceed 830 mG and occupation exposure should not exceed 4,150 mG, these figures for electric fields are 4.2 and 8.3 kV/m for public and occupational exposure respectively.
Risk of soil contamination	Low likelihood of occurrence - short term impact	Minor	Following standard protection for the soil and proper waste management described on the section of waste management measures
Impacts on ambient noise level	Low likelihood of occurrence - short term impact	Minor	Noise levels under OHTL towers should be measured once annually for each selected towers. In case of recording irregular high noise levels under OHTLs, maintenance department should be informed to take necessary maintenance/repair measures.
Health and Safety	Low likelihood of medium to major for the workers	Medium to Major	Standard protection for the workers especially working at elevated heights
Natural disaster risks	Low likelihood to occur	Negligible impact	No mitigation identified Technical specifications of the equipment is include the standard measures for natural disaster risks
Visual Resources	Low likelihood to occur	Very low impact or negligible impact	No mitigation measure is prepared

XIV. Environmental and Social Management Plan (ESMP) and Monitoring Plan

This chapter presents Environmental and Social Management Plan (ESMP) developed for EETC and the contractor for New Gamasa Substation with its overhead transmission lines. This chapter consists of the following sections:

- ESMP during construction and operation phase (including detailed mitigation measures) of Substation and OHTLs(500kV and 220 kV)
- Guidance on Emergency Response Plans
- Roles and responsibilities in the implementation of the ESMP (during construction and operation phase) of Substation and OHTLs (500 kV and 220 kV)
- Trainings
- Cost Estimation

Arabic Non-Technical Executive Summary

1 مقدمة

في إطار مشاريع التنمية في زيادة الطاقة الكهربائية والتي توليها الدولة اهتمام كبير في هذه المرحلة، تقوم الشركة المصرية لنقل الكهرباء بعدة مشاريع تنموية منها إنشاء عدة محطات محولات وربطها بالشبكة القومية لسد الفجوة الموجودة من الطاقة .

وطبقاً لشروط ولوائح جهاز شئون البيئة فعلى مالك المشروع إجراء دراسة تقييم للآثار البيئية لأي مشروع خدمي والحصول على موافقة بيئية قبل البدء في أي أعمال بالموقع.

وعليه تعاقدت الشركة المصرية لنقل الكهرباء التابعة للشركة القابضة لكهرباء مصر مع شركة إكوكنسرف للحلول البيئية لإعداد دراسة تقييم أثر بيئي للمشروع والذي يتكون من محطة محولات جمصا الجديدة kv220 والخطوط الهوائية لربطها بالشبكة القومية.

2 أهداف الدراسة

تهدف الدراسة إلى بحث جميع جوانب وأنشطة المشروع من حيث التأثير على العناصر البيئية وتقديم البدائل الأفضل للحفاظ على البيئة وتجنب التأثيرات السلبية المحتملة أثناء إنشاء وتشغيل المشروع.

كما تهدف الدراسة إلى التوافق مع المتطلبات القانونية واللوائح والإرشادات العامة التي تحدد أساليب التنمية المستدامة.

3 المنهجية

تم الاعتماد على العديد من الأساليب من أجل تحديد الآثار البيئية وتقييمها. من تلك الأساليب إجراء مسوحات حقلية للبيئة البرية والجيولوجية كما تم إجراء مقابلات مع الجهات ذات الصلة. وقد تم مراجعة المراجع البيئية التي تغطي منطقة الدراسة. أضف إلى ذلك الاعتماد على فريق عمل مكون من خبراء في مجالات البيئة مثل الحياة البرية والجيولوجيا بالإضافة إلى خبير دراسة تقييم الآثار البيئية وخبير القانون البيئي وخبير في المرافق. إعداد خطة إعادة التوطين RAP للخط بأكمله ويشمل ذلك التعداد الكامل وتحديد وتقييم الأشخاص والأصول المتأثرة بحق طريق (ROW) يبلغ طوله 50 مترًا يحدده الإحداثيات الواردة في خط التفصيل لعام 2017 ونشر التاريخ النهائي. وسوف يشمل هذا التقرير التنفيذي ملخص غير فني للدراسة الكاملة لوصف مكونات المشروع والأنشطة وتأثيراتها المتوقعة على البيئة وكيفية منع أو تقليل تلك التأثيرات

4 الاعتبارات التشريعية والقانونية

تضم التشريعات المصرية المتعلقة بالجوانب البيئية ما يلي:

- قانون التشريع البيئي الوطني 4 لسنة 1994، والمعدل بالقانون 9 لسنة 2009 و 2015/105.

- التوجيهات الإرشادية ومتطلبات جهاز شئون البيئة الخاصة بتقييم الأثر البيئي، المواد 19، 20، 21، 23، في القانون 4 لسنة 1994
- التوجيهات الإرشادية لمبادئ وإجراءات تقييم الأثر البيئي، الطبعة الثانية - يناير 2009
- قوانين السلامة والصحة لمهنية
- قوانين المرور والتخطيط العمراني

تضم التشريعات المصرية المتعلقة بالجوانب الاجتماعية ما يلي:

- التوجيهات الإرشادية لجهاز شئون البيئة الخاصة بعملية التشاور العام، التوجيهات الإرشادية لمبادئ وإجراءات تقييم الأثر البيئي، الطبعة الثانية - يناير 2009
- التشريعات المصرية المرتبطة بنزع ملكية الأرض وإعادة التوطين القسري وتضم القانون 2003/94 في شأن تأسيس المجلس القومي لحقوق الإنسان والقانون 1990/10 الخاص بنزع الملكية للمنفعة العامة
- التشريعات المصرية الخاصة بحماية حقوق الإنسان القانون رقم 94 لسنة 2003 في شأن تأسيس المجلس القومي لحقوق الإنسان.
- القوانين والتشريعات المرتبطة بالآثار (القانون رقم 119 لسنة 2008، القانون رقم 117 لسنة 1983
- قانون المناقصات رقم 1998/89 المرتبط بالمناقصات وتنظيم أنشطة المشتريات
- كثير من مؤسسات التمويل الدولية تنظر في تمويل المشروع المقترح ومنها البنك الأوروبي لإعادة الإعمار والتنمية، هيئة التمويل الدولية، وبنك الاستثمار الأوروبي، وأفرسيز للاستثمارات الخاصة، وFMO، OPEC، Proparco . جميع هذه المؤسسات لها متطلبات بيئية واجتماعية يجب أن تنفذها الشركات التي تطلب التمويل. لهذه الأغراض يشير التقرير إلى سياسات البنك الأوروبي لإعادة الإعمار والتنمية ومتطلبات الأداء العشرة الخاصة به، وهيئة التمويل الدولية ومعاييرها الثمانية، وبنك الاستثمار الأوروبي ومعايره البيئية والاجتماعية.

5 وصف المشروع

1-5 بيانات المشروع

انشاء محطة محولات جمصة الجديدة GIS 220/66/11 ك.ف. مكونات المشروع كما يلي:

- عدد (10) خلايا جهد 220 ك.ف (GIS) عبارة عن عدد 2 خلية ربط شريين المقترحة، عدد 2 خلية ربط غرب دمياط، عدد 2 خلية ربط حديد طبيعية، عدد 3 خلية محمول 125 م.ف.أ، عدد 1 خلية رابط.

- عدد (15) خلايا جهد 66 ك.ف (GIS) عبارة عن عدد 2 خلية ربط توليد دمياط، عدد 2 خلية ربط غرب دمياط، عدد 2 خلية ربط جمصة القائمة، عدد 2 خلية ربط بلطيم، عدد 3 خلية محمول 40 م.ف.أ، عدد 1 خلية رابط.
- عدد (3) section جهد 11 ك.ف من نوع التقليدي.
- عدد (2) محول مساعد
- عدد (2) وحدة مكثف
- مهمات التحكم و الوقاية و الاتصالات اللازمة للمحطة
- الاعمال المدنية اللازمة.

2-5 مكان وموقع المشروع

يقع المشروع بمدينة جمصة على الطريق الدولي الساحلي بمنطقة الساحلي بمنطقة ابيزيس بالحدود الاتية:

الحد البحري: ارض فضاء ملك الوحدة ثم محطة المياه الجديدة بطول 200 متر.

الحد الشرقي: ارض فضاء ملك الوحدة مقترح انشاء مشروع الإسكان الجديد بطول 150 متر.

الحد القبلي: الطريق الدولي الساحلي بطول 200 متر.

الحد الغربي: طريق ثم ارض فضاء مخصصة للمدارس بطول 150 متر.



3-5 وصف موجز لأنشطة الإنشاء

1-3-5 إنشاء محطة المحولات

إعداد الموقع: يشمل أعمال تسوية الموقع (الحد من التأثيرات على شبكات البنية الأساسية القائمة في الموقع)

نقل مواد البناء والمعدات اللازمة للإنشاءات - تشوين مواد البناء والمعدات في الموقع

يتم في هذه المرحلة الحصول على التصاريح والموافقات من الجهات الرسمية المختصة

أعمال الخرسانة: أعمال إنشاء الأساسات وصب الخرسانة والهيكل

أعمال إنشاء المباني الفرعية: تشمل المباني الإدارية وغيرها من المباني وغرف التحكم... الخ

تركيب المعدات: تشمل المحولات ووحدات التحكم واللوحات الكهربائية. الخ

إدارة المخلفات: وتشمل المخلفات البلدية ومخلفات الإنشاءات (مخلفات خطرة وغير خطرة)، وتشمل التعرف على

أنواع المخلفات وتخزينها بشكل مؤقت وإدارتها ونقلها إلى مدفن النفايات.

بالإضافة إلى الأنشطة السابقة سوف يتم تدريب العاملين على التشغيل والصيانة وسوف تشمل برامج التدريب

خطة الطوارئ التي سوف يلتزم بها المقاول خلال أعمال توريد وتركيب وإعداد المحولات ومستلزماتها، سوف تتم

أنشطة بناء القدرات في خلال فترة الضمان.

2-3-5 مرحلة أعمال الإنشاءات للكابلات الهوائية

تحديد مسار الطريق (ROW): حدد قانون الكهرباء 2015/87 حدود المسافات التي يجب قياسها من محور

مسارات من أجل تحديد مسار الطريق (ROW). وسيتم الاحتفاظ بمسافة 25 مترا من كلا الجانبين من أجل

خطوط الجهد الهوائية (500 كيلو فولت) كحق الطريق (ROW) أو المنطقة العازلة للحفاظ على السلامة العامة

من المخاطر الكهربائية والتعرض الشديد للمجالات المغناطيسية الكهربائية

حفر القواعد: يتم الحفر بعمق حوالي 4.5 م لكل قاعده ويبلغ متوسط المساحة المطلوبة لتنفيذ قاعدة البرج من

22م X 22م إلى 33م X 33م.

تركيب ملحقات تعليق البرج: يتم تركيبها يدويا عن طريق نقل الملحق باستخدام بكرة سلسلة

تركيب الأبراج الهوائية: يتم تجهيز البرج كأجزاء منفصلة ويتم تركيبه بالموقع عن طريق شركة مقاولات متخصصة. ويستخدم فريق الانشاء الروافع والمعدات لتركيب البرج بالموقع حيث يتم تركيب الزوايا الحديدية والعازلات.

عملية شد الأسلاك: بعد اتمام عملية انشاء الأبراج تقوم الروافع بثبيت الاسلاك الكهربائية ومدها ما بين الابراج حتى تصل بين المحطتين

إدارة المخلفات: وتشمل المخلفات البلدية ومخلفات الإنشاءات (مخلفات خطرة وغير خطرة)، وتشمل التعرف على أنواع المخلفات وتخزينها بشكل مؤقت وإدارتها ونقلها إلى مدفن النفايات.

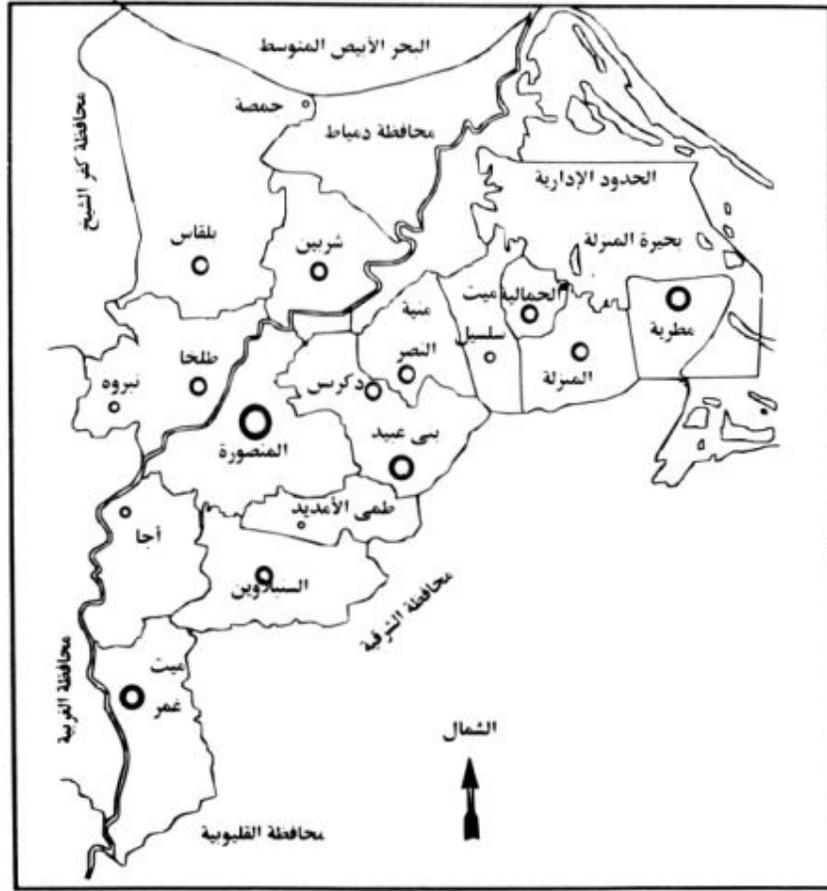
بالإضافة إلى الأنشطة السابقة سوف يتم تدريب العاملين على التشغيل والصيانة وسوف تشمل برامج التدريب خطة الطوارئ التي سوف يلتزم بها المقاول خلال أعمال توريد وتركيب وإعداد المحولات ومستلزماتها، سوف تتم أنشطة بناء القدرات في خلال فترة الضمان.

5-3-3 مرحلة التشغيل

تحتاج محطة المحولات والابراج الهوائية إلى أعمال صيانة دورية وقائية وإصلاحية للحفاظ على عليها في أحسن حال في فترة التشغيل. تتبع الصيانة الوقائية جدول دوري يهدف إلى تجنب حدوث الأعطال والحفاظ على تشغيل المحولات على مستواها الأمثل. يعتمد تكرار الصيانة الوقائية على عدة عوامل مثل التكنولوجيا المستخدمة، والأوضاع البيئية في الموقع، شروط الضمان، والفروق الموسمية. تضم أنشطة الصيانة على سبيل المثال، فحص المحولات من حيث السلامة الهيكلية. تجرى أعمال الصيانة الإصلاحية في حالة حدوث الأعطال، على سبيل المثال لإصلاح أو تبديل المعدات المعطلة أو التالفة.

6 الوصف البيئي والاجتماعي

تقع محطة المحولات في مدينة جمصة ضمن حدود محافظة الدقهلية، دلتا النيل، مصر. وهي محاطة من الشمال بمحافظة دمياط، ومن الجنوب بمحافظة الشرقية، ومن محافظات شرق بورسعيد: بينما من الغرب من محافظة الغربية.



المناخ

تعتبر محافظة الدقهلية جزء من إقليم مناخي يمكن تقسيمه إلى كل من: حزام ساحلي يخضع لتأثير البحر الأبيض المتوسط يتميز بصيف جاف قصير المنطقة الداخلية التي تتصف بفترة جفاف أطول. وبالتالي فإن محافظة الدقهلية تصنف إلى إقليمين فرعيين رئيسيين هما ساحل البحر لمتوسط لمنطقة الدلتا منطقة نهر النيل. متوسط سقوط الأمطار السنوي أقل من 100 ملم وينقص جنوبا. الشتاء معتدل مع سقوط أمطار، يتبعه صيف حار جاف.

الهواء

تؤثر نوعية الأنشطة التي تمارس فالمجتمع والأحوال الجوية على نوعية الهواء المحيط. قد ساعدت الأحوال المناخية في محافظة الدقهلية خلال فصلي الخريف والشتاء السابقين على زيادة نسبة درجة الحرارة على مستوى الأرض مما أدى إلى زيادة نسب التلوث المحلية في مراكز حضرية معينة، وساعد على ذلك أيضا أن متوسط سرعة الرياح في الأحوال العادية يتعدى 5.5 كم/الساعة.

المياه السطحية

تتمثل موارد المياه السطحية لمحافظة الدقهلية في نهر النيل (فرع دمياط) ترعة الري الرئيسية، شبكة الري الصرف القنوا المكشوفة. بشكل عام يساهم نهر النيل بحوالي 5.55 مليار متر مكعب/سنة من الموارد المائية طبقا معاهدة 1959. أما موارد المياه الجوفية فتتمثل في (مياه الكثبان الرملية مياه التربة التحتية والمياه الجوفية) بالمقارنة تساهم بنسبة 5.4 % فقط من هذا المقدار، وحوالي 50 % منه تأتي من مياه الرش الناتجة عن نهر النيل.

المياه الجوفية

المياه الجوفية عبارة عن طبقة صخرية مائية ضيقة، يبلغ متوسط سمكها أكثر من 700 متر.

فونا وفلورا

نظرا لوجود أراضي زراعية بالقرب من موقع المشروع، فتعتبر الحيوانات الأكثر هيمنة في المنطقة هي حيوانات المزارع أما عن الحيوانات الأخرى فهي أنواع متكيفة مع البيئة الحضرية كالفطير والكلاب والقوارض والسحالي والخفافيش والطيور، والتي تعتمد على المخلفات كغذاء لها.

تضم الأراضي الزراعية النباتات الشائعة في المنطقة وهم أشجار شجرة الشيح، شجرة الجميز، السنط، الكافور والنباتات المختلفة التي تنتشر على ضفاف القنوات والمصارف. بالإضافة إلى المحاصيل المزروعة والأكثر شيوعا وهي القمح والأرز والذرة والخضروات.

ومع ذلك، لا توجد أي تسجيلات للنباتات أو الحيوانات الموجودة داخل المنطقة المحيطة، حيث أن الموقع المقترح للمشروع هو أرض فارغة داخل المنطقة الحضرية، والتي تعتبر منطقة صحراوية ولذلك فمن المتوقع ندرة النباتات ولكن ليس النباتات المتوطنة. ويمكن أن تقع مزارع الحيوانات الأليفة والمحلية في المنطقة السكنية المحيطة، ولكن لن تتأثر هذه الموائل من أنشطة المشروع.

وفيما يتعلق بهجرة الطيور، فلا يقع موقع المحطة في مسار الطيور المهاجرة محليا أو دوليا.

الخصائص الاقتصادية والاجتماعية

تنقسم محافظة الدقهلية إلى 16 مركزًا و19 مدينة، و2 منطقة، و120 وحدة محلية ريفية تضم 366 قرية تابعة. تقع مدينة جمصة بمحافظة الدقهلية على حدود مركز بلقاس الذي يعد أكبر مركز في محافظة الدقهلية مقارنة بالمراكز الأخرى، ويطل على البحر الأبيض المتوسط.

بلغ المساحة الإجمالية للمحافظة حوالي 3538.23 كيلومتر مربع، لتشكل 0.4% من المساحة الإجمالية للبلاد. يصل إجمالي عدد سكان محافظة الدقهلية إلى 5692.11 آلاف نسمة. يصل إجمالي عدد سكان مدينة جمصة إلى 56987 نسمة.

7 بدائل المشروع

1-7 المشروع والتقنيات المستخدمة

- يهدف المشروع للتوسع في خدمات الكهرباء المقدمة لمنطقة الصناعة بجمصة.
- التقنية المطبقة في محطة المحولات هي محطة GIS وتعتبر أفضل نوع تكنولوجيا لمحطة المحولات من ناحية الأمان والسلامة والصحة المهنية في مرحلة التشغيل. سوف يتم ربط المحطة بالشبكة من خلال الكابلات القائمة بالفعل وهو ما يمثل استغلال أمثل للموارد المتاحة.

2-7 بدائل الموقع ومسار خطوط الربط الهوائية

- تم تخصيص الأرض المخصصة لإنشاء محطة المحولات للشركة المصرية لنقل الكهرباء من محافظة الدقهلية، الإدارة العامة. الشئون القانونية، إدارة البحوث والعقود. وتم اختيار موقع المحطة ومسار الكابلات لمراعاة الاستخدام الأمثل للموارد وتجنب اي مستقبلات حساسة.
- سوف يتم إنشاء الكابلات بمحاذاة شبكة الطرق (بما يسهل من توصيل المواد الخام والقيام بأعمال الصيانة)
- تم اختيار موقع المحطة ومسار الكابلات لمراعاة الاستخدام الأمثل (الحد من التكلفة بقدر الإمكان).

8 تأثيرات المحتملة على البيئة وإجراءات التخفيف

يتضمن التقرير تفاصيل التأثيرات المحتملة على البيئة وإجراءات التخفيف المقترحة خلال مرحلة أعمال الإنشاءات وخلال مرحلة التشغيل لمحطات المحولات وخطوط نقل الكهرباء كلاً على حدة. مثال على ذلك التأثير الناتج عن الضوضاء الناتجة من المركبات/المعدات أثناء أعمال الإنشاءات والحفر، انبعاثات الهواء الناتجة من المركبات/المعدات ونقل التربة أثناء أعمال الإنشاءات، التأثير على الموارد الثقافية والموارد الإيكولوجية، التعامل مع المخلفات (الخطرة والغير خطرة) الناتجة عن أعمال الإنشاءات، الصحة والسلامة المهنية للعمال، التأثير على استخدام الأراضي، التأثير على المواقع الأثرية والثقافية، التأثيرات الاجتماعية، التأثير على حركة المرور، التأثير على الكساء النباتي والحيواني، التأثير على مصادر المياه الجوفية، التأثير على الطيران والاتصالات، فقدان بعض المميزات البيئية نتيجة قطع الأشجار لإقامة خطوط نقل الكهرباء، التأثيرات على مسار وأنماط هجرة الطيور وتأثير المشروع على المجتمع من خلال خلق فرص العمل وازدهار الاقتصاد.

9 خطة الإدارة والرصد البيئية

يتضمن هذا الفصل مصفوفات الإدارة البيئية خلال مرحلة أعمال الإنشاءات وخلال مرحلة التشغيل لكلاً من محطات المحولات وخطوط نقل الكهرباء، ويشمل التأثيرات المحتملة، إجراءات التخفيف المقترحة، مرحلة المشروع، المسؤولية الإدارية عن التنفيذ، المسؤولية المباشرة عن الإشراف، وأسلوب الإشراف. كما يتضمن هذا الفصل أيضاً مصفوفات خطة المتابعة البيئية خلال مرحلة الإنشاءات وخلال مرحلة التشغيل لكلاً من محطات المحولات وخطوط نقل الكهرباء، ويشمل التأثيرات المحتملة، مؤشرات المتابعة، موقع المتابعة، أسلوب المتابعة، دورية المتابعة، والمسؤولية المتابعة.

يمثل الجدول التالي العناصر الرئيسية من مصفوفة خطة الإدارة البيئية لمحطة المحولات خلال مرحلة الإنشاء

التعليقات	تقديرات التكلفة (\$)*	المسئولية الإدارية عن التنفيذ	إجراءات التخفيف المقترحة	التأثيرات المحتملة
التدابير العامة للمنشآت المحيطة والمستقبلات الحساسة				
خطاب تغطية من الشركة المصرية لنقل الكهرباء للموافقة على بدء المشروع	-	المقاول	خطاب إعلام من أجل تقديم المشروع ومدته للمنشآت المحيطة والبلدية	الضوضاء والاهتزاز خلال إعداد الموقع، الإنشاء وتركيب المعدات
	غير محددة	المقاول كجزء من الشروط المرجعية للمتطلبات العامة للصحة والسلامة البيئية	وضع علامة واضحة وعلامة تحذير (يمكن أن ينظر إليها خلال النهار والليل) طوال فترة المشروع (متضمنة المدة)	
	-	المقاول	مدة العمل في الموقع (متضمنة التحميل) خلال النهار فقط (بين 7 صباحا الى 5 مساء)	
تدابير التخفيف لعمال البناء أثناء الإعداد والبناء				

التعليقات	تقديرات التكلفة (\$)*	المسئولية الإدارية عن التنفيذ	إجراءات التخفيف المقترحة	التأثيرات المحتملة
	غير محددة	المقاول (خلال المناقصة)	معايير إجرائية صارمة على مستوى الصحة وسلامة العمال وفقا للمبادئ التوجيهية العامة لمؤسسة التمويل الدولية بشأن الصحة والسلامة البيئية وإدارة أعمال التركيز على الآلات الثقيلة	
		المقاول (خلال المناقصة) متعلقة بمتطلبات الصحة والسلامة البيئية خلال أعمال الإنشاءات	معايير إجرائية صارمة خاصة لحماية الأذن أثناء العمل	
خطاب تغطية من الشركة المصرية لنقل الكهرباء للموافقة على بدء المشروع	-	المقاول	الموافقة من إدارة المرور قبل البدء في الإنشاء	التأثيرات على حركة المرور في الطرق
	غير محدد	المقاول (خلال المناقصة) متعلقة بمتطلبات الصحة والسلامة البيئية	وضع علامة واضحة وعلامة تحذير (يمكن أن ينظر إليها خلال النهار والليل) طوال فترة المشروع (متضمنة المدة)	
	غير محدد	المقاول بالتعاون مع إدارة المرور إذا لزم الأمر	حركة المركبات (لنقل المواد ومخلفات البناء ومعدات محطة المحولات أثناء الليل والتحميل أثناء النهار داخل موقع محطة المحولات).	

التعليقات	تقديرات التكلفة (\$) *	المسئولية الإدارية عن التنفيذ	إجراءات التخفيف المقترحة	التأثيرات المحتملة
	غير محدد	السائقين والفنيين الذين يتم توظيفهم من قبل المقاول. وتقع مسؤولية تطبيق اللوائح على السائقين والفنيين على عاتق المقاول	ينبغي أن يتلقى السائقون والفنيون التدريب على كيفية الاستخدام الآمن لألاتهم	
	غير محدد	استنادا إلى خطة إدارة المخلفات المقدمة من المقاول والموافقة من الشركة المصرية لنقل الكهرباء	الاتفاق على التخزين المؤقت والتخلص النهائي إلى مكتب النفايات المحدد	
كجزء من ميزانيتها المالية خلال أنشطة العطاءات		المقاول	<ul style="list-style-type: none"> • الحد من حركات عربات المستخدمة في عمليات الانشاء مع تحديد سرعة القيادة. • إذا لزم الأمر ، رش التربة قبل أي حفر ، تعبئة التحميل والتفريغ. رصف طرق الوصول قبل الاستخدام في بناء مكونات المشروع. • الحفاظ على كفاءة المركبات والآليات 	جودة الهواء المحلي بالأثرية والانبعاثات المتولدة من معدات وعربات الانشاء

التعليقات	تقديرات التكلفة (\$)*	المسئولية الإدارية عن التنفيذ	إجراءات التخفيف المقترحة	التأثيرات المحتملة
تنفيذ إدارة المخلفات المقدمة من قبل المقاول والموافقة عليها من قبل الشركة المصرية لنقل الكهرباء قبل مرحلة الإعداد والإنشاء	غير محدد	المقاول	<p>الإخطار والعقد، إذا لزم الأمر لنقل المخلفات الخطرة وغير الخطرة إلى مدافن المخلفات المعينة.</p> <p>فصل المخلفات الخطرة والمخلفات غير الخطرة للتخزين المؤقت</p> <p>ينبغي إدراج المنطقة أو الموقع المخصص في خطة إدارة المخلفات المقدمة من المقاول والموافقة عليها من قبل الشركة المصرية لنقل الكهرباء</p> <p>ينبغي نقل مخلفات البناء في نهاية كل يوم عمل إلى مواقع التخلص المعتمدة رسمياً</p>	المخلفات المتولدة (الخطرة وغير الخطرة، الصلبة والسائلة وكذلك مخلفات البناء والمخلفات المنزلية)

التعليقات	تقديرات التكلفة (\$)*	المسئولية الإدارية عن التنفيذ	إجراءات التخفيف المقترحة	التأثيرات المحتملة
			الشاحنات المناسبة لنقل النفايات إلى مكبات النفايات المعينة. وفيما يتعلق بنقل النفايات الخطرة، يجب أن تكون المركبات وفقا للمعايير المذكورة في لوائح جهاز شئون البيئة لنقل النفايات الخطرة	
وفقا لخطة إدارة المخلفات المقدمة إلى الشركة المصرية لنقل الكهرباء			يجب توفير صناديق المخلفات المؤقتة في الموقع للمخلفات الصلبة قبل جمعها ومرافق الصرف الصحي المؤقتة للعمال	
الإشراف على الموقع مراجعة تقارير المشرف	غير محدد	المقاول	يجب أن يحصل السائقين على رخصة قيادة سارية يجب فحص كافة المعدات قبل الاستخدام يجب وضع لافتات واضحة لكافة المعدات الميكانيكية أثناء الاستخدام أو في حالة عدم الاستخدام	الصحة والسلامة المهنية للعمال

وسائل المراقبة	مسؤولية الإشراف المباشر	المسؤولية الإدارية عن التنفيذ	مرحلة المشروع	إجراءات التخفيف المقترحة	التأثيرات المحتملة
خلال مرحلة إعداد وإنشاء خطوط الربط					
التعليقات	تقديرات التكلفة (\$) *	المسؤولية الإدارية عن التنفيذ	إجراءات التخفيف المقترحة	التأثيرات المحتملة	
	غير محدد	المقاول	الاحتياطات والوقاية من إدارة المخلفات لمنع تلوث التربة والموارد المائية (المياه الجوفية)	الموارد المائية وتلوث التربة خلال مرحلة الإنشاء	

يمثل الجدول التالي العناصر الرئيسية من مصفوفة خطة الإدارة البيئية لمحطة المحولات خلال مرحلة التشغيل

<ul style="list-style-type: none"> • مراجعة موافقات السلطات المحلية • الإشراف على الموقع • التفتيش العرضي لموقع التخلص من المخلفات • مراجعة حسابات منطقة تراكم المخلفات • مراجعة المخازن 	<p>الشركة المصرية لنقل الكهرباء-مشرف الإنشاءات-الاستشاري</p>	<p>الشركة المصرية لنقل الكهرباء موظف المخلفات الذي رشحته الشركة المصرية لنقل الكهرباء مقاوم الإنشاءات</p>	<p>قبل الإنشاء - الإنشاء</p>	<ul style="list-style-type: none"> • تحديد مواقع التخلص من مخلفات البناء التي وافقت عليها السلطة المحلية • تحديد منطقة تراكم المخلفات داخل موقع الإنشاء للتخزين المؤقت لمخلفات الإنشاء، بما في ذلك منطقة أمانة للتراكم المؤقت للمخلفات الخطرة • التخلص من مخلفات الإنشاء • تخصيص وإعداد مناطق للتخزين المؤقت للخردة • الحفاظ على نظافة منطقة تراكم المخلفات • يجب على مقاوم البناء توفير خزانات المياه المحمولة في الموقع لتوفير بيئة عمل صحية للقوة العاملة. يجب تزويد خزانات المياه المحمولة بخزان خارجي لتخزين مياه المجاري. 	<p>التأثيرات الناتجة عن مخلفات الإنشاء</p>
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<ul style="list-style-type: none"> الإشراف على الموقع والتفتيش في بعض الأحيان 	مشرف الإنشاءات	مقاوم الإنشاءات	قبل الإنشاء	<ul style="list-style-type: none"> تحديد عمق وعرض الحفر وفقا لتصميم الرسم وضوح علامات السلامة والحدود لمواقع الحفر السلامة ومنطقة واضحة حول موقع الحفر خوذ وأحذية آمنة إجبارية للعمال 	أنشطة الحفر
<ul style="list-style-type: none"> الإشراف على الموقع 	مشرف الإنشاءات - الاستشاري	مقاوم الإنشاءات	الإنشاء	<ul style="list-style-type: none"> رش التربة قبل الحفر في التربة الرملية 	انبعاثات الهواء الناتجة عن أعمال الإنشاءات

<ul style="list-style-type: none"> • الإشراف على الموقع 	<p>مشرف الإنشاءات - الاستشاري</p>	<p>مقاوم الإنشاءات</p>	<p>الإنشاء</p>	<ul style="list-style-type: none"> • توفير سدادات الأذن لعمال البناء خاصة لهؤلاء الذين يعملون بالقرب من الآلات الجهرية • تنظيم ساعات العمل بحيث يتم تقليل التعرض للضوضاء إلى أدنى حد ممكن • التنسيق وإخبار السكان / الموظفين القائمين بالقرب من المستقبلات الحساسة القريبة بوقت الذروة والساعات التي يتم فيها أنشطة البناء. • تجنب أنشطة البناء في الليل بالقرب من المناطق السكنية 	<p>الضوضاء الناتجة عن أعمال الإنشاءات</p>
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<ul style="list-style-type: none"> • الإشراف على الموقع • الوصول إلى خريطة الطريق والوصول إلى إدارة الطرق من المركبات إلى الأبراج. • توفير المعلومات من خلال توجيه فريق العمل، والمنتشورات، والملصقات المكتبية، • الإخبار عن موائل ومواقع أنواع النباتات المحمية / المهدة 	<p>الشركة المصرية لنقل الكهرباء-مشرف الإنشاء-الاستشاري-مسئول الصحة والسلامة البيئية</p>	<p>مقاول البناء -استشاري التصميم</p>	<p>قبل الإنشاء - الإنشاء</p>	<ul style="list-style-type: none"> • يجب تحديد المسارات المطلوبة لنقل المعدات والمواد الخام وغيرها من الطرق الرئيسية إلى مواقع البناء في المحميات لتجنب المناطق الحساسة • يجب أن يحصر البناء وحركة المركبات في الحد الأدنى • يجب تحديد طريق الوصول قبل مرحلة الإنشاء لتجنب إعادة التوطين أو التعويض • التقليل من الضوضاء والإضاءة الصناعية ليلا خلال مرحلة الإنشاء • إعداد وتنفيذ خطة الموائل / إزالة التربة • عدم الصيد أو الصيد غير المشروع من قبل فريق عمل المقاول في منطقة المشروع والمناطق المحيطة بها أثناء مرحلتى الإنشاء والتشغيل • إجراء مسح ما قبل البناء للحد من التأثيرات على الموائل الطبيعية والنباتات المحمية والمهدة • إخبار فريق الإنشاء عن أهمية الموائل الطبيعية والأنواع النباتية البارزة 	<p>التأثير على الكساء النباتي والحيواني</p>
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<ul style="list-style-type: none"> • مراجعة تقارير المقاول المتعلقة بالعمال • أنشطة إشراك أصحاب المصلحة • تقارير بناء القدرات وتقارير الدورات التوجيهية 	<p>مشرف الإنشاء - الاستشاري</p>	<p>مقاول الإنشاء</p>	<p>الإنشاء</p>	<ul style="list-style-type: none"> • التوسع في استخدام العمال المحليين قدر الإمكان • تقديم جلسات معلومات إلى الخارج • إشراك أفراد المجتمع المحلي في عملية التوظيف 	<p>التأثيرات على الثقافة وخصوصية المجتمعات المحلية</p>
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<ul style="list-style-type: none"> • مراجعة تقارير المتعاقدين المتعلقة بتدابير الصحة والسلامة، وكذلك قوائم العمال المصابين • تقارير بناء القدرات والجلسات التوجيهية المتعلقة بتدابير الصحة والسلامة 	<p>مشرف الإنشاء - الاستشاري</p>	<p>مقاول الإنشاء</p>	<p>الإنشاء</p>	<ul style="list-style-type: none"> • تقييد تطبيق إجراءات الصحة والسلامة • يجب على المقاول توفير مرافق الصحة والسلامة في موقع المشروع • يجب توقيع العقود مع المرافق الصحية القريبة من موقع البناء • يجب أن يكون لدى السائقين ترخيص معتمد وساري المفعول • يجب فحص جميع المعدات الميكانيكية قبل استخدامها • وضع علامة على جميع المعدات الميكانيكية التي تكون مغلقة أو خارج الخدمة • تنفيذ برنامج الحماية من السقوط الذي يشمل التدريب على تقنيات التسلق واستخدام تدابير الحماية من السقوط؛ التفتيش، الصيانة، واستبدال معدات الحماية من السقوط؛ وإنقاذ العمال المعتقلين • ينبغي تعيين حارس لحماية موقع الإنشاء 	<p>التأثيرات المتعلقة بسلامة وصحة العمال</p>
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<ul style="list-style-type: none"> • نتائج خطة عمل إعادة التوطين المختصرة • تقرير إستشاري التصميم • تقارير الزيارات الميدانية • تقارير التعويضات والإيصالات 	<p>مشرف الإنشاء - الاستشاري</p> <p>استشاري خطة عمل إعادة التوطين</p> <p>الشركة المصرية لنقل الكهرباء-والسلطات المحلية</p>	<p>استشاري التصميم</p> <p>المقاول</p>	<p>التصميم والتخطيط والتنفيذ</p>	<ul style="list-style-type: none"> • ينبغي إعتداد آلية التقادي بشكل كامل • في حالة حدوث إعادة التوطين، ينبغي نشر المعلومات وتنفيذ إطار عمل إعادة التوطين وفقا لمعيار البنك الدولي وبنك الاستثمار الأوروبي • يجب إعداد دراسة خطة عمل إعادة التوطين المختصرة للإبلاغ عن أفضل الاستراتيجيات لتعويض الفقراء • تحديد طرق الوصول ومناطق التخزين • إعادة تأهيل موقع الإنشاء • إشراك أصحاب الجهات المعنية أثناء عملية التعويض 	<p>فرض القيود على استخدام الأراضي وإمكانية إعادة التوطين</p>
<ul style="list-style-type: none"> • مراجعة التقارير وعمليات المراجعة الدورية 	<p>الشركة المصرية لنقل الكهرباء</p>	<p>المقاول بالتعاون مع المزارعين والجمعيات الزراعية</p>	<p>الإنشاء</p>	<ul style="list-style-type: none"> • تجنب الأشجار أمر ضروري • زراعة الأشجار بالقرب من الأشجار التي تم إزالتها • يجب على الجمعية الزراعية توجيه المزارعين حول أفضل استراتيجية لنقل أشجارهم 	<p>إزالة الأشجار لخطوط الطاقة-الحق في الطريق</p>

<ul style="list-style-type: none"> تقارير عن العمال العاملين الشكاوى التي أثرت بشأن التوظيف 	الشركة المصرية لنقل الكهرباء (مهندس الموقع ومسئول التنمية الاجتماعية)	المقاولين والمقاولين من الباطن بالتعاون مع قادة المجتمع	مرحلة الإنشاء	<ul style="list-style-type: none"> توفير فرص عمل للعاملين في المجتمع المحلي إدماج قادة المجتمع المحلي أثناء إجراءات التوظيف 	التأثيرات الاجتماعية والاقتصادية
<ul style="list-style-type: none"> مشرف الموقع وسجل الشكاوى المتعلقة بتأثيرات حركة المرور 	مشرف الإنشاء الاستشاري	مقاول الإنشاء	قبل الإنشاء - الإنشاء	<ul style="list-style-type: none"> منع تخزين مواد البناء والمعدات والآلات على الطرق المرورية يجب التأكد من بناء قدرات السائقين حول الاستخدام الآمن 	حركة المرور

يمثل الجدول التالي العناصر الرئيسية من مصفوفة خطة الإدارة البيئية لخطوط الربط خلال مرحلة التشغيل

التأثيرات المحتملة	إجراءات التخفيف المقترحة	المسئولية الإدارية عن التنفيذ	* (\$تقديرات التكلفة	التعليقات
خلال تشغيل وصيانة محطة المحولات				
الضوضاء	تدابير التخفيف للفنيين وعمال محطة المحولات			
	الإجراءات المعيارية لصحة وسلامة العمال وفقا للمبادئ التوجيهية العامة لمؤسسة التمويل	الشركة المصرية لنقل الكهرباء	طبقا لمعايير	

التعليقات	* (\$تقديرات التكلفة	المسئولية الإدارية عن التنفيذ	إجراءات التخفيف المقترحة	التأثيرات المحتملة
	حماية فريق العمل		الدولية بشأن الصحة والسلامة البيئية (بما في ذلك الحد من مدة التعرض للضوضاء العالية) وإدارة أعمال التركيز على الآلات الثقيلة	
		الشركة المصرية لنقل الكهرباء	المعدات القياسية خاصة لحماية الأذن أثناء العمل	
	غير محددة	الشركة المصرية لنقل الكهرباء	الإدارة السليمة للمخلفات (المخلفات الصناعية) بما في ذلك فصل المخلفات، ومساحة منفصلة للمخلفات المؤقتة، ونقل المخلفات الصناعية إلى مكبات المخلفات المخصصة لها والتخلص منها خاصة للمخلفات الخطرة، يجب أن يتم تخزين المخلفات الخطرة وجمعها ونقلها والتخلص منها وفقا للوائح جهاز شئون البيئة بشأن المخلفات الخطرة	المخلفات المتولدة (المخلفات الخطرة وغير الخطرة والصلبة والسوائل الصناعية والمخلفات المنزلية)
			وفيما يتعلق بالمخلفات المنزلية، ينبغي الالتزام بالإجراءات المعيارية لصيانة الشبكات (بما في	

التعليقات	* (\$تقديرات التكلفة)	المسئولية الإدارية عن التنفيذ	إجراءات التخفيف المقترحة	التأثيرات المحتملة
			(ذلك توفير صناديق المخلفات)	
	-	فنيين الشركة المصرية لنقل الكهرباء بمحطة المحولات	الصيانة الدورية لمحطة المحولات وتوصيلاتها. وهذا يشمل التشديد المنتظم، كفاءة المحطة، جودة الزيت، ضغط الغاز، الخ	الأفراد والفنيين وسلامة الموظفين من التعرض للمجالات المغناطيسية الكهربية
من المستحسن شراء جهازين لأغراض الاستعداد	100-150 USD per EMF meter 150-100	الشركة المصرية لنقل الكهرباء	قراءة للمجالات المغناطيسية الكهربية لمحطة المحولات والموقع المحيط	
يتم تضمين تقدير التكلفة في الدورات التدريبية السنوية التي تقدمها الشركة المصرية لنقل الكهرباء لعمال محطة المحولات	غير محددة	الشركة المصرية لنقل الكهرباء	توفير التدريبات المقدمة من قبل الشركة المصرية لنقل الكهرباء كمتطلبات عامة	التدريبات المقدمة حول المخاطر المحتملة أثناء الحوادث (التدريب على مكافحة الحرائق، وانسكاب النفط، وكشف الدخان، وما إلى

التعليقات	* (\$) تقديرات التكلفة	المسئولية الإدارية عن التنفيذ	إجراءات التخفيف المقترحة	التأثيرات المحتملة
				(ذلك)
	غير محددة	الشركة المصرية لنقل الكهرباء	الحماية المعيارية لفنين محطة المحولات والموظفين	صحة وسلامة العمال

10 الخلاصة

بعد تحليل أنشطة المشروع المختلفة خلال مرحلتي الإنشاء والتشغيل والتأثيرات البيئية المختلفة المترتبة عليها، إلى أن اختيار تلك المواقع المحددة للمشروع تمت بناء على المحددات التي تحقق الأهداف الفنية والاقتصادية والاجتماعية للمشروع. أما بالنسبة للتأثيرات البيئية السلبية في مرحلتي الإنشاء والتشغيل فهي محدودة ويمكن تخفيفها إلى الحد الأدنى الذي يمكن به جعل هذه التأثيرات مهمة بتطبيق خطة الإدارة والرصد البيئي المقترحة.

1. Introduction

1.1. Project Background

Over the past period, the electricity demand in Egypt has increased forming additional pressure on the already existing and aging electricity infrastructure. Recurrent and persistent power cuts and planned outages on the electrical grid peaked during 2011 and 2012. Such power cuts affected the daily life of citizens in addition to impacting production facilities. Since 2013 there have been constant efforts to meet the growing demand from the Egyptian government as well as by the private sector.

In order to meet the forecasted demand and secure the electricity stability in addition to the commitment to supply electricity to slum areas and informal buildings, the Egyptian Electricity Transmission Company (EETC) together with the distribution companies need to provide additional substations and their interconnections to evacuate newly produced energy and deliver to the final consumer.

The EETC is one of sixteen affiliated Companies under the Egyptian Electricity Holding Company (EEHC). The main role of the EEHC is the management, operation and maintenance of electric power transmission grids on extra high voltage and high voltage all over the country, for the optimal economic usage of those grids. EEHC's goal is to meet the growth in electricity demand while optimizing the use of all resources and maximizing the profit.

In response to the growing demand for electricity and in support for EEHC's plan to expand the existing electricity infrastructure of power stations, substations and interconnecting lines/cables, the European Investment Bank (EIB) is funding the construction of several substations and interconnecting lines in cooperation with the EETC.

In line with EIB environmental and social standards, EETC is committed to carrying out an ESIA of New Gamasa GIS Substation and its interconnecting OHTL to different existing substations and a Resettlement Action Plan (RAP) should the project activities trigger Egyptian legislations and/or EIB instruments relevant to resettlement.

EcoConServ environmental services (hereinafter referred to as 'the consultant') has been contracted to carry out the ESIA study and RAP in accordance with national legislations as well as "EIB environmental and Social Practices handbook, 2013¹, and the standards of IFC, particularly the book 5 on the preparation of a resettlement action plan RAP report².

The consultant proceeded to identify and assess the environmental and social conditions in the project's area. In addition, the management and monitoring plan, including the mitigation measures during construction and operation and maintenance phases are described in the ESIA report for all project components involved.

¹ http://www.eib.org/attachments/strategies/environmental_and_social_practices_handbook_en.pdf

² <http://documents.worldbank.org/curated/en/206671468782373680/pdf/301180v110PAPE1ettlement0sourcebook.pdf>

https://www.ifc.org/wps/wcm/connect/322d9d80488559f584b4d66a6515bb18/OD430_InvoluntaryResettlement.pdf

1.2. Project's Rationale of the New Gamasa GIS Substation and its interconnection overhead transmission lines.

In order to meet the steady increase in energy demand, the Egyptian expansion plan targeted to reinforce the national electricity network by adding more capacities and overhead transmission lines and underground cables, this expansion is required for evacuation of power generated from the new power plants to the load centers.

The construction of New Gamasa GIS Substation and its overhead transmission line cable will evacuate and transmit the energy of New West Damietta power plant, provide system stability electricity service at Delta zone area by improving the voltage level, as well relieve the loading of the neighboring substations in Delta Zone.

1.3. The ESIA and RAP Objectives

According to the ToR, this consultancy task had two main outputs; An Environmental and Social Impact Assessment (ESIA) study, and a RAP study.

The objectives of the ESIA study thus are as follows:

- Identify and assess the potential environmental and social impacts of the each project components on the surrounding areas (during construction and operation phase).
- Compare the impacts in relation to the relevant national and international legal requirements and guidelines.
- Develop an environmental and social management plan for the mitigation of the potential negative impacts of each project components and for monitoring compliance with the relevant environmental laws and regulations during construction and operation.
- Hold consultations with the public including a final public consultation event which is publicly announced and well attended by relevant stakeholders.
- As a requirement, in parallel with the consultations activities, the disclosure will be conducted in accordance with the EIB standards. The disclosure shall take place to ensure that the information about the project was well conveyed to the stakeholders and the community involved in the decision processes.

The objectives of the RAP study are as follows:

- to ensure that the project affected persons (PAPs) including those who might be affected by physical resettlement or negative impacts on their sources of livelihoods or other impacts according to the World Bank OP 4.12 will be fairly compensated and that allocations for this will be planned as part of the social management plan.
- To enable those displaced by a project to improve their standard of living. This requires an examination of social, environmental, and economic conditions beyond simple physical inventories. Thus, resettlement activities should result in measurable improvements in the economic conditions and social well-being of affected people and communities.
- Displacement may be either physical or economic.

- Physical displacement is the actual physical relocation of people resulting in a loss of shelter, productive assets or access to productive assets (such as land, water, and forests).
 - Economic displacement results from an action that interrupts or eliminates people's access to productive assets without physically relocating the people themselves.
- While land acquisition does not necessarily require the displacement of people occupying or using the land, it may have an effect on the living standards of people who depend on resources located in, on, or around that land. For example, a farming family may lose a portion of its land to a project without having to vacate its homestead.

1.4. The ESIA Methodology

The ESIA focused on identifying and assessing the negative and positive impacts of the project on the environment and the socioeconomic characteristics of the impacted groups in addition to developing necessary mitigations for the negative impacts. The identifications and assessments were conducted for each of the project components during construction and operation phases. The mitigation measures were developed and presented in Environmental and Social Management Plan matrix. In addition, the monitoring plan was developed to monitor implementation of the ESMP as well as identifying the necessary capacity building activities for the implementation team. The consultant proposed the necessary budget, to implement the ESMP and the monitoring plan. Similarly, the monitoring plan is presented in the form of a matrix.

The ESIA methodology included reviewing the secondary data sources from previous reports and studies about the environmental and socio-economic characteristics of the project area. The literature review (included both reports provided by the client as well as web based resources), contributed to elaborating the ESIA study's objectives mentioned above by assessing:

- The environmental and socio-economic characteristics of the project areas
- Project background and proposed interventions
- The legal, institutional and organizational framework and background of the electricity sector and the historical background
- Environmental and social standards and guidelines for related environmental and social issues

In addition to the literature review, structured site visits were undertaken to collect primary data from the site. The visits also were used as a tool to identify stakeholders' perceptions regarding some issues (especially social issues), such as:

- The current environmental and socioeconomic characteristics on the site and at the surrounding area
- The current electricity supply at the area and its impact on the families' livelihoods particularly on the vulnerable groups (children, women, the poor),
- Gender issues related to energy management on the level of household,
- The perception of the local community towards the existing electricity service provider,

- The environmental and socioeconomic short and long term impacts predicted from the project,
- Ideas for maximizing the positive benefits especially on people's livelihoods and the economic development of the project,
- Consult with project-affected groups and local non-governmental organizations about potential resettlement issues, and take their views into account.



Figure 1-1: Photos of the site visit to the SS

1.5. The RAP Methodology

Preparation of a RAP for the entire line including complete census, identification and valuation of affected assets in the 50-meter right of way (RoW) determined by the coordinates presented in the Detailed Line Route Report of 2013 and publication of the cut-off date. The RAP should be a full and detailed planning report in compliance with the latest applicable Egyptian regulations regarding resettlement and World Bank OP4.12 and the principles and objectives of the “EIB environmental and Social Practices handbook, 2013³, and the standards of IFC, particularly the book 5 on the preparation of a resettlement action plan RAP report⁴. The RAP should take all the relevant data from the ESIA and RPF.

All man-made structures such as roads, buildings, drainages, culverts, bridges located within the Right of Way (ROW) shall be 50 meters (divided into 25 meters each from the center of the transmission lines). Also all potential sensitive natural habitat, natural features will be captured such as rivers, creeks, canals, etc. as well as all terrain conditions and vegetation types. At surface crossings, such as roads, creeks and so on, the survey shall be conducted in such a manner as to determine the crossing width, elevation, direction and the name of the crossing. For above ground crossings such as power and high-tension lines, their elevation, type, direction of crossing shall be determined. Appropriate consideration will be given to vulnerable social groups, such as women, children, the elderly, poor and ethnic minorities, all of whom are susceptible to

³ http://www.eib.org/attachments/strategies/environmental_and_social_practices_handbook_en.pdf

⁴ <http://documents.worldbank.org/curated/en/206671468782373680/pdf/301180v110PAPE1ettlement0sourcebook.pdf>

https://www.ifc.org/wps/wcm/connect/322d9d80488559f584b4d66a6515bb18/OD430_InvoluntaryResettlement.pdf

environmental and social impacts, and who may have little access to the decision-making process within society. Disclosure of information was conducted at an early stage and the outcomes of public consultations activities have been incorporated into the contents of this ESIA.

2. Legislative and Regulatory Frameworks

2.1. Egyptian Laws, Regulations and Policies

The main legislations and guidelines that will be discussed under this section are as follows:

2.1.1. Egyptian Constitution of 2014:

Article 13 states that the State shall protect workers' rights and strive to build balanced work relationships between both parties to the production process. It shall ensure means for collective negotiations, protect workers against work risks, guarantee the fulfillment of the requirements of security, safety and occupational health, and prohibit unfair dismissal, all as regulated by Law.

Article 35 states that the state is responsible for protecting private properties. With regards to expropriation, it shall be allowed only in the public interest and for its benefit, and against fair compensation to be paid in advance according to the Law.

Article 36 states that the State shall motivate the private sector to undertake its social responsibility in serving the economy and society.

Article 46 states that protecting the Environment is a national duty and that the State shall take necessary measures to protect and ensure not to harm the environment; ensure a rational use of natural resources so as to achieve sustainable development; and guarantee the right of future generations thereto.

2.1.2. Environmental Law 4/1994 for the Protection of the Environment

Of its provisions in Cabinet decree 1741/2005, is the main environmental protection legislation in Egypt. The published Environmental Impact Assessment (EIA) guidelines (October 2001/January 2005/ January 2009) form the key regulation on environmental protection. Kindly refer to Annex 1 for detailed Executive Regulation related to Law 4/1994 concerning EIA.

Provisions for Project Activities

Based on Law 4/1994 and its Executive Regulations, the following are some provisions, pertinent to the activities of the proposed project:

- Preparation of an ESIA study of the project and its presentation to the competent administrative authority, which, in turn shall refer it to EEAA for consultation.
- In terms of EEAA classifications, the project is classified as a Category B Project. For Category B project, it is not compulsory to submit the full ESIA study including consultations and disclosure. However, based on the International requirements (EIB guidelines) the full ESIA study including public consultations and disclosure processes was followed during the study preparation.
- Obtaining a license for the handling of hazardous materials from the competent administrative authority (Ministry of Housing). Onsite generation rates of hazardous wastes shall be reduced. Safe storage of hazardous waste in solid containers with clear and visible

marks for their hazard type and maintenance of an integrated record for waste handling is required by law.

- Disposal of excavation/construction waste at licensed locations through the local authority.
- Maintenance of work place noise levels and exposure periods within the regulatory limits. Strict prohibition of ambient noise higher than regulation limits for housing zones Please refer to Annex 1 for the maximum permissible limit of noise.
- Taking precautionary measures to control fugitive dust emissions during excavation and construction works.
- Compliance with the maximum permissible limits of air pollutants in the gas emissions at the project site Please refer to Annex 1 for maximum permissible gas emissions and period of exposure.

2.1.3. Law 38/1967 on Public Cleanliness

The conditions mentioned in the previous paragraph are also mentioned in Law 38/1967 for General Cleanliness and its Executive Regulations. Article 15 of the Executive regulations stipulates that vehicles hauling construction waste should have tight cover to prevent dispersion or falling of its contents.

2.1.4. Law 93/1962: Discharge of Liquid Waste

The law regulates the discharge of liquid waste to sewerage networks, thus protecting such networks and sewerage utilities from polluting discharges. Provisions of this law apply to all parts of sewerage networks including final inspection chambers and their joints to the main network and all pipelines whether constructed under public or private roads. Decree 649/1962 was revised (regulations of law 93/63) by Minister of Housing decree 44/200 including the revised specifications of liquid waste, prior to their discharge to the sewerage network. Late 2003, Minister of Housing decree 254/2003 (as 8th chapter of decree 44/2000) was issued for the bases and specifications of the treatment, handling and safe re-use of sludge.

Following, are some pertinent articles for the project activity.

Wastewater discharged to the sewerage network should comply with the standards stipulated in the regulations (decree 44/2000). Please refer to Annex 1 for maximum pollutant to be discharged in public sewer network.

2.1.5. Electricity Law No. 87 of the Year 2015

In addition to Environmental Impact Assessment requirements, concerning the electricity sector installation, the People Assembly passed the bill of Electricity Law 87 which regulates all activities and developments related to the electricity sector.

Electricity Law 87/2015 addresses the limits of distances to be measured from the axis of the OHTL routes as well as the underground cables, which should be kept away from the infrastructures and development areas.

For the purposes of this report, Chapter 5 of law 87/2015 stipulates proceedings as follows:

Land Acquisition: Article 53, 55 and 62 addresses matters pertaining to land acquisition resulting from electricity projects and covers the compensation, the formation and responsibilities of the compensation committee, addressing grievances as well as specifications for the right of way.

Addressing Grievances: Article 53 further stipulates the owner/the tenants may submit written grievances/objections within 15 days from receiving the notice of forthcoming construction activities. Rejected objections will need a decision from the relevant minister to be implemented. Further grievances may be taken to the specialized courts.

Right of Way: Article 55 of the law specifies the distances to be measured and cleared from the axis of the OHTL routes as well as the underground cables, which should be kept away from the infrastructures and development areas tall trees, buildings and structures for the axis of the overhead/aerial lines routes as well as the cables. These paths are called the Right of Way (RoW). Following are the specifications:

- Twenty five meters in the case of overhead ultrahigh voltage lines (OUHVL). (132+kV)
- Thirteen meters in the case of overhead high voltage lines (HVL). (33kv – 66kv)
- Five meters from the medium voltage lines (MVL). (1kv – 33kv)
- Two meters in the case of low voltage lines (HVL). (Up to 1kv)

2.1.6. Electricity Law No. 67 of the Year 2006

Electricity Law 67/2006 was issued for the sake of protecting the consumer. Article 2 of this law, states that the consumer's rights must not be compromised, including the consumer's right to access to knowledge on the protection of his legitimate rights and interests in order to ensure that he is aware of the party whom he can refer to in case of any complaints. The consumer also has the right to bring lawsuits on all that would prejudice or damage his rights or restrict them. The service provider also must supply the consumer with correct information about the nature and characteristics of the product – which is indicated in this report as "the electricity" - to avoid misleading the consumers or the beneficiaries of the service causing them to fall into error or mistake.

Under this law, an agency should be established for the protection of the consumer and his interests. The Egyptian Electric Utility & Consumer Protection Regulatory Agency is the authority competent for the protection of the consumer in the electricity sector. In regard of electricity tariff and collection fee, EETC is already provides the certain fees regulation and fees collection system, to provide all diverse consumers.

2.1.7. The work environment and operational health and safety

Several laws and decrees tackle occupational health and safety provisions at the work place, in addition to Article 43 – 45 of Law 4/1994, which address air quality, noise, heat, humidity and the provision of protective measures to workers. These laws and decrees apply to the work crew that will be involved in construction activities.

Law 12/2003 on Labour and addresses workforce safety and assurance of the adequacy of the working environment. The law also deals with the provision of protective equipment to workers

and fire-fighting/emergency response plans. Moreover, the following laws and decrees should be considered:

- Minister of Labour Decree 48/1967
- Minister of Labour Decree 55/1983
- Minister of Industry Decree 91/1985
- Minister of Labour Decree 116/1991

2.2. European Investment Bank (EIB) Environmental Guidelines

The European Investment Bank (EIB) promotes European Union (EU) policies through its financial and other support to sustainable investment projects. Its approach is based on the environmental principles enshrined in the Treaty of preservation of the environment, protection of human health, rational utilization of natural resources and promotion of measures at the international level, establishing the European Community and the standards and practices incorporated in European Union (EU) secondary legislation on the environment.

The EIB adopted an Environmental Statement in 1996 to underline its commitment to protecting and improving the natural and built environment according to EU policy. A revised Statement was issued in 2002 and again in 2004, aligning the Bank with the Sixth EAP in support of sustainable development both within the EU and outside.

The EIB environmental and social handbook also refers to the following directives as references to consider during the preparation of an ESIA

- The EU EIA Directive 2011/92/EU amended by Directive 2014/52/EU
- The Habitats Directive and 92/43/EEC
- The Birds Directive 2009/147/EC
- The EU Water Framework Directive (2000/60/EC)
- The SEA Directive 2001/42/EC
- The SEA Protocol under the UN ECE Espoo Convention

EIB policy towards EIA is summarized in its Environmental Statement 2004 and "Environmental and Social Handbook" of 2013 - EIB.

According to the EU EIA Directive, it is the responsibility of the host country and its competent Authorities to ensure that the "public concerned" are informed and consulted on the proposed project (Articles 6 and 9). Bank staff as part of their environmental assessment checks that these requirements have been fulfilled.

Concerning the bird migration and habitat, although Egypt does not lie within the European territory, but as the bird migration and the wildlife of the migration birds might trigger as some of the migration path pass the Egyptian territory from the European member states. However, as the project sites; both SS site and interconnections sites are not on the wild state and are not within the migration path that pass the Egyptian territory, the impacts on migration of birds are considered negligible.

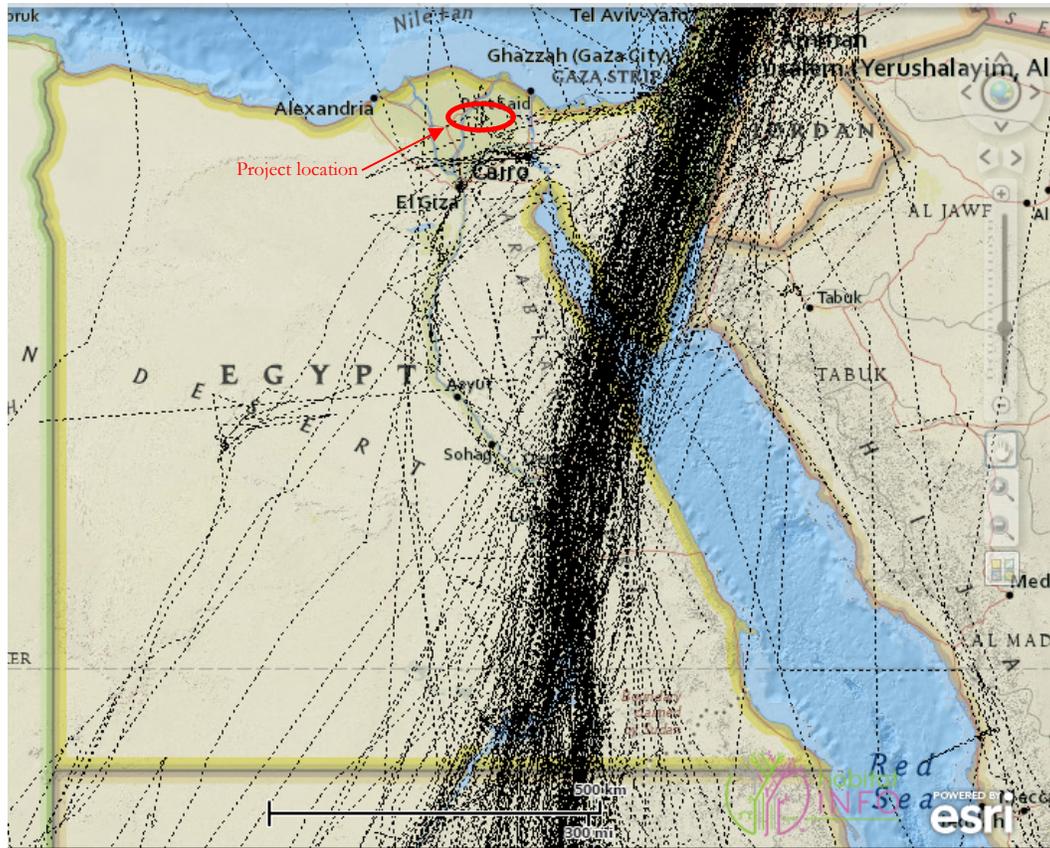


Figure 2-1. Main migration routes in Egypt

Source: BirdLife International (2015)

In addition, as the nature of the existing sites are the empty land dedicated for a construction of a substation (within the suburb residential area) and interconnections lines to connect the new SS to the national grid, there is no natural habitats or wild life are present on site. Similarly, the flora and fauna of the project sites are considered low.

Consultation and participation is essential for investment sustainability through increased local ownership and support through informed involvement. Moreover, meaningful dialogue and participation is crucial to promoting and supporting the rights of people affected by a project. This includes the rights to due process via recourse to independent appeal and arbitration procedures in the case of disputes. As such, public consultation is a general requirement of the environmental and social safeguards of the Bank. For this ESIA, to ensure the public participation and public concerns is accounted, the public consultations were held during the preparation of ESIA, following the Chapter C.9 Public Consultation and Participation – EIB Environmental and Social Practices Handbook 2010 and WB procedures for public consultations plan. Summary of the EEAA, EIB policies and WB Procedures and guidelines concerning the environmental and social aspects of the project is presented at Table 2-1.

Table 2-1. Summary EEAA, EIB and WB safe guard and policies for environmental and social aspects

	Safe guard	Policy Triggered		Justification
		EEAA	EIB	
1	EIA	Yes	Yes	<ul style="list-style-type: none"> • ESIA is a compulsory study (in accordance to Egyptian and International guidelines and regulations); that has to be provided prior to the implementation of any project. • This policy applies to all projects requiring a Category B of Egyptian Laws and Regulations 4/1994, and Table D of EIB project categorization will be applied. In addition, the EIA is in accordance to EIA Policy summarize in Environmental Statement 2004 governed by Directive 85/337/EEC, amended by Directives 97/11/EC and 2003/35/EC • All Environmental and Social aspects related to construction of the substation and interconnections project will be adequately examined in accordance to the Egyptian and EIB regulations and guideline • All Environmental and Social aspects related to operation of the substation and interconnections project shall be adequately examined in accordance with the Egyptian and EIB regulations and guidelines
2	Natural habitat and Bird Migration	No	No	<ul style="list-style-type: none"> • No natural habitat or physical cultural or natural protectorate property issues have been identified during site visits or desk studies, hence the risk of project affecting natural habitats or physical cultural or natural protectorate property is considered negligible. • The project does not belong to the international bird migration path. Therefore, the bird migration is not triggered in this study (by both national (Egyptian) and International (EIB)). • In addition, the project sites are mainly urban areas which are characterized by only local birds
3	Involuntary Resettlement	No	Yes	<ul style="list-style-type: none"> • For this particular component of the project, involuntary resettlement was triggered. • There is no private land acquisition or resettlement that will take place at the new SS site as it is already plotted and approved by the decree from Dakahlia Governorate. However for the overhead transmission lines, the parts of the routes which pass through (State-owned) no land acquisition is required for these parts but it will be required for the parts crosses by agricultural lands (Private Ownership).

	Safe guard	Policy Triggered		Justification
		EEAA	EIB	
4	Public Consultation	No	Yes	<ul style="list-style-type: none"> Although it is not compulsory under the Egyptian laws and regulations, the Consultant carried out stakeholder engagement activities through Two phases in August 2017 and May 2018 through the following methods: Focus Group Discussions (FGDs) with community members and surrounding farming-related stakeholders, Group Meetings and Semi-Structured Interviews with community stakeholders to ensure that the public is well informed. The consultations involved as part of the scoping, several discussions and interviews held to receive stakeholders' feedback on the project's. the stakeholder engagement activities were conducted on the station and its OHTLs, and designed in accordance with EIB handbook, IFC Guidance. Consultation activities Process and results has been designed in accordance with EIB handbook, IFC Guidance. Consultation activities process and results are presented as a part of the ESIA study <p>Public Consultation Activities Process has been designed in accordance with the Standard 10 – Stakeholder Engagement of the environmental and social EIB handbook and IFC Guidance.</p>
5	Disclosure	No	Yes	<ul style="list-style-type: none"> According to Egyptian Law and Regulation, Disclosure is only applicable to category C project; hence it is not applicable to the current project. However, as the Disclosure process is compulsory under the EIA Directive, it has been designed in according the EIB disclosure requirements <p>The Consultant carried out stakeholder engagement activities in Two phases in August 2017 and May 2018 through the following methods: Focus Group Discussions (FGDs) with community members and surrounding farming-related stakeholders, Group Meetings and Semi-Structured Interviews with community stakeholders in order to spread information about the project and identify their concerns toward the project.</p>

3. Project Description

3.1. Project Objectives

The construction of New Gamasa GIS Substation 220/66/11 kV (2x125+2x40 MVA,) and its overhead transmission lines interconnection (220 kV and 66 kV networks) will improve power capacity at Delta Zone Area with minimum losses of transferred power. The project aims to fulfill the following five main objectives:

- Evacuate the generated power from New West Damietta Power plant,
- Feeding 80MW to TIBA steel plant near Gamasa city,
- Relieving the loading of the neighboring Substations in Delta zone such as (Mansoura, Gamalia, Damietta...).
- Improve the voltage profile and system stability in Delta Zone area, and
- Reinforce the 200kV and 66 kV national electricity network.

Those objectives are in accordance to the EEHC and its affiliated companies' mission toward the society: to provides continuous and safe supply of electricity to all type of consumers. In addition, as the EEHC and its affiliated companies' long term goals, all the implementation of their project is in accordance with international performance standards and taking into consideration all the environmental, social and economic determinants.

As part of the current project, the New Gamasa Substation will be connected to the national electricity network through 220 kV and 66/11 kV overhead transmission line, in addition to improving the 220 kV network through construction of new 220 kV network, modifying and extending current ones.

3.2. Project Overview

3.2.1. Project Location

During the preparation of the ESIA report, the ESIA experts conducted several site visits to the proposed SS location. The routes for the overhead transmission line was identified according to the data and maps collected from EETC, including the map showing the general layout of the Substation and the routes of the overhead transmission lines sorting from the new Gamasa GIS SS. The data provided by the EETC and site reconnaissance visits conducted by the experts gave the team a better understanding of the project site, description of the project locations and its surroundings and the existing environmental and social conditions related to the different perspectives (environmental, social, human being, flora, fauna, cultural heritage sites, etc.).

The proposed SS will be located in Gamasa city, Dakahlia governorate, on the international coastal road in Isis area. The site will be constructed in arid area with no vegetation covers; the proposed substation has an irregular rectangular shape with area of approximately 38.424057 m² (198.3 m x 195.66m x 197.05m x 193.11 m) as determined in the following coordinates:

Proposed New Gamasa GIS SS coordinates

UTM Coordinates	
31°25'54.12"N	31°31'28.50"E
31°25'54.95"N	31°31'21.10"E
31°26'1.20"N	31°31'22.33"E
31°26'0.20"N	31°31'29.54"E

The map of the proposed New Gamasa GIS SS and conceptual line diagram is presented in Figure 3-1.



Figure 3-1. Map of proposed SS for New Gamasa GIS SS and its surroundings

The following table presents the boundaries of the proposed area for the SS site location:

North	200 m long facing to a vacant area and then new drinking water plant
South	200m long facing to the international coastal road
East	150 m long facing to an youth residential area
West	150m long facing to a road and then a dedicated vacant area for schools

Overhead transmission lines

220 kV OHTL New Gamasa SS \ West Damietta power

The OHTL from west Damietta power plant, originates from Damietta power plant crosses the international coastal road heading to the new Gamasa SS crosses over drainage. It is clear from the coordinates and the map of the route that OHTL will pass by several agriculture lands and the towers will be constructed on these lands. Construction of the towers may require cut off some crops or tall trees if exist on these lands. Accordingly, a resettlement action plan (RAP) is prepared with full detailed about the types of these crops and the acquired compensations.

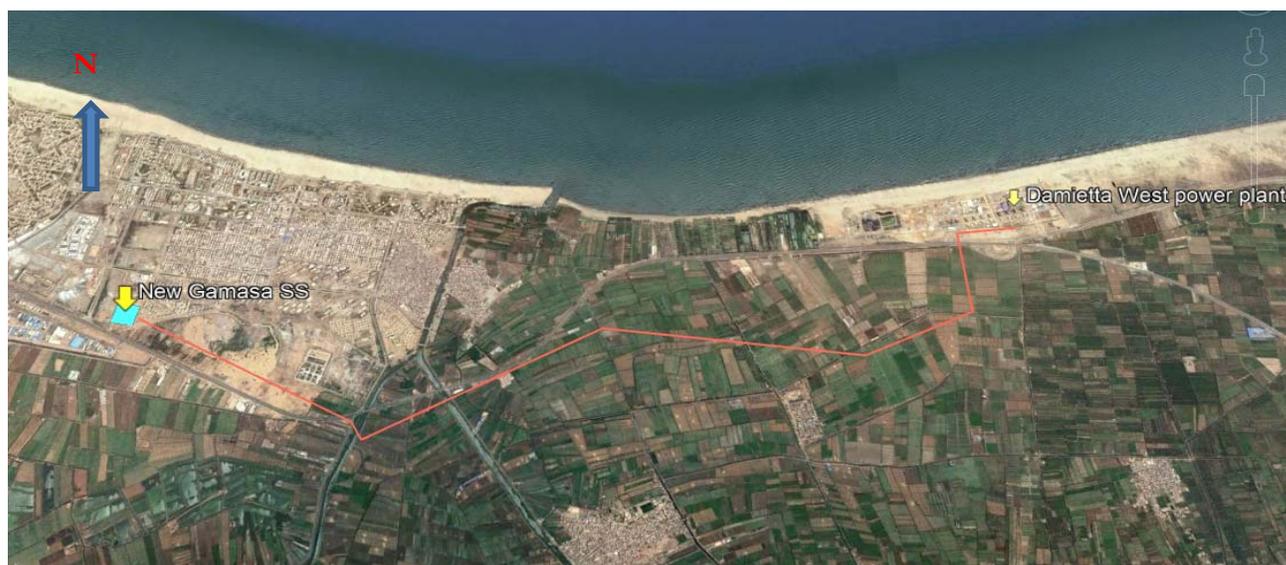


Figure 3-2. The route of 220 kV OHTL from Damietta power plant to New Gamasa SS

220 kV OHTL New Gamasa SS \ Tiba Steel plant

The OHTL originates from new Gamasa SS on a state-owned land, then it crosses the international coastal road, then it will pass in cultivated lands heading TIBA Steel. The OHTL is of 3.5 km total distance where 12 electric towers are to be established. All of the OHTL passes in Dakahlia Governorate. Construction of the towers may require cut off some crops or tall trees

if exist on these lands. Accordingly, a resettlement action plan (RAP) is prepared with full detailed about the types of these crops and the acquired compensations.



Figure 3-3. The route of 220 kV OHTL New Gamasa SS \ Tiba Steel plan

66 kV OHTL Gamasa SS (the old one)/ Balteem

The OHTL Gamasa 66 SS(the old one) / Balteem is the only OHTL of 66kV associated to New Gamasa SS and had been constructed before the arrangement to commence the proposed New Gamasa SS. Its route is passing through state-owned land. The line consists of 2 towers which are constructed on allocated areas of the industrial zone, on which there is no economic activity. Consequently, No RAP study anticipated for this OHTL.

The first tower is located 50 meters far from the fence of New Gamasa SS then it crosses the international coastal road between Alexandria and Damietta to reach the second tower with total length of 150 meters(2x150 meters (IN/OUT)) to connect it to the existing dismantled and renovated OHTL Kafr el Bateekh/Gamasa 66kv (the old one)



Figure 3-4 The route of 66 kV OHTL Gamasa SS (the old one)/ Balteem

3.2.2. Project Components

The main components of the project according to EETC technical specifications on 14/09/2014 are as following:

New Gamasa GIS Substation SS 220/66/11 kV (2x125+2x40 MVA), with the following scope:

- 10 cells of 220 kV GIS;
- 15 cells of 66 kV GIS ;
- 3 sections of 11 kV;
- 2 transmitters;
- 2 compressors units; and
- Future expansion with 3rd transmitter 220/66 kv, 125 MVA and 3rd transmitter 66/11 kv, 40MVA.

Construction of 220 kV overhead transmission line network with the following scope:

- 220 kV, construction of OHTL double circuit Gamasa \ West Damietta power plant with approximately 10.5 kilometer (IN/OUT)
- 220 kV, construction of OHTL double circuit Gamasa \ TIBA Steel with approximately 3.5 kilometer (IN/OUT)

Construction of 66 kV overhead transmission line network with the following scope:

- 66 kV, OHTL double circuit AAAC 405 mm² Gamasa SS/ Balteem and extending its length by approximately 2x 0.15 kilometers(2x150 meters) (IN/OUT)

3.3. Description of Activities during project implementation

3.3.1. Description of Activities during Construction Phase of SS

- **Site preparation:** including but not limited to: site clearance (limiting ground disturbance to existing networks during site preparation), fences construction, preparing site camp, preparing access road (if needed) for moving construction material and machineries and temporary storage of construction materials, machineries, etc.
Besides the site preparation, the approvals or the permissions from the competent authorities and surrounding establishments shall be obtained.
- **Construction of concrete works:** (footing, foundations, SS framework, support structures and equipment) and other concrete construction for OHTL path, etc.
- **Construction of Supporting buildings:** including administration building and facilities, control room, etc.
- **Erection of the equipment:** including transformers, switches yards, electrical panel, etc.
- **Waste management:** including generated domestic and construction waste (hazardous and non-hazardous). This activity will include waste identification, temporary storage, handling and transportation to the designated landfill. Temporary storage of wastes includes on site sanitation before the proper connection to the existing sewage network is installed. The common practice in Egypt that the wastes are segregated and they can be sold to a

contractor for reuse or recycling depends on the classification of the wastes. The disposal method for the construction wastes should be included in the ToR for the Contractor for waste management during construction.

For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities (EEAA). Besides all activities described above, the training for operation and maintenance, including the emergency plans is required to be conducted by the contractors who supply, erect and start up the transformers and their accessories. The capacity building activities shall be held during the warranty period.

3.3.2. Description of Activities during Construction Phase of OHTL

- **Identifying the right of way (ROW):** As discussed in chapter 2, the Electricity Law 87/2015 has identified the limits of distances to be measured from the axis of the OHTL routes in order to identify the Right of Way (ROW) zone. A distance of 25 meters from both sides for OHTL (of 500 kV and 220 kV) will be kept as a Right of Way (ROW) or buffer zone for maintaining the public safety from electric hazards.
- **Tower erection:** The depth of drilling is about 4.5 m per base and the average area required to implement the base tower from 22 m X 22 m to 33 m X 33 m.
- **Installation of tower suspension accessories:** they are erected manually by hauling the accessory using chain pulley
- **Stringing of pulling line over each stringing block for the conductor:** the pilot wire is manually strung over valley which is attached to power cable. The pilot wire is sometimes shot using winch or through drones.
- **Tensioning and sagging of conductor:** tension and sag corrected using manual winch, chain pulleys, bull wheel type pullers and other associated equipment
- **Waste management:** for generated domestic and construction waste (hazardous and non-hazardous). This activity will include waste identification, temporary storage, handling and transporting to the designated landfill, etc. In general, the disposal method for the construction wastes should be included in the ToR for the Contractor for waste management during construction. Temporary storage of wastes includes on site sanitation before the proper connection to the existing sewage network is installed. It is preferable to include the temporary onsite waste management in the ToR of the contractor. The common practice in Egypt that the wastes are segregated and they can be sold to a contractor for reuse or recycling depends on the classification of the wastes

For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities (EEAA).

Contractor responsibility before EETC

Under the project scope agreement of EETC with substation and OHTL contractor, the work shall cover on turn-key basis engineering, design, services, fabrication, factory testing, site delivery, loading, unloading of the specified equipment, civil works, installing, site testing, commissioning and insurance till handing over, training, warranty and technical assistance during warranty period.

The contractor shall abide to the ESIA findings and the ESMP in this study should be included within the ToR of the contractor. Moreover, and the contractor will adhere to the recommendations entailed in the environmental permit that would be issued by the Egyptian Environmental Affairs Agency upon approval of the environmental studies.

3.3.3. Description of Activities during Operation Phase of SS

- **General check:** for the fitting, oil quality, performance of the transformers, gas insulation quality and quantity etc.
- **Oil filtration:** Please note that during the operation and maintenance, it is expected to generate limited amounts of the rejected oil (from machines at the SS site), since oil is generally filtered using the oil filter machine available at the SS site.
- **Transformer replacement:** Due to the increased power demand at some areas, EETC may change the transformer. Please note that the current practice of the EETC is to replace the transformer. The old transformer is reused at other SS with less demand on electricity.
- **Replacement of cables and insulators:** the old and rejected insulators, OHTL cables, etc.
- **Waste management:** including the generated domestic waste and rejected waste (rejected cables and spare parts). The waste management will include waste identification, temporary storage, handling and transporting to the designated landfill. In general, the disposal method for the operation wastes should be included in the ToR for the Contractor for waste management during operation phase. It is preferable to include the temporary onsite waste management in the ToR of the contractor.

For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities (EEAA).”Besides all activities mentioned above, to ensure the knowledge and the skill of the operator of the SS, the regular training, including regular simulation during the emergency shall be organized and provided by EETC to the operators of the SS.

3.3.4. Description of Activities during Operation Phase of OHTLs

On the other hand, regular maintenance and monitoring activities along the transmission lines OHTL are minimum, it involves periodically inspecting the OHTL and the safety clearances are maintained.

3.4. Description of the Technology

3.4.1. Proposed Substation Technology

Gas Insulated Switchgear (GIS) with SF₆ gas will be used at New Gamasa 500/220/66/11 kV GIS Substation SS. GIS is a compact multi component assembly enclosed a ground metallic housing in which the primary insulating medium is compressed Sulphur hexafluoride (SF₆) gas. SF₆ acts as insulation between live parts and the earthed metal closure.

The use of SF6 gas is one of the revolutionary technologies in addition to the technology of circuit breakers. The dielectric strength of SF6 gas atmospheric pressure is approximately 3 times that of air, it is combustible, low order of toxicity, colorless and chemically very stable and kinetically inert. Also, it has quenching properties three to four times better than air at equal pressure. GIS occupy 25% space than it is required for conventional substation (needed only small ground space requirements).

With regards to maintenance activities, the GIS substation requires minimal gas maintenance work efforts, has less field erection time and erection cost.

Reasons for selection of the SS technology, is that the site is located at an arid area. The optimal option for SS technology is the indoor GIS substation using SF6 gas as described above.

Regarding the pollution and other accidents that may occur during operation and maintenance, the GIS SS with SF6 gas is known to be non-flammable, non-explosive, oil free and less pollution. Moreover, SF6 is a powerful climate change factor, and it can cause asphyxia, not related to an intrinsic toxicity, but its higher density from air, and it can substitute the air in the lungs and cause asphyxia. However, if SF6 is released to the environment will increase the impact on ozone depletion and global warming. Therefore, the check of the insulated gas has to be done properly and periodically in accordance to the specification and operation manuals. In addition, with regards to the aesthetic aspects, the GIS SS is placed inside a closed building. Thus there will be no impact on the scenery at existing establishment surrounding. Figure 3.4 below describe the main advantages of the GIS SS compared with other technologies (Conventional SS, Hybrid GIS SS)

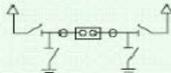
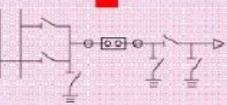
	Conventional AIS	Hybrid GIS	GIS
Main Bus	In air	In air	In SF6 gas
Arrangement of Equipment	Distributed	→ Highly integrated	
Exposure of Live Parts	Exposed	→ Fully enclosed	
Overall Land Area	Large	→ Small	
Equipment Cost	Less than GIS	→ -	
Outline of main component	 ↑ 	 ↑ 	 ↑ 

Figure 3-1 Type of GIS and their specifications

3.4.2. Proposed Overhead Transmission Line Technology (500kV and 220 kV)

Codes and Standards

Electrical

IEC60826-2003: Design criteria of overhead transmission lines.

IEC 61865: Overhead lines-Calculation of the electrical component of distance between live parts and obstacles- Method of calculation.

IEEE C2-2012: National Electrical Safety Code (NESC).

IEEE 516-2009: IEEE Guide for Maintenance Methods on Energized Power Lines.

GB 50545-2010: Code for design of 110-750kV overhead transmission line Electricity utilities specification

Civil Work

ASCE 7-05: Minimum Design Loads for Buildings and Other Structures

ASCE 10-97: Design of Latticed Steel Transmission Structures

IEEE STD 691™-2001: IEEE Guide for Transmission Structure Foundation Design and Testing

American concrete institutes (ACI)

Material

IEC61089: Round wire concentric lay overload electric standard conductor.

IEEE 812: Definition of terms relating to the fiber optics

IEC 60120: Dimensions of ball and socket coupling for string Insulators.

ISO 898: Mechanical properties of fasteners made of carbon steel and alloy steel.

ASTM: American Society for Testing and Materials.

GB/T: 700-2006: Carbon structural steels.

GB/T: 1591-2008: High strength low alloy structural steels.

3.5. Description of the materials to be used

3.5.1. Basic Design Data

The following table presents the basic information of the OHTL

Table 3-1. Basic Information of the OHTL

Subject	Description
Nominal Voltage	500kV /220 kV AC
Number of Circuits	Double circuit
Max. ambient temperature	50°C
Min. ambient temperature	-5°C
Av. ambient temperature	25°C
Conductor	ACSR-490/65 AAAC-506

Subject		Description
Shield wire		AACSR-94.1 GSW-108 OPGW(48)-G.652
Suspension Insulator String		1×160kN single suspension Insulator set 2×160kN double suspension Insulator set
Tension Insulator String		2×240kN double tension Insulator set
Types of Towers	Suspension towers	W2
	Tension towers	WA, W30, W60
	Terminal towers	WT60
	Navigation towers	WCR

3.5.2. Electrical System Data

Table 3-2 Electric system data of 500 kV and 220kV

Subject	Description
Nominal voltage Un	500kV/220 kV
Maximum operating voltage Us	525kV/231kV
Power frequency	50Hz/22 Hz
Basic Insulation Level Design BIL (lightning impulse)	1550kV/682 kV
Switching impulse withstand voltage	2.0p.u.
Design creep age distance	40mm/kV 45mm/kV

3.5.3. Conductor and Shield wire

The new overhead transmission lines will consist of two circuits of each quad-bundle phase conductors ACSR-490/65 or conductor AAAC-506. The line will be equipped with two shield wires; one shield wire shall be of AACSR-94.1 type, the other of similar type but designed as OPGW with 48 fibers Basic Standards as follows:

For the complete conductor: ASTM B 232 and EN 50182

For the component wires:

- a) Aluminum wires EN 60889
- b) Steel wires EN 50189
- c) Grease EN 50326
- d) Conductor creep IEC 61395

Conductor ACSR 490/65 and AAAC-506

The phase configuration shall be quad-bundle of aluminum conductor steel reinforced (ACSR) and all aluminum alloy conductor (AAAC) as per DIN_EN 50182.

The main principal of conductor selection is as follows:

- 1) Meet the requirement of current-carrying capacity;
- 2) Meet the requirement of electromagnetic environment;
- 3) Good mechanical properties;
- 4) Economical;
- 5) Meet the requirement of production and construction.

The conductor of this project is mainly selected based on these principles and the employer's requirements.

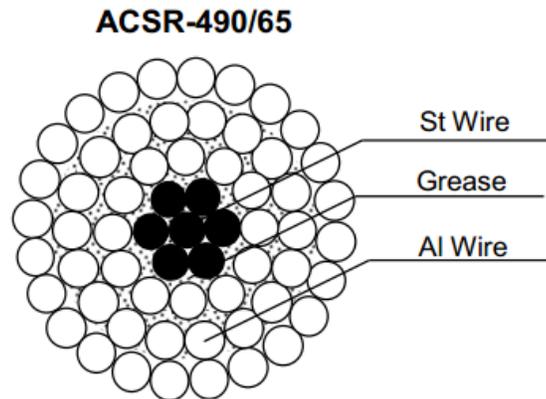


Figure 3-2 Conductor ACSR-490/65 Structure

The main technical data of the ACSR 490/65 are as follows in accordance with EN 50182:

Table 3-3 Technical data for ACSR 490/65

Parameter		Unit	Value
Structure	Center: Steel wire	Nos./mm	1/3.40
	Layer 1: Steel wire		6/3.40
	Layer 2: Aluminum wire		12/3.40
	Layer 3: Aluminum wire		18/3.40
	Layer 4: Aluminum wire		24/3.40
Standard		/	IEC 60888/60889/61089
Stranding direction of outer layer		Direction	Right
Conductor diameter		mm	30.60
Cross section		mm ²	553.8
Conductor weight(Without grease)		kg/km	1852
Conductor weight(All the conductor is greased except the outer layer)		kg/km	1922
Rated tensile strength		kN	152.85
Modulus of Elasticity		GPa	70
Coefficient of linear expansion		10 ⁻⁶ /°C	19.3
Max. DC Resistance at 20°C		Ω/km	0.05896
Dropping point temperature		°C	120
Lay ratio	Aluminum layer	times	Inner layer 10-16 Outer layer 10-14
	Steel layer		6 wires layer 16-26

The main technical data of the AAAC-506 are as follows in accordance with EN 50182:

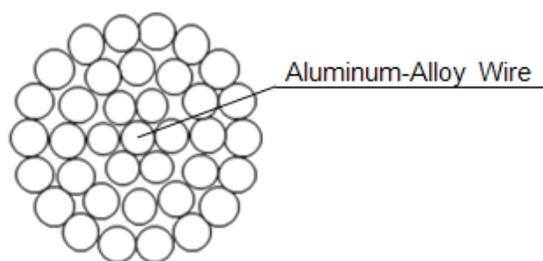


Figure 3-3 Conductor AAAC-506 Structure

Table 3-4. Technical data of conductor AAAC-506

Code name	AAAC-506
Sectional area of Aluminum alloy	506.71 mm ²
Total sectional area	506.71 mm ²
Overall diameter	29.23mm
Approximate weight	1399 kg/km
Modulus of elasticity	55000 N/mm ²

Code name	AAAC-506
Coefficient of linear expansion	$23 \times 10^{-6}/^{\circ}\text{C}$
Minimum UTS	144.7kN
EDT at 25°C and no wind	18%UTS
0°C and max wind pressure	33%UTS
Resistance DC @20°C	0.06609Ω/km

Conductor creep will be compensated by over tensioning the conductor at a temperature of 25°C lower than the stringing temperature for ACSR-490/65 and AAAC-506 for the transmission lines.

Shield wire AACSR-94.1 and GSW-108

94.1 mm² Aluminum clad steel will be used as shield wire for 500 kV O.H.T's in coastal areas and in other areas 108 mm² zinc coated steel wires (hot dip galvanized) will be used.

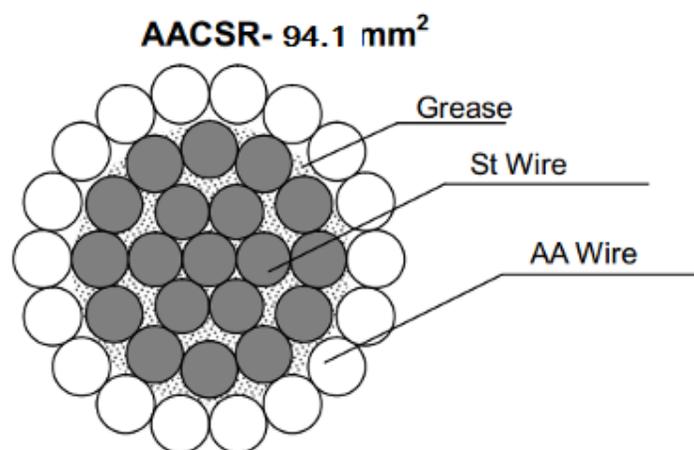


Figure 3-4 Shield wire AACSR-94.1 structure

The main technical data of the AACSR-94.1 type according to ASTM are shown in the table below:

Table 3-5. Technical data for AACSR-94.1

Standard	FRENCH CONDUCTOR (Non-equal steel and aluminum wire diameter)
Conductor type	PHLOX 94.1
Aluminum Alloy Area	51.95
Steel Area	42.12
Total sectional area(mm ²)	94.07
No. & Dia Of Al Alloy Wires(mm ²)	15×2.10
No. & Dia Of Steel Wires	19×1.68
Overall diameter(mm)(mm ²)	12.8
Linear weight(kg/m)	0.481
Modulus of elasticity(N/mm ²)	112000
Coefficient of linear expansion	14.7×10^{-6}

Rated tensile strength/kN	80.35
Max. DC resistance at 20°C	0.642

The main technical data of the GSW-108 are shown in the table below:

Table 3-6. Technical data of conductor GSW-108

Standard	FRENCH CONDUCTOR (Non-equal steel and aluminum wire diameter)
Conductor type	GSW-108
Total sectional area(mm ²)	108
Overall diameter(mm)(mm ²)	13.29
Linear weight(kg/m)	0.87
Modulus of elasticity(N/mm ²)	186200
Coefficient of linear expansion	11.5×10 ⁻⁶
Rated tensile strength/kN	134.26

The shield wire sag shall be equal the phase conductor's sag for everyday conditions (25°C, still air).

Dampers are proposed for the shield wire for wire protection against Aeolian vibration as a necessary measure for the adopted tension.

3.5.4. Optical fiber composite overhead ground wire (OPGW)

An Optical Phase Conductor with a design similar to an AACSR conductor shall be used.

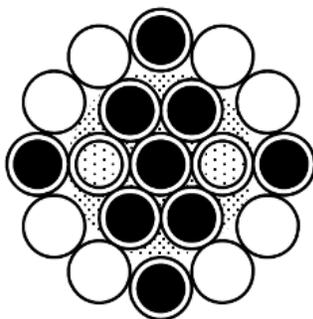


Figure 3-5 OPGW structure

Table 3-7. Technical data of OPGW

		Named	No.	Diameter
Structure Details		27%AS wire	1	3.00 mm
	Layer 1	27%AS wire	4	3.00 mm
		SUS-Tube	2	3.00 mm
	Layer 2	27%AS wire	4	3.00 mm
AA wire(LHA1)		8		

Technical Data	According to IEEE std 1138、IEC 60794-4 standards		
	Stranding direction of outer layer is "Right-hand"		
	Fiber No. & Type	48 G.652D	
	Standard Diameter	15.00 mm	
	Supporting Cross Section	120.17 mm ²	
		Section of AS wire	63.62 mm ²
		Section of AA wire	56.55 mm ²
	Approximate mass	574.9 kg/km	
	Rated Tensile Strength	82.7 kN	
	Maximum Allowable Tension(40%RTS)	275.4 N/mm ²	
	Everyday Stress(20%RTS)	137.7 N/mm ²	
	Strain Margin Stress(70%RTS)	481.9 N/mm ²	
	Modulus of Elasticity	105.0 GPa	
	Thermal Elongation Coefficient	16.2 ×10 ⁻⁶ /°C	
	Calculated D.C. Resistance at 20°C	0.374 Ω/km	
	Short-Circuit Current (0.5 sec, 50~200°C)	14.3 kA	
Short-Circuit Current Capacity (50~200°C)	101.7 kA ² -s		
Minimum Bending Radius	300 mm		
Ratio between Pull and Weight	14.67 km		
Temperature Range:	Installation	-10°C~+50 °C	
	Transportation and Operation	-40°C~+80 °C	

Remarks: All Sizes and Values are Nominal Values

OPGW sag shall be equal the phase conductor's sag for everyday conditions (25°C, still air). Dampers are proposed for the OPGW for wire protection against Aeolian vibration as a necessary measure for the adopted tension. Regarding the optical fibers, the OPGW shall have 48 fibers.

Splice boxes

Suitable splice boxes (enclosures) shall be provided to encase the optical cable ends and fusion splices in protective, moisture and dust free environment.

- The splice boxes shall be designed for the storage and protections of a (48) fibers cables as specified and provide access through locked doors.
- Attenuation of single mode fusion splices shall not exceed 0.03 dB when measured at either 1310 or 1550 nm wavelengths.
- The splice boxes shall be appropriate for mounting on steel structures and accommodate pass-through splicing and fiber terminations.
- The splice box, including organizer/splicing trays, shall be designed to seal and protect the fiber cable splices from the environment and it shall protect easy access for any maintenance function.
- All splice boxes shall be of metal construction that are clean and smooth finished, treated to resist rust, accommodate the storage of a minimum of 3 meters of coiled fiber and allow easy

- access to the splice trays.
- The splice box shall be furnished with necessary grounding pads to connect the grounding conductor.
- The splice boxes shall be IP65.

Vibration damper shall be Stockbridge type.

Suspension clamp shall be flexible.

Tension clamp shall include adjustable extension link.

If an armor rod be inserted between the clamp of VD and the cable, thickness of the armor rod should be stated to ensure that the diameter of VD clamp is compatible with the diameter of the armor rod plus the OPGW diameter.

3.5.5. Tension limitation

Conductor tension limitation shall be as follows:

- a) 33% of rated strength at 0°C with max wind. OPGW final sag shall be equal to the conductor sag of EDS temperature. Maximum tension of OPGW shall be at 0°C and maximum wind of referring to its tension mentioned above at EDS temperature.
- b) 18% of rated strength at 25°C with no wind.

3.5.6. Phase Order

Total trip-out rate of double circuit transmission lines from high to low is same phase sequence (ABC-ABC) different phase sequence (ABC-BCA), reverse phase sequence (ABC-CBA). Lightning stroke simultaneity trip-out rate of parallel double circuit from high to low arrangement is same phase sequence (ABC-ABC), reverse phase sequence (ABC-CBA) and different phase sequence (ABC-BCA). Total trip-out rate of double circuit with same phase sequence (ABC-ABC) is significantly higher than that with different phase sequence and reverse phase sequence. Thus considering the lightning protection, double circuit transmission line shall avoid the same phase sequence. At the same time, in order to reduce the capacitive current different phase sequence and reverse phase sequence are proposed.

3.5.7. Transposition

According to international rules, for directly grounded system, it is necessary to conduct a transposition if the length of transmission lines from the substation is more than 100km.

Sketch map of the transposition of the line is shown in attached drawings. Transposition tower will be modified and design based on the tension tower.

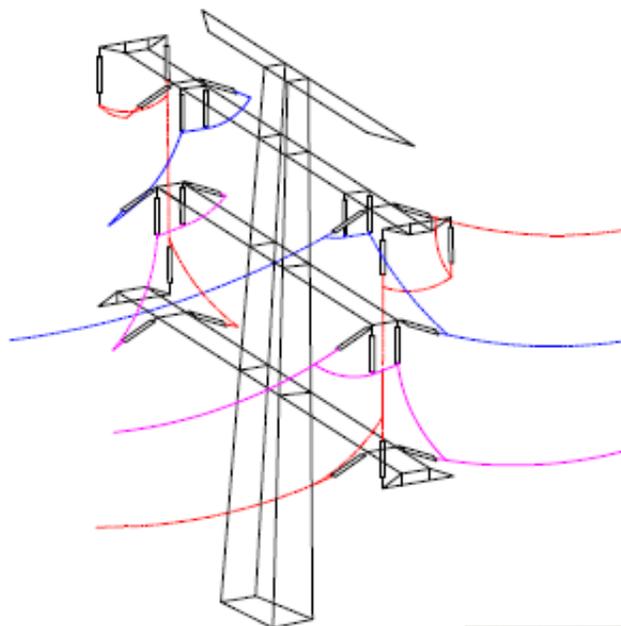


Figure 3-6 Sketch map of transposition tower

3.6. Waste generation

The waste generated during construction could be categorized as follows:

- Normal construction wastes including scrap concrete, steel, bricks, wood, etc.,
- Miscellaneous non-hazardous solid wastes, including packaging waste, wood, scrap metal, and building rubble will be generated during the construction phase of the project
- Solid hazardous wastes generated include empty containers, used drums, spent welding materials, solvents, paints or adhesives, and other hazardous wastes resulting from operation and maintenance of the equipment and vehicles, i.e. spent oils, spent lube, waste oil filters, batteries, etc. Among the hazardous wastes also are the wasted or faulted materials including conductors and insulators.

Human or domestic wastes generated by construction labor, including sewage and garbage collected from the labor camp location.

The wastes generated during Operation phase will be minimal and will largely consist of municipal waste (e.g. food; packaging) and over time potentially defunct parts and spare parts, cabling and control equipment etc. Waste management arrangements for the construction phase should be continued (proper control of collection, storage and final disposal via licensed contractors).

3.6.1. Waste Generation and Disposal

New Gamasa Substation

During Construction

For hazardous solid and liquid wastes, proper waste collection and storage plus regular (preferably twice a week) waste collection by licensed contractors will need to be arranged by site management.

To co-ordinate and control this, the site management should develop a waste management plan which is included in the ToR for the Contractor for waste management during construction. It will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities (EEAA).”For the non-hazardous solid wastes, those that cannot be recycled will be disposed in a sanitary landfill periodically (weekly or monthly depending on the volume of waste generated). The domestic wastes (wastewater and solid waste) generated during the construction will be collected by a licensed contractors according to the Egyptian legislation and regulations and it will be included in the ToR of the contractor.

The management and monitoring of the hazardous and non-hazardous waste, temporary internal storage and collection and transportation arrangement including the monitoring of waste management will be discussed in Chapter 8.

During Operation and maintenance

Small quantity of domestic wastes (solid and liquid waste) will be generated. Industrial hazardous wastes are generated during routine operations (e.g., lubricating oils, hydraulic fluids, coolants, solvents, and cleaning agents). These wastes; according to EEAA regulations for hazardous waste management, should be placed in containers, characterized and labeled, possibly stored briefly, and transported by a licensed contractor to an appropriate [permitted off-site disposal facility](#) as a standard practice.

Regarding the replaced transformer, the reuse, if possible, is conducted as a common practice at EETC. When the transformer is still functioning well but due to the increase capacity on the substation, the functioned transformer will be reuse at the other SS. Otherwise, the unused transformer will be dispose to the hazardous landfill.

Regarding the domestic waste, the liquid waste generated from the sanitation facility will be connected to the existing public sewage network. In addition, the domestic solid waste will be collected as well by the existing public collection.

Hazardous materials and waste management resulted from the construction of the underground cables will be limited to the possible rejected cables, scraps.

OHTLs

During Construction

Beside the wastes generated due to construction activities, the human or domestic waste will be generated. Although the amount is considered limited, but due to aesthetic reason, the management of domestic waste should be implemented by the contractor. It is preferable to include the onsite temporary storage (for solid and sanitation) waste management (for hazardous and non-hazardous wastes) in the ToR of the contractor.

During operation

There shall be different types of wastes generated during the operation phase of OHTL resulting from maintenance, repair and replacement activities. Among these types the following:

- Waste cables that will be replaced along the transmission line. Some of these cables may be covered with PVC insulators, which, if burned, cause harmful emissions including dioxins. Accordingly, waste cables could be of high risk if PVC cables were disposed in open dumps where it could be exposed to open fires.
- Scrap fittings, insulators, cross arms, conductors, and other scrap which are expected to be from inert materials that does not cause high risk in disposal/recycling procedure.

3.7. Overall Approach and Methodology

The ESIA focused on identifying and assessing the negative and positive impacts of the project on the environment and the socioeconomic characteristics of the impacted groups in addition to developing necessary mitigations for the negative impacts. The identifications and assessments were conducted for each of the project components during construction and operation phases. The mitigation measures were developed and presented in Environmental and Social Management Plan matrix. In addition, the monitoring plan was developed to monitor implementation of the ESMP as well as identifying the necessary capacity building activities for the implementation team. The consultant proposed the necessary budget, to implement the ESMP and the monitoring plan. Similarly, the monitoring plan is presented in the form of a matrix.

The ESIA methodology included reviewing the secondary data sources from previous reports and studies about the environmental and socio-economic characteristics of the project area. The literature review (included both reports provided by the client as well as web based resources), contributed to elaborating the ESIA study's objectives mentioned above by assessing:

- The environmental and socio-economic characteristics of the project areas
- Project background and proposed interventions
- The legal, institutional and organizational framework and background of the electricity sector and the historical background
- Environmental and social standards and guidelines for related environmental and social issues.

In addition to the literature review, structured site visits were undertaken to collect primary data from the site. The visits also were used as a tool to identify stakeholders' perceptions regarding some issues (especially social issues), such as:

- The current environmental and socioeconomic characteristics on the site and at the surrounding area,
- The current electricity supply at the area and its impact on the families' livelihoods particularly on the vulnerable groups (children, women, the poor),
- Gender issues related to energy management on the level of household,
- The perception of the local community towards the existing electricity service provider,
- The environmental and socioeconomic short and long term impacts predicted from the project,

- Ideas for maximizing the positive benefits especially on people's livelihoods and the economic development of the project,
- Consult with project-affected groups and local non-governmental organizations about potential resettlement issues, and take their views into account.

Preparation of a RAP for the entire line including complete census, identification and valuation of affected assets in the 50-meter right of way (RoW) determined by the coordinates presented in the Detailed Line Route Report of 2018 (See Annex 2), and publication of the cut-off date. The RAP should be a full and detailed planning report in compliance with the latest applicable Egyptian regulations regarding resettlement and "EIB environmental and Social Practices handbook, 2013"⁵, and World Bank OP4.12⁶, and the IFC book 5 related to involuntary resettlement action plan. The RAP should take all the relevant data from the ESIA.

All man-made structures such as roads, buildings, drainages, culverts, bridges located within the Right of Way (ROW) shall be 50 meters (divided into 25 meters each from the **Centre** of the transmission lines). Also all potential sensitive natural habitat, natural features will be captured such as rivers, creeks, canals, etc. as well as all terrain conditions and vegetation types. At surface crossings, such as roads, creeks and so on, the survey shall be conducted in such a manner as to determine the crossing width, elevation, direction and the name of the crossing. For above ground crossings such as power and high-tension lines, their elevation, type, direction of crossing shall be determined. Appropriate consideration will be given to vulnerable social groups, such as women, children, the elderly, poor and ethnic minorities, all of whom are susceptible to environmental and social impacts, and who may have little access to the decision-making process within society. Disclosure of information was conducted at an early stage and the outcomes of public consultations activities have been incorporated into the contents of this ESIA .

⁵ http://www.eib.org/attachments/strategies/environmental_and_social_practices_handbook_en.pdf

⁶

<http://documents.worldbank.org/curated/en/206671468782373680/pdf/301180v110PAPE1ettlement0sourcebook.pdf>

https://www.ifc.org/wps/wcm/connect/322d9d80488559f584b4d66a6515bb18/OD430_InvoluntaryResettlement.pdf

4. Project Alternatives

4.1. No Go Option

The main objective of the project is to meet the steady increase in energy demand and evacuate the power generated from the new West Damietta power plant. Environmental and social impacts from the project are assessed and no significant impacts are anticipated. Other objectives of the proposed project includes feeding 80MW to TIBA steel plant near Gamasa city, relieving the loading of the neighboring Substations in Delta zone such as (Mansoura, Gamalia, Damietta), improve the voltage profile and system stability in Delta Zone area, and reinforce the 200kV and 66 kV national electricity network.. Recently Egypt has suffered from an energy crisis across the country because of the energy capacity.

If the SS and the OHTL not built, the consequences would be as follows:

- Energy capacity will not increase,
- Secure the demand of the new establishment as well as to cope with the demand increased from the residential / housings will not be achieved,
- The power supply to the consumers will not be improved,
- The consumers' financial losses from low quality power supply will not decline, and
- As a result, an increase in the economic activities in the region would not be possible.

The site of the proposed SS at Gamasa city is far by 25 meters from the youth residential area and which is the required safe distance of the ROW. Therefore, the "No Go Option" alternative is not an environmental/social requirement.

4.2. Technology Limitation

The substation is based on GIS technology with SF6 gas insulated is the most appropriate technology to be used based on environmentally and economically acceptable standards for similar SSs. It requires limited space, occupies only 1/10 compared to the conventional SS (due to the aesthetic landscape as the SS will be indoor) and more reliable than conventional SS are the priorities to select the GIS system in this project. In addition, to reducing the risk of flammable materials, having long lifetime and less operation and maintenance compared to the conventional SS, the SF6 gas insulated system is selected for this substation at Gamasa.

However, if SF6 is released to the environment will increase the impact on ozone depletion and global warming. Therefore, the check of the insulated gas has to be done properly and periodically in accordance to the specification and operation manuals.

4.3. Location/Routes Alternatives

New Gamasa Substation

The selection of the SS location and the OHTL routes should be undertaken according to criteria that fulfills technical, environment as well as socioeconomic objectives in order to achieve the most feasible application. The SS location is in the best location for interconnection with neighboring SS in Delta Zone such as Mansour, Gamalia, and Damietta...etc. The selection of the SS location has considered length optimization thus reducing the cost as much as possible and easy access during construction and maintenance.

220 kV OHTL New Gamasa SS \ West Damietta power

It is clear from the coordinates that the route is not crossing any of the protectorates and it crosses over drainage with minimal biodiversity that would have minor impact over any receptors given mitigation measures set forth in chapter 7 are followed.

However, it will pass by several agriculture lands and the towers will be constructed on these lands. Construction of the towers may require cut off some crops or tall trees if exist on these lands. Accordingly, a resettlement action plan (RAP) is prepared with full detailed about the types of these crops and the acquired compensations.

220 kV OHTL New Gamasa SS \ Tiba Steel plan

It is clear from the coordinates that the route is not crossing any of the protectorates. Construction of the towers may require cut off some crops or tall trees if exist on these lands. Accordingly, a resettlement action plan (RAP) is prepared with full detailed about the types of these crops and the acquired compensations.

66 kV OHTL Gamasa SS (the old one)/ Balteem

The OHTL Gamasa 66 SS(the old one) / Balteem had been constructed before the arrangement to commence the proposed New Gamasa SS. This line constructed onto 2 towers. The 2 towers are constructed in allocated areas of the industrial zone which is state property with no economic activities and total length of 150 meters. Consequently, No RAP study anticipated for this OHTL. Due to the short length of the route, there are limited possibilities of alternatives routes.

Conclusion

Generally, there are few environmental constraints for construction of the Substation which requiring a set of mitigations described in ESMP(Chapter 8 of this ESIA). If necessary measures will be followed during the implementation (construction and operation phase) of the project, there will be no environmental/social objection with regard to site selection for SS.

5. Baseline Environmental and Social Conditions

This section of the ESIA contains a description of the baseline physical, biological and socio-cultural characteristics of the environment at the proposed project areas.

The proposed SS and its overhead transmission lines are located in Gamasa City within the boundaries of Dakahlia governorate, Nile delta, Egypt. It is surrounded from the North by Damietta governorate, from the South by Ash Sharia governorate, from the East Port Said governorates: while from the west by Gharbyah governorate.



Figure 5-1 location of Dakahlia governorate

5.1. Environmental Baseline Conditions

5.1.1. Climate

The climate of Dakahleya is "semi-arid"; annual rainfall averages less than 100mm and decreases Southwards. Winters are mild with rain, followed by hot dry summers. Meteorological data, based on Mansoura Station records for the past 50 years, are as follows:

Parameter	Annual Mean
Air Temperature	21.3° C

Parameter	Annual Mean
Relative Humidity	62.0 %
Evapo-transpiration	100.0 mm
Rainfall	60.0 mm

Dakahleya is part of a climatic province which can be sub-divided into a coastal belt under the maritime influence of the Mediterranean, with a shorter dry summer, and the inland area with a longer dry period. Reflecting this, the Governorate can be classified into two main sub-regions - the Deltaic Mediterranean coast and the Nile System.

Wind speed

The average of wind speed in the governorate in general about 7.5 note/hours; the wind speed vary seasonally; the highest during winter is about 11 km/hour and during summer it is about 7.5 km/hours. The following table presents the wind speed the proposed area of the SS.

Table 5-1 wind speed at Dakahleya Governorate

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov	Dec.
Km/h	7.8- 11.1	8.1- 11.1	9.3- 10.6	9.3-10	8.7-9.3	7.8-9.3	7.2-8.9	7-9.3	6.1- 10.3	6.5- 10.6	6-11.1	8.1- 11.1

Source : <http://www.weatherbase.com/>

5.1.2. Air

Air quality is a function of community activities and weather conditions, including time. Climatic conditions in Dakahleya during both late autumn and winter favor the incidence of ground level temperature inversions. These lead to an aggravation of local pollution levels in certain urban centers, as does the fact that average wind speeds do not normally exceed 5.5 km/hour. It is reported (Noweir, K & Youssef, A-F. 1995) that "the quality of air in Dakahleya is not satisfactory, although about 20 years ago this Governorate was known as a pleasant district in which to live". The seriousness of air pollution in the Governorate as a whole is evidenced by the following average statistics for the period 1989-94: Total Suspended Particles (TSP) (micrograms per cubic meter) have risen from 2.5 times the WHO standard to almost 3.5 times; in relation to 2 smoke the corresponding figures are 2.3 and 2.0 times, i.e. a slight reduction. In the case of sulphur dioxide, there has also been some reduction (from 2.4 times to 1.6 times), but still the WHO standard continues to be exceeded. In short, particulates generally represent the main ambient air pollutant in the Governorate. These are emitted as a result of a whole array of activities: fuel combustion, industrial processes (especially those used in brick kilns, foundries and workshops), construction works and the fly-tipping and burning of solid wastes in open areas. However, in some cities, such as Mit Ghamr, sulphur dioxide is the main pollutant.

The causes for this deterioration in air quality are many: "the rapid growth of industrialization, greater dependence on fossil fuels, high rates of construction, poor pollution control and other human activities".

Air quality monitoring has been carried out as part of the Environmental air and noise quality measurements of new Gamasa Substation – Gamasa city at Al-Dakahlia Governorate.

Air quality monitoring has been undertaken for the pollutants of primary concerns (NO₂, SO₂, CO, T.S.P and PM₁₀); in order to better characterize the ambient air quality, as part of the environmental measurements required. Where, a one-hour average measurements were conducted for carbon monoxide (CO), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), total Suspended Particulates (T.S.P) and particulate matter (PM₁₀), for two specific locations, where the air quality complies with the national guidelines for all the analysed parameters. The site-specific air quality measurements had conducted using Standard ambient air quality monitoring instruments under the supervision of experienced specialists.

The selection of the active air measurement location has based on the prevailing wind direction; site Topography, the future layout of the proposed project components and the location of the nearest sensitive receptors with respect to the store plots. Moreover, the selection had based on the guidelines stated in the American Society for Testing Materials (ASTM) reference method.

The following ambient air pollutants where the target parameters, which will be measure during the monitoring program:

- TOTAL Suspended Particulate (TSP)
- Thoracic particulate (PM10)
- Nitrogen dioxide NO₂.
- Sulfur dioxide SO₂.
- Carbon monoxide CO.

More details about the methodology of air sampling and measurements is presented in annex 3.

5.1.2.1. Results of air sampling

The following tables present the results for ambient air quality measurements conducted at the location.

The objectives of the ambient air quality Monitoring activities conducted at the proposed site are:

- To verify compliance with authorized discharge limits and any other regulatory requirements concerning the impact on the public and the environment due to the normal operation of a practice or a source within a practice;
- to establish air quality baseline which will assist in the estimation of the site impact on the local physical, biological and social environment ;
- To check the conditions of operation and the adequacy of controls on discharges from the source and to provide a warning of unusual or unforeseen conditions and, where appropriate, to trigger a special environmental monitoring program.

The air qualities at the current site of the project site in the location are exhibiting acceptable levels of classic air pollutants in fact the levels are way below the national guidelines. Generation and dispersion of dust from increased vehicle traffic, especially during the daily activities, may reduce visibility, relative to baseline levels, and, together with combustion engine emissions, may affect ambient air quality. Concentration of dust particles, both total suspended particulate and respirable particulate matter and other pollutants from open burning, emissions from equipment and machinery used in transportation, the nearby plant operations and emissions from vehicles used to transport passengers also contribute to air pollution. These impacts may affect the human environment and, typically, arise during the ordinary daily activities and, to a much lesser extent, during the operation phase, requiring monitoring and assessment of the natural and man-made air pollutants.

One-hour average results for 8 hours continuous measurements have shown in Table 5-2 for all the measured parameters

Table 5-2 daily average results ($\mu\text{g}/\text{m}^3$) First Location near Gamasa Substation

Time	NO	NO ₂	NO _x	SO ₂	CO (mg/m^3)	PM ₁₀	T.S.P
10:AM	13.3	24.9	38.2	18.2	2.5	104.87	121.20
11:00	12.9	24.9	37.8	12.8	3.2		
12:00	11.6	18.1	29.7	16.3	2.8		
13:00	13.7	10.6	24.3	14.4	2.9		
14:00	11.8	24.9	36.7	11.2	2.8		
15:00	10.8	18.1	28.9	11.3	3.1		
16:00	13.7	11.6	25.3	14.1	2.8		
17:00	19.8	16.2	36	15.8	2.3		
National Limits	-	300	150	300	30 (mg/m^3)	150	230

Table 5-3 daily average results ($\mu\text{g}/\text{m}^3$) Second Location Nearest residential area (Youth residential area)

Time	NO	NO ₂	NO _x	SO ₂	CO (mg/m^3)	PM ₁₀	T.S.P
10:AM	18.1	17.8	35.9	18.2	2.1	91	123.1
11:00	16.4	40.8	57.2	12.8	2.2		
12:00	10.5	14.2	24.7	16.3	2.4		
13:00	16.2	31.5	47.7	14.4	2.2		
14:00	13.4	26.8	40.2	17.1	2.8		
15:00	18.7	31.8	50.5	19.5	3.5		
16:00	16.6	13.8	30.4	14.5	2.7		
17:00	10.8	12.5	23.3	13.6	3.1		
National Limits	-	300	150	300	30 (mg/m^3)	150	230

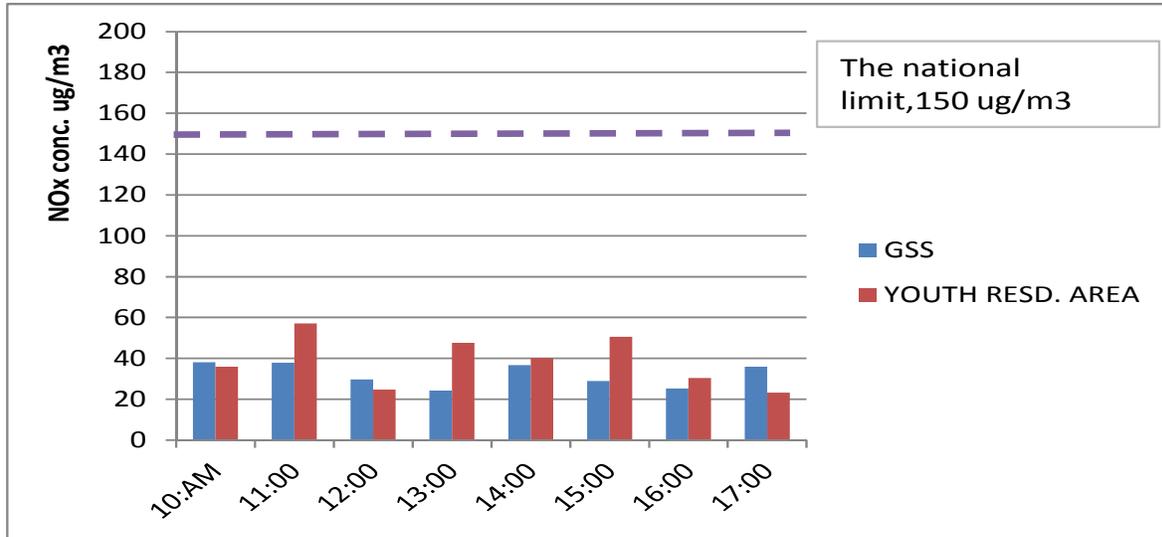


Figure 5-2 NOx variation in the locations

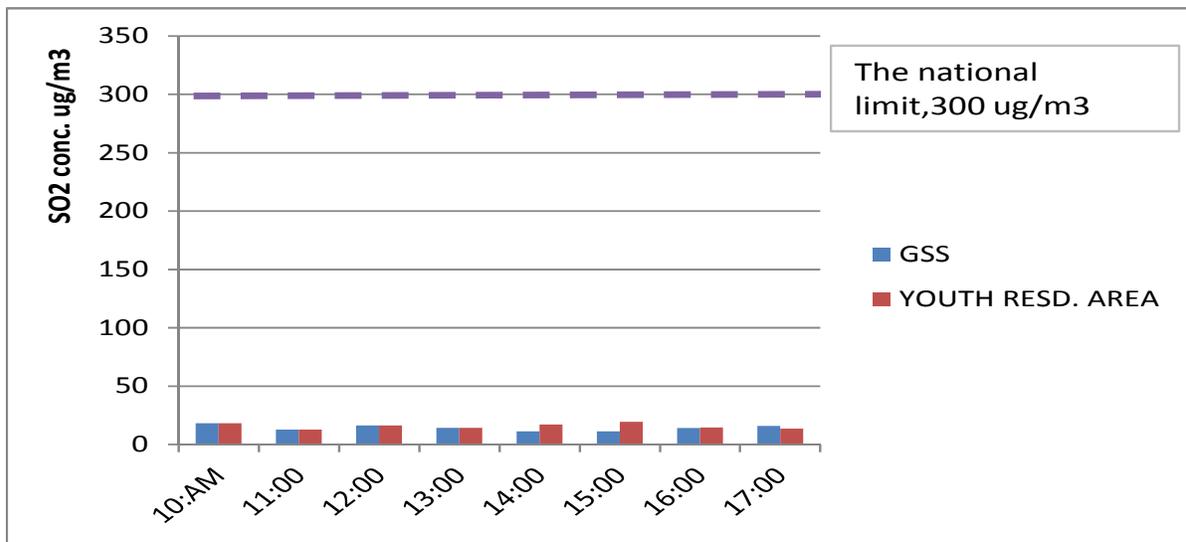


Figure 5-3 SO₂ variation in the locations

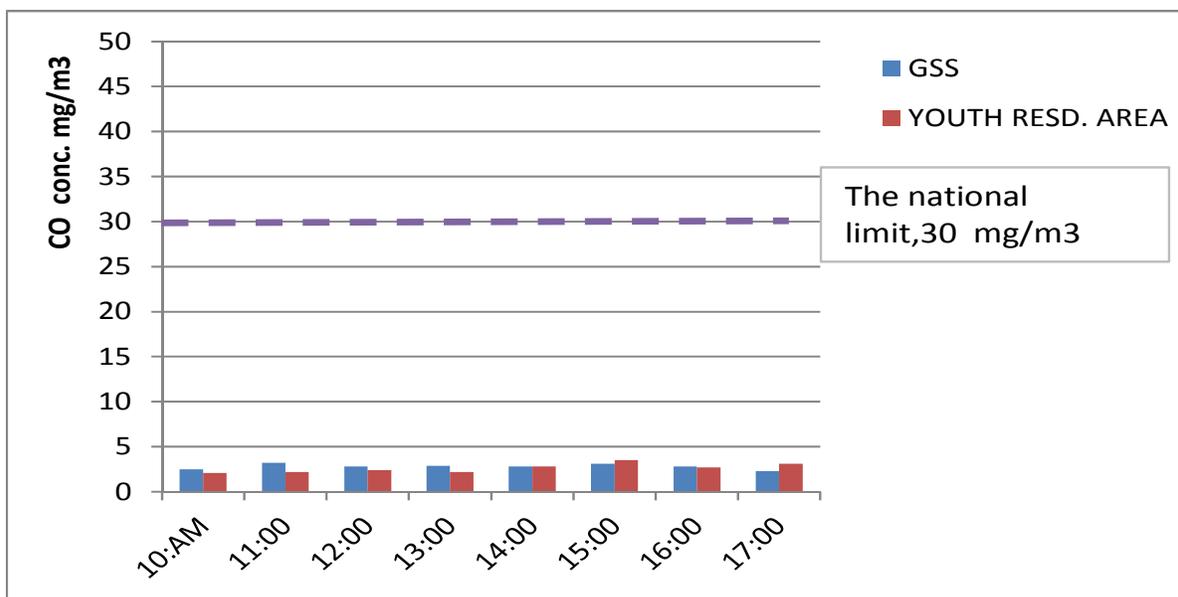


Figure 5-4 Co variation in the location

5.1.2.2. Analysis of air quality Results

In general, there are two main factors affecting the ambient air concentration of a certain pollutant emitted from a certain source or sources in a selected area:

- The intensity of the emissions (e.g. concentration and flow rate) from the source or sources.
- The uncontrollable atmospheric dispersion conditions, which include but not limited to (wind speed, wind direction, temperature, humidity, rainfall, atmospheric turbulence, solar radiation intensity and atmospheric pressure).

All the recorded results compared by the national and international limits and the stringent limits were followed except for SO_x, the national limits is higher than the international limit. The comparison showed compliance with the national and international guidelines for ambient air quality moreover, most of the data recorded were way below the guidelines, which indicates that the ambient air quality in this area are matching with guidelines of emissions released from proposed sources.

5.1.3. Noise

Noise measurements had been carried out in the same location where air measurements took place. More details of noise measurements methodology are presented in annex 3.

The following table presents the results of one-hour average ambient noise measurements and their corresponding national and international permissible limits.

Table 5-4 Ambient Noise Levels Readings at First Location at Gamasa Substation 8 hours average

Time	Sound Level Equivalent & Percentile Recordings in dBA for 8 Hours						Permissible Limits LAeq (dBA)	
	LAeq	LA10	LA50	LA90	LA95	LCpeak	National	International
10:00	53.82	50.52	46.05	39.93	41.27	103.97	60	70
11:00	64.96	59.06	34.62	32.4	37.83	112.52		
12:00	73.12	56.87	47.47	39.7	37.8	132.96		
13:00	66.52	57.38	49	41.11	39.06	105.77		
14:00	77.91	53.54	41.9	36.13	34.77	106.7		
15:00	61.12	54.52	42.65	35.86	34.17	105.57		
16:00	67.89	60.94	53.44	45.95	44.89	104.93		
17:00	64.5	58.67	49.75	38.61	36.17	99.24		
Average	66.23 LAeq							

Table 5-5 Ambient Noise Levels Readings at Second Location Nearest residential area (Youth residential area)

Time	Sound Level Equivalent & Percentile Recordings in dBA for 8 Hours						Permissible Limits LAeq (dBA)	
	LAeq	LA10	LA50	LA90	LA95	LCpeak	National	International
10:00	69.5	51.52	46.05	39.93	37.27	116.97	60	70
11:00	63.8	48.06	34.62	28.4	27.83	121.52		
12:00	53.7	54.87	47.47	39.7	37.8	104.96		
13:00	58.9	57.38	49	41.11	39.06	105.77		
14:00	61.8	52.54	41.9	36.13	34.77	93.7		
15:00	71.3	50.52	42.65	35.86	34.17	105.57		
16:00	64.9	61.94	53.44	45.95	43.89	104.93		
17:00	59.4	59.67	49.75	38.61	36.17	99.24		
Average	62.9 LAeq							

The results of ambient noise measurements were compared to the national permissible limits and shown that the limits of noise are in general within the international limits but higher than the national limits therefore good mitigation measures should be taken. However, the noise generated during construction of the SS will be for a short and temporary period.

The location of the point where the noise and air sample had been measured is presented in the following table and the figure below presents the location.

Table 5-6 Coordinates of the point where Ambient Noise and Air were measured

Locations	N coordinates	E coordinates
Nearest residential area (Youth accommodation)	31°25'56.77"N	31°31'31.52"E

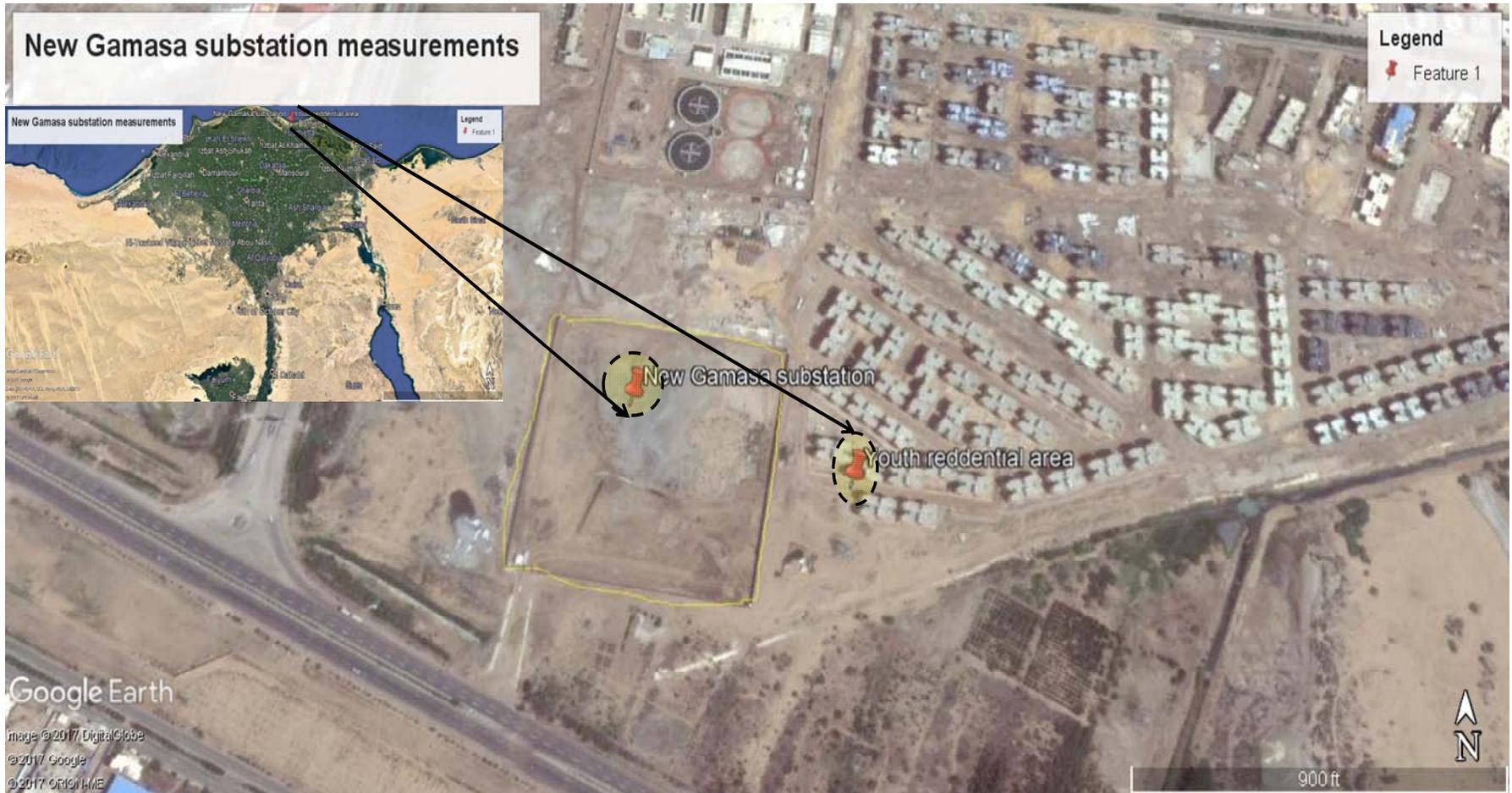


Figure 5-5 locations map for new Gamasa Substation

5.1.4. Water

5.1.4.1. *Surface Water*

The surface water resources of the Governorate comprise the River Nile (Dumyat Branch), the main irrigation canals, the irrigation-drainage network and open ditches. In total, under the 1959 Treaty, the Nile contributes approximately 55.5 billion m³/year. Groundwater resources (sand dune water, subsoil water and groundwater) by comparison amount to only 4.5% of that figure, of which about 50% is infiltration water from the Nile.

5.1.4.2. *Ground Water*

The groundwater source is a confined aquifer, which has an average thickness of more than 700 meters. The aquifer is dominated by permeable sands and gravels with minor clay lenses. Deep percolation from flooded irrigation fields plays a major role in aquifer re-charge. The depth to groundwater resources varies across the Governorate. As will be observed, the water table in the Governorate, particularly in its northern half, is close to ground level. As a result evaporation rates are high, leading to capillary rise and progressive Salinization/deterioration of both soils and groundwater resources.

5.1.5. Land resources and soils

Generally, the Governorate is flat, with a gentle slope to the north. The topography has been described thus: "elevation varies from about 12 meters above sea level in the south to less than 1 meter near the shore. The cultivated lands possess a network of irrigation and drainage channels related to the Dumyat Branch of the Nile. It contains wide areas, which are less than 1 meter. Some parts in the north, including the coastal lagoons, are below sea level. High sand dunes protect some localities, but others are flooded by winter surges". The coastal belt consists of 3 units: extensive back-shore flats, flooded low lands (sabkhas, salinas and marshes) and coastal, fore- and back-shore sand dunes (which are low and narrow). Much of the land within the Governorate, especially along the eastern and western banks of the Dumyat Branch, is based on fine deltaic deposits of silt and clay. It is high in both organic matter and nitrogen. Good fertility is thus assured. Furthermore, most of these soils are non-saline. The land resources are classified according to their suitability for cultivation. In total, 636,970 feddans or nearly 79% of the total land area of the Governorate (3,471 km²) is presently cultivated. Of the suitable agricultural land, the classification - based on potential productivity.

5.1.6. Ecology & Biodiversity

5.1.6.1. *Sensitive Habitats*

No particularly sensitive habitats are known to be present within the study area. Habitats here are thought to have been previously degraded by human activities.

5.1.7. *Fauna and Flora*

The plant species on site, most were common and abundant in the area, none is protected, rare or of particular biodiversity value. There are four common species of amphibians known in the wider study area, i.e. the Nile Frog *Bufo regularis*, *Ptychadena mascareniensis* and the green toad *Bufo viridis*, and *Rana ridibunda*. A total of 27 species of reptiles in the study site were recorded in this area (Saber, 1999), plus 19 species of lizards and 8 species of snakes.



Figure 5-6: Flora found within the SS area and OHTLs route

5.2. Baseline Socioeconomic Conditions

This section includes a description of the baseline socio-cultural characteristics of the social environment at the proposed project areas. It will highlight the following: basic information about the project areas, administrative areas, demographic characteristics, human development profile, access to basic services, health profile, economic characteristics, transportation, services, and NGOs.

The SS is located in Dakahleya Governorate, which is forms the base of the Nile Delta. It is bordered from the East by Sharqiyah Governorate, from the West by Gharbyah and Kafr El Sheikh Governorates, from the North by the Mediterranean Sea, Damietta and Port Said to the north, and from the South by Qalyubiya Governorate. Al Mansoura city is the capital of Dakahleya.

Dakahleya Governorate is one of the main agricultural governorates, which is rich in water resources and fish production. It is also famous for production of meat, poultry and dairy products. It hosts industries that spread all over the governorate, such as large and diversified industries, the most important of which are chemicals, spinning and weaving, garments, hydrogenated oils, soap, rice milling, grain mills, cotton ginning, milk, and printing and publishing, in addition to small and environmental industries that exist in the villages and hamlets (*Egyptian description by information - Dakahleya Governorate 2014*).

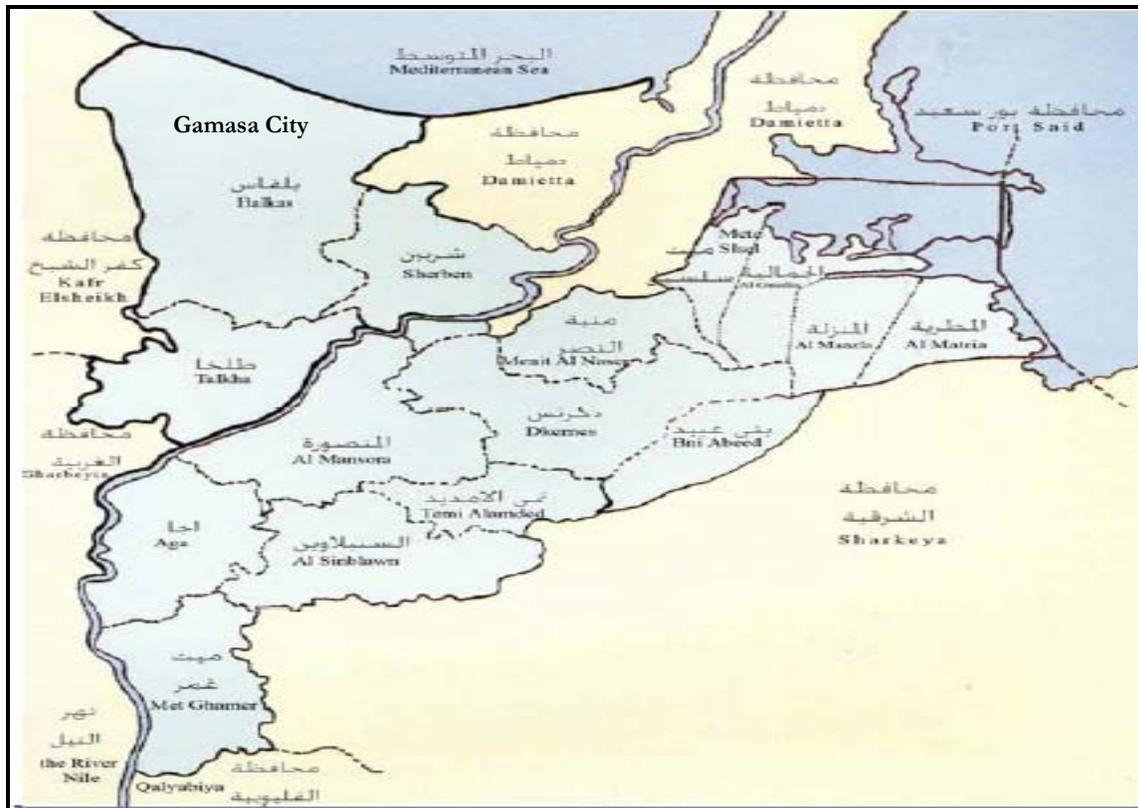


Figure 5-7: Division and Administrative boundaries of Dakahleya Governorate

Source: Egyptian description by information - Dakahleya Governorate 2014.

The Governorate total area is around 3538.23 km², forming 0.4% of the country's total area. The populated area is 3538.23 km²; the percentage of the populated area is 100% of the governorate total area. The following table shows the total area and populated total area within Dakahleya Governorate, and Gamasa city (Egyptian description by information - Dakahleya Governorate 2014).

Table 5-7: Total Area and Populated Area within Dakahleya Governorate and Gamasa City

Area	Total area	Populated area
Dakahleya Governorate	3538.23km ²	3538.23 km ²
Gamasa city	14.6 km ²	14.6 km ²

Source: CAPMAS - Egyptian Survey Authority (E.S.A) 2015

5.2.1. Administrative divisions

Dakahleya Governorate is divided into 16 centers (Marakez), 19 cities, 2 districts, and 120 rural local units with 366 affiliated villages. Gamasa city is affiliated to Dakahleya Governorate on the borders of the Belqas center which is the largest center in Dakahleya governorate compared to other centers, it overlooks the Mediterranean Sea (Egyptian description by information - Dakahleya Governorate 2014).

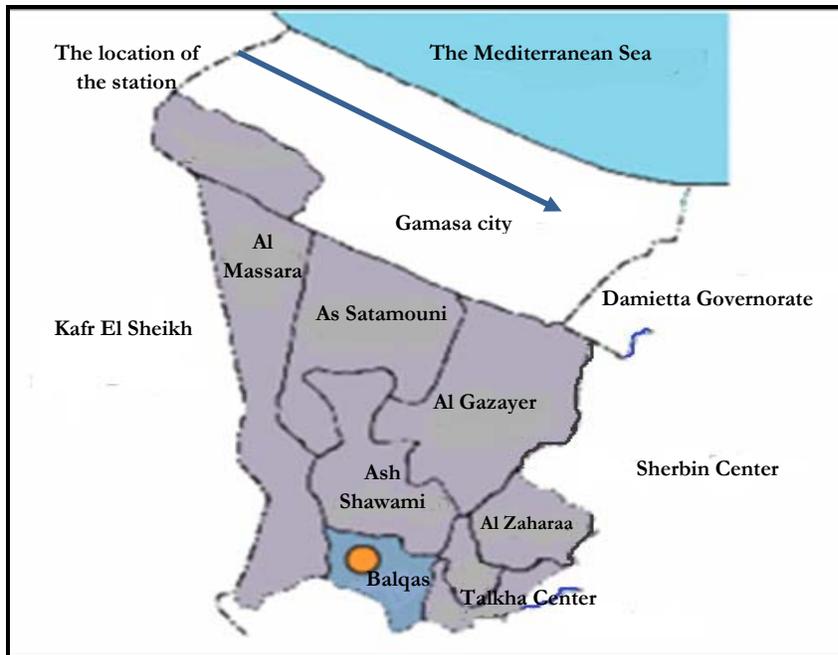


Figure 5-8: The location of the station within Gamasa city in Dakahleya Governorate

Source: Egyptian description by information - Dakahleya Governorate 2014

5.2.2. Population

Dakahleya Governorate total population reaches 5692.11 thousands persons. For Gamasa city the total population reaches 56987 persons. The following table shows the distribution of population in Gamasa city according to type, urban and rural areas, in addition to no. of households

Table 5-8: Distribution of Population in Gamasa City

City	Urban/ rural	Population no.			No. of households
		Males	Females	Total	
Gamasa	Urban	592	480	1072	275
	Rural	28110	27805	55915	14337
	Total	28702	28285	56987	14612

Source: CAPMAS 2015

5.2.3. Site-neighboring settlements

The land of the substation is located Northeast Gamasa city and close to the social Housing project for Youth, the industrial area, and the agricultural lands which are located in the South of the station land. The substation’s land and its surrounding area are allocated from Gamasa City Authority (State Property) in accordance of the specifications of the Ministry of Electricity and the Egyptian Law. The site of the substation is 1,500 km away from Gamasa City Authority, and about 150 meters from International coastal road.

The Site visits to the project area showed that the land surrounding the substation site varied between space lands devoid of structures, residential blocks and farm lands. The boundaries and geographical surroundings of the substation according to the site visit will be described below:

- The project land is located in the area allocated for facilities and services in the strategic planning of Gamasa City. The area is devoid of facilities excluding the water station which is adjacent to the project site from the north and about 125 meters away from it.
- There are Industrial area, and agricultural area adjacent to the project site from South. The agricultural area is cultivated of corn crops, wheat and some types of vegetables. The nearest agricultural land to the project area is about 500 meters away from it.
- The Field visits showed that the area located in the West of the project is devoid of facilities. The strategic planning for this area is school complex affiliated to the Educational Buildings Authority and the Courts Complex,
- The nearest residential block to the project site is located in the East and it is about 35 meters away from the project site, the area represents Social Housing Project for Youth.

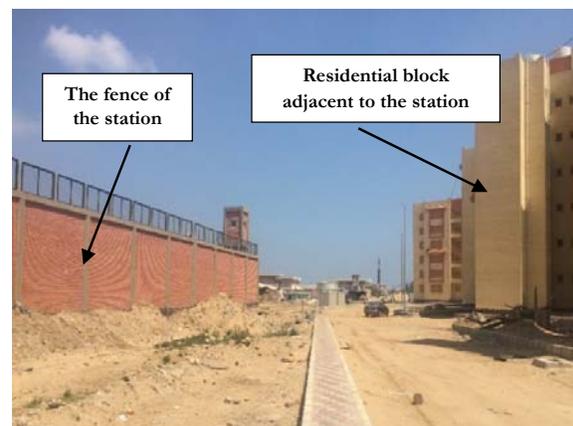
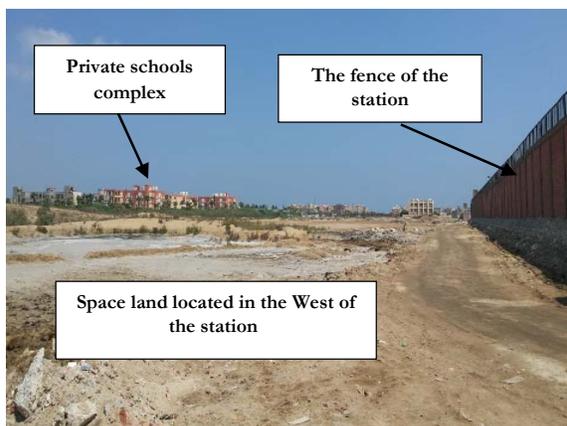
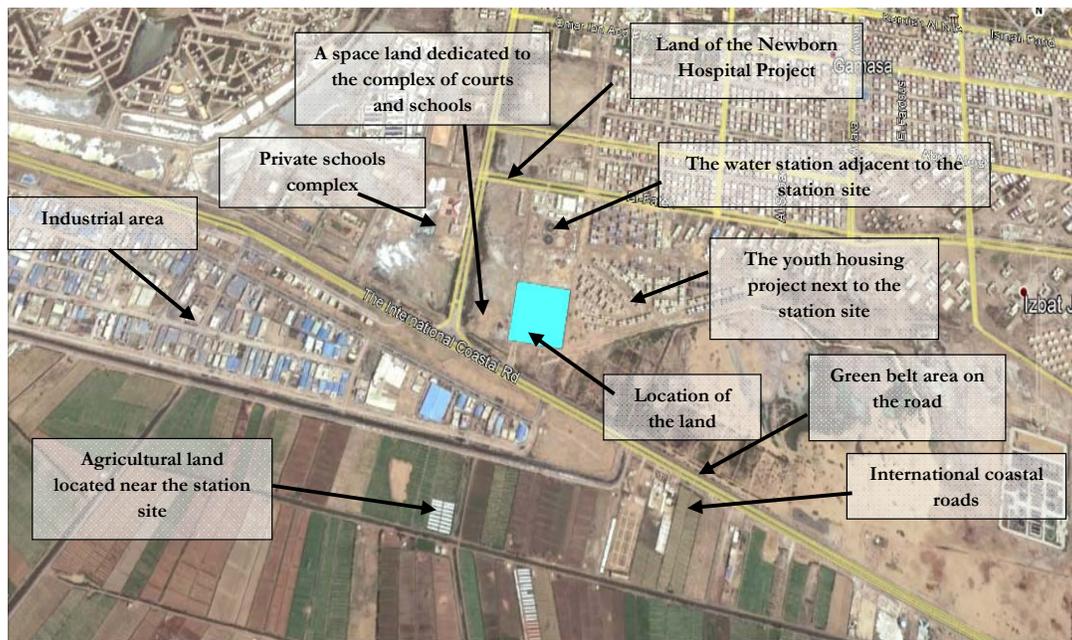




Figure 5-9: The Nearest Structures to the Substation Location



Figure 5-10: Photos of Agricultural Land Located near the Station Site

5.2.4. Living Conditions

5.2.1.1. Household Size

A household is defined as “Family (and non-family) members who share residence and livelihood, and operate as one social and economic unit”. The average family size in Dakahleya Governorate is about 3.93 persons/ household (*Egyptian description by information - Dakahleya Governorate 2014*).

Access to Electricity

Access to electricity in Upper Egypt governorates is 99.0% (Egyptian Human Development Report 2010). Even squatter areas have access to electricity regardless of their legality.

The following table shows the amount of electricity produced and consumed in Dakahleya governorate and Gamasa city, number of subscribers, number of households connected to electricity network.

Table 5-9: Access to Electricity in Dakahleya Governorate and Gamasa city

Area	Total production (Million k.w.h yearly)	Total consumption (Million k.w.h yearly)		Number of subscribers		Number of households connected to electricity (HH)		
		For lighting	For industry	lighting	industry	Urban	Rural	Total
Dakahleya Governorate	7242584	5057970	1356402	1916321	22039	830656	148775	2318431
Gamasa city	123479	66628	44419	1151	306	22195	-	22195

Source: CAPMAS 2015

Access to Potable water

According to CAPMAS 2015, the total production of potable water in Dakahleya governorate is 472240.987 thousand m³/year, while the total production of potable water in Gamasa city is 6871.05 thousand m³/year.

The following table illustrates the total consumption and production of potable water, number of households connected to it, and number of subscribers to potable water networks in Dakahleya governorate, and Gamasa city.

Table 5-10: Access to Potable water in Dakahleya governorate and Gamasa city

Area	Total production (thousand m ³ /year)	Total consumption (thousand m ³ /year)	Number of subscribers	Number of households connected to potable water (HH)	
				Urban	Rural
Dakahleya Governorate	472240.987	390584.823	1102162	474389	1068774
Gamasa city	6871.05	3001.786	15095	254	13071

Source: CAPMAS 2015
EcoGamasa ENVIRONMENTAL SOLUTIONS

Access to sanitation

The capacity of sanitation in Dakahleya governorate is 687.382 Thousand m³/ Day, while the capacity of sanitation in Gamasa city is 14.169 Thousand m³/ Day. The following table shows the number of households and buildings connected to sanitation networks in Dakahleya Governorate and Gamasa city.

Table 5-11: Access to Sanitation in Dakahleya Governorate and Gamasa city

Area	Number of households			Number of buildings		
	Urban	Rural	Total	Urban	Rural	Total
Dakahleya Governorate	413748	852033	1265781	156286	336441	492727
Gamasa city	200	9720	9920	3252	4711	7963

Source: CAPMAS 2015

Work Status

According to Egypt description by information 2014 – Dakahleya governorate, the unemployment rate in Dakahleya Governorate reaches 14.10%, the percentage of labor force is 32.95%, and the number of employed persons is 1611 thousand employees, while the number of unemployed persons is 264.50 thousand persons.

5.2.5. Services available in Gamasa city

Education

Due to the unavailability of data about the education state in Gamasa city, the study will focus on the available data on the scale of Balqas center.

The number of university students on the scale of Dakahleya Governorate is 47430 males, and 56056 females according to CAPMAS 2015. The following table shows number of schools, students, teachers in urban and rural areas in Balqas center:

Table 5-12: Number of Educational Structures Available in Dakahleya Governorate and Gamasa City

Balqas	No. of schools		No. of students		No. of teachers	
	Urban	Rural	Urban	Rural	Urban	Rural
Primary	45	94	20099	35741	1087	1665
Intermediate	25	63	7532	16544	382	899
Secondary	2	6	3281	3391	162	196

Source: CAPMAS 2015

Health services

Table 5-13: Health Services Available in Gamasa

Area	Number of health structures						
	Private clinic	Radiology Center	Analytical Laboratories	Ambulance center	Ambulance	Health office	Pharmacy
Gamasa city	9	1	8	1	6	1	31

Source: Dakahlia official website

Commercial Services

There are many markets and shops that provided the basic needs of the citizens. Most of these shops operate in the summer only. This is due to the nature of the area, which is predominantly tourist. It is the main resort for the residents of Central and North Delta.

Transportation

- **External Transportation**

Gamasa city is connected to Balqas, Sharben, Talkha centers, Mansoura and Damietta cities and the capitals of the surrounding governorates by (28) buses of East Delta buses and (450) private minibuses (Source: Gamasa City Information Center).

- **Internal Transportation**

Gamasa city is depending on the microbus as an internal transportation with total (320) buses, in addition to (170) taxis. There are 2 bus stops, 4 microbus stops for external transportation, and many microbus stops for internal transportation in the city (Source: Gamasa, City Information Center).

Various Services

Table 5-14: Various service structures in Gamasa City

Area	Number of structures							
	Bakeries	Youth center	Clubs	Department of Social Affairs	Social Units	Traffic Unit	Fire station	Police station
Gamasa city	12	1	1	1	2	1	1	3

Source: Gamasa City, Information Center

5.2.6. NGOs

There are 282 associations working in social work in Dakahleya Governorate as follows:

Table 5-15: Distribution of NGOs in Dakahleya Governorate

Work area	Number
Local development	59
Family and childhood care	57
charitable works	72
Environment	13
Care for special groups and disabled persons	28
Cultural, scientific and religious services	53

Source: Dakahleya Governorate, Information Center

The above table shows the intensity of the civil work in Dakahleya Governorate and the diversity of the work fields, which works on supporting the social work in the Governorate and promoting the well-being of all sectors of the population and workers of the Governorate, which would bring benefits to all the population of the Governorate.

5.2.7. Archaeology and Cultural Heritage

There are many archaeological sites in Dakahlia Governorate, most of which are concentrated in Tamei Al-Amadid city, where there are many archaeological sites such as Tal Al-Rub'a, Tal Mendis, Tal Al-Balamoun, and Tal Ibn Salam. The Geographical data from Gamasa City Information Center and Dakahleya Governorate showed that there are no archaeological sites or heritage areas in the project areas, and the nearest tourist archaeological areas are more than 45 km away from the project areas.

6. Potential Environmental and Socioeconomic Impacts

To ensure the accurate determination of project impacts; environmentally and socially, the ESIA study was carried out at different levels. The selection of the most appropriate technology, the most environmental and socioeconomic advantageous and the suitable mitigation measures are presented to minimize the negative impacts and maximize the positive impacts.

As the nature and characteristics of the impacts associated to the project components (SS and interconnection overhead transmission lines) are different, the impacts assessment in this chapter is divided into each of the project components. In addition, impact assessment is also differentiated between two phases of the proposed development; during construction phase and during operation and maintenance phase.

The assessment of potential impacts has been done through analyzing different project activities and envisaging possible changes to the environment. Each potential impact was qualitatively analyzed to classify its significance to three degrees: *major impacts*, medium impacts and minor impacts⁷. Major impacts are impacts with a reasonable likelihood to cause violation of applicable standards. *Medium impacts* are impacts with a reasonable likelihood that are likely to cause violation of applicable standards only in combination with the impact of other sources. *Minor impacts* are impacts which are not likely to cause violation of applicable standards whether on its own or in combination with other sources. The likelihood of each impact has been qualitatively evaluated to two degrees: highly probable and low probable.

In addition, besides presenting the degree of the impacts, this Chapter will also distinguish between significant positive and negative impacts, direct and indirect impacts, and immediate (or short term) and long-term impacts during construction, operation and maintenance phases indicating their level of importance and their probability of occurrence. This chapter will identify impacts which are unavoidable or irreversible. Cumulative effects shall be also addressed taking into account other projects or actions planned in the study area. This shall include the socio – economic impact assessment.

Each potential positive and negative impact resulting directly or indirectly from the project will be assessed based on both the **Magnitude** and **Sensitivity of the receptor**.

An Environmental and Social Management Plan (ESMP), presented later in Chapter 7, includes mitigation measures that will minimize the negative impacts using available technologies and managerial procedures.

6.1. Magnitude of Impact

The impacts resulting from the project were categorized as a positive or negative impact; then latter were further analyzed and its magnitude assessed as: **Negligible, Low, Medium, or High**. Various considerations come into play as the experts assessed the impacts, the main parameters are:

- Duration - As the time duration of the impact increases, it is weighed more heavily. Special consideration is given to impacts that go beyond the project's anticipated life-expectancy.


⁷According to EEA EIA Guideline, January 2009

- Time – The time of which an impact commences or occurs can be vital to construction and maintenance operations.
- Spatial – The area impacted is to be considered, as some impacts may extend beyond the project's boundaries or interfere with land regulations, etc.
- Probability – The chance of an impact occurring and its frequency is to be assessed
- Reversibility - The possibility and extent to which an impact can be intervened or mitigated for a factor to return to the Baseline environment
- Compliance – National and international standards and regulations may dictate an impact's maximum allowable consequence.

After an analysis of the various parameters, an impact's magnitude is categorized as follows:

- **Negligible** – No anticipated change to the baseline environment
- **Low** – Minor anticipated change to the baseline environment
- **Medium** – Moderate anticipated change to the baseline environment
- **High** – Significant anticipated change to the baseline environment

Medium and High impacts usually cause a major temporary variance to the baseline conditions or a long-term ongoing modification.

6.2. Sensitivity of the receptor

Sensitivity of the receptor is based on the relationship between the respective project and present baseline environment (the receptor). It is assessed based on vulnerability of the receptor. These receptors include the surrounding population and environment. As the effect of an impact is more readily absorbed and easily mitigated it becomes less sensitive; on the other hand, as an impact is more challenging to mitigate and cannot be absorbed by the population or the environment it becomes more sensitive and requires an extensive management plan.

The sensitivity of the receptor is assessed as:

- **Low**- Existing capacity to absorb/mitigate impact
- **Medium** – Limited capacity to absorb/mitigate impact
- **High** – No capacity to absorb/mitigate impact

6.3. Impact Evaluation

The virtual resultant of the **magnitude of the impact** and **sensitivity of the receptor** for each impact are evaluated in order to generate the impact's significance and overall assessment. The following Table illustrates how the two factors are coupled:

		Magnitude of Impact			
		Negligible	Low	Medium	High
Sensitivity	Low	Level 1	Level 1	Level 1	Level 2
	Medium	Level 1	Level 2	Level 2	Level 3
	High	Level 2	Level 3	Level 3	Level 4

Where:

- **Level 1 – Nominal (insignificant)** impact to the baseline environment (requires no mitigation or management plan)
- **Level 2 – Minimal** impact to the baseline environment.
- **Level 3 – Medium** impact to the baseline environment.
- **Level 4 – Significant (Major)** impact to the baseline environment

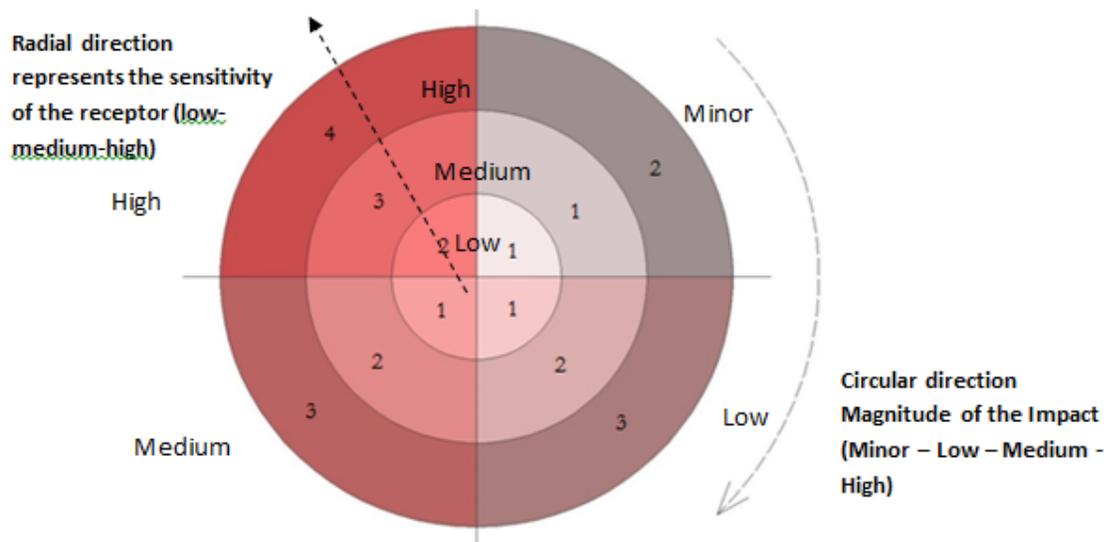


Figure 6-1 Impact Evaluation Diagram

This section will discuss the environmental impacts (both negative and positive impacts) associated with the construction and operation and maintenance phase of new substation at New Gamasa and its interconnection overhead transmission lines. [Please refer to Chapter 3, Project Description].

6.3.1. Impact Assessment during Construction of New Gamasa SS

Typical activities of construction phase of the SS include site preparation, construction of concrete works, construction of supporting building and erection of the equipment.

The potential impacts which may result from the construction activities of the SS are:

Noise



Construction of the SS will require using various construction equipment, vehicle, etc. in addition to the other activities that generate noise. These tools signify potential major sources of different types of noise that will have an impact on the receptors who are susceptible to the generated noise.

On construction site these major sources exhibit many different types of noise such as background noise, idling noise, blast noise, impact noise, rotating noise, intermittent noise. In addition to the British standard for general construction noise, the table below lists the major expected noise generated from different construction equipment according to *Society of Automotive Engineers SAE*. This comparison indicated that the general International standard is similar to the standard used at the Egyptian standard provided by the local automotive society.

Table 6-1 Expected construction equipment and sound levels

Equipment	Sound Level at operator dB (20 feet from the equipment)	
	Average	Range
<i>Earth Moving</i>		
Front End Loader	88	85-91
Back Hoe	86.5	79-89
Bull Dozer	96	89-103
Roller	90	79-93
Grader	<85	
Truck	96	89-103
<i>Material Handling:</i>		
Concrete Mixer	<85	
Concrete Pump	< 85	
Crane	100	97-102
Derrick	<85	
<i>Power Units:</i>		
Generators	<85	
Compressors	<85	
<i>Other Equipment:</i>		
Poker Vibrator	94.5	87-98
Power Saw	88.5	78-95

The potential vulnerable groups who are susceptible to the construction noise during the construction of the SS are the following:

- Onsite Workers and
- Neighboring establishments

Impact Significance

Based on the typical construction machineries used during construction (Table 6-1 Expected construction equipment and sound levels above), the wind direction and the duration of the noise, the average construction noise can be assumed around 90-95 dBA

Consequently, to predict the noise impact from the point of source against the distance, the extrapolation calculation is done based on the noise calculation from clays handbook of environmental health

$$\text{Sound level dB (A)} = L_w - 20 \log R - 8$$

Where L_w = sound source level, dB (A) and

R = distance from the source, m

The youth residential area is about 30 meters far and the newborn hospital as distance of 500 meters away from the proposed sit of the SS. Based on the extrapolation calculation and propagation of sound waves, the distances of the sensitive receptors were plotted. The result are presented at the following table.

Table 6-2 Expected noise level in (dBA) from the source of substation to the sensitive receptors during construction

Area	Distance (m)	Sound Source Level(dBA)	Permissible limits national
Youth Residential	30	68.4	60 day and 50 night
Newborn Hospital	500	44	50 day and 40 night

The calculation is based on the 90 – 95 dB noise level from the source of noise

Activities conducted at the worksite; during the use of the equipment for construction, will generate levels of noise which will have a considerable impact on workers. Therefore construction noise shall be mitigated to ensure a safe work environment and to fulfill the occupational health and safety requirements concerning national and international requirements (as presented at Chapter 2, Legislative and Regulatory Frameworks.

As seen from the expected noise level during construction the sensitive receptors will exceed the limit of noise according to the law requirement and therefore good mitigation measures should be taken. However, the noise generated during construction of the SS will be for a short and temporary period.

Activities conducted at the worksite; during the use of the equipment for construction, will generate levels of noise which will have a considerable impact on workers. Therefore construction noise shall be mitigated to ensure a safe work environment and to fulfill the occupational health and safety requirements (using PPE, earmuffs) concerning national and international requirements (as presented at Chapter 2, Legislative and Regulatory Frameworks.

The impact on the construction workers will be medium impact.

Traffic Impacts

SS can be accessed from the coastal road and the greatest potential for traffic impacts to occur arises during the short period where construction works peaks. The traffic flow that will be created during

construction period will to some extent depend on which type and number of trips to and from the proposed site.

The contractor require to have a time management plan to manage and schedule the traffic movement for the construction materials, equipment in addition to transporting the debris to the landfill. In addition, the notification to the traffic department should be obtained and the time management plan should be approved prior to the construction activities.

Impact Significance

It is estimated that the overall additional traffic would have insignificant impacts on the level of service on the road.

During transportation of the equipment and raw materials, it is anticipated that one lane will be used by the trolleys and the movement of one trip will not last more than 8 hours (during the midnight – morning). Therefore, the impact significant on traffic is considered short term, during the specific time duration and low to medium impact.

The SS site is located not directly to the main road (around 400 meter from the main road). Additional activities, such as entering and exit to the site will not have significant impacts on the main road. In addition, there is sufficient storage area adjacent to the site, next to the service road that the raw material can be placed, as well as the standby equipment, it is expected that the main road will not be impacted.

The impact is considered low to medium and the mitigation measures as well as the management plan will effectively control the traffic impact and reduce the impact to minor.

Air Quality

Construction of the SS and installation of the equipment will include several activities such as excavation, land clearing, earthworks, stock piling transportation of construction material and equipment, burial of cables and pipes, etc. Those activities in consequence are expected to emit air pollutants to the ambient air, however it will be conducted for a short periods. The following air pollutants are foreseeable for most of the construction activities:

- **Fugitive dust emissions (PM₁₀, PM_{2.5})**
- **Exhaust of vehicles or equipment such as temporary generators, trucks, trolley, etc**

Impact Significance

Near project site, dust emissions will slightly negatively impacts the ambient air quality, particularly during the initial phases of construction. However, the impact is not significant as soil characteristic at SS site is mainly hard soil.

Fugitive dust impacts from the construction activities are expected to be minimum medium and will be minimized with the measures and the recommendations stated in the ESMP of this study which will be done by the Contractor for the following reasons:

- Dust emissions from construction activities impact will be limited to a small area near the project site of SS (within less than 100 m) and the dust is expected to settle in close proximity to the construction site(s).
- The wind speed is considered low in the area.

The ESIA will provide the provision of the health, safety and precaution of the environmental impacts and its mitigation measures to be followed during project activities and demonstrated in the ESMP for this study. The ToR for the contractor should include the implementation of this ESMP. Therefore the impact is assessed as medium impact for the workers and for the receptors in the vicinity of the project area. Therefore, the dust control should be mitigated to reduce or minimize the impact to the residents as well as the workers.

Emissions of CO₂, CO and PM will result from the operation of the construction machinery and road vehicles during construction of the Substation. However, impacts of gas emissions due to the construction activities are expected to be temporarily negatively significant for the following reasons:

- Quantities of air pollutants emitted from construction machinery are generally temporary (during the working activities) and non-permanent.
- It is expected that most of the vehicles and machineries for work activities are diesel-powered, emit nitrogen oxides (NO_x), particulate matter (PM) and carbon monoxide (CO). The emission of the NO_x and PM as well as CO at the existing baseline conditions are considered high. The cumulative impact due to the construction activities will have only slightly higher than the existing emission.
- The intensity of work activities and the number of vehicles traveling onsite would be relatively low for all tasks.
- The emissions will be mostly limited to the construction phase and therefore are temporary.

Therefore, the impact is assessed as low impact. However, the air quality control or monitoring should be mitigated to further reduce the impact.

Vibration

Construction activities would result in varying degrees of ground-borne vibration depending on the stage of construction, the equipment and construction methods employed, the distance from the construction locations to vibration-sensitive receptors and soil conditions.

According to the proposed activities during the construction phase of SS project, the concern of vibration comes from the truck movements and construction of the infrastructures and installation of the equipment.

Based on the investigation of the sensitive receptors surrounding the project site, no sensitive establishment will be impacted due to the vibration generated during the construction phase. Consequently, minor vibration impacts could be anticipated to occur.

Impact Significance

It is estimated that the vibration has minor impact.

Hazardous Materials and Waste Management

The waste generated during construction could be categorized as follows:

- Normal construction wastes including scrap concrete, steel, bricks, wood, etc.,
- Miscellaneous non-hazardous solid wastes, including packaging waste, used drums, wood, scrap metal, and building rubble will be generated during the construction phase of the project
- Solid hazardous wastes generated include empty containers, spent welding materials, solvents, paints or adhesives, and other hazardous wastes resulting from operation and maintenance of the equipment and vehicles, i.e. spent oils, spent lube, waste oil filters, batteries, etc. Among the hazardous wastes also are the wasted or faulted materials including conductors and insulators.

Human or domestic wastes generated by construction labor, including sewage and garbage collected from the labor camp location. The wastes generated during Operation phase will be minimal and will largely consist of municipal waste (e.g. food; packaging) and over time potentially defunct parts and spare parts, cabling and control equipment etc. Waste management arrangements for the construction phase should be continued (proper control of collection, storage and final disposal via licensed contractors).

For hazardous solid and liquid wastes, proper waste collection and storage plus regular (preferably twice a week) waste collection by licensed contractors will need to be arranged by site management. To coordinate and control this. The site management should develop a waste management plan which is included in the ToR for the Contractor for waste management during construction. For the non-hazardous solid wastes, those that cannot be recycled will be disposed in a sanitary landfill periodically (weekly or monthly depending on the volume of waste generated). Regarding the domestic waste, as the existing collection is already established and the amount to be expected is considered small.

The domestic wastes (wastewater and solid waste) generated are relatively small as only small number of workers will be employed during the construction and operation and will be collected by a licensed contractors.

Negative Impacts could result if hazardous wastes were not properly handled which is banned consequently. The management of hazardous waste should be developed in accordance with EEAA guidelines for hazardous waste handling, storage, transportation and final disposal to the designated landfill facilities.

The lubrication oils, and paint container waste could contain some hazardous components. Disposal of paint containers waste at construction waste disposal sites is the common practice in Egypt. However, it should have recognized as hazardous waste based on Law 4/1994 and its Executive Regulations. (Chapter 2 of this ESIA)

Impact Significance

The impact of temporary construction waste storage area onsite before transporting it to the landfill facility on the groundwater quality is considered insignificant impacts. The spillage of oil should be avoided as it could have a negative impact on the soil quality. Therefore, it is considered Medium

significant uncontrolled waste accumulation would be visually unacceptable and would therefore be of Medium significance.

From the above, it can be concluded that the impact of solid wastes in general, if not properly managed, could be considered of Medium significance due to the potential presence of hazardous wastes and the possibility of wastes being accumulated which has a negative environmental, health and visual impact.

Health and Safety

As the site of the substation is localized with enclosed area and entrance gate, the potential impacts may mainly occur to the workers at the construction site. There will be no potential impacts on safety at the surrounding residential area as the main entrance of the SS is at the other side from where the residential area(youth residential area) is located.

Potential safety impacts to workers and health for the public community and the workers during construction of a substation, in general, are the same as those associated with any construction project involving earthmoving, use of large equipment, transportation of overweight and oversized materials, and construction and installation of facilities. In addition, health and safety issues include either working at heights or in trenches.

In addition, accidents might occur on site to workers in various construction project activities, therefore mitigation measures are developed to mitigate the risk of health and injuries to the workers.

Impact significance

Health and safety concerns for the sensitive receptors (community surrounding the SS site) have minor significant impacts, as it is described previously that the project site is localized in enclosed area. Standard prevention, i.e. clear sign at the entrance and the surrounding the project site and management of the machineries and vehicles avoiding the peak hours are sufficient to prevent the accident occur for the residential area surrounding the construction site.

Medium to major impact is identified for the health and safety of the workers. The standard protection of the workers, especially for the workers that involved in the risk due to the height has to be put into mitigation measures and in the management and monitoring plan to minimize and reduce the significant impact.

Visual Resources and landscaping

Project component installation would produce visible activity and dust in dry soils. Project construction may be progressive, persisting over a significant period of time. Ground disturbance (e.g., trenching and grading) would result in visual impacts that produce contrasts of color, form, texture, and line. Soil scars and exposed slope faces could result from excavation, leveling, and equipment movement.

The site of the SS is nearby the access road; therefore, it is visible that the construction activities are held on site. However, with the clear sign and the existing fences and possible to the temporary fences provided by the contractor will minimize the visual impact to the surrounding areas.

Impact significance:



The impact associated to the visual resource is considered minor, localized and temporary. Therefore, the standard protection for the ground disturbance, dust, wastes generated will be mitigated to ensure the proper management and to minimize the impact.

Water Resource (groundwater, geology and hydrogeology)

The impact of temporary construction waste storage area onsite before transporting it to the landfill facility on the groundwater quality is considered insignificant impacts. The impact on the soil quality is considered Medium due to the potential presence of hazardous wastes such as spent oils which could leach into the soil.

Uncontrolled waste accumulation would be visually unacceptable and would therefore be of Medium significance. From the above, it can be concluded that the impact of solid wastes in general, if not properly managed, could be considered of Medium significance due to the potential presence of hazardous wastes and the possibility of wastes being accumulated which has a negative environmental, health and visual impact.

Regarding the surface water and potential pollution on the drinking water, it is not expected that the construction of the SS will have significant impacts as there are no surface water as well as drinking water exist at the surrounding area.

Impact Significance

This impact could be classified as Minor Impact which is believed to be fully controlled with the implementation of proposed mitigation measures such as standard construction precaution and prevention measures; including waste management (solid and liquid, hazardous and non-hazardous) in order to avoid accidents, pollution and spillage encountered during the construction. The standard prevention or precaution measures shall be prepared by the contractor prior to the construction. It is preferable to include the waste management plan in the ToR of the contractor.

Impacts on Ecological (Fauna and Flora)

Due to the presence of agriculture lands near by the project's location, the dominating fauna in the area is farm animals and other species adapted to urban areas as feral cats and dogs, rodents, lizards, bats and birds, which depend on waste as food.

The agricultural lands includes common plants of the region such as wormwood plant trees sycamore tree, acacia, eucalyptus and different palm plants which spread on the banks of canals and drains. In addition to the cultivated crops in which the most common are wheat, rice, corn, and vegetables)

However, there are no recorded for flora and fauna found within the vicinity as the proposed site itself is an empty land within the urban area. The local pets and pot plantations might exist at the surrounding residential area but those habitats will not be impacted from the project activities. .

Regarding the bird migration, there is no such recorded avian bird surrounding the site and the site is not belonging to the migration path, locally or internationally. The following figure represents the bird's migration path versus the project location.

In conclusion, no endangered species were identified within the project's affected areas.

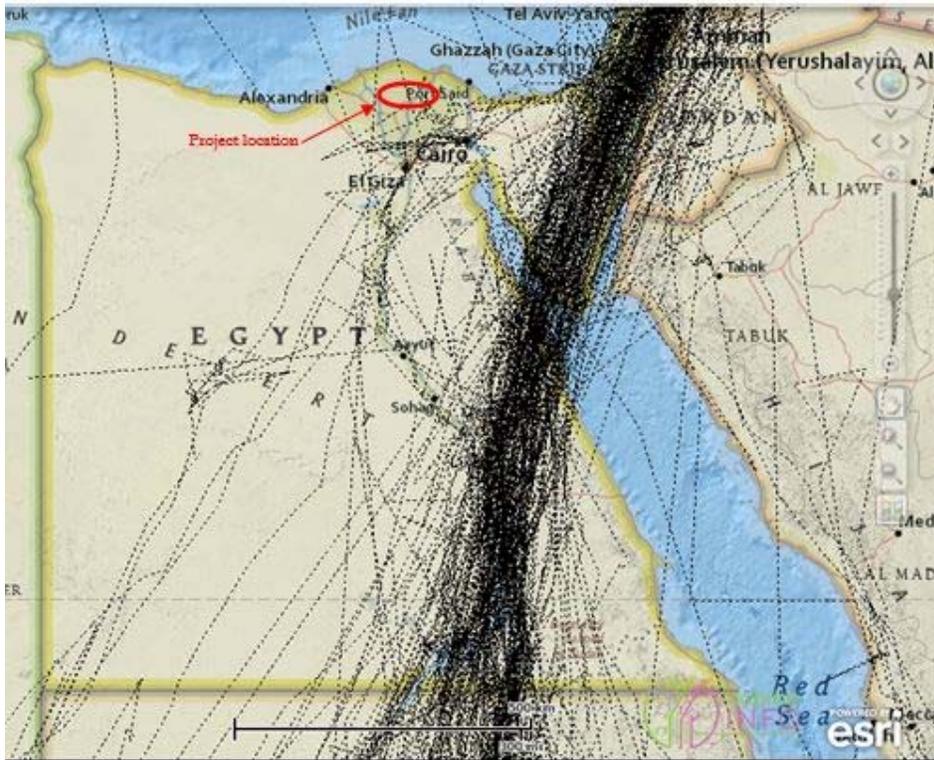


Figure 6-2 Main migration routes in Egypt

Impact Significance

According to the recorded species; no endemic or threatened species were documented during this study. In addition, the investigated habitats are not unique and are very common and widespread in neighboring areas (only several local pets and pot plantations at the residential area) which easily continue their life cycle. The bird migration pattern as well is not affected by the construction. The impact is considered insignificant Impact.

Natural disaster risks

According to the baseline information which show no recorded major or low seismic activity in the site of the proposed SS for more details please revise the baseline section. Accordingly, it has been concluded that given the engineering measures incorporated into the design of the GIS SS, the potential environmental impacts of a seismic event during the construction of SS not anticipated to be significant

Impact significance

This impact would be considered as insignificant impacts.

Land use and involuntary Resettlement

The EETC has already received the governor's decree to allocate the land for the construction of the proposed SS. From the field observation, the land is an empty flat land that has no other structures.

Accordingly, there is no conflict for the future use of the land. In addition, regarding the involuntary resettlement, there will be no involuntary physical resettlement resulting from construction activities.

SS can be accessed from the coastal road and the impacts to land use could occur during construction if there were conflicts with existing land use plans and community goals. Long-term land use impacts would occur if existing land uses are not compatible with construction of the SS.

This impact is not significant for the construction phase of the SS, as it will be built on a land already affiliated to EETC and approved by the el Dakahlia Governorate. Therefore, insignificant impact associated to the land use; therefore, no mitigation measures will be developed.

There is no potential impact of having any involuntary resettlement for this project component (SS). Similarly, there is no impact associated to the involuntary resettlement; therefore, no RAP, ARAP or RPF is necessary for the SS.

Impact on Archeological and Cultural sites

The construction site is located far from any cultural or archeological sites. It is not expected that any impacts may appear during construction on any surrounding cultural or archeological sites. This impact is considered: insignificant impact.

Creation of Job Opportunities and Flourishing Economies of Construction Sites

The project can benefit from the opportunity of the construction activities to have a better relation with the surrounding community, facilitating later the acceptance of the project operation in the area. The project may participate in creating job opportunities for local people from the neighboring residential areas as construction workers and guards during the construction process. The job opportunities offered during the construction phase represent a temporary high positive impact, as it will add to the benefits of nearby resettlements from the project.

6.3.2. Impact Assessment during Construction of OHTL

Typical activities of construction phase of the OHTL include site preparation, determining ROW, construction of concrete works, construction of supporting building and erection of the equipment.

The following section presents the significance of expected impacts during construction phase of 220 kV OHTLs.

The 66kV is already constructed and existed. The environmental and social impacts during operation of this line are limited due to its short length.

220 kV OHTL New Gamasa SS | West Damietta power

Noise

Normally construction works include noisy activities related to the operation of construction equipment, possible hammering and drilling works in addition to the noise generated from construction related

trucks. The noise impacts could be analyzed in two main aspects: noise impact within the construction areas, and the noise impact on the neighboring receptors.

During the construction phase, noise would be generated during day and night at levels exceeding the currently recorded levels during the baseline study. At the vicinity of all identified receptors off site, the noise intensity should not exceed the following limits according to the international standards

- Residential, Institutional, educational: 55 dB (A) daytime from 07:00 to 22:00; and 45 dB (A) nighttime from 22:00 to 07:00
- Industrial, commercial: 70 55 dB (A) daytimes and 70 55 dB (A) nighttime

The potential vulnerable groups who are susceptible to the construction noise during the construction of the OHTLs are the following:

- Onsite Workers and
- Neighboring establishments

Monitoring the noise emissions and implementing the mitigation measures during the construction phase will help to effectively control this impact and ensure that the noise limits are within the allowable limits and there is no any violation of the standard levels.

Impact Significance:

Construction noise is likely to affect the neighboring areas (the youth residential area) close the SS site

For noise impact upon workers, within the construction site, it is possible that construction workers could be exposed to relatively high levels of noise. This could be mitigated through application of the normal precautions normally taken by construction labor.

Accordingly, this impact has been classified as a medium Impact (level 3), which could be further minimized and fully controlled if construction workers used safety gear as recommended in the ESMP.

Traffic Impacts

Power lines routes will be established away from road sides and on the desert land, as well as on urban and agriculture lands. In addition, there will be plenty of space for storage of construction materials and construction waste on road sides, therefore there will be very little possibilities that construction contractors will actually need to store materials on road lanes.

Furthermore, the extra traffic caused by construction vehicles is not expected to effectively impact the flow of traffic on the existing roads. The limitations on access to roads during construction are temporary; it will not affect any of the inhabitants. The impacts on access to roads beside the power lines are minor as the power lines will be located on the desert land and on the side of the existing roads.

Impact Significance

The impact is therefore considered Minor Impact. Mitigation measures included in the ESMP will effectively control this impact.

Air Quality

Excavation, filling, loading, transportation and unloading of soil and raw materials cause suspension of airborne dust that raises the particulate matter concentration on ambient air. These emissions are temporary and its severity depends on the construction activity, meteorological conditions, silt content of the soil and moisture content of the soil.

Another source of air emissions during construction is the exhaust emissions of construction machinery and vehicles visiting and leaving the site. The extent of these emissions depends on the number of machinery working at the site at one time, the type and efficiency of the engines and also the climate conditions.

Impact Significance:

Most of the OHTL routes is in desert landscape far from any settlement, in addition at a relatively large distance from receptors such as residential/settlement zone. In addition, the short duration of the impact given. Consequently, this impact could be also considered Minor along the OHTL line and Medium on the workers environment along the line. Exhaust from vehicles is considered minor.

Hazardous Materials and Waste Management

Wastes generated during construction activities of OHTL comprise of excavated soil for foundations. The excavated soil will normally be accumulated besides OHTL routes, and collected after installations are completed. Other types of solid construction wastes would include the following:

- Foundations
- Trimmings of steel.
- ⊖ Cut-off trees and vegetation
- Metals, wood, cement sacks, sand and gravel, concrete spills, cut off cables, garbage from daily activities of workers.
- Hazardous wastes such as spent oils from the operation and maintenance of machinery.
- Wasted or faulted materials of the towers including conductors and insulators

Impact Significance

Uncontrolled waste dumping is banned. However, if it occurs, it could have impact on groundwater but it is considered as a minor impact along the proposed project as the receptor (groundwater) is situated at a large depth from the source of emissions along the routes. Moreover, the impacts during construction are characterized by being short term impacts.

The impact of solid wastes in general, if not properly managed, could be considered of medium significance due to the potential presence of hazardous wastes and the possibility of wastes being accumulated which has a negative visual impact.

By implementing the mitigation measures and mitigation management recommended in the ESMP, the significance of the impact could be reduced to minor.

Health and Safety

Potential impacts to workers and public health and safety during construction of transmission lines are the same as those associated with any construction project involving earthmoving, use of large equipment, transportation of overweight and oversized materials, and construction and installation of facilities. In addition, health and safety issues include working at heights. Health and safety impacts are distributed into:

- **Community health and safety:** It is predicted to affect the community people due to moving the vehicles, dust emissions and contamination of water. As well; there was a fear that neglectful workers may cause accidents harmful to themselves or to the community members, particularly children, especially close to the construction areas. The significance of this impact is limited and of temporary nature.
- **Occupational health and safety:** the workers could be affected by accidents that might occur in the construction sites. There is a low probability of being infected by the Blood Transmission Diseases (BTDs) through several modes of transmission, particularly, sharing the toilets, not following hygienic procedures, and using personal shaving tools.
- Adverse impacts might result in due to the bites of reptiles (snakes, lizards and scorpions)

Impact significance

Health and safety for the sensitive recipient communities surrounding the route of the OHTL is of low and minor significance, as most of the route of the OHTLs are not in the urban area or in the populated area. Therefore, the impact can be classified as minor. Standard prevention, i.e. clear sign and fences around the project area are sufficient to prevent the accident occur for the animals or inhabitants might pass the project site. In addition, the medium to high impact is identified for the health and safety of the workers.

The standard protection of the workers reported in Labor law related to occupational health and safety No. 12 of year 2003, especially for the workers that involved in the risk due to the height has to be put into mitigation measures and in the management and monitoring plan to minimize and reduce the significant impact. In addition special attention shall be paid for Working at height during crossing towers construction.

Removing trees on the Right of Way (ROW)

Tall tree removal is necessary within the ROW zone which is 25 meters from both sides for the ultra-high voltage electricity power (500 kV) in accordance to the Electricity Law 87/2015. The removal of trees, where it exists along the ROW of the proposed transmission lines and cannot be avoided, will require compensations. The compensations have to be matched with the loss to the source of income that is created by removing these trees. The EETC will have to substitute the removed trees. The ROW will also limit tall trees plantations along the transmission lines during operation in order to maintain the safety of the lines.

The compensations for trees will vary according to the type of tree, its age, productivity, type of irrigation used. The EETC will only be responsible for the compensation; however, as the EETC is not

responsible for replanting trees, it will be the responsibility of Agricultural Associations as well as individuals.

Identifying the value of the removed trees should be through the valuation and compensation committee that has to consider that the price lists developed by the Agriculture Directorate are applied.

It was noted that the project will result in a temporary impact on the crops and lands. Therefore, the study team relied upon the pricing lists provided for the crops. Along price list is attached to the RAP. The pricing lists are evaluated annually in cooperation with the agriculture associations within the project areas. The lists were based on:

- 1- Quality of crop/tree
- 2- Productivity of lands
- 3- Type of irrigation system
- 4- Age of trees
- 5- Access to main roads

Impact significance:

Removing the trees will have a negative impact, medium to major on the environment as well as on the owners of these trees. In order to compensate the negative impact on the environment, any removed tree should be substituted by planting other trees in other areas away from the ROW by the local stakeholders. The compensation for the owners of these trees should also take place in order to minimize the significance of the impact.

The ESIA and the RAP represent components of a consolidated document. This document will be subject to review and acceptance as whole.”

Land Use

Impacts to land use of the OHTL could occur during construction if there were conflicts with existing land use plans and community goals. Long-term land use impacts would occur if existing land uses are not compatible with transmission project.

As discussed in chapter 2, the Electricity Law 87/2015 has identified the limits of distances to be measured from the axis of the OHTL routes in order to identify the Right of Way (ROW) zone. There will be possible effects of electromagnetic fields from the OHTL, which will create certain restrictions on some land uses under the power lines. A ROW of 25 meters from both sides for OHTL (of 500 kV) will be kept as a Right of Way (ROW) or buffer zone for maintaining the public safety from electric hazards and high exposure to EMFs.

The ROW zone as identified by the Electricity Law 87/2015 will restrict the construction of new buildings and plantation of high trees on the routes in order to maintain the safety of the line; therefore in case of OHTL, there will be a limitation on agriculture crops such as wheat- maize- citrus fruits- potatoes and clover as well as trees plantation.

The total affected lands are limited to 225,000 m². There will be no need for additional storage areas or access roads as the estimated plots of lands will satisfy the needs of storage areas and access roads.

There are no direct effects related to power lines to animals passing under them; therefore, the construction of power lines is unlikely to cause any limitations on grazing activities.

Location of power lines will be most suitable to be found on sides of existing rural roads to facilitate access to these lines for construction and maintenance

Impact significance:

For the construction of the towers of the OHTL along the routes and the transmission lines, there will be affected land due to these constructions. The construction will only affect the plant growth in the agricultural lands along the right of way, as well as, put limitation to the buildings constructions. Therefore, the significance of this impact is high in the populated areas and minor in most of the desert project areas. Limitation of land use has a direct influence on the livelihood of people.

There is potential impact of having involuntary resettlement the OHTL project component. Therefore, The RAP should be prepared as a complementary part of the ESIA of Gamasa SS, a RAP will be necessary, and it has already been prepared as a standalone study upon the agreement with EIB representatives.

Visual Intrusion

Potential sources of visual impacts during construction of OHTL along the routes include:

- Visual contrasts in the landscape from access tracks and staging areas
- Small-vehicle traffic for worker access and frequent large-equipment traffic for project and access road construction.

Project component installation would produce visible activity and dust in dry soils. Project construction may be progressive, persevering over a period of time. Ground disturbance (e.g., trenching and grading) would result in visual impacts that produce contrasts of color, form, texture, and line. Soil scars and exposed slope faces could result from excavation, leveling, and equipment movement.

Impact significance:

The impact associated to the visual intrusion is considered minor, localized and temporary. Therefore, the standard protection for the ground disturbance, dust, wastes generated will be sufficient to mitigate to ensure the proper management and to minimize the impact.

Impacts on Ecological (Fauna and Flora)

The proposed route of the OHTL line up is mainly located on desert margins, sand areas habitat, and agricultural lands and therefore poses no threat to endangered species. The investigated habitats at agricultural lands are not unique and are very common and widespread in neighboring areas which would provide alternative habitats for the sympatric faunal species to move to these habitats and continue their life cycle.

The preferred route was selected on parameters like:

- Study Area Identification: Identifying major features in the study area like main roadways, residential and commercial areas to help identify constraints during the selection of the routes

- Mapping the resources: Existing linear corridors include major streets, waterways, railroads, and utility lines. Existing linear corridors are considered opportunity areas for routing because they have already been developed and therefore are generally considered a compatible land use. In addition, these linear corridors generally provide existing access for construction and maintenance requirements.

The potential impacts of construction are likely to be localized and good site management practices will be implemented, no significant effects are predicted.

Mitigation measures have been developed to ensure the systematic implementation of the mitigation i.e. avoid, reduce (minimize), remedy (restore) and offset. This will allow for the careful management of risk and the best possible outcomes for the project and local communities, without compromising the health, function and integrity of the ecological system.

Impact significance:

It is considered to be a Minor impact

Water Resource (groundwater, geology and hydrogeology)

Similar to the impact associated to the groundwater, surface water and drinking water associated to the construction of the SS; the construction of OHTL will have Minor Impact. However, standard prevention or precaution measures shall be prepared by the contractor prior to the construction. It is preferable to include the waste management plan in the ToR of the contractor.

Impact on Archeological and Cultural Sites

The OHTL route is far distance from any cultural or archeological sites. It is not expected that any impacts may appear during construction on any surrounding cultural or archeological sites. This impact is considered: insignificant impact.

Impact on the Culture and Privacy of Local Communities

EETC normally conducts construction activities through an external contractor. Therefore, in areas where the OHTL will pass through populated areas, local communities are expected to be exposed to openness and interaction with the outsiders of the project crew and workers during the construction phase. This impact is expected to be minor and temporary. Since the workers and the contractor are expected to respect the local culture of the community. As well as respect the privacy of the surrounding residential area. These impacts will end upon completion of the construction phase. It has been recommended in the ESMP to maximize the use of local labor to reduce such impact and to maximize the benefits to local communities.

Creation of Job Opportunities and Flourishing Economies of Construction Sites

The project can benefit from the opportunity of the construction activities to have a better relation with the surrounding community, facilitating later the acceptance of the project operation in the area. The project may participate in creating job opportunities for local people from the neighboring residential areas as construction workers and guards during the construction process. The job opportunities offered during the construction phase represent a temporary high positive impact, as it will add to the benefits of nearby resettlements from the project.

Noise

Normally construction works include noisy activities related to the operation of construction equipment, possible hammering and drilling works in addition to the noise generated from construction related trucks. The noise impacts could be analyzed in two main aspects: noise impact within the construction areas, and the noise impact on the neighboring receptors.

During the construction phase, noise would be generated during day and night at levels exceeding the currently recorded levels during the baseline study. At the vicinity of all identified receptors off site, the noise intensity should not exceed the following limits according to the international standards

- Residential, Institutional, educational: 55 dB (A) daytime from 07:00 to 22:00; and 45 dB (A) nighttime from 22:00 to 07:00
- Industrial, commercial: 70 55 dB (A) daytimes and 70 55 dB (A) nighttime

The potential vulnerable groups who are susceptible to the construction noise during the construction of the OHTLs are the following:

- Onsite Workers and
- Neighboring establishments

Monitoring the noise emissions and implementing the mitigation measures during the construction phase will help to effectively control this impact and ensure that the noise limits are within the allowable limits and there is no any violation of the standard levels.

Impact Significance:

Construction noise is likely to affect the neighboring areas he youth residential area close the SS site

For noise impact upon workers, within the construction site, it is possible that construction workers could be exposed to relatively high levels of noise. This could be mitigated through application of the normal precautions normally taken by construction labor.

Accordingly, this impact has been classified as a medium Impact (level 3), which could be further minimized and fully controlled if construction workers used safety gear as recommended in the ESMP.

Traffic Impacts

Power lines routes will be established away from road sides and on the desert land, as well as on urban and agriculture lands. In addition, there will be plenty of space for storage of construction materials and construction waste on road sides, therefore there will be very little possibilities that construction contractors will actually need to store materials on road lanes.

Furthermore, the extra traffic caused by construction vehicles is not expected to effectively impact the flow of traffic on the existing roads. The limitations on access to roads during construction are temporary; it will not affect any of the inhabitants. The impacts on access to roads beside the power lines are minor as the power lines will be located on the desert land and on the side of the existing roads.

Impact Significance

The impact is therefore considered Minor Impact. Mitigation measures included in the ESMP will effectively control this impact.

Air Quality

Excavation, filling, loading, transportation and unloading of soil and raw materials cause suspension of airborne dust that raises the particulate matter concentration on ambient air. These emissions are temporary and its severity depends on the construction activity, meteorological conditions, silt content of the soil and moisture content of the soil.

Another source of air emissions during construction is the exhaust emissions of construction machinery and vehicles visiting and leaving the site. The extent of these emissions depends on the number of machinery working at the site at one time, the type and efficiency of the engines and also the climate conditions.

Impact Significance:

Most of the OHTL routes is in desert landscape far from any settlement, in addition at a relatively large distance from receptors such as residential/settlement zone. In addition, the short duration of the impact given. Consequently, this impact could be also considered Minor along the OHTL line and Medium on the workers environment along the line. Exhaust from vehicles is considered minor.

Hazardous Materials and Waste Management

Wastes generated during construction activities of OHTL comprise of excavated soil for foundations. The excavated soil will normally be accumulated besides OHTL routes, and collected after installations are completed. Other types of solid construction wastes would include the following:

- Foundations
- Trimmings of steel.
- ⊖ Cut-off trees and vegetation
- Metals, wood, cement sacks, sand and gravel, concrete spills, cut off cables, garbage from daily activities of workers.
- Hazardous wastes such as spent oils from the operation and maintenance of machinery.
- Wasted or faulted materials of the towers including conductors and insulators

Impact Significance

Uncontrolled waste dumping is banned. However, if it occurs, it could have impact on groundwater but it is considered as a minor impact along the proposed project as the receptor (groundwater) is situated at a large depth from the source of emissions along the routes. Moreover, the impacts during construction are characterized by being short term impacts.

The impact of solid wastes in general, if not properly managed, could be considered of medium significance due to the potential presence of hazardous wastes and the possibility of wastes being accumulated which has a negative visual impact.

By implementing the mitigation measures and mitigation management recommended in the ESMP, the significance of the impact could be reduced to minor.

Health and Safety

Potential impacts to worker and public health and safety during construction of transmission lines are the same as those associated with any construction project involving earthmoving, use of large equipment, transportation of overweight and oversized materials, and construction and installation of facilities. In addition, health and safety issues include working at heights... Health and safety impacts are distributed into:

- **Community health and safety:** It is predicted to affect the community people due to moving the vehicles, dust emissions and contamination of water As well; there was a fear that neglectful workers may cause accidents harmful to themselves or to the community members, particularly children, especially close to the construction areas. The significance of this impact is limited and of temporary nature.
- **Occupational health and safety:** the workers are predicted to get affected by accidents that might occur in the construction sites. There is a low probability of being infected by the Blood Transmission Diseases (BTDs) through several modes of transmission, particularly, sharing the toilets, not following hygienic procedures, and using personal shaving tools.
- Adverse impacts might result in due to the bites of reptiles (snakes, lizards and scorpions)

Impact significance

Health and safety for the sensitive recipient communities surrounding the route of the OHTL is of low and minor significance, as most of the route of the OHTLs are not in the urban area or in the populated area. Therefore, the impact can be classified as minor. Standard prevention, i.e. clear sign and fences around the construction areaa are sufficient to prevent the accident occur for personnel who might pass the project site. In addition, the medium to high impact is identified for the health and safety of the workers.

The standard protection of the workers reported in Labor law related to occupational health and safety No. 12 of year 2003, especially for the workers that involved in the risk due to the height has to be put into mitigation measures and in the management and monitoring plan to minimize and reduce the significant impact. In addition special attention shall be paid for working at height during crossing towers construction.

Removing trees on the Right of Way (ROW)

Tall tree removal is necessary within the ROW zone which is 25 meters from both sides for the ultra-high voltage electricity power (500 kV) in accordance to the Electricity Law 87/2015. The removal of trees, where it is exists along the ROW of the proposed transmission lines and cannot be avoided, will

require compensations. The compensations have to be matched with the loss to the source of income that is created by removing these trees. The EETC will have to substitute the removed trees. The ROW will also limit tall trees plantations along the transmission lines during operation in order to maintain the safety of the lines.

The compensations for trees will vary according to the type of tree, its age, productivity, type of irrigation used. The EETC will only be responsible for the compensation; however, as the EETC is not responsible for replanting trees, it will be the responsibility of Agricultural Associations as well as individuals.

Identifying the value of the removed trees should be through the valuation and compensation committee that has to consider that the price lists developed by the Agriculture Directorate are applied.

It was noted that the project will result in a temporary impact on the crops and lands. Therefore, the study team relied upon the pricing lists provided for the crops. Along price list is attached to the RAP. The pricing lists are evaluated annually in cooperation with the agriculture associations within the project areas. The lists were based on:

- 6- Quality of crop/tree
- 7- Productivity of lands
- 8- Type of irrigation system
- 9- Age of trees
- 10- Access to main roads

Impact significance:

Removing the trees will have a negative impact, medium to major on the environment as well as on the owners of these trees. In order to compensate the negative impact on the environment, any removed tree should be substituted by planting other trees in other areas away from the ROW by the local stakeholders. The compensation for the owners of these trees should also take place in order to minimize the significance of the impact.

The ESIA and the RAP represent components of a consolidated document. This document will be subject to review and acceptance as whole.”

Land Use

Impacts to land use of the OHTL could occur during construction if there were conflicts with existing land use plans and community goals. Long-term land use impacts would occur if existing land uses are not compatible with transmission project. The project will penetrate several populated areas.

As discussed in chapter 2, the Electricity Law 87/2015 has identified the limits of distances to be measured from the axis of the OHTL routes in order to identify the Right of Way (ROW) zone. There will be possible effects of electromagnetic fields from the OHTL, which will create certain restrictions on some land uses under the power lines. A ROW of 25 meters from both sides for OHTL (of 500 kV) will be kept as a Right of Way (ROW) or buffer zone for maintaining the public safety from electric hazards and high exposure to EMFs.

The ROW zone as identified by the Electricity Law 87/2015 will restrict the construction of new buildings and plantation of high trees on the routes in order to maintain the safety of the line; therefore in case of OHTL, there will be a limitation on agriculture crops such as wheat- maize- citrus fruits- potatoes and clover as well as trees plantation.

The total affected lands are limited to 225,000 m². There will be no need for additional storage areas or access roads as the estimated plots of lands will satisfy the needs of storage areas and access roads.

There are no direct effects related to power lines to animals passing under them; therefore, the construction of power lines is unlikely to cause any limitations on grazing activities.

Location of power lines will be most suitable to be found on sides of existing rural roads to facilitate access to these lines for construction and maintenance

Impact significance:

For the construction of the towers of the OHTL along the routes and the transmission lines, there will be an affected land due to these constructions. The construction will only affect the plant growth in the agricultural lands along the right of way, as well as, put limitation to the buildings constructions. Therefore, the significance of this impact is high in the populated areas and minor in most of the desert project areas. Limitation of land use has a direct influence on the livelihood of people.

There is potential impact of having involuntary resettlement the OHTL project component. Therefore, The RAP should be prepared as a complementary part of the ESIA of Gamasa SS, a RAP will be necessary, and it has already been prepared as a standalone study upon the agreement with EIB representatives.

Visual Intrusion

Potential sources of visual impacts during construction of OHTL along the routes include:

- Visual contrasts in the landscape from access tracks and staging areas
- Small-vehicle traffic for worker access and frequent large-equipment traffic for project and access road construction.

Project component installation would produce visible activity and dust in dry soils. Project construction may be progressive, persevering over a period of time. Ground disturbance (e.g., trenching and grading) would result in visual impacts that produce contrasts of color, form, texture, and line. Soil scars and exposed slope faces could result from excavation, leveling, and equipment movement.

Impact significance:

The impact associated to the visual intrusion is considered minor, localized and temporary. Therefore, the standard protection for the ground disturbance, dust, wastes generated will be sufficient to mitigate to ensure the proper management and to minimize the impact.

Impacts on Ecological (Fauna and Flora)

The proposed route of the OHTL line up is mainly located on desert margins, sand areas habitat, and agricultural lands and therefore poses no threat to endangered species. The investigated habitats at

agricultural lands are not unique and are very common and widespread in neighboring areas which would provide alternative habitats for the sympatric faunal species to move to these habitats and continue their life cycle.

The potential impacts of construction are likely to be localized and good site management practices will be implemented, no significant effects are predicted.

The preferred route was selected on parameters like:

- Study Area Identification: Identifying major features in the study area like main roadways, residential and commercial areas to help identify constraints during the selection of the routes
- Mapping the resources: Existing linear corridors include major streets, waterways, railroads, and utility lines. Existing linear corridors are considered opportunity areas for routing because they have already been developed and therefore are generally considered a compatible land use. In addition, these linear corridors generally provide existing access for construction and maintenance requirements.

Mitigation actions have been developed to ensure the systematic implementation of the mitigation i.e. avoid, reduce (minimize), remedy (restore) and offset. This will allow for the careful management of risk and the best possible outcomes for the project and local communities, without compromising the health, function and integrity of the ecological system.

Impact significance:

It is considered to be a Minor impact

Water Resource (groundwater, geology and hydrogeology)

Similar to the impact associated to the groundwater, surface water and drinking water associated to the construction of the SS; the construction of OHTL will have Minor Impact. However, standard prevention or precaution measures shall be prepared by the contractor prior to the construction. It is preferable to include the waste management plan in the ToR of the contractor.

Impact on Archeological and Cultural Sites

The OHTL route is far distance from any cultural or archeological sites. It is not expected that any impacts may appear during construction on any surrounding cultural or archeological sites. This impact is considered: insignificant impact.

Impact on the Culture and Privacy of Local Communities

EETC normally conducts construction activities through an external contractor. Therefore, in areas where the OHTL will pass through populated areas, local communities are expected to be exposed to openness and interaction with the outsiders of the project crew and workers during the construction phase. This impact is expected to be minor and temporary. Since the workers and the contractor are expected to respect the local culture of the community. As well as respect the privacy of the surrounding residential area. These impacts will end upon completion of the construction phase. It has been recommended in the ESMP to maximize the use of local labor to reduce such impact and to maximize the benefits to local communities.

Creation of Job Opportunities and Flourishing Economies of Construction Sites

The project can benefit from the opportunity of the construction activities to have a better relation with the surrounding community, facilitating later the acceptance of the project operation in the area. The project may participate in creating job opportunities for local people from the neighboring residential areas as construction workers and guards during the construction process. The job opportunities offered during the construction phase represent a temporary high positive impact, as it will add to the benefits of nearby resettlements from the project.

Summary of the impacts during construction of SS and OHTLs presented in Table 6.2 and Table 6.3 respectively.

Table 6-3. Assessed significance of expected impacts during construction phase of New Gamasa500 GIS substation

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction New Gamasa of substation			
Noise	High likelihood to occur – short term and temporary -	Medium Impact	General measures should be applied by the construction workers to reduce the impact of construction to surrounding establishments nearby the construction. (See chapter 8) Notification to the surrounding establishment prior to the construction of the SS Time management and construction schedule according to the IFC regulation (Residential, Institutional, educational: 55 dB (A) daytime from 07:00 to 22:00; and 45 dB (A) nighttime from 22:00 to 07:00, Industrial, commercial: 70 55 dB (A) daytimes and 70 55 dB (A) nighttime) will be provided by the contractor prior to the construction phase
Traffic	High likelihood to occur – short term, temporary and localized only on the main road	Low to medium impact	Time management for transporting the materials, equipment, debris, etc Clear sign surrounding construction site and the enter / exit gate Coordination with traffic department (ministry of interior) for vehicles routes and movement.
Air Quality	High likelihood to occur – short term, temporary and localized - Highly sensitive receptors include construction workers. Receptors with low sensitivity include nearby projects/settlements.	Medium impact on construction workers and on the residents, surrounding establishment and pedestrians passing by the construction site	Spraying the sandy soil with water (if needed, especially during the dry period). Maneuver area and the parking area should be well paved Management of the number of vehicles at the same time for specific location and the scheduling the intensity of vehicles
Vibration	Low likelihood to occur	Minor impact	Schedule and time plan for vehicles movements and construction activities

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction New Gamasa of substation			
<p>Hazardous materials and waste generation</p>	<p>Uncertain likelihood – Uncertain impact duration - Highly sensitive receptors include soil pollution and workers. Receptors with low sensitivity include nearby projects/settlements. Physical environment receptors with low sensitivity include groundwater, surface water and drinking water</p>	<p>Low to Medium impact</p>	<p>Agreement should be reached prior to commencing construction work between the contractor and a licensed waste collector for officially assigning a location for the disposal of construction waste.</p> <p>Waste management submitted by the contractor for waste management (upon the agreement with the licensed waste collector.</p> <p>•For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities (EEAA).”</p> <p>Protection from spillage includes paved site for workshop or maintenance of vehicles</p> <p>Temporary storage of wastes includes on site sanitation before the proper connection to the existing sewage network is installed. It is preferable to include the temporary onsite waste management in the ToR of the contractor.</p>

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction New Gamasa of substation			
Health and Safety	<p>High likelihood to occur for the construction workers</p> <p>Low likelihood to occur for the surrounding establishment and sensitive receptors.</p> <p>Highly sensitive receptors include workers. Receptors with low sensitivity include nearby residents and existing establishments</p>	<p>Minor impact for sensitive receptors and medium to high / major impact for the workers</p>	<p><u>Community Health and Safety</u></p> <p>Standard protection by placing clear project signs.</p> <p>Time management for vehicles movement; especially avoiding the peak hours</p> <p><u>Occupational Health and Safety</u></p> <p>Standard protection for the workers especially working at elevated heights as following:</p> <p>a) The Contractor shall be responsible to ensure that its personnel are protected from the risk of falling from any height by applying the following general guidelines.</p> <p>b) The Contractor shall provide training and maintain training records for safe working at height procedures and for the use of any equipment that enables working at height to its personnel assigned to work at height based on risk assessment and Applicable Laws.</p> <p>c) The Contractor shall ensure that all personnel assigned to work at height are physically and medically fit to do so.</p> <p>d) Collective fall protection – guard rails, scaffolds, mobile platform ladders, mobile elevating work platforms (MEWP) or cherry-pickers, safety nets, etc., has priority over individual fall protection.</p> <p>e) When collective fall protection measures are not possible to implement then individual protection, such as a safety harness and life-lines, etc., is compulsory.</p> <p>f) Safe access to all work stations at height must be assured.</p> <p>g) No person is obliged to place themselves at risk of falling; they retain the right to withdraw from any situation, without prejudice, where the risk of falling exists.</p>
Visual Resources and landscaping	<p>Low likelihood to occur</p>	<p>Minor impact, localized and temporary</p>	<p>Following the standard protection for the ground and soil disturbance, air quality (and dust) measures and proper waste management described on the section of waste management measures</p> <p>Clear sign of the construction activities</p>
water resource (ground water, surface water and drinking water)	<p>Low likelihood to occur</p>	<p>Minor impact on groundwater, surface water and drinking water</p>	<p>Following standard protection for the ground and soil and proper waste management described on the section of waste management measures</p>

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction New Gamasa of substation			
Ecological resources(Fauna and Flora and bird migration)	Low likelihood to occur	Negligible impact (no impact)	No mitigation measures are needed.
Impact on natural disaster risks	Low likelihood to occur	No significant impact	No mitigation measures is prepared Technical specifications of the equipment is include the standard measures for natural disaster risks
Land use and Involuntary resettlement	Low likelihood to occur	Very low or insignificant	No mitigation measures is prepared (it will be discussed in details in the RAP study includes the involuntary resettlement related to the construction activities.
Archeological and cultural sites	Low likelihood to occur as no archeological and cultural sites are located within SS site.	Very low or insignificant	No mitigation measures is prepared

Table 6-4. Assessed significance of expected impacts during construction phase of 220 kV West Damietta power OHTL

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of OHTL			
Noise	High likelihood to occur – short term and temporary -	Medium Impact	General measures should be applied by the construction workers to reduce the impact of construction to surrounding establishments nearby the construction. (See chapter 8) Notification to the surrounding establishment prior to the construction of the SS Time management and construction schedule according to the IFC regulation (Residential, Institutional, educational: 55 dB (A) daytime from 07:00 to 22:00; and 45 dB (A) nighttime from 22:00 to 07:00, Industrial, commercial: 70 55 dB (A) daytimes and 70 55 dB (A) nighttime) will be provided by the contractor prior to the construction phase
Traffic	High likelihood to occur – short term, temporary and localized only on the main road	Low to medium impact	Time management for transporting the materials, equipment, debris, etc Clear sign surrounding construction site and the enter / exit gate Coordination with traffic department (ministry of interior) for vehicles routes and movement.
Air Quality	High likelihood to occur – short term, temporary and localized - Highly sensitive receptors include construction workers. Receptors with low sensitivity include nearby	Medium impact on construction workers Low impact on the residents, surrounding establishment and	Spraying the sandy soil with water (if needed, especially during the dry period). Maneuver area and the parking area should be well paved Management of the number of vehicles at the same time for specific location and the scheduling the intensity of vehicles

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of OHTL			
	projects/settlements.	pedestrians passing by the construction site	
Hazardous Materials and Waste Management	Likely to occur - short term – Highly sensitive receptors include soil at protectorate areas and workers. Receptors with medium sensitivity include nearby settlements. Receptors with low sensitivity include groundwater.	Medium	<p>Agreement should be reached prior to commencing construction work between the contractor and landfill for officially assigning a location for the disposal of construction waste.</p> <p>Waste management submitted by the contractor for waste management upon the agreement with the licensed waste collector. For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities (EEAA).”</p> <p>Protection from spillage includes paved site for workshop or maintenance of vehicles</p> <p>Temporary storage of wastes includes on site sanitation before the proper connection to the existing sewage network is installed. It is preferable to include the temporary onsite waste management in the ToR of the contractor.</p>
Health and Safety	Low likelihood of major or medium impacts for workers– high likelihood of minor impact for sensitive recipient	Minor	<p>Standard protection by placing clear project signs.</p> <p>Time management for vehicles movement; especially avoiding the peak hours</p> <p>Standard protection for the workers especially working at elevated heights</p>
Removing trees on ROW	Low likelihood of major or medium impacts	Medium to Major	<ul style="list-style-type: none"> • Reduce impact significance to minor following RAP • Avoiding of trees is essential • Plantation of trees near removed trees <p>Agriculture association should orient the farmers about the best strategy to move their trees</p>
Land use	Medium and direct impact to livelihood	Medium	Reduce impact significance to minor following recommendations of RAP preparation
Visual intrusion	Low likelihood of major or medium impacts and localized	Minor	<p>Following the standard protection for the ground and soil disturbance, air quality (and dust) measures and proper waste management described on the section of waste management measures</p> <p>Clear sign of the construction activities</p>
Ecological resources(Fauna and Flora)	Medium likelihood to occur – short term	Minor	<p>Following the standard protection for the fauna and flora and proper waste management described on the section of waste management measures</p> <p>The preferred route was selected on parameters like:</p> <ul style="list-style-type: none"> • Study Area Identification: Identifying major features in the study

Impact		Likelihood and Severity	Significance	Mitigation Measures
During construction of OHTL				
				area like main roadways, residential and commercial areas to help identify constraints during the selection of the routes <ul style="list-style-type: none"> Mapping the resources: Existing linear corridors include major streets, waterways, railroads, and utility lines. Existing linear corridors are considered opportunity areas for routing because they have already been developed and therefore are generally considered a compatible land use. In addition, these linear corridors generally provide existing access for construction and maintenance requirements.
Water Resources	Medium likelihood to occur – short term	Minor		Standard prevention or precaution measures shall be prepared by the contractor prior to the construction. It is preferable to include the waste management plan to be included in the ToR of the contractor.
Cultural resources	Low likelihood of major or medium impacts	Insignificant		No mitigation measures is needed

Table 6-5 Assessed significance of expected impacts during construction phase of 220 kV Tiba Steel Plant OHTL

Impact		Likelihood and Severity	Significance	Mitigation Measures
During construction of OHTL				
Noise	High likelihood to occur – short term and temporary -	Medium Impact		General measures should be applied by the construction workers to reduce the impact of construction to surrounding establishments nearby the construction. (See chapter 8) Notification to the surrounding establishment prior to the construction of the SS Time management and construction schedule according to the IFC regulation (Residential, Institutional, educational: 55 dB (A) daytime from 07:00 to 22:00; and 45 dB (A) nighttime from 22:00 to 07:00, Industrial, commercial: 70 55 dB (A) daytimes and 70 55 dB (A) nighttime) will be provided by the contractor prior to the construction phase
Traffic	High likelihood to occur – short term, temporary and localized only on the main road	Low to medium impact		Time management for transporting the materials, equipment, debris, etc Clear sign surrounding construction site and the enter / exit gate Coordination with traffic department (ministry of interior) for vehicles routes and movement.
Air Quality	High likelihood to occur – short term, temporary and localized - Highly sensitive receptors include construction workers. Receptors with	Medium impact on construction workers Low impact on the residents, surrounding		Spraying the sandy soil with water (if needed, especially during the dry period). Maneuver area and the parking area should be well paved Management of the number of vehicles at the same time for specific location and the scheduling the intensity of vehicles

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of OHTL			
	low sensitivity include nearby projects/settlements.	establishment and pedestrians passing by the construction site	
Hazardous Materials and Waste Management	Likely to occur - short term – Highly sensitive receptors include soil at protectorate areas and workers. Receptors with medium sensitivity include nearby settlements. Receptors with low sensitivity include groundwater.	Medium	<p>Agreement should be reached prior to commencing construction work between the contractor and landfill for officially assigning a location for the disposal of construction waste.</p> <p>Waste management submitted by the contractor for waste management upon the agreement with the licensed waste collector. For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities (EEAA).”</p> <p>Protection from spillage includes paved site for workshop or maintenance of vehicles</p> <p>Temporary storage of wastes includes on site sanitation before the proper connection to the existing sewage network is installed. It is preferable to include the temporary onsite waste management in the ToR of the contractor.</p>
Health and Safety	Low likelihood of major or medium impacts for workers– high likelihood of minor impact for sensitive recipient	Minor	<p>Standard protection by placing clear project signs.</p> <p>Time management for vehicles movement; especially avoiding the peak hours</p> <p>Standard protection for the workers especially working at elevated heights</p>
Removing trees on ROW	Low likelihood of major or medium impacts	Medium to Major	<ul style="list-style-type: none"> • Reduce impact significance to minor following RAP • Avoiding of trees is essential • Plantation of trees near removed trees <p>Agriculture association should orient the farmers about the best strategy to move their trees</p>
Land use	Medium and direct impact to livelihood	Medium	Reduce impact significance to minor following recommendations of RAP preparation
Visual intrusion	Low likelihood of major or medium impacts and localized	Minor	<p>Following the standard protection for the ground and soil disturbance, air quality (and dust) measures and proper waste management described on the section of waste management measures</p> <p>Clear sign of the construction activities</p>
Ecological resources(Fauna and Flora)	Medium likelihood to occur – short term	Minor	<p>Following the standard protection for the fauna and flora and proper waste management described on the section of waste management measures</p> <p>The preferred route was selected on parameters like:</p>

Impact	Likelihood and Severity	Significance	Mitigation Measures
During construction of OHTL			
			<ul style="list-style-type: none"> • Study Area Identification: Identifying major features in the study area like main roadways, residential and commercial areas to help identify constraints during the selection of the routes • Mapping the resources: Existing linear corridors include major streets, waterways, railroads, and utility lines. Existing linear corridors are considered opportunity areas for routing because they have already been developed and therefore are generally considered a compatible land use. In addition, these linear corridors generally provide existing access for construction and maintenance requirements.
Water Resources	Medium likelihood to occur – short term	Minor	Standard prevention or precaution measures shall be prepared by the contractor prior to the construction. It is preferable to include the waste management plan to be included in the ToR of the contractor.
Cultural resources	Low likelihood of major or medium impacts	Insignificant	No mitigation measures is needed

6.3.3. Impact assessment during Operation of Gamasa 500 GIS Substation

During the operation of the substation, typically, beside the managerial and administration activities, the most important activities are operation and maintenance of the substation components according to their specifications, monitoring of the substation components and regular trainings (administrative, managerial, emergency plan, etc.)

It is expected that prior to the commissioning of the substation, the training of the operator staff will be done by the contractor / supplier, as a part of their contract for operation and maintenance of the substation. Normally, according to the practice done by EETC, at least 5 staff will be needed for operation and maintenance of new substation. Thus, the impact during the operation and maintenance of the substation is expected to be minimized.

However, the following potential impacts may result from the operation and maintenance of a substation:

Noise

Sources of noise during the operation and maintenance phase would include staff vehicles and GIS transformers and other supporting equipment of the substation. The primary impacts from noise would be localized disturbance. It is worth mentioning that the GIS substation is placed indoor and the transformers will be selected to have the least noise disturbance accordingly. Full noise measurements will be conducted for each new substation.

To be able to predict the impacts during operation, the consultant used noise measurements previously done at Ain Serra GIS transformers and other supporting equipment of the substation. Ain Serra SS GIS is 220/66/11 similar to Gamasa SS.

Please refer to Table 6-6 for the noise measurement result at Ain Serra SS

Table 6-6 Ain Serra (Existing SS) Noise measurements

Ain Serra SS (existing SS)	Mean value (dB)
Nearby transformers	78
GIS (indoor)	65.4
Control room (indoor)	61

To predict the impacts during the operation of New Gamasa SS, the consultant used the highest dBA value nearby by the transformers with the following extrapolation calculation to calculate the noise at the closest receptors.

$$\text{Sound level dB (A)} = L_w - 20 \log R - 8$$

Where L_w = sound source level, dB (A) and

R = distance from the source, m

The youth residential area is about 30 meters far and the newborn hospital as distance of 500 meters away from the proposed site of the SS. Based on the extrapolation calculation and propagation of sound

waves, the distances of the sensitive receptors were plotted. The result are presented at the following table.

Table 6-7 Expected noise level in (dBA) from the source of substation to the sensitive receptors during operation

Area/Noise level dBA	Youth residential Distance at 30 m(dBA)	Newborn Hospital Distance at 500 m(dBA)
Nearby transformers/ 78	56.45	32
GIS (indoor)/ 65.4	43.86	19.4
Control room (indoor)/ 61	39.46	15
Permissible limits national	60 day and 50 night	50 day and 40 night

Impact significance:

It is shown in the above table that all results are below the allowable levels. The maintenance, investigation and staff and vehicles movement is not expected to be significant or considered very low impact. The number of vehicles will be limited during operation and maintenance, the staff will be using the ear protection. However, regarding the noise generated from the operation of substation, the impact of the surrounding environment will not be highly noticable. According to the measurement for existing SS and the nearest residential area (refer to chapter 3). The impact to the sensitive reseptors surrounding is clasified as insignificant.

Traffic

During the operation and maintenance of the substation, there will be no expected impact. There will be only small number of staff vehicles moving in and out from the substation. The additional number of vehicles will not impact the existing traffic at east desert highway.

Air Quality

Similarly for noise and traffic impact, vehicular traffic and machinery would continue to produce small amounts of fugitive dust and exhaust emissions during the operation and maintenance phase. These emissions would not likely exceed air quality standards nor have any impact or considered as low impact. High electrical field around power cables attract airborne pollutants. Ozone may be generated around transmission lines but in low concentrations and there is no evidence of it being harmful to health. Moreover, the air emission from the GIS substation, as the substation is insulated; the gas emission is not expected and there is no impact generated from the substation during operation and maintenance phase.

Vibration

The substation will generate low vibration. Additional vibration will be associated with the staff vehicles only and it is considering low as the number of vehicles will be very small. Therefore, it is not expected there is any impact related to the vibration, thus the impact is considered very low and there is no mitigation measure is prepared.

Hazardous and non-hazardous wastes

During operation and maintenance of the substation, besides industrial hazardous and non-hazardous waste, small quantity of domestic wastes (solid and liquid waste) will be generated. Industrial hazardous wastes are generated during routine operations (e.g., lubricating oils, hydraulic fluids, coolants, solvents, and cleaning agents). These wastes are typically; according to EEAA regulations for hazardous waste management should be placed in containers, characterized and labeled, possibly stored briefly, and transported by a licensed contractor to an appropriate permitted off-site disposal facility as a standard practice.).

For hazardous solid and liquid wastes, proper waste collection and storage plus regular (preferably twice a week) waste collection by licensed contractors will need to be arranged by site management. To coordinate and control this. The site management should develop a waste management plan prepared by EETC .For the non-hazardous solid wastes, those that cannot be recycled will be disposed in a sanitary landfill periodically (weekly or monthly depending on the volume of waste generated). Regarding the domestic waste, as the existing collection is already established and the amount to be expected is considered small.

Any pesticides stored on site for control of weeds, rodents or vectors as mosquitoes should be kept in a secure storage and application should be made under controlled conditions.

The domestic wastes (wastewater and solid waste) generated are relatively small as only small number of workers will be employed the operation and will be collected by a licensed contractors.

Impact significance:

Concerning the industrial wastes, accordingly, Medium impact shall be resulted due to the wastes generated. EEAA regulations should be followed to minimize the impact. The detailed mitigation measures are developed at the following chapter.

Concerning the domestic wastes, standard monitoring for leakage or damage for the pipeline and septic tank and it consider minimal impact of the wastes generated.

Risks of soil contamination

Risk of soil contamination is only associated with the possible spillage or leakage of the transformer oil. The possibilities of contaminating the soil during incident of oil spillage or leakage are not high although the amount of the transformers oils could be accidentally released to the environment is very high (over thousands of liters in every transformer, and, eventually, leakage of transformers oil is considered as being a great and serious environmental accident.

Impact Significance:

The soil contamination impact is considered to be high impact in case of rare leakage of the transformers oil but due to the design of transformer which is unusual to leakage so it can be considered as a minimal impact;

Health and Safety

Possible impacts to health and safety during operations include exposures to electromagnetic fields (EMF), accidental injury to workers during operation and maintenance activities. In addition; health and safety issues include working around energized equipment, and possible contact with natural hazards. However, during the operation and maintenance phase, if there is any incident or emergency situation, the impact will be negatively endanger the surrounding community and establishment.

Impact significance

Health and safety for the sensitive recipient (community surrounding the project site of substation) does not have a significant impact, the impact can be classified as insignificant. In addition, the SF6 gas insulated in the SS will eliminate the EMF exposure to the environment.

In addition, the medium impact is identified for the health and safety of the workers. However; concerning the high risk impact associated to the incident or emergency situation, i.e. during the fire, leakage, or other equipment faults.

Natural disaster risks

An assessment of the risks to the operation and maintenance of the substation due to earthquake or seismic activity; concluded that the given engineering measures incorporated into the design of the SS and the potential environmental impacts of a seismic event are not anticipated to be significant. This impact would be considered as a minimal or insignificant impact. Possible mitigation measures have been already considered in the technical design.

Visual Resources and landscaping

As the substation is an indoor facility, and the transformers side will be placed in the area on the middle of the infrastructure, as well as the fences is considered high and the site itself is higher than the existing establishment, visually, there will be no indication that this site is a substation. The infrastructure within the site will be well integrated with the surrounding establishment. Therefore, the impact associated to the visual resource is considered minimal or insignificant and no measure is developed.

Ecological Resources

As the operation and maintenance of SS, Depending on the size and purpose of the substation, the area affected could vary from less than one Fadden. Already the area don't have any important flora or fauna there is no impact.

Creation of Job Opportunities and Flourishing Economies

The availability of stable electricity service may encourage members of the local community to open new business activities. This represents a positive opportunity for members of the local community. The problem that may arise can be related to increasing consumption patterns of electricity with the improvement of the service. Significance of Impact:

Positive/Minor/Generate Impact

The summary of the impact during operation of the SS will be presented in Table 6.5.

6.3.4. Impacts assessment during Operation of OHTL

220 kV OHTL New Gamasa SS | West Damietta power

Hazardous Materials and Wastes Management

There shall be different types of wastes generated during the operation phase of OHTL resulting from maintenance, repair and replacement activities. Among these types the following:

- Waste cables that will be replaced along the transmission line. Some of these cables may be covered with PVC insulators, which, if burned, cause harmful emissions including dioxins. Accordingly, waste cables could be of high risk if PVC cables were disposed in open dumps where it could be exposed to open fires.
- Scrap fittings, insulators, cross arms, conductors, and other scrap which are expected to be from inert materials that does not cause high risk in disposal/recycling procedure.

Impact Significance

Non-hazardous wastes which include domestic waste, and scrap associated with relatively low environmental risks. However, certain waste management procedures should be considered in order to avoid situations where scrap occupies large areas of land and causes aesthetic and land-use impacts.

Hazardous waste will be mainly generated from mechanical room during maintenance of equipment along the transmission line. Therefore, it is expected that the amount of generated hazardous waste will not be significant and it will be collected by a licensed waste contractor

The impact is considered of Medium significance due to the small amount of hazardous waste generated. The ESMP includes measures for establishing temporary stores (waste accumulation areas) for scrap at the project site and keeping the tidiness and cleanliness of these stores until scrap is sold for recycling or disposed as shall be detailed in the ESMP. In addition scrap, wastes shall be segregated as recommended according to the ESMP. Implementing the measures could reduce the impact to be of a minor significance.

Effect of Electromagnetic Fields (EMF)

Table 6-8. ICNIRP guidelines for EMF public and occupational exposure

Frequency	Public Exposure		Occupational Exposure	
	Electric Field (V/m)	Magnetic Field (mG)	Electric Field (V/m)	Magnetic Field (mG)
50 Hz	5,000	1,000	10,000	5,000
60 Hz	4,150	830	8,300	4,150

OHTL generate electromagnetic fields around the conductors, the intensity of such fields are proportional with the line voltage and electric current which changes in strength over time as the demand for electricity fluctuates. There are some concerns that EMFs could cause health impacts to the general public by prolonged exposure. EMFs have been considered by the International Agency for Research on Cancer (IARC) as possible carcinogenic, this classification was based on some evidences; however, there is no agreement among the scientific community about certain effects of EMFs.

Despite of the uncertainty about the health impacts of EMF, the mitigation measures include keeping track of EMF values in substations and at the edge of OHTL ROW.

Impact Significance:

The ICNIRP has set a guideline figure that public exposure to EMF should not exceed 830 mG and occupation exposure should not exceed 4,150 mG, these figures for electric fields are 4.2 and 8.3 kV/m for public and occupational exposure respectively.

Risk of Soil Contamination

Risk of soil contamination associated with the operation phase of the transmission lines is minimal. This could only arise if spent parts during maintenance are accidentally dumped at random sites across the line which is totally banned. The severity of such impact will depend on the local conditions where the waste is dumped and whether contaminants migration and propagation would be likely to take place in the event of a rainfall.

Impact Significance:

Along the transmission line the impact is considered minor impact if design precautions are applied. Application of appropriate mitigation will effectively control the impact and minimize it to the maximum possible extent.

Noise

OHTL are not sources of noise; however noise may be emanated due to corona effects. Corona associates with operating OHTL under certain weather conditions, rainy and foggy weather, which is not normally, occur along the proposed routes.

The baseline assessment of noise quality along the OHTL line indicated that the hourly equivalent sound levels do not exceed the 8-hr maximum limit value of 45 dB as mentioned in the Egyptian law no.4/1994.

The noise impacts could be analyzed in two main aspects: noise impact within the project areas, and the noise impact on the neighboring receptors.

Impact Significance:

Since noise may be emanate from OHTL due to corona effects only which is associated with the operation hours of the OHTL and special weather conditions, the impact is considered minor.

Impact on Archeological and Cultural Sites

Impacts during the operations and maintenance phase for cultural resources as well as visual impact does not have any significant impact and OHTL. Therefore, there are no mitigation measures to be developed.

Health and Safety

There are major safety risks associated with the operation of OHTL: 1) electric shock risks, 2) the probability to fall down the towers, 3) impact of electromagnetic field under the ROW and, 4) fire risks. Electrocutation could happen for maintenance operators during repairs or to the general public because of unforeseen accidents; however the normal safety precautions that are followed in the design and construction of transmission lines, transformers, etc are generally minimizing such risks both to the general public and to the maintenance workers.

A number of epidemiological studies suggest small increases in risk of childhood leukemia with exposure to low frequency magnetic fields in the home. However, scientists have not generally concluded that these results indicate a cause-effect relation between exposure to the fields and disease (as opposed to artifacts in the study or effects unrelated to field exposure). In part, this conclusion has been reached because animal and laboratory studies fail to demonstrate any reproducible effects that are consistent with the hypothesis that fields cause or promote cancer.

Fire risks could be due to connection of transmission lines to vegetation, an issue which have been previously discussed in the impacts of construction phase and it was mentioned that power line routing will avoid, as much as possible. Fields having high trees will be removed from the ROW zone of transmission lines. Another factor which could cause fires, is overloading of transmission lines, a risk that is also minimized by adequate safety precautions in the design and operation of the system.

Although electrocution accidents and fires could lead to losses in lives and properties, it is believed that the normal design, construction and operation procedures expected to be followed by the EETC, in accordance to Labor Law, No. 12 of year 2003 will provide sufficient safety precautions so that accidents will be due to unforeseen factors that could not be considered in risk estimation

Impact significance

Health and safety for the sensitive recipient (community surrounding the project site of transmission lines) does not have a significant impact, as it is described previously that the route of the line in agriculture lands and heath lands and far away from any residential areas. Therefore, the impact can be classified as minor.

In addition, the medium to major impact is identified for the health and safety of the workers. The standard protection of the workers, especially for the workers that involved in the risk due to the height has to be put into mitigation measures and in the management and monitoring plan to minimize and reduce the significant impact. The impact has been classified as medium impact that could be reduced, following mitigation measures, to minor impact.

In addition, regarding the safety issues, EETC periodically provide the specific trainings for the operators and the workers who is responsible for the work of operation and maintenance of the transmission line. The training obtains include the civil protection, firefighting and smoke detection, besides the operation and maintenance of the transmission lines and its equipment. The map of the emergency plan in case of fire accident is also provided.

However, although EETC is already taking precaution for its operator and workers for safety standard, the ESMP is designated to minimize the impact of such accident. It is also worth noting that at Cairo 500 substation that has been established since 1964 has no recorded accidents at the substation and its interconnection lines.

In addition, the medium to major impact is identified for the health and safety of the workers. The standard protection of the workers, particularly, for the workers who get involved in the risk due to the height has to be put into mitigation measures and in the management and monitoring plan to minimize and reduce the significant impact.

Land Use

The impacts would be major for OHTL, as many activities could continue within the ROW (e.g., agriculture and grazing). However, the construction activities will be limited as much as possible to the ROW distances as required. Compensation is done to the residents and the owners of lands under the ROW. The restrictions of land use might shed light on the economic situation of the households due to the high probability of not being able to trade in land. As well as, in case of urbanization, the lands under the ROW will not be used for the construction activities.

Impact significance:

Major impact will be associated to the land use. The impact is classified as major and developing RAP/RFP (depends on the number of project affected persons) is recommended

Visual Intrusion

The overhead transmission lines would be highly visible in rural or natural landscapes. The artificial appearance of a transmission line may have visually intrusion associations for some, particularly in a predominantly natural landscape. Visual evidence of these projects cannot be completely avoided, reduced, or concealed.

Impact significance:

Major impact will be associated to the visual intrusion that cannot be avoided or mitigated.

220 kV OHTL New Gamasa SS \ Tiba Steel plan

Hazardous Materials and Wastes Management

There shall be different types of wastes generated during the operation phase of OHTL resulting from maintenance, repair and replacement activities. Among these types the following:

- Waste cables that will be replaced along the transmission line. Some of these cables may be covered with PVC insulators, which, if burned, cause harmful emissions including dioxins. Accordingly, waste cables could be of high risk if PVC cables were disposed in open dumps where it could be exposed to open fires.
- Scrap fittings, insulators, cross arms, conductors, and other scrap which are expected to be from inert materials that does not cause high risk in disposal/recycling procedure.

Impact Significance

Non-hazardous wastes which include domestic waste, and scrap associated with relatively low environmental risks. However, certain waste management procedures should be considered in order to avoid situations where scrap occupies large areas of land and causes aesthetic and land-use impacts.

Hazardous waste will be mainly generated from mechanical room during maintenance of equipment along the transmission line. Therefore, it is expected that the amount of generated hazardous waste will not be significant and it will be collected by a licensed waste contractor

The impact is considered of Medium significance due to the small amount of hazardous waste generated. The ESMP includes measures for establishing temporary stores (waste accumulation areas) for scrap at the project site and keeping the tidiness and cleanliness of these stores until scrap is sold for recycling or disposed as shall be detailed in the ESMP. In addition scrap, wastes shall be segregated as recommended according to the ESMP. Implementing the measures could reduce the impact to be of a minor significance.

Effect of Electromagnetic Fields (EMF)

Table 6-9. ICNIRP guidelines for EMF public and occupational exposure

Frequency	Public Exposure		Occupational Exposure	
	Electric Field (V/m)	Magnetic Field (mG)	Electric Field (V/m)	Magnetic Field (mG)
50 Hz	5,000	1,000	10,000	5,000
60 Hz	4,150	830	8,300	4,150

OHTL generate electromagnetic fields around the conductors, the intensity of such fields are proportional with the line voltage and electric current which changes in strength over time as the demand for electricity fluctuates. There are some concerns that EMFs could cause health impacts to the general public by prolonged exposure. EMFs have been considered by the International Agency for Research on Cancer (IARC) as possible carcinogenic, this classification was based on some evidences; however, there is no agreement among the scientific community about certain effects of EMFs.

Despite of the uncertainty about the health impacts of EMF, the mitigation measures include keeping track of EMF values in substations and at the edge of OHTL ROW.

Impact Significance:

The ICNIRP has set a guideline figure that public exposure to EMF should not exceed 830 mG and occupation exposure should not exceed 4,150 mG, these figures for electric fields are 4.2 and 8.3 kV/m for public and occupational exposure respectively.

Risk of Soil Contamination

Risk of soil contamination associated with the operation phase of the transmission lines is minimal. This could only arise if spent parts during maintenance are accidentally dumped at random sites across the line which is totally banned. The severity of such impact will depend on the local conditions where the waste is dumped and whether contaminants migration and propagation would be likely to take place in the event of a rainfall.

Impact Significance:

Along the transmission line the impact is considered minor impact if design precautions are applied. Application of appropriate mitigation will effectively control the impact and minimize it to the maximum possible extent.

Noise

OHTL are not sources of noise; however noise may be emanated due to corona effects. Corona associates with operating OHTL under certain weather conditions, rainy and foggy weather, which is not normally, occur along the proposed routes.

The baseline assessment of noise quality along the OHTL line indicated that the hourly equivalent sound levels do not exceed the 8-hr maximum limit value of 45 dB as mentioned in the Egyptian law

The noise impacts could be analyzed in two main aspects: noise impact within the project areas, and the noise impact on the neighboring receptors.

Impact Significance:

Since noise may be emanate from OHTL due to corona effects only which is associated with the operation hours of the OHTL and special weather conditions, the impact is considered minor.

Impact on Archeological and Cultural Sites

Impacts during the operations and maintenance phase for cultural resources as well as visual impact does not have any significant impact and OHTL. Therefore, there are no mitigation measures to be developed.

Health and Safety

There are major safety risks associated with the operation of OHTL: 1) electric shock risks, 2) the probability to fall down the towers, 3) impact of electromagnetic field under the ROW and, 4) fire risks. Electrocutation could happen for maintenance operators during repairs or to the general public because of unforeseen accidents; however the normal safety precautions that are followed in the design and construction of transmission lines, transformers, etc are generally minimizing such risks both to the general public and to the maintenance workers.

A number of epidemiological studies suggest small increases in risk of childhood leukemia with exposure to low frequency magnetic fields in the home. However, scientists have not generally concluded that these results indicate a cause-effect relation between exposure to the fields and disease (as opposed to artifacts in the study or effects unrelated to field exposure). In part, this conclusion has been reached because animal and laboratory studies fail to demonstrate any reproducible effects that are consistent with the hypothesis that fields cause or promote cancer.

Fire risks could be due to connection of transmission lines to vegetation, an issue which have been previously discussed in the impacts of construction phase and it was mentioned that power line routing will avoid, as much as possible. Fields having high trees will be removed from the ROW zone of transmission lines. Another factor which could cause fires, is overloading of transmission lines, a risk that is also minimized by adequate safety precautions in the design and operation of the system.

Although electrocution accidents and fires could lead to losses in lives and properties, it is believed that the normal design, construction and operation procedures expected to be followed by the EETC, in accordance to Labor Law, No. 12 of year 2003 will provide sufficient safety precautions so that accidents will be due to unforeseen factors that could not be considered in risk estimation

Impact significance

Health and safety for the sensitive recipient (community surrounding the project site of transmission lines) does not have a significant impact, as it is described previously that the project site is already localized. Therefore, the impact can be classified as minor.

In addition, the medium to major impact is identified for the health and safety of the workers. The standard protection of the workers, especially for the workers that involved in the risk due to the height

has to be put into mitigation measures and in the management and monitoring plan to minimize and reduce the significant impact. The impact has been classified as medium impact that could be reduced, following mitigation measures, to minor impact.

In addition, regarding the safety issues, EETC periodically provide the specific trainings for the operators and the workers who is responsible for the work of operation and maintenance of the transmission line. The training obtains include the civil protection, firefighting and smoke detection, besides the operation and maintenance of the transmission lines and its equipment. The map of the emergency plan in case of fire accident is also provided.

However, although EETC is already taking precaution for its operator and workers for safety standard, the ESMP is designated to minimize the impact of such accident. It is also worth noting that at Cairo 500 substation that has been established since 1964 has no recorded accidents at the substation and its interconnection lines.

In addition, the medium to major impact is identified for the health and safety of the workers. The standard protection of the workers, particularly, for the workers who get involved in the risk due to the height has to be put into mitigation measures and in the management and monitoring plan to minimize and reduce the significant impact.

Land Use

The impacts would be major for OHTL, as many activities could continue within the ROW (e.g., agriculture and grazing). However, the construction activities should be limited to the ROW in order not to impose the residents and the owners of lands under the ROW. The restrictions of land use might shed light on the economic situation of the households due to the high probability of not being able to trade in land. As well as, in case of urbanization, the lands under the ROW will not be used for the construction activities.

Impact significance:

Major impact will be associated to the land use. The impact is classified as major and developing RAP/RFP (depends on the number of project affected persons) is recommended

Visual Intrusion

The overhead transmission lines would be highly visible in rural or natural landscapes. The artificial appearance of a transmission line may have visually intrusion associations for some, particularly in a predominantly natural landscape. Visual evidence of these projects cannot be completely avoided, reduced, or concealed.

Impact significance:

Major impact will be associated to the visual intrusion that cannot be avoided or mitigated.

Summary of significant Impact during Operation of SS and OHTLs is presented on Table 6.5 and Table 6.6 respectively.

66 kV OHTL Gamasa SS (the old one)/ Balteem

Hazardous Materials and Wastes Management

There shall be different types of wastes generated during the operation phase of OHTL resulting from maintenance, repair and replacement activities. Among these types the following:

- Waste cables that will be replaced along the transmission line. Some of these cables may be covered with PVC insulators, which, if burned, cause harmful emissions including dioxins. Accordingly, waste cables could be of high risk if PVC cables were disposed in open dumps where it could be exposed to open fires.
- Scrap fittings, insulators, cross arms, conductors, and other scrap which are expected to be from inert materials that does not cause high risk in disposal/recycling procedure.

Impact Significance

Non-hazardous wastes which include domestic waste, and scrap associated with relatively low environmental risks. However, certain waste management procedures should be considered in order to avoid situations where scrap occupies large areas of land and causes aesthetic and land-use impacts.

Hazardous waste will be mainly generated from mechanical room during maintenance of equipment along the transmission line. Therefore, it is expected that the amount of generated hazardous waste will not be significant and it will be collected by a licensed waste contractor

The impact is considered of Low significance due to the short length of the line and the small amount of hazardous waste generated.

Effect of Electromagnetic Fields (EMF)

Table 6-10. ICNIRP guidelines for EMF public and occupational exposure

Frequency	Public Exposure		Occupational Exposure	
	Electric Field (V/m)	Magnetic Field (mG)	Electric Field (V/m)	Magnetic Field (mG)
50 Hz	5,000	1,000	10,000	5,000
60 Hz	4,150	830	8,300	4,150

OHTL generate electromagnetic fields around the conductors, the intensity of such fields are proportional with the line voltage and electric current which changes in strength over time as the demand for electricity fluctuates. There are some concerns that EMFs could cause health impacts to the general public by prolonged exposure. EMFs have been considered by the International Agency for Research on Cancer (IARC) as possible carcinogenic, this classification was based on some evidences; however, there is no agreement among the scientific community about certain effects of EMFs.

Despite of the uncertainty about the health impacts of EMF, the mitigation measures include keeping track of EMF values in substations and at the edge of OHTL ROW.

Impact Significance:

The ICNIRP has set a guideline figure that public exposure to EMF should not exceed 830 mG and occupation exposure should not exceed 4,150 mG, these figures for electric fields are 4.2 and 8.3 kV/m for public and occupational exposure respectively.

Risk of Soil Contamination

Risk of soil contamination associated with the operation phase of the transmission lines is minimal. This could only arise if spent parts during maintenance are accidentally dumped at random sites across the line which is totally banned. The severity of such impact will depend on the local conditions where the waste is dumped and whether contaminants migration and propagation would be likely to take place in the event of a rainfall.

Impact Significance:

Along the transmission line the impact is considered minor impact if design precautions are applied. Application of appropriate mitigation will effectively control the impact and minimize it to the maximum possible extent.

Noise

OHTL are not sources of noise; however noise may be emanated due to corona effects. Corona associates with operating OHTL under certain weather conditions, rainy and foggy weather, which is not normally, occur along the proposed routes.

The baseline assessment of noise quality along the OHTL line indicated that the hourly equivalent sound levels do not exceed the 8-hr maximum limit value of 45 dB as mentioned in the Egyptian law no.4/1994.

The noise impacts could be analyzed in two main aspects: noise impact within the project areas, and the noise impact on the neighboring receptors.

Impact Significance:

Since noise may be emanate from OHTL due to corona effects only which is associated with the operation hours of the OHTL and special weather conditions, the impact is considered minor.

Health and Safety

There are major safety risks associated with the operation of OHTL: 1) electric shock risks, 2) the probability to fall down the towers, 3) impact of electromagnetic field and, 4) fire risks. Electrocutation could happen for maintenance operators during repairs or to the general public because of unforeseen accidents; however the normal safety precautions that are followed in the design and construction of transmission lines, transformers, etc are generally minimizing such risks both to the general public and to the maintenance workers.

A number of epidemiological studies suggest small increases in risk of childhood leukemia with exposure to low frequency magnetic fields in the home. However, scientists have not generally concluded that these results indicate a cause-effect relation between exposure to the fields and disease (as opposed to artifacts in the study or effects unrelated to field exposure). In part, this conclusion has been reached because animal and laboratory studies fail to demonstrate any reproducible effects that are consistent with the hypothesis that fields cause or promote cancer.

Impact significance

The medium to major impact is identified for the health and safety of the workers. The standard protection of the workers, especially for the workers that involved in the risk due to the height has to be put into mitigation measures and in the management and monitoring plan to minimize and reduce the significant impact. The impact has been classified as medium impact that could be reduced, following mitigation measures, to minor impact.

In addition, regarding the safety issues, EETC periodically provide the specific trainings for the operators and the workers who is responsible for the work of operation and maintenance of the transmission line. The training obtains include the civil protection, firefighting and smoke detection, besides the operation and maintenance of the transmission lines and its equipment. The map of the emergency plan in case of fire accident is also provided.

However, although EETC is already taking precaution for its operator and workers for safety standard, the ESMP is designated to minimize the impact of such accident. It is also worth noting that at Cairo 500 substation that has been established since 1964 has no recorded accidents at the substation and its interconnection lines.

In addition, the medium to major impact is identified for the health and safety of the workers. The standard protection of the workers, particularly, for the workers who get involved in the risk due to the height has to be put into mitigation measures and in the management and monitoring plan to minimize and reduce the significant impact.

Visual Intrusion

The overhead transmission lines would be highly visible in rural or natural landscapes. The artificial appearance of a transmission line may have visually intrusion associations for some, particularly in a predominantly natural landscape. Visual evidence of these projects cannot be completely avoided, reduced, or concealed.

Impact significance:

Major impact will be associated to the visual intrusion that cannot be avoided or mitigated.

Summary of significant Impact during Operation of SS and OHTLs is presented on Table 6.5 and Table 6.6 respectively.

Table 6-11. Assessed significance of expected impacts during operation phase of New Gamasa 500 GIS substation

Impact	Likelihood and severity	Significance	Mitigation Measures
During operation and maintenance of New Gamasa substation			
Noise	Low likelihood to occur –receptors include nearby settlements (Low impact on settlement and nearby establishment :Low impact on permanent workers Insignificant impact	Application of the normal precautions normally taken such as planting trees. Besides reducing the visual impact, the green environment will be achieved as well. Standard protection for the workers provided at the substation.
Traffic	Low likelihood to occur	Low impact	No mitigation identified
Air quality	Low likelihood to occur	Low impact	No mitigation identified
Impact on Vibration	Minor or very low likelihood to occur	Very minor	No mitigation identified
Hazardous and non-hazardous, solid and liquid wastes	Uncertain likelihood – Uncertain impact duration - Highly sensitive receptors include soil pollution and workers. Receptors with low sensitivity include nearby projects/settlements. Physical environment receptors with low sensitivity include groundwater, surface water and drinking water	Medium impact on industrial wastes generated (hazardous and non-hazardous) Low impact on domestic wastes (solid and liquid wastes)	Agreement should be reached prior to commencing construction work between the contractor and landfill for officially assigning a location for the disposal of construction waste. Waste management submitted by the contractor for waste management upon the agreement with the licensed waste collector. For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities , the Egyptian Environmental Affairs Agency (EEAA).”
Soil contamination	High likelihood to occur, only during the incident of oil spillage from the transformers and possible vehicles.	Low to medium impact	Standard design of precaution for the site of transformers Paved within surrounding site of substation especially at the area for parking and movement of vehicles

Impact	Likelihood and severity	Significance	Mitigation Measures
During operation and maintenance of New Gamasa substation			
Health and Safety	High likelihood to occur for the permanent workers Low likelihood to occur for the surrounding establishment and sensitive receptors. High risk likelihood impact during the emergency and accident	Minor impact for sensitive receptors (public and residents as well as existing establishment) and medium impact for the workers High risk likelihood impact during the emergency and accident	Standard protection by placing clear project signs. Time management for vehicles movement; especially avoiding the peak hours Standard protection for the workers especially working at elevated heights. Please refer to Annex 1 for the health and safety guide
Visual Resources	Low likelihood to occur	Very low impact or negligible impact	No mitigation measure is prepared
Ecological Resources	Low likelihood to occur	No significant impact	No mitigation identified

Table 6-12. Assessed significance of expected impacts during operation phase of 220 kV West Damietta OHTL

Impact	Likelihood and severity	Significance	Mitigation Measures
During operation and maintenance of OHTL			
Risk of Waste generated	Likely to occur - short term – Highly sensitive receptors include soil and workers. Receptors with medium sensitivity include nearby projects/settlements. Receptors with low sensitivity include groundwater.	Medium	Waste management implemented according to the Egyptian Environmental Affairs Agency (EEAA) regulations, especially for industrial hazardous wastes (solid and liquid wastes) Regular monitoring for domestic sewage network and provision of waste bins for temporary storage before collected by municipality. Disposal means of the hazardous wastes will be according to the Egyptian laws and regulations regarding the disposal.
Exposure to EMFs	Likely to occur - long term impact	Medium	Keeping track of EMF values in substations and at the edge of OHTL ROW. Applying the ICNIRP guideline figure that public exposure to EMF should not exceed 830 mG and occupation exposure should not exceed 4,150 mG, these figures for electric fields are 4.2 and 8.3 kV/m for public and occupational exposure respectively.

Impact	Likelihood and severity	Significance	Mitigation Measures
Risk of soil contamination	Low likelihood of occurrence - short term impact	Minor	Following standard protection for the soil and proper waste management described on the section of waste management measures
Noise emissions	Low likelihood of occurrence - short term impact	Minor	Minimizing impact significance
Cultural resources	Low likelihood of major or medium impacts	insignificant	Standard mitigation measures of recording and reporting
Health and Safety	Low likelihood of minor impact for the sensitive recipient and medium to major for the workers	Medium to Major	Standard protection for the workers especially working at elevated heights
Visual Resources	Low likelihood to occur	Very low impact or negligible impact	No mitigation measure is prepared
Ecological Resources	Low likelihood to occur	No significant impact	No mitigation identified

Table 6-13. Assessed significance of expected impacts during operation phase of 220 kV Tiba Steel Plant OHTL

Impact	Likelihood and severity	Significance	Mitigation Measures
During operation and maintenance of OHTL			
Risk of Waste generated	Likely to occur - short term – Highly sensitive receptors include soil and workers. Receptors with medium sensitivity include nearby projects/settlements. Receptors with low sensitivity include groundwater.	Medium	Waste management implemented according to the Egyptian Environmental Affairs Agency (EEAA) regulations, especially for industrial hazardous wastes (solid and liquid wastes) Regular monitoring for domestic sewage network and provision of waste bins for temporary storage before collected by municipality. Disposal means of the hazardous wastes will be according to the Egyptian laws and regulations regarding the disposal.
Exposure to EMFs	Likely to occur - long term impact	Medium	Keeping track of EMF values at the edge of OHTL ROW. Applying the ICNIRP guideline figure that public exposure to EMF should not exceed 830 mG and occupation exposure should not exceed 4,150 mG, these figures for electric fields are 4.2 and 8.3 kV/m for public and occupational exposure respectively.
Risk of soil contamination	Low likelihood of occurrence - short term impact	Minor	Following standard protection for the soil and proper waste management described on the section of waste management measures
Noise emissions	Low likelihood of occurrence - short term impact	Minor	Minimizing impact significance
Cultural resources	Low likelihood of major or medium impacts	insignificant	Standard mitigation measures of recording and reporting

Impact	Likelihood and severity	Significance	Mitigation Measures
Health and Safety	Low likelihood of minor impact for the sensitive recipient and medium to major for the workers	Medium to Major	Standard protection for the workers especially working at elevated heights
Visual Resources	Low likelihood to occur	Very low impact or negligible impact	No mitigation measure is prepared
Ecological Resources	Low likelihood to occur	No significant impact	No mitigation identified
Impact	Likelihood and severity	Significance	Mitigation Measures
During operation and maintenance of 66 kV OHTL Gamasa SS (the old one)/ Balteem			
Risk of Waste generated	Likely to occur - short term – Medium sensitive receptors include workers. No significant receptors around the line as the line is too short and it is started near the fence of the SS (desert area) and crosses the international road which is empty	Low	Waste management implemented during maintenance of the OHTL according to the Egyptian Environmental Affairs Agency (EEAA) regulations, especially for industrial hazardous wastes (solid and liquid wastes)
Exposure to EMFs	Likely to occur - long term impact	Medium	Keeping track of EMF values in substations and at the edge of OHTL ROW. Applying the ICNIRP guideline figure that public exposure to EMF should not exceed 830 mG and occupation exposure should not exceed 4,150 mG, these figures for electric fields are 4.2 and 8.3 kV/m for public and occupational exposure respectively.
Risk of soil contamination	Low likelihood of occurrence - short term impact	Minor	Following standard protection for the soil and proper waste management described on the section of waste management measures
Impacts on ambient noise level	Low likelihood of occurrence - short term impact	Minor	Noise levels under OHTL towers should be measured once annually for each selected towers. In case of recording irregular high noise levels under OHTLs, maintenance department should be informed to take necessary maintenance/repair measures.
Health and Safety	Low likelihood of medium to major for the workers	Medium to Major	Standard protection for the workers especially working at elevated heights
Visual Resources	Low likelihood to occur	Very low impact or negligible impact	No mitigation measure is prepared

7. Resettlement Action Plan (RAP)

Based upon the impacts identified during the environmental and social impact assessment phase, the project is foreseen to incur negative impacts on the use of land in the project area where limited lands will be acquired for the erection of the towers, trees and buildings along the right of way. EETC approaches land acquisition in the form of consensual sale rather than resettlement as per the electricity law.

In order to identify potential Project Affected Persons and mitigate the impacts of resettlement activities, a Resettlement Action Plan Report shall form integral part of the ESIA with the following objectives.

- Mitigate the negative impacts and identify potential development benefits;
- Establish the entitlements of all categories of affected people, including the host communities;
- Document all compensation measures and relocation activities (if any);
- Establish procedures to guarantee fair process to the affected people; and;
- Establish procedures to monitor and evaluate the implementation of resettlement plans and take corrective action as necessary.

The RAP shall employ a participatory bottom-up approach. Various qualitative and quantitative data collection tools shall be used in order to engage various categories of PAPs. A document for RAP for Gamasa is prepared.

8. Environmental and Social Management Plan (ESMP) and Monitoring Plan

This chapter presents Environmental and Social Management Plan (ESMP) developed for EETC and the contractor for New Gamasa Substation and its overhead transmission lines. This chapter consists of the following sections:

- ESMP during construction and operation phase (including detailed mitigation measures) of Substation and its OHTLs
- Guidance on Emergency Response Plans
- Roles and responsibilities in the implementation of the ESMP (during construction and operation phase) of Substation.
- Trainings
- Cost Estimation

8.1. Objective of the environmental and social management plan (ESMP)

This ESMP has been prepared as supporting documentation and it includes an Environmental Monitoring Plan. The ESMP is to provide:

- a practical framework for establishing best practice environmental management standards to mitigate potential environmental harm for each activity undertaken.
- assist managers, supervisors and construction crews from the contractor to comply with applicable legislation.
- A mechanism to reduce the potential impacts of the construction and operation of the facility

8.1.1. Definition of ESMP

The Environmental and Social Management Plan (ESMP) consists of a set of mitigation, management and monitoring measures to be taken during implementation of the project to avoid, reduce, mitigate, compensate or offset any adverse social and environmental impacts analyzed. The ESMP has distinguished between mitigation measures that should be implemented during the construction and operation of the substation and the overhead transmission lines

ESMP defines procedures to ensure that the management of environmental and social issues during the different project phases are undertaken in accordance with national legislation and best practice procedures. The ESMP presented in this reflects the implementation procedures and mechanisms for the mitigation measures and monitoring activities of the potential impacts previously discussed in Chapter 6. The ESMP assigns certain tasks for different stakeholders according to their roles and responsibilities in the project.

The following sections beside the environmental mitigation, it will present the socioeconomic mitigation measures and the social management and monitoring plan as well. The management and monitoring plan mainly involves the EETC technical team who will be appointed under the health and safety department in the Substation. Reference is made to these measures in their place

The successful implementation of the ESMP will depend on a range of different elements. To ensure the ESMP incorporates and successfully integrates with other interfacing documents, the following elements must be considered and acted upon:

- The environmental and Social Management unit should be adequately staffed with competent personal to ensure the proper implementation and monitoring of the ESMP.
- The development and management of second tier documentation that facilitates the necessary tracking and performance monitoring all social and environmental risks and complaints will be developed and firmly implemented.

8.1.2. Management Responsibilities

Roles and responsibilities for implementing the ESMP during the construction phase have been proposed based on the following set-up:

- EETC will contract an authorized and specialized consultant to prepare detailed designs and tender documents, for construction of substation and its interconnection, which will include the environmental measures that should be undertaken by the construction contractor
- During tenders evaluation EETC will assure that the winning offer includes the required environmental mitigation measures to be implemented during construction. This will include the management of traffic and management of wastes (solid and liquid; hazardous and non-hazardous wastes)
- EETC will assign supervision staff who will undertake supervision over the contractor to make sure that the mitigation measures specified in the design/tender document are implemented on field
- The site supervisor consultant from EETC will produce the monthly report about the performance of the contractor in implementing the ESMP measures

During the operation phase, the substation shall have permanently at least one staff member for health, environmental and safety during operation and maintenance of the substation. HSE staff of the substation appointed by EETC (under environmental safety and health department) will be responsible for monitoring the ESMP. He/She will be responsible for implementing the mitigation measures and providing periodic reports to EETC.

8.2. Environmental Management Plan (ESMP) and Monitoring Plan during Construction Phase of SS

Management of noise and vibration during construction

Mitigation measures

General measures should be done to reduce the impact of construction to surrounding establishments nearby the construction, the measures are:

- Prior to the preparation of the construction of substations, the notification letter should be sent to the sensitive receptors for the project introduction and the duration of the project.
- Clear sign for construction sites label and warning signs should be placed. The signs should be clear during the night as well.
- The construction should be done during the day (between 7 AM to 5 PM).
- Although the transportation of the materials and the other equipment (that need the big trolley) will be done during the night (after midnight) to avoid the traffic congestion.

For mitigation measures of construction workers, within the construction site, it could be mitigated through application of the normal precautions normally taken by construction labor. The safety measures have to be taken for standard protection of the construction workers and according to the HSE general guideline of IFC, in addition the schedule of the machineries used for the construction activities and for transporting the equipment or materials should be managed properly.

According IFC General EHS Guidelines, the mitigation measures that should be implemented are the following:

- No employee should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection. Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85 dB(A).
- The use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110dB(A).
- No unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C).
- Limiting the duration of noise exposure.
- Construction of the structure and the installation of the equipments should be conducted at daytime.
- The management of the use of heavy machineries and the equipment (at the same time and concentrated at the same place) to avoid the vibration accumulation.

Monitoring activities:

Frequent inspection to:

- Ensure the warning signs and the construction site labels are placed and clearly seen.
- Reviewing contractor's policy for EHS and ensure that all the National and international requirements are fulfilled.
- Random inspection on contractors during SS construction and installation of the equipment.
- Review the contractor's project progress, accident and the complaint from the surrounding establishment, if any, due to the noise and vibration disturbance.

Reporting:

- Monthly report for the implementation of the ESMP submitted by the contractor to EETC
- Monthly report on incident and complaint from the surrounding establishments and residents nearby the construction site.

Management of Ambient Air Emission During Construction

Mitigation measures:

- The vehicles are preferable to be rented from areas close to construction areas to minimize the travelled distance so reduce the amount of emissions. In areas of loose sandy soils the contractor should provide source of water for spraying soil before excavation, filling, loading and unloading. If the site supervisor consultant noticed visual/sensible increase of dust emissions, he should ask for additional spraying of water in the spot generating high emissions. Roads on site shall be graveled when necessary

- All vehicles and heavy equipment working in the site should be effectively maintained. Any vehicle that has high smoke emissions visibly detected should be promptly repaired.
- Limiting trucks and other vehicles speed on site
- Construction materials and stock piles of material should be carefully managed to minimize the risk of windblown material and dust.
- Removing excavated material promptly
- Storage pile activity should be conducted downwind and covering storage piles and properly shape storage piles

Monitoring Activities:

- Ensure that the contractor is applying mitigation measures on site
- Daily visual monitoring of the increase dust and exhaust emission
- Immediate action if there is complaint from the surrounding establishment.

Reporting:

- The Site Supervisor prepares a monthly progress report, which would be submitted to EETC, on implementation of mitigation measures. This report should include any incidents of high dust emissions or smoke during construction works including the natural dust that might be encountered.

Management of Traffic

Mitigation measures:

- Approval from the traffic department prior to the construction of the substation should be obtained by the contractor prior to the construction preparation
- Clear signs and warning at the construction site and surrounding.
- The trucks and trolleys movement for equipment, construction materials and disposal of the construction debris should be done during the night. The loading and unloading should be done within the site of the SS or at the empty land adjacent to the SS site (if needed and upon the agreement for temporary storage).
- An agreement between contractors and supervisor consultants should be reached about the suitable location for temporary storage of construction materials, equipment, tools and machinery prior to starting construction
- The contractors should make sure that the employed drivers of construction machinery (such as trucks and loaders) have received sensitization/training on safety utilization of their machines in order to minimize accidents risks.

Monitoring activities:

- Ensure the mitigation measures are done by the contractor

Reporting:

- Unusual traffic delays or accident caused during construction or any complaints received should be reported in the monthly report prepared by the construction supervisor.

Management of Wastes (hazardous and non-hazardous; liquid and solid wastes)Mitigation measures:

- The nearby landfill that is used to receive the non-hazardous waste has to be notified if there are bigger or different amounts of waste generated resulting from the construction activities. Agreement on these disposal sites should be reached prior to commencing construction works
- The non-hazardous waste has to be separated from hazardous waste at storage area. The separation will be done to identify the parts that can be recycle or sell.
- A certain location in the construction site should be assigned for temporary storage of construction waste; this location will be within the construction area of the substation. This location should be agreed between the contractor and supervisor prior to starting the project.
- Separate area should be dedicated for temporary storage before sending it to the hazardous waste landfill has to be defined prior to the construction activities. The hazardous waste management has to be developed by contractor before the construction according to the national and international regulations. In addition, the management plan can be added as a part of ToR.
- Construction waste should be hauled at the end of each business day to the officially approved disposal sites. Adequately equipped trucks should undertake waste transportation. The supervisor consultant should make-sure that the trucks are not overloaded and that the waste is adequately contained inside the rear box or covered to prevent dust or particles movements from the truck. The supervisor should also occasionally inspect that the truck drivers are disposing the waste in the approved location and not through practicing open dumping in the midway, through irregular visits and inquiries in the disposal site.
- Regarding the hazardous waste, the contract with the hazardous waste landfill shall be applied before starting the construction
- For the hazardous waste, the management and monitoring plan is in accordance with EEAA's requirements for hazardous waste handling, disposing and transporting.
- As the domestic solid waste is already established, the contractor only provides temporary storage onsite before collection done by the municipality.
- For the sanitation or wastewater generated, before the site is connected to the existing sewage network, onsite sanitation facility has to be provided by the contractor for their workers. In general, a proper waste collection and storage plus regular (preferably twice a week) waste collection by licensed contractors will need to be arranged by site management. To co-ordinate and control this, the site management should develop a waste management plan which is included in the ToR for the Contractor for waste management during construction and operation. For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities (EEAA)."

Monitoring Activities:

- Ensure the collection; transportation and disposal of wastes are according to the measures.
- Regarding the hazardous waste generated, the management, temporary storage, transportation and disposal to the designated landfill should be in accordance to EEAA regulations for hazardous waste.

Reporting:

- There should be a form prepared by EETC for the contractor to keep records of quantities, types of wastes received and the location where it has been received from.
- The monthly report of supervisor from EETC should include how well does the contractor abide to the above measures and any comments noticed by the site supervisor about mismanagement of construction waste during the month.

Safety during Excavation and Trenching

Mitigation measures:

- All excavations shall be conducted in accordance with the approved drawings.
- The sides of all excavations, which might expose personnel or facilities to danger resulting from shifting earth shall be protected by providing slope to the appropriate angle of repose or benching in the sides and ends of the excavation or ladders must be used and secured, enough to withstand at least 1 meter above the top of the excavation.
- All excavation deeper than 1.5 meters must have barriers and toe boards around the outside to prevent persons and material falling into the excavation. Barriers must be of a strength that is capable of withstanding the weight of a person falling against the barrier. Barriers shall be readily visible by day or night.
- All persons in excavation must wear safety helmets and safety boots
- Vehicles and other machineries or construction equipment must not be allowed to come within 2 meters of an excavation unless working in connection with the excavation.

Monitoring Activities

- An inspection must be conducted at the end of the works to ensure that the excavation has been left in a safe manner. Heavy loads shall not be put on the edge of the excavation.
- The observer must conduct monitoring of the safety tools for the workers and the vehicles restrictions along the excavation and trenching sites.

Reporting

- The observer should report on the monthly basis of the accident or the worker's obedience.

Safety of Mechanical Equipment

Mitigation measures:

- All mobile mechanical equipment shall be operated by authorized personnel and has a valid license.
- All equipment shall be checked prior to use by qualified personnel.
- Brakes, lights, tire pressure and battery shall be inspected before using the equipment. Revolving lights must be used for heavy duty vehicles.
- The design capacity of any equipment shall never be exceeded. The equipment shall not be modified to alter its capacity.
- All drivers shall have valid driving license.
- Equipment that could present a hazard to personnel, if accidentally activated during the performance of installation, repair, alteration, cleaning or inspection, work shall be made inoperative prior to state of work.

- Equipment, which is subject to unexpected external physical movement such as rotating, turning, dropping, sliding etc., mechanical and/or structural constraint, shall be applied to prevent such movement.
- All equipment, which is locked or taken out of service, because of potentially hazardous condition, shall be appropriately tagged indicating the reason for taken out of service.

Monitoring Activities

- A safety observer during using heavy mobile equipment, which may be hazardous, by its movement. The observer shall ensure that people are kept away of mobile equipment.
- Observer shall appointed specific place for heavy equipment standby area when it is not been used or taken out of service.
- Observer shall ensure the performance of the heavy equipment, tagged the equipment which are locked or taken out of service and reported on monthly basis

Reporting

- Reporting on the monthly basis, the total number and the type of heavy equipment use during the construction phase.
- Reporting on the monthly basis the number of heavy equipment that are locked or taken out of service and the reason of the damages.

Health and safety of the construction workers

As the site of the substation is localized, the significant impact on health and safety concerns are for the construction works mainly.

Mitigation measures:

- Workers should wear standard protection for the construction site.
- Workers should be trained to cover the completed parts and keep their work areas safe. In case of causing an accidents, the workers should be penalized either by deduction of salaries or dismissal.
- Existing utilities would be located and staked before construction begins, including and at intersections of other pipes and crossings. This would confirm the location and depth to ensure new construction does not impact the existing utilities.
- Following the measures above, the identification of the existing infrastructure (other pipelines, cables, etc.) have to be identified prior to the construction phase.
- Heavy equipment should not normally be operating above the existing utilities during construction. If heavy equipment or trucks must cross the existing utilities, additional soil cover will be needed to protect the existing pipe.
- Workers should take the following steps to protect themselves from falls during high construction:
 - a) Use 100% fall protection when working on higher construction sites
 - b) Participate in all training programs offered by the employer (contractor).
 - c) Follow safe work practices identified by worker training programs.

Monitoring Activities:

- Inspect equipment daily and report any damage or deficiencies

- Onsite inspectors should be present during construction to verify that the construction contractor is following engineering specifications and meeting regulatory requirements.

Reporting:

- Monthly report on health and safety performance. This report will include any incident and complaint regarding health and safety measures performed by the contractor.

Management of water resources

Mitigation measures:

- Include the precaution and prevention of waste management to avoid ground water resources and soil pollution
- Emergency plan during accident due to oil spillage or other possible pollution on soil and water resource
- If needed, the site is paved or graveled to reduce to direct contact of the possible soil contamination during the workshop of the equipment and vehicles and their movements

Monitoring Activities:

- Proper implementation of waste management done by contractor

Reporting:

- Monthly report of any accident due to oil spillage, etc.

Management of Possible Impacts on Culture and Privacy of Local Communities

Mitigation measures:

- The contractor should be advised to use construction labor from the areas where construction works will take place. The incentives to contractors for such measure include reducing accommodation and transportation for his workers. The contractor could be advised to seek the help of local Nongovernmental organizations (NGOs) or community leaders for recruiting labor from the local communities

Monitoring Activities:

- The contractor should provide list of construction workers and their addresses from the surrounding area on quarterly basis.

Reporting

- Reporting on percentage of labor recruited from local governorates should be presented by the contractor to the supervisor consultant and to EETC on a quarterly basis.

Other socioeconomic impacts

Mitigation measures:

The Distribution Company may be advised to start some awareness raising campaigns about the importance of legal connections at the area. As well as awareness campaigns to rationalize consumption of electricity. The company may network with the local NGO's to participate in conducting the awareness activities.

Monitoring Activities:

- The number of posters and awareness events held by the company and by the local NGO's. A staff member (social development officer) from the distribution company may attend the events held by the NGO's.

Reporting

- Reporting on percentage of attendance and response to awareness events.
- Reporting on the numbers of new requests for electricity legal connections.

Table 8-1 presents the ESMP matrix during construction and the Table 8-2 presents the Monitoring Plan during Construction phase.

Table 8-1 Environmental Management Plan (ESMP) during Construction Phase

Potential Impacts	Proposed Mitigation Measures	Institutional Responsibilities (enforcement and coordination)	Cost Estimates (\$)*	Comments
During Preparation and Construction of the SS				
Noise and vibration during site preparation, construction and installation of equipment	General measures for surrounding establishments and sensitive receptors			
	Notification letter of the introduction of project and duration to surrounding establishment and municipality	Contractor	-	Cover letter from EETC for approval of starting of the project
	Clear sign and warning sign (can be seen during day and night) of the project (including duration)	Contractor as a part of ToR for EHS general requirements	None as a part of tender process	
	Duration of the working on site (including unloading and loading) are during day only (between 7AM – 5 PM)	Contractor	-	
	Mitigation measures for construction workers during preparation and construction			
	Strictly standard procedures for health and safety of the workers according to IFC general EHS guidelines (including limitation of the duration and expose to high noise) and	Contractor (through tendering activity)	None as a part of tender process	

Potential Impacts	Proposed Mitigation Measures	Institutional Responsibilities (enforcement and coordination)	Cost Estimates (\$)*	Comments
	management of concentration works of heavy machineries			
	Strictly standard equipment especially for ear protection during the work	Contractor (through tendering activity) related to the EHS requirements during construction works	None as a part of tender process	
Traffic destruction or congestion during transportation of construction materials, construction waste, equipment and movement of project vehicles and machineries	Approval from traffic department prior to the construction	Contractor	-	Cover letter from EETC for approval of starting of the project
	Clear sign and warnings (including duration) of the project that can be seen during the day and night	Contractor as a part of the tender activities related to EHS requirements	None as a part of tender process	
	Movement of vehicles (for transporting materials, construction waste and SS equipment done during the night and loading and unloading done during the day within the site of the SS.	Contractor in coordination with traffic department, if needed	None as a part of Contractor financial budget during the bidding activities	
	Careful turn at the main road. The drivers and operators of the machineries should have training on safety utilization of their machines	Drivers and operators employed by the Contractor. It is the responsibility of the contractor for implementing regulations to the drivers and	None as a part of contractor responsibility	

Potential Impacts	Proposed Mitigation Measures	Institutional Responsibilities (enforcement and coordination)	Cost Estimates (\$)*	Comments	
		operators			
	Agreement for temporary storage and the final disposal to the designated landfill	Based on the waste management plan submitted by the contractor and approval from EETC	None as a part of the ToR for waste management		
Ambient Air Quality by dust emission and the air emission due to the exhaust gasses from the construction vehicles and machineries	Localize and minimize the vehicle movements including limiting the speed	Contractor	As a part of their financial budget during the bidding activities	Low impact and temporary	
	If needed, spray the soil before any excavation, filling loading and unloading. Pavement (graveled) of access roads prior to usage in construction of the project components	Contractor	-		
	Maintaining the efficiency of the vehicles and machineries	Contractor	As a part of their financial budget during the bidding activities		

Potential Impacts	Proposed Mitigation Measures	Institutional Responsibilities (enforcement and coordination)	Cost Estimates (\$)*	Comments
	<p>Waste management of temporary stock piles, construction materials, construction waste. The periodic waste transportation to the designated landfill should be included on the waste management as well.</p>	<p>Contractor</p>	<p>As a part of the ToR for waste management</p>	<p>Implementing the waste management submitted by the contractor and approved by EETC prior to the preparation and construction phase</p>
<p>Waste generated (hazardous and non-hazardous, solid and liquid as well as construction waste and domestic waste)</p>	<p>Notification and contract, if needed for transporting hazardous and non-hazardous waste to their designated landfills.</p> <p>Separation of hazardous waste and non-hazardous waste for temporary storage</p> <p>Designated area or location should be included at the waste management plan submitted by the contractor and approved by the EETC</p> <p>Construction waste should be hauled at the end of each business day to the</p>	<p>Contractor</p>	<p>None, as a part of the contractor's offers and responsibilities during preparation and construction phase</p>	<p>Implementing the waste management submitted by the contractor and approved by EETC prior to the preparation and construction phase</p>

Potential Impacts	Proposed Mitigation Measures	Institutional Responsibilities (enforcement and coordination)	Cost Estimates (\$)*	Comments
	officially approved disposal sites			
	Adequate trucks with standard precaution (coverage of the waste, not overloaded, etc) for transporting the waste to the designated landfills. Regarding the hazardous waste transportation, the vehicles should be according to the standard mentioned on the EEAA regulations for hazardous waste transportation			
	Temporary onsite waste bins for solid waste before its collection and temporary onsite sanitation facilities should be provided within the construction site for the workers	Contractor	None, as a part of waste management	According to the waste management plan submitted to EETC
Safety impacts during excavation and trenching for the workers and surrounding communities and	Excavation and trenching in accordance to the design and drawings.	Contractor	-	
	Protection and localized (by fences or barriers) the excavation and trenching sites to reduce the danger and prevent falling of materials and person and the other vehicles or machineries	Contractor	None as a part of contractor offers related to EHS requirements	

Potential Impacts	Proposed Mitigation Measures	Institutional Responsibilities (enforcement and coordination)	Cost Estimates (\$)*	Comments
establishments	moving nearby the site			
	Standard helmet and safety boots for the workers	Contractor	None as a part of contractor offers related to EHS requirements	
Safety impacts during the mechanical and machineries use for the health and safety of the workers	Provision of authorized and licensed personnel for heavy machineries	Contractor	None as a part of contractor responsibilities	
	Maintaining the efficiency of the heavy machineries, including inspection before its use and following the design capacity and standard manuals of the heavy machineries, etc.			
Health and safety of the construction workers	Standard protection for the construction site workers	Contractor	None as a part of contractor offers related to EHS requirements	
	Provided on job training for the construction workers prior to the preparation and construction phase (including working at the high			

Potential Impacts	Proposed Mitigation Measures	Institutional Responsibilities (enforcement and coordination)	Cost Estimates (\$)*	Comments
	construction) Identification of the existing underground networks Management of heavy equipment movement, especially nearby other existing underground networks			
Water resources and soil pollution during construction	Precaution and prevention of waste management to prevent the soil and further water resource (groundwater) pollution	Contractor	None, as a part of waste management	According to the waste management plan submitted to EETC

Table 8-2 Environmental and Social Monitoring Plan

Project activities	Parameters to be monitored	Locations	Measurements (methods and equipment)	Frequency of measurements	Cost Estimates (\$)**	Responsibilities
During Pre-Construction / Preparation and Construction phase						
Site clearance	Worker's injuries	Construction site location	Preparation of recording form of workers injure during the construction	Monthly	None	

Project activities	Parameters to be monitored	Locations	Measurements (methods and equipment)	Frequency of measurements	Cost Estimates (\$)**	Responsibilities
Base camp preparation for the workers	Neighbors farm /projects complaints	Project construction sites	Recording of complaint and type of complaint	Once during the preparation and prior to start the construction phase	None	Contractor On the preparation stage, the tendering has been done to purchase the standard procedure for site clearance. However, the contractor shall put into consideration on their budget proposal
Monitoring the traffic disturbance due to the vehicles and machineries movement and other related construction activities	Traffic complaint	Within 500 m from the construction site	Visual observation and recording complaint received	During the duration of the construction activities		
Monitoring ambient Air Quality during construction works	Ambient air (gas emissions) PM, dust complaint	Within the site and surrounding establishments	Visual investigation and recording of the dust and ambient air increased due to construction activities Recording and reporting of the complaints (monthly report)	during the construction activities at different locations	As a part of contractor's financial offer	
Monitoring Noise and	Noise complaints from the	Project locations	Visual investigation and recording and	during the construction	As a part of contractor's	

Project activities	Parameters to be monitored	Locations	Measurements (methods and equipment)	Frequency of measurements	Cost Estimates (\$)**	Responsibilities
vibration Impacts at the project sites	neighboring farm/project		documentation of complaints	activities at different locations	financial offer	Contractor
Management of construction waste and handling of hazardous waste	Amount of hazardous and nonhazardous waste generated	Project site locations	Estimation of the hazardous waste and non-hazardous waste in relation to the handling and transporting to the landfill	Weekly or monthly depending on the volume of waste	As a part of contractor's financial offer for wastes handling	Contractor during construction and EETC SS staff during operation
Monitoring soil contamination and water resource contaminations	Area of spillage	Project sites	Visual observation Recording and documentation of spillage	weekly	As a part of contractor's financial offer for environmental monitoring	Contractor
Monitoring health and safety of the workers during the construction of the project components	Health records about occupational injuries	Clinic / hospital referred by the contractor	Medical reporting on received cases	on received case	The cost is undefined, depending on the cases	contractor

Project activities	Parameters to be monitored	Locations	Measurements (methods and equipment)	Frequency of measurements	Cost Estimates (\$)**	Responsibilities
Storage of the machines and construction materials of the project components	Complaints from neighboring communities and records and documentation of the temporary area for storage of materials or machineries	Project sites	Recording and documentation	monthly	-	contractor
Impacts of culture and privacy of local communities	% of local labor to total labor	Construction site	Reporting labor origin governorates and calculating the natives ratio	Quarterly	-	Construction contractor

8.3. Environmental Management Plan (ESMP) During Construction of the Overhead Transmission Lines

8.3.1. Management of Wastes [Hazardous and Non-Hazardous]

During the construction of the OHTL the following mitigation measures shall be applied

Mitigation measures:

- EETC should communicate with the local authorities including protectorates for officially assigning location for the disposal of construction waste within the three governorates. Agreement on the disposal sites and the collection means should be reached prior to commencing construction works.
- A specified (one or multiple) locations along the proposed routes for the transmission line should be assigned for temporary accumulation of construction waste. This location should be agreed upon with the contractor prior to starting the project.
- Ensure that excavation done for steel towers does not unnecessarily exceed the designed diameter of the butt of the tower and that the excavation is exactly as deep as the foundation design requirements. This will minimize to the extent possible the volume of excavated soil.
- Make sure that the anchors are fixed at the designed depth and at the designed angle so that they provide the required support to the tower and prevent its early failure. It will be required that construction supervisor makes sure that contractors do not fix the anchor vertically and then bend it during the site survey. Premature partial or complete failure, besides the associated risks, would increase the volume of wastes generated and would result in additional construction works/reinforcements.
- Maintain the correct tensioning of the conductor so that it will not have high tension loads, line vibrations and premature failure. During construction phase the supervisor engineer has to make sure that after the conductor has been properly stung, it is brought up to the initial tension within 4 hours, and that it sits in the rollers for at least two hours, after being tensioned, to give it chance to equalize itself prior to tying the conductors to the insulators.
- Construction waste should be hauled at the end of each working day to the officially approved disposal sites or to the specified interim on site accumulation area. Adequately equipped trucks should undertake waste transportation. The supervising Consultant should make-sure that the trucks are not overloaded and that the waste is adequately contained inside the rear box or covered to prevent dust or particles movements from the truck. The supervising Consultant should also occasionally inspect that the truck drivers are disposing of the waste at the approved location, and regular checks to the disposal site.
- The on-site waste accumulation area (WAA) along the transmission lines shall be designed to accommodate the expected amounts and different types of wastes. It shall be covered and provided with adequate flooring for possible access of forklifts and small trucks. The waste officer should keep separate areas for each type of waste, keep internal passages inside the WAA for facilitating access and should order for regular cleansing of the area. Records of the admitted waste shall be kept in a register and before the WAA is full, the waste officer should organize to sell or dump the scrap to recycling contractors or at the authorized landfill respectively.
- Domestic waste generated on site shall be segregated and not mixed with any other type of waste.
- Construction contractor shall provide portable water cabinets on site to provide hygienic work environment for the work force. The Portable water cabinets shall equipped with an external tank for sewage storage.

- Construction contractor shall contract competent authority at each governorate premises for safe disposing of generated sewage

Mitigation measures for hazardous waste management:

For the management of HW, A hazardous waste management plan (HWMP) is proposed which will direct actions to be undertaken to ensure environmentally sound management of hazardous wastes. The plan identifies the roles and responsibilities for EETC staff and/or the Contractor's staff, how hazardous wastes can be identified and safely handled, the places where the hazardous wastes could be accumulated and the training requirements for the staff involved. The HWMP and the HWM-SOP shall apply to all hazardous wastes generated at the sites managed by EETC and apply to the EETC staff and contractors.

8.3.2. Management of Excavations

During the construction of the OHTL the following mitigation measures shall be applied

Mitigation measures:

- All excavations shall be made in accordance with the approved drawings.
- The sides of all excavations, which might expose personnel or facilities to danger resulting from shifting earth shall be protected by providing slope to the appropriate angle of repose or benching in the sides and ends of the excavation or ladders must be used and secured, enough to withstand at least 1 meter above the top of the excavation.
- All excavation deeper than 1.5 meters must have barriers and toe boards around the outside to prevent persons and material falling into the excavation. Barriers must be of a strength that is capable of withstanding the weight of a person falling against the barrier. Barriers shall be readily visible by day or night.
- All persons in excavation must wear safety helmets and safety boots
- Vehicles and other machineries or construction equipment must not be allowed to come within 2 meters of an excavation unless working in connection with the excavation.

Monitoring Activities

- An inspection must be conducted at the end of the work to ensure that the excavation has been left in a safe manner. Heavy loads shall not be put on the edge of the excavation.
- The observer must conduct monitoring of the safety tools for the workers and the vehicles restrictions along the excavation and trenching sites.

Reporting

The observer should report on the monthly basis of the accident or the worker's obedience.

8.3.3. Management of Ambient Air Emission

During the construction of the OHTL the following mitigation measures shall be applied

Mitigation measures:

- In areas of loose sandy soils the contractor should provide source of water for spraying soil before excavation, filling, loading and unloading. If the site supervisor consultant noticed visual/sensible increase of dust emissions, he should ask for additional spraying of water in the spot generating high emissions.

Monitoring activities:

- Frequent monitoring of dust emissions and the amount of water sprayed on soil, under the supervision of the Consultant.

Reporting

- The Site Supervisor Consultant shall prepare a monthly progress report, which would be submitted to EETC, on implemented mitigation measures. The Consultant should report on any incident of high dust emissions or smoke during construction works including the natural dust that might be encountered especially at the site that most of the area is desert land.

8.3.4. Management of Noise

During the construction of OHTL the following mitigation measures shall be applied

Mitigation measures:

- Workers that operate noisy machines and nearby workers should be supplied with earmuffs and should be instructed to put them on when they get into noisy zones. Contractors should be responsible to instruct their workers to abide to this role, and the site supervisor should make sure the Contractor is compliant with this role
- Working hours for workers exposed to noise equipment should be designed so that noise exposure periods do not exceed the safe limits
- Coordinate and Inform inhabitants/employees at the nearby sensitive receptors about the peak time and hours for construction activities.
- Avoid construction activities at night

Monitoring activities:

- No monitoring measures shall be undertaken since the noise emissions are temporary.

Reporting

- The monthly report should include how well does the contractor abide to the above measures and any comments noticed by the site supervisor about high noise levels.
- A monthly report on any observations or complaints about high noise level.

8.3.5. Management of Traffic

During the construction of OHTL the following mitigation measures shall be applied

Mitigation measures:

- An agreement between contractors and supervisor consultants should be reached about the suitable location for temporary storage of construction materials, equipment, tools and machinery prior to starting construction of each reach of the power lines. No storage of construction materials or electric tools should be allowed in traffic lanes.
- Find suitable locations for temporary storage of conventional construction wastes.
- In case a narrow access road needs to be occupied for limited period (for example by loading/unloading trucks or loaders) the occupation time should be minimized. The additional measure is to have a careful turn (if needed) for the heavy trucks or loaders due to the high-speed vehicles passing by the highway.
- The contractors should make sure that the employed drivers of construction machinery (such as trucks and loaders) have received sensitization/training on safety utilization of their machines in order to minimize accidents risks.

Monitoring Activities:

- No monitoring of physical indicators is required

Reporting

Unusual traffic delays or accident caused during construction or any complaints received should be reported in the monthly report prepared by the construction supervisor consultant

8.3.6. Health and Safety of Construction Workers

Potential impacts to worker and public health and safety during construction of a the proposed project are the same as those associated with any construction project involving earthmoving, use of large equipment, transportation of overweight and oversized materials, and construction and installation of industrial facilities. In addition, health and safety issues include either working at heights. The practices of electricity companies in Egypt reflect that the health and safety procedures are relatively not abided by the workers. That might result in injuries and death.

Mitigation measures:

- In accordance with Labor law related to occupational health and safety No. 12 of year 2003 the workers should be oriented about the health and safety procedures.
- All safety procedures reported in the Law should be abided to by the workers and the top management.
- The contractor should assign a health and safety supervisor who ensures the workers are abided to the H&S procedures
- The contractor should make health and safety facilities available in the project site
- Contracts should be signed with the health facilities close to the construction site
- Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers
- Safety belts should be provided to workers working at height and should be of not less than 16 millimeters (mm) (5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident.
 - When operating power tools at height, workers should use a second (backup) safety strap

- Testing structures for integrity prior to undertaking work
- A guard should be assigned to assure that the community people are not stepping into the project sites. He should pay attention to children and old people.

Monitoring Activities:

- The resident health and safety supervisor should follow the commitment of workers to use the protective equipment.
- Health and Safety officer should record on a daily bases the activities and accidents occur among the community people.
- The lists of injured workers and community people should be documented and reported to the H&S supervisor on daily bases
- The Grievance log should be monitored, particularly, the cases regarding injuries among the community and the workers
- All workers should attend an orientation session about health and safety procedures

Reporting

- Monthly reporting should be prepared by the H&S supervisor and handed to the H&S manager within the PMU
- Orientation session reports should be prepared by the H&S consultant
- A report should be prepared by the H&S manager within the PMU and shared with the funding agencies on quarterly bases. That report should include the following parameters:
 - Total injured workers distributed by their type of work and project site
 - Total injured people among the community people distributed by age category, sex and area
 - Total complaints related to H&S procedures. The grievances should be segregated by the type, area and the aggrieved person sex.

8.3.7. Safety of Mechanical Equipment

Similar measures as described for new Gamasa substation construction

8.3.8. Management of Flora and Fauna Impacts

At the OHTL routes no mitigation measures are required to be implemented to protect endangered species except along the tracks that will be made to facilitate transportation for raw materials and equipment.

Mitigation measures

- Tracks routes required for transporting equipment, raw material, etc, from main roads to the construction locations within protectorates shall be located to avoid impacts.
- Minimize noise and artificial lighting at night during construction
- Inform construction staff on the importance of natural habitats and notable plant species
- No hunting or poaching by Contractor staff in the Project area and surroundings during construction and operation
- Construction and vehicle movement should be made to minimum
- Prepare and implement a habitat/soil removal and re-instatement plan

- Undertake pre-construction surveys to minimize impacts on natural habitats and protected and threatened plants
- Prepare habitat maps for project sites using aerial photography and high resolution satellite imagery

Monitoring Activities

- EETC health and Safety Officer shall ensure that tracks routes that will be made by the construction contractor are avoiding locations where endangered species may be present
- Evidence of provisions for minimizing light and noise practices during construction
- Reported incidents of staff violating the hunting ban to Wildlife Officer
- Provision of information through staff induction, toolbox talks, leaflets, office posters, wildlife photo competition
- Report on habitats and locations of protected/threatened plant species
- Habitat maps prepared and issued one month before construction

Reporting

- No reporting is required

8.3.9. Management of Possible Impacts on Culture and Privacy of Local Communities

Potential impacts on cultural resources include visual impacts resulting from large areas of exposed surface, increases in dust, the presence of large-scale equipment, machinery, and vehicles for cultural resources that have an associated landscape component that contributes to their significance, such as a sacred landscape or historic trail.

The EETC is normally constructing such projects through specialized construction firms working in the field of energy. Therefore, local communities are expected to be exposed to openness and interaction with the outsiders of the project crew and workers during the construction phase. This is not a significant concern in urban areas. However, in the conservative rural areas and Bedouin this may affect the local people's cultural privacy.

Mitigation measures:

- Minimizing the number of workers from outside the project areas is highly recommended. The contractor should be advised to employ construction labor from the areas where construction works will take place. The incentives to contractors for such measure include reducing accommodation and transportation for his workers.
- The community leaders could take part in the process of employment in terms of informing their local community about job opportunities
- The newly employed persons and non-Egyptian experts should be oriented about the norms and traditions of the surrounding communities, particularly, the Bedouin ones.
- In case of any violation of norms, the site engineer should handle meetings with the community leaders in order to settle any disputes
- Enable grievance and redress mechanism in order to receive people concerns about such impact

Monitoring Activities:

- The contractor should provide lists of construction workers and their governorates of origin on quarterly basis.
- The Social Development Officer (SDO) should provide reports about any stakeholder engagement activities (meetings- interviews- group discussions) conducted with the communities in case of any problem occurred with the residence of project areas.
- The SDO should provide reports about any training sessions conducted with the workers and the non-Egyptian personnel.

Reporting

- Reporting on percentage of labor recruited from local governorates should be presented by the contractor to the supervisor consultant and to EETC on quarterly basis
- Reporting on meetings conducted with the community people
- Reports about training sessions conducted with the workers

8.3.10. Management of Land Use Restrictions

The ROW zone as identified by the Electricity Law 87/2015 will restrict the construction of new buildings and plantation of high trees on the routes of the OHTL (25 m from the center of the line from both sides) in order to maintain the safety of the line; therefore in case of OHTL, there will be a limitation on agriculture crops such as wheat- maize- citrus fruits-potatoes and clover as well as trees plantation. The habitats of nesting birds should be identified first before any construction to take place in order to avoid the demolition of these habitats.

Mitigation measures:

- The main mitigation measure to be adopted is exerting the maximum effort to minimize the impact on land. Avoidance mechanism should be applied to the maximum possible. Routes of power lines should be placed in vacant desert lands. However,
 - Select ROW for locating routes of power lines, and seek alternatives whenever the routes are rejected by community people. The ROW is 25 meters from the center of the power line from both sides. That is in accordance with Electricity Law 87/2015.
 - Access roads for the vehicles and storage areas during construction have to be defined during the preparation of the construction phase.
 - Inform the local people and raise their awareness about the importance of the project. Mobilizing the community people is essential in terms of raising their awareness about the importance of the project and the compensation mechanism to be adopted
 - The contractor is responsible for clearing the tower site after completing his work. EETC shall help the contractor if any problem with the landowner in the agriculture area or with any other authority / agency along the line routes would arise.
 - An area of 25 meter from the center of the OHTL should be evacuated from tall trees and buildings. Such area will be kept as a Right of Way (ROW) for maintaining the public safety from electric hazards. Appropriate compensation should be paid to the owner of trees
 - In case of resettlement, a proper Resettlement Action Plan or Abbreviated Resettlement Action Plan (ARAP) should be adequately prepared depends on the number of the project affected persons
 - Form a committee of local people and involve them in the compensation process.
 - Develop an adequate Grievance mechanism that enable people to voice their concerns and worries, particularly, the ones related to involuntary

Monitoring activities:

- Conduct regular monitoring visits to verify that no encroachment took place under the ROW.
- A field visit should take place by the designer of the project in order to identify the areas of restricted uses and to identify different habitat locations, to be reported by the designer in his design report.
- Monitoring of ROW maintenance activities to apply proper control methods.
- Areas of restricted uses should be monitored along with the type and reason for the restriction and identification of the different habitat locations. The designer in his design report should report these areas.

Reporting

- The designer should identify the locations of intersection between OHTL ROW with areas of restricted uses. In case where this intersection could not be avoided, the designer should justify reasons for selecting this routes in his design report.
- Reporting associated with the land acquisition problems could arise along the routes line.
- Reporting possible resettlement procedures are detailed in the RAP

8.3.11. Management of Socio-economic Impact

Direct impacts would include the creation of new jobs for construction workers and the associated income and taxes generated by the project. Such impact is positive in nature; however, it might be a negative impact in case of not managing employing activities efficiently and wisely. As well as, paying attention to employing some of the community members might put limitation to community disturbance. As stated by the representatives of the electricity companies, it is cheaper for the company to find local workers from each community in order to save the costs of transporting workers from outside. The workers who are needed for such construction works are those with low and medium skills, who represent a high proportion of the residents in the targeted areas.

Mitigation measures:

- Job opportunities should be primarily provided to the community people adjacent to the OHTL
- Community leaders should be represented in a Steering Committee. They should be informed about the job opportunities available for the community people
- The community should voice their concerns through an appropriate grievances and redress mechanism
- The workers should be fully aware about their nature and duration of their work
- Reducing the value of residential units is an unavoidable impact along the OHTL routes.

Monitoring Activities:

- Monitoring the lists of workers and their origins
- Site visits to be paid to the surrounding areas in order to investigate the prices of properties pre and post construction
- Review the grievances log in order to verify whether there are any grievance related to economic impacts

Reporting

- Monthly report should be developed by the contractor including the workers employed during the previous month. Information included should be segregated by: 1) type of work, 2) workers, 3) the living area of workers
- Total complaints related to economic impacts. The grievances should be segregated by the type, area and the aggrieved person sex and age.

The ESMP for SS and OHTL is presented in the following tables.

Table 8-3 Environmental Management Plan (ESMP) during Construction Phase of OHTLs

Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
During preparation and construction of OHTL					
<p align="center">Effects of construction waste</p>	<ul style="list-style-type: none"> • Identify disposal sites for construction waste approved by the local authority • Identify a Waste Accumulation Area (WAA) within the construction site for temporary storage of construction waste , including a secured area for the interim accumulation of hazardous wastes • Adequate transportation and disposal of construction waste • Allocate and prepare areas for temporary storage of scrap • Keeping tidiness and cleanliness of the WAA • Construction contractor shall provide portable water cabinets on site to provide hygienic work environment for the work force. The Portable water cabinets shall equipped with an external tank for sewage storage. 	Pre-construction– construction	EETC- Waste officer nominated by EETC Construction contractor	EETC- Construction supervisor consultant	<ul style="list-style-type: none"> • Review local authority approvals • Site supervision • occasional inspection of disposal site • Auditing of allocated WAA • Auditing of stores

Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
During preparation and construction of OHTL					
Excavation	<ul style="list-style-type: none"> Identify the excavation depth and width according to the drawing design Clear safety signs and boundary for the excavation sites Safety and clear area around the excavation site safety helmets and boots compulsory for workers 	Pre-Construction	Construction Contractor	Construction supervisor	<ul style="list-style-type: none"> Site supervision and occasional inspection
Construction air emissions	<ul style="list-style-type: none"> Spraying soil before excavation in loose sandy soil 	Construction	Construction contractor	Construction supervisor consultant	<ul style="list-style-type: none"> Site supervision
Construction noise	<ul style="list-style-type: none"> Provide ear muffs to construction workers usually located near noisy machines Organize working hours so that noise exposure to workers will be minimized Coordinate and Inform inhabitants/employees at the nearby sensitive receptors about the peak time and hours for construction activities. Avoid construction activities at night close to residential areas 	Construction	Construction contractor	Construction supervisor consultant	<ul style="list-style-type: none"> Site supervision

Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
During preparation and construction of OHTL					
<p>Impacts of Flora and Fauna</p>	<ul style="list-style-type: none"> • Tracks routes required for transporting equipment, raw material, etc, from main roads to the construction locations in protectorates shall be located to avoid sensitive areas • Construction and vehicle movement should be made to minimum • Access road has to be defined prior to the construction phase to avoid the resettlement or compensation • Minimize noise and artificial lighting at night during construction • Prepare and implement a habitat/soil removal and re-instatement plan • No hunting or poaching by Contractor staff in the Project area and surroundings during construction and operation • Undertake pre-construction surveys to minimize impacts on natural habitats and protected and threatened plants • Inform construction staff on the importance of natural habitats and notable plant species 	<p>Pre-Construction & Construction</p>	<p>Construction contractor Design consultant</p>	<p>EETC- Construction supervisor consultant- EHS officer</p>	<ul style="list-style-type: none"> • Site supervision • Access road map and access road management of the vehicles to the towers. • Evidence of provisions for minimizing light and noise practices during construction • Provision of information through staff induction, toolbox talks, leaflets, office posters, wildlife photo competition • Report on habitats and locations of protected/threatened plant species

Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
During preparation and construction of OHTL					
Impacts of culture and privacy of local communities	<ul style="list-style-type: none"> • Maximize the use of local workers as much as possible • Provide information sessions to the outsider • Engaging community people in employment process 	Construction	Construction contractor	Construction supervisor consultant	<ul style="list-style-type: none"> • Review of contractor's reports related to workers • Stakeholder engagement activities • Capacity building reports and orientation sessions reports

Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
During preparation and construction of OHTL					
<p>Human health and safety</p>	<ul style="list-style-type: none"> • Restrict application to the health and safety procedures • The contractor should make health and safety facilities available in the project site • Contracts should be signed with the health facilities close to the construction site • Drivers should have a certified and valid license • All mechanical equipment should be checked prior to use • Appropriately tag all mechanical equipment that are locked or out of service • Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers • Safety belts should be provided to workers working at height and should be of not less than 16 millimeters (mm) (5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident. • A guard should be assigned to keep community people out of the construction site 	<p>Construction</p>	<p>Construction contractor</p>	<p>Construction supervisor consultant</p>	<ul style="list-style-type: none"> • Review of contractor's reports related to health and safety measures as well as the lists of injured workers • Capacity building reports and orientation sessions related to health and safety measures
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Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
During preparation and construction of OHTL					
<p>Land use restrictions and possible resettlement</p>	<ul style="list-style-type: none"> • Avoidance mechanism should be fully adopted • If the resettlement occur, information and RPF should be implemented accordance with WB and EIB standard • A comprehensive Resettlement Action Plan RAP RAP study should be prepared to inform about best strategies to compensate all PAPs • Access roads and storage areas to be defined • Rehabilitating the construction site • Engaging the stakeholder during the process of compensation 	<p>Design, planning and implementation</p>	<p>Design consultant Contractor</p>	<p>Construction supervisor consultant A RAP consultant EETC and local authorities</p>	<ul style="list-style-type: none"> • RAP results • The design consultant report • Site visits reports • Compensation reports and receipts
<p>Trees removal for power lines right-of-way</p>	<ul style="list-style-type: none"> • Avoiding of trees is essential • Plantation of trees near removed trees • Agriculture association should orient the farmers about the best strategy to move their trees 	<p>Construction</p>	<p>Contractor in cooperation with the farmers and the agriculture associations</p>	<p>EETC</p>	<ul style="list-style-type: none"> • Review reports and occasional audits

Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
During preparation and construction of OHTL					
Socioeconomic impacts	<ul style="list-style-type: none"> • Job opportunities to be provided to the community workers • Integration of community leaders during the employment procedures 	Construction phase	Contactor and sub-contractors in cooperation with the community leaders	EETC (site engineer and the SDO)	<ul style="list-style-type: none"> • Reports about the workers employed • Complaints raised about employment
Traffic	<ul style="list-style-type: none"> • Prevent storage of construction materials, equipment and machineries on traffic lanes • Capacity building of the drivers about safety utilization should be assured 	Preconstruction and Construction	Construction Contractor	Construction supervisor consultant	<ul style="list-style-type: none"> • Site supervision and grievance log related to traffic impacts

Table 8-4.Environmental monitoring plan matrix during construction phase for OHTL

Potential Impact/Activity	Monitoring Indicator	Monitoring Location	Monitoring Methods	Monitoring Frequency	Monitoring Responsibility
During preparation and construction of OHTL					
Disposal of waste during construction	<ul style="list-style-type: none"> Quantities of scrap item by type Segregated waste weight 	WAA	<ul style="list-style-type: none"> Inspection and recording of admitted items 	<ul style="list-style-type: none"> Quarterly reporting 	EETC storekeeper/Waste officer
Excavation impacts	<ul style="list-style-type: none"> Areas of excavations and trenching Safety areas around the excavation 	Construction site	<ul style="list-style-type: none"> Inspection and marking of the safety areas for excavation 	<ul style="list-style-type: none"> Upon excavation and trenching 	Site supervisor consultant Construction contractor
Impacts of culture and privacy of local communities	<ul style="list-style-type: none"> Number of workers from within the project areas Number of stakeholder engagement activities Training sessions and capacity building trainees 	Desk work	<ul style="list-style-type: none"> Reports about the workers Reports about stakeholder engagement activities Reports about capacity building activities 	<ul style="list-style-type: none"> Quarterly during the construction phase 	EETC SDO
Human health and safety	<ul style="list-style-type: none"> Total number of injured workers Total number of injured community people Total received grievances related to health and safety Total number of attendance to the 	Construction site Desk work	<ul style="list-style-type: none"> Site visits to the construction site H&S monthly reports Reports about stakeholder engagement activities 	<ul style="list-style-type: none"> Quarterly during the construction phase 	Site engineer and EETC SDO

Potential Impact/Activity	Monitoring Indicator	Monitoring Location	Monitoring Methods	Monitoring Frequency	Monitoring Responsibility
	orientation sessions about health and safety		<ul style="list-style-type: none"> • Reports about H&S capacity building activities 		
Safety of mechanical equipment	<ul style="list-style-type: none"> • Performance of the equipment and the visible damage 	Construction site	<ul style="list-style-type: none"> • Inspection and recording of the performance 	<ul style="list-style-type: none"> • Upon the use of the mechanical and heavy machineries 	Construction contractor
Land use restrictions and possible resettlement	<ul style="list-style-type: none"> • Total areas of restricted use penetrated by ROWs and access road to the towers for the materials • Total affected persons • Total compensation paid to the PAPs 	Construction site	<ul style="list-style-type: none"> • Area measurements on maps and on ground using surveying tools 	<ul style="list-style-type: none"> • During the construction and operation phase • The resettlement consultant should conduct a mid-term and final monitoring 	Design consultant Resettlement consultant EETC SDO
Trees removal for power lines right-of-way	<ul style="list-style-type: none"> • Number of removed trees • Total number of affected farmers • Total cost of compensation for trees 	Construction site Desk work	<ul style="list-style-type: none"> • Visual counting of removed trees • Reports related to compensation 	<ul style="list-style-type: none"> • Upon removal of trees, reporting will be once monthly • Quarterly report to be developed about the compensation activities 	Site supervisor consultant Compensation committee EETC SDO
Socioeconomic impacts (job opportunities and reducing the value of residential units)	<ul style="list-style-type: none"> • Number of jobs provided to the community people • Total number of 	Construction site	<ul style="list-style-type: none"> • Reports about the workers and employment 	<ul style="list-style-type: none"> • Quarterly 	EETC SDO

Potential Impact/Activity	Monitoring Indicator	Monitoring Location	Monitoring Methods	Monitoring Frequency	Monitoring Responsibility
	complaints raised by workers	Desk work			
	<ul style="list-style-type: none"> • Number of affected units • Number of complaints raised 	Construction site Desk work	<ul style="list-style-type: none"> • Reports about the cost of units 	<ul style="list-style-type: none"> • Quarterly 	EETC SDO
Traffic	<ul style="list-style-type: none"> • Storage sites areas • Complaints related to traffic • Total number of drivers attended training about safety utilization • Total number of complaints raised due to traffic problems 	Construction site Desk work	<ul style="list-style-type: none"> • Reports about the capacity building received by drivers • Complaints reports • Reports about capacity building to the drivers 	<ul style="list-style-type: none"> • Quarterly 	Site supervisor consultant EETC SDO

8.4. Environmental Safeguard Training

The Project Company (EETC) will ensure that the substation is manned 24 hours 7 days per week. Typically, a substation of this type employs around 25 staff with around 10 engineers with 3 shifts per day. All staff employed will be trained in the following:

- Specific job roles and procedures;
- Occupational health and safety; and
- Contingency plans and emergency procedures.

Training will include:

- Induction training on appointment;
- Specialist training (as required for their prescribed job role); and
- Refresher training as required.

The training program will be designed to ensure that appropriate skilled staff is used to operate and maintain the substation at all times. Aspects of occupational health and safety and emergency procedures are to be emphasized.

Furthermore, environmental training will be given to all staff employed at the project and special environmental training will be given to the staff during the operation phase to implement the ESMP. They will receive training in the following:

- Day-to-day monitoring activities;
- Collection and analysis of data;
- Use of monitoring equipment, operation and maintenance;
- Industrial hygiene;
- Occupational health and safety; and
- Emergency and contingency procedures.

During the consultation with one of the operators of an existing substation, a safety standard and regular training for staff is already established. However, regular refreshment training held besides the operation and maintenance training are:

- Administration skills
- Civil protection
- Firefighting and fire accident
- Smoke detection
- Fire equipment maintenance

In addition, at every substation EETC provides an emergency plan map including the responsibility of each staff during emergency and their contacts.

8.5. Environmental Management Plan (ESMP) and Monitoring Plan during Operation and Maintenance (O&M) Phase for the SS

Generally, during Operation and Maintenance (O&M) of the substation is related to the noise generated from the transformers, possible EMF exposure, and other related accident that has to be managed by the proper emergency plans. The emergency plans should be prepared and periodically trained to the SS staff include fire accident, emergency of possible leakage of the transformers, the smoke detection. The mitigation measures, monitoring activities as well as reporting expected during O&M of the SS are the following:

Management of Noise

Transformers typically produce harder to mitigate low frequency noise, especially during the night as the SS location is rural developed area so it is hard to disturbed any neighbors; however birds and fauna in the area can be disturb. Accordingly, regarding the noise level during the operation phase, the standard specifications for the transformers are already included at the tender documents.

Mitigation measures:

- Standard specification written of expected noise from the transformers has to be strictly followed by the supplier. Accordingly, the expected noise level of the transformers measured at the residential area will not exceed the permissible noise level (55 dB(A) during the day and 45 dB(A) during the night).

Monitoring Activities and Reporting:

- Monitor and report if there is any complaint related to the noise generated from the SS and disturb the surrounding establishments.

Management of Wastes (hazardous and non-hazardous waste)

Mitigation measures:

- The non-hazardous waste generated is very limited and can be disposing with the domestic waste to be transported to the landfill.
- Regarding the hazardous waste, it is also considered limited. When the transformers need to be replaced due to the increased of the capacity, the transformer will be reuse and installed at the SS that has the needed capacity.
- Temporary storage area will be defined to separate the storage area of the hazardous wastes with the non-hazardous waste before transporting it to the designated landfill.
- Domestic waste is connected to the existing network. Regular check for pipeline connection will be done to avoid the leakage and the dis-function of the network.
- In general, a proper waste collection and storage plus regular (preferably twice a week) waste collection by licensed contractors will need to be arranged by site management. To co-ordinate and control this, the site management should develop a waste management plan which is included in the ToR for the Contractor for waste management during construction and operation. For the hazardous waste, it will be managed and disposed in accordance with applicable Egyptian regulations and legislations by a specialized authorized company under the control of the Environmental authorities (EEAA).”

Monitoring Activities and Reporting:

- Implementation of the EAAA regulation for temporary storage, collection, transportation and disposal of hazardous waste
- Record keeping of the admitted waste and their quantity. When the waste is considered sufficient, the management shall dispose it to the designated landfill for solid waste.

Management of EMFMitigation measures:

- Periodic maintenance of the GIS SS and its interconnections. This includes the regular tightening, SS efficiency, oil quality, gas pressure, etc.

Monitoring Activities and Reporting:

- Regular EMF monitoring, quarterly at several place inside the SS area and surround the establishment. This measurement can be done together with the EMF monitoring of the OHTLs.

Management of risks during the emergency situations (fire, soil contamination, water resource contamination and smoke)Mitigation measures:

- Providing the safety equipment and regular check of the equipment
- Design of the foundation of the transformers to include the side for possible oil leak collection (including concrete and gravel surrounding the transformers area).

Monitoring Activities and Reporting:

- Regular visual monitoring for possible leak at surrounding the transformers area
- Regular visual monitoring for possible damage on the foundation and isolated area surrounding the transformers

In addition, regarding the safety issues, EETC periodically provide the specific trainings for the operators and the workers who are responsible for the work of operation and maintenance of the SS. The training obtains include the civil protection, firefighting and smoke detection, besides the operation and maintenance of the SS and its equipment. The map of the emergency plan, responsible persons and their contacts in case of fire accident is also provided.

Table 8-5 Environmental and Social Management Plan (ESMP) during Operation and Maintenance of SS

Potential Impacts	Proposed Mitigation Measures	Institutional Responsibilities (enforcement and coordination)	Cost Estimates (\$)*	Comments
During Operation and Maintenance of the SS				
Noise	<i>Mitigation measures for operators and staff of SS</i>			
	Standard procedures for health and safety of the workers according to IFC general EHS guidelines (including limitation of the duration and expose to high noise) and management of concentration works of heavy machineries	EETC	Around 10,000 LE annually for standard protection of staff	
	Standard equipment especially for ear protection during the work	EETC		
Waste generated (hazardous and non-hazardous, solid and liquid industrial wastes as well as domestic waste)	Proper waste management (industrial wastes) including separation of waste, separate area for temporary waste, transporting and disposing the industrial waste to their designated landfills	EETC	Undefined as the amount of wastes generated, especially for the industrial non-hazardous and hazardous waste are uncertain.	
	Especially for hazardous waste, the storage, collection, transportation and disposal of hazardous waste should follow the EEAA regulations for			

Potential Impacts	Proposed Mitigation Measures	Institutional Responsibilities (enforcement and coordination)	Cost Estimates (\$)*	Comments
	<p>hazardous waste.</p> <hr/> <p>Concerning domestic waste, the standard procedures for maintenance of the networks (including provision of waste bins) should be maintained</p>			
Public and operators and staff safety of the EMF exposure	Periodic maintenance of the GIS SS and its interconnections. This includes the regular tightening, SS efficiency, oil quality, gas pressure, etc.	EETC operators of the SS	-	
	EMF reading at the SS and surrounding site	EETC	100-150 USD per EMF meter	The cost estimation is based on one time purchased for one meter. It is advisable to purchase two machines for standby purposes.

Potential Impacts	Proposed Mitigation Measures	Institutional Responsibilities (enforcement and coordination)	Cost Estimates (\$)*	Comments
Trainings provided for potential risks during accidents (firefighting training, oil spillage, smoke detector, etc)	Provision of trainings provided by EETC as a general requirements	EETC	Undefined as the type of trainings and the duration of trainings are vary.	The cost estimation is included at annual trainings provided by EETC for their SS staffs.
Health and safety of the staff	Standard protection for the SS operators and staffs Provided on job training for the staff for general health and safety	EETC	None as a part of precaution of noise protection	

Table 8-6 Environmental and Socioeconomic Monitoring Plan

Potential Impacts	Proposed Mitigation Measures	Institutional Responsibilities (enforcement and coordination)	Cost Estimates (\$)*	Comments
During Operation and Maintenance of the SS				
<p>In general, the administration works, recording of accidents, injuries and other complaints from the surrounding establishment will be done during the monitoring of the operation and maintenance of the SS.</p> <p>The record includes the recording and monitoring of the waste management on the SS (especially industrial waste management).</p> <p>Regarding the EMF exposure, the monitoring of the surrounding the SS will be done similar and at the same time with the measurements of EMF exposure of the SS.</p>				

9. Stakeholder Engagement Activities Stakeholder Identification

The Stakeholder Engagement chapter aims at highlighting the key consultation and community engagement activities and their outcomes, in addition to outlining the validity and reliability of the collected data. The Stakeholder engagement activities were conducted reference to the standard 10 of the environmental and social standards of EIB In summary, the following system of stakeholder engagement is applicable to the project:

- Identification of project stakeholder groups including members of the public who could be affected (directly or indirectly) by project construction and operation.
- Stakeholder engagement process. Timely and ongoing provision of information to stakeholders on the environmental and social issues that could potentially affect them
- Meaningful consultation and disclosure which will be based on the disclosure of information relevant project activities, and will be undertaken in a manner that is inclusive and culturally appropriate for all stakeholders.
- Grievance mechanism by which the general public and other stakeholders can raise concerns, which the Company will handle in a prompt and consistent manner.

In order to achieve that:

- Community engagement plan has been developed for the different Stakeholders through Two phases :
- Phase I: Consultation activities conducted on the SS and the surrounding areas (August 2017),
- Phase II: During the preparation of the RAP study, the affected areas and communities located along the routes of the OHTLs; were included in May & June 2018.

Based on the identification of stakeholders, it is observed that there are no nomadic people along the lines, or residents only cultivated lands and heaths..

Various questionnaires and guidelines were prepared in order to engage:

- The residents in the project area
 - o The community people
 - o Women
 - o Young people and Elderly
- Governmental Organizations and Authorities
 - o Dakahleya Governorate Authority
 - o Gamasa city Authority
- NGOs
- Environmental administrations
- Contractors
- Project owner (Egyptian Electricity Transmission company)

The consultation outcomes will be used in:

- 1- Define/refine potential project stakeholders and suggest their possible project roles
- 2- Identify the most effective outreach channels that support continuous dialogue with the community

Thereafter the results will provide proper documentation of stakeholder feedback and enhance future stakeholder engagement activities accordingly.

9.1 Stakeholder Identification

The project is recognized as an important electricity distribution project, accordingly, it is essential to realize, within the context of this project the importance of engaging the wide base of ‘stakeholders’ in the process which aims to bring these stakeholders together from the local and national levels to inform and support project implementation.

A stakeholder is defined, in the IFC Guidance Note 1, 2012 as:

“Persons, groups or communities external to the core operations of a project who may be affected by the project or have interest in it. This may include individuals, businesses, communities, local government authorities, local nongovernmental and other institutions, and other interested of affected parties”. The following table summarizes all potential project stakeholders.

Table 9-1: Gamasa SS & OHTLs Stakeholders

Categories	Stakeholder groups	Role
<i>Primary stakeholders</i>		
Potential Affected Communities in Gamasa City	District Authority in Gamasa city	<ul style="list-style-type: none"> - They are the community leaders of the project affected communities - They will be responsible of communicating with the Project and sharing information with their community people
	The community people	<ul style="list-style-type: none"> - Households and communities that will receive impacts (positive/negative) as a result of the project.
	Women	<ul style="list-style-type: none"> - They will receive the impacts of the project. Additionally given their vulnerable status they might be severely affected by positive or negative impacts
	Young people (from age of 18 to 35 year)	<ul style="list-style-type: none"> - They have interests in the project as they might get a job opportunities
	Elderly	<ul style="list-style-type: none"> - They will receive the impacts of the project. Additionally given their vulnerable status they might be severely affected by positive or negative impacts
Governmental sector	Dakahleya Governorate Authority	<ul style="list-style-type: none"> - The main role of the governorate is the provision of support to the project through providing various permissions needed.

Categories	Stakeholder groups	Role
	Gamasa City Authority	<ul style="list-style-type: none"> - Permissions for the road cut during the implementation - Rehabilitation of roads, which is one of the major issues raised by the community, will be performed by the LGU.
	Information Centers in Gamasa City	<ul style="list-style-type: none"> - Provide the project with the underground utilities and infrastructure maps. As well as, providing information about the surrounding communities
Environmental sector	Ministry of Environment - Egyptian Environmental Affairs Agency (EEAA)	<ul style="list-style-type: none"> - Responsible for reviewing and approving ESIA's, and monitoring implementation of the Environmental Management Plan
	Environmental Office within the governorate	<ul style="list-style-type: none"> - Responsible for monitoring the compliance to environmental requirements
Project owner	Egyptian Electricity Transmission Company	<ul style="list-style-type: none"> - Project owner
Financial institutes	European Investment Bank (EIB)	<ul style="list-style-type: none"> - Financiers and regulators
Contractors	Contractor	<ul style="list-style-type: none"> - Manage the design, engineering, procurement and construction works for the project
Other governmental entities	The General Authority for Roads, Bridges & Land Transport	<ul style="list-style-type: none"> - Permissions for the road cut during the implementation of the associated projects
	Ministry of Defense	<ul style="list-style-type: none"> - Permitting the location of plant and the routes of the associated overhead transmission line
Secondary stakeholders		
Civil society	Local NGOs (Two NGOs) <ul style="list-style-type: none"> - Local Society development Association in Gamasa - Friends of Gamasa Beach Association 	<ul style="list-style-type: none"> - They are responsible of sharing information with the community. - NGO's are a good method for spreading awareness messages to the local community. Regular meetings are held regularly every two months with the NGO's and community leaders. Publications will be distributed (project fact sheets and grievance forms).

Categories	Stakeholder groups	Role
Traders and suppliers	Traders (small scale stores) within Gamasa City (unofficial suppliers)	- Provide workers with food and amenities.
	Small contractors within Gamasa City (unofficial suppliers)	- From the project adjacent areas, may be affected.

In order to ensure an inclusive and meaningful consultation process, a stakeholder’s analysis was conducted to get better understanding of the various groups and their roles, interests and influence on the project. Full list of the stakeholders on the governorate level is included in Annex 4

A focused stakeholders’ identification was conducted to identify the key groups of relevance to the project in this specific location. The main identified groups are very similar to those identified on the governorate level but on a smaller scale (elaborated details on that are include in the Governorate level ESIA). In the meantime, local communities of both men and women of projects beneficiaries, local NGOs (Two) were among the key stakeholders on the local level.

Various interviews were conducted with the stakeholders; the diversity of community representation was taken into account.

9.2 Methodology of Conducting Field Work

The Consultant carried out stakeholder engagement activities in August 2017 through the following methods: Focus Group Discussions (FGDs) with community members, Group Meetings and Semi-Structured Interviews with community stakeholders.

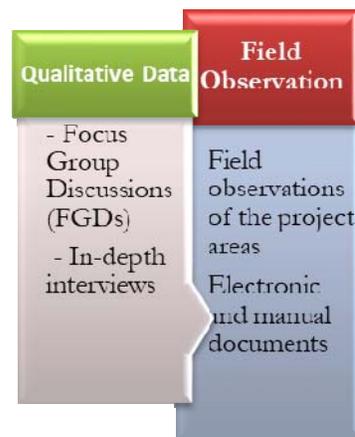


Figure 9-1 Summary for the tools used to

9.3 Consultation Methodology and Activities

The research team for this study has adopted multi-dimensional consultation activities that enable the marginalized, voiceless, youth and women to gain information about the project. As well as, gaining

information about their concerns and worries that regarding the project during various implementation phases. Following are the main consultation activities to date:

- 1- The study team visited the project area in order to define various stakeholders.
 - Stakeholder engagement plan has been developed for the different communities which is the consultation activities that conducted in August 2017, at this phase study aims to publish comprehensive information on the project, in order to enable the entities concerned to determine the fears, needs and recommendations
- 2- The study team divided the various engagement activities of the project to:
 - Data collection phase and,
 - Consultation activities.
- 3- All activities conducted were documented with photos and lists of participants in order to guarantee an appropriate level of transparency.
- 4- All information disclosure took place by presenting non-technical executive summary, note document on grievance mechanism and explaining their contents verbally.
- 5- This section presents the consultation activities which carried out in August 2017 and their results in the ESIA study. The second phase of the consultation activities which carried out in May & June 2018 will be presented in the RAP study; which included all affected persons by construction of the OHTLs.

Table 9-2: Summary of Consultation Activities in project area

Stakeholders		Number		Method	No. of Meeting
		Males	Females		
Governmental Organizations and Authorities	Dakahleya Governorate Authority	0	1	- ⁸ In-depth interviews	1 In-depth interviews
	Gamasa city Authority	3	1		4 In-depth interviews
The residents in the project area	Health unit	1	1	In-depth interviews	2 In-depth interviews
	Women	0	19	- In-depth interviews	6 In-depth interviews
				- ⁹ Focus group Discussions	3 Focus group Discussion
Young people	10	0	- In-depth	5 In-depth interviews	

⁸ In-depth interviews: In depth interviews are one to one meeting and with clear objective where the findings are used in the research. A number of in-depth interviews with project stakeholders have been performed, also an interview agenda has been prepared to guide through the topics that require to be discussed during the interview.

⁹ Focused group discussion (FGD): Are group discussion of 6 to 10 participants that are chosen based on their common background or selected based on sharing common interest. FGD allows knowing the practices and setting of the area. It is effective tool in delivering local community facts in relatively short period which can vary from 45 min to 60 min depending on the participants' time availability.

				interviews - Focus group Discussions	1 Focus group Discussion
	Elderly	21	0		19 In-depth interviews
					1 Focus group Discussion
Local Governmental Unit (LGU) and NGOs	Environmental administrations	3	0	- In-depth interviews	3 In-depth interviews
	Local NGOs	1	1		2 In-depth interviews
	Information Center	1	0		1 In-depth interview
Project owners	Egyptian Electricity Transmission company	2	0	- In-depth interviews	2 In-depth interviews
	EETC- Delta zone	1	1		2 In-depth interview

Stakeholders		Number		Method	No. of Meeting
		Males	Females		
Governmental Organizations and Authorities	Dakahleya Governorate Authority	0	1	- 8 In-depth interviews	1 In-depth interviews
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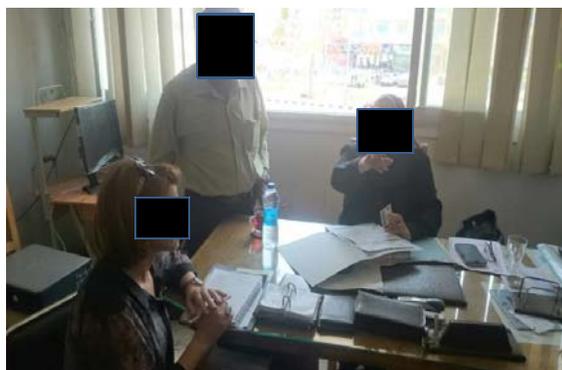


Photo 9-1: interview with Deputy Prime of Gamasa city Authority



Photo 9-2: interview with Director General of Department of Environment in Gamasa city Authority

Stakeholders		Number		Method	No. of Meeting
		Males	Females		
Governmental Organizations and Authorities	Dakahleya Governorate Authority	0	1	- 8 In-depth interviews	1 In-depth interviews
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	Local NGOs	1	1		2 In-depth interviews
	Information Center	1	0		1 In-depth interview
Project owners	Egyptian Electricity Transmission company	2	0	- In-depth interviews	2 In-depth interviews
	EETC- Delta zone	1	1		2 In-depth interview



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	Local NGOs	1	1		2 In-depth interviews
	Information Center	1	0		1 In-depth interview
Project owners	Egyptian Electricity Transmission company	2	0	- In-depth interviews	2 In-depth interviews
	EETC- Delta zone	1	1		2 In-depth interview

Photo 9-3: Interview with one of the staff of the Planning Department in Dakahlia Governorate

oto 9-4: Focus Group with the officials of Electric Administration Department in Gamasa Authority

Stakeholders		Number		Method	No. of Meeting
		Males	Females		
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Project owners	Egyptian Electricity Transmission company	2	0	- In-depth interviews	2 In-depth interviews
	EETC- Delta zone	1	1		2 In-depth interview



Photo 9-5: Interview with one a doctor in Gamasa city



Photo 9-6: Interview with Director of Local Society development Association in Gamasa

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		Males	Females		
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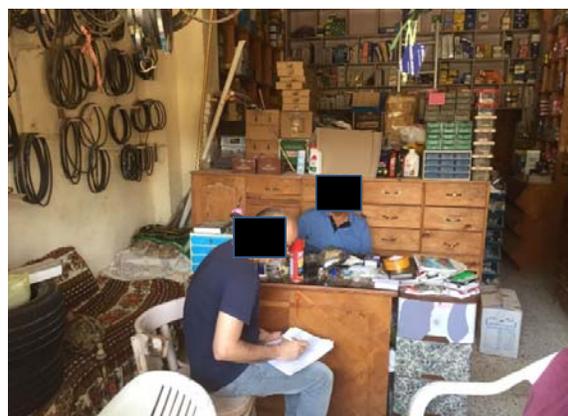
Photo 9-7: Focus Group with some of women in



Photo 9-8: Focus Group with some of construction

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	Information Center	1	0		1 In-depth interview
Project owners	Egyptian Electricity Transmission company	2	0	- In-depth interviews	2 In-depth interviews
	EETC- Delta zone	1	1		2 In-depth interview
Gamasa city			workers in Gamasa city		

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	EETC- Delta zone	1	1		2 In-depth interview

Photo 9-9: Interview with a pharmacist

Photo 9-10: Interview with one of Gama traders

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	EETC- Delta zone	1	1		2 In-depth interview

Photo 9-11: Interview with one of Gamasa city women

Photo 9-12: Interview with one of Gamasa city men

photos of some meetings with the project stakeholders

9.4 Consultation processes

9.4.1 The results of Consultation activities are presented as follows:

Table 9-3: Key comments and concerns that raised during the Consultation activities

Stakeholders	Comments/Concerns Raised

<ul style="list-style-type: none"> - Governmental entities and Authorities in Dakahleya Governorate - Gamasa city Authority - NGOs 	<p>-According to the interviews with the Governmental Entities in Gamasa city Authority, the majority of the officials emphasized on the importance of the project and its role in development especially in Gamasa city. They reported that the project will have public benefits.</p> <p>- The Head of Gamasa city Authority reported that, there are future projects for development in Gamasa city in order to support and develop the extension of the existing industrial area. This area is located on the borders of Gamasa city. It includes all food, chemical, metal, electrical, mining, light industry, textile and garment industries. The number of producing factories is (58 factories) and the number of workers in the producing factories is (2454 workers). The number of factories and industrial projects under construction is (76 factories), and the number of workers in factories and projects under construction is (2662 workers).</p> <p>- The engineer of the Engineering Department in Gamasa city Authority stressed on the importance of taking into account the engineering design of the station, so that the internal structures of the station are 15 meters or more away from the fence of the station, especially that the station is very close to the Youth Housing.</p> <p>- The Department of Urban Planning in Gamasa Authority stressed on the importance of taking into account the distance between the station and the future planning of the surrounding region.</p> <p>- For NGOs, the meetings with them showed that, they were interested in the project and in raising the awareness of the community people about it and the adopted grievance Mechanism, as well as, how the individuals can obtain their rights in case of any impacts occurred.</p>
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<p>The residents in the project area</p> <ul style="list-style-type: none"> - Women - Young people - Elderly 	<ul style="list-style-type: none"> - The in-depth and focus group discussion with the stakeholders in the project area revealed that some of them do not know about the construction of the station. - After a detailed describing to the project to the stakeholders they reported that, the project will result in a number of positive impacts such as: <ul style="list-style-type: none"> o Solve the problem of power outages, as the electricity is constantly interrupted in Gamasa city, o Provide job opportunities for all those who can work, especially youth, o Increase the production, o Help in opening many restaurants, especially as there is lot of laborers in Gamasa city, o After the substation enters into operation, it may provide job opportunities for youth to work in it, o Construction of clubs, preschools, hospitals, o Increase the efficiency of medical equipment, <p>Moreover, EETC will inform Gamasa City Council about the time of commencing the construction activities. Here comes the role of Gamasa City Council to inform the community about it through the following website https://almansoura.weladelbalad.com/</p> <ul style="list-style-type: none"> - The sample surveyed reported that, the project will solve the problem of electrical appliances damaged as a result of the sudden supply of electricity after a cut off period. - The stakeholders reported that the project will improve their social conditions and will help in developing Gamasa city from resort area to residential area. - according to the opinions of the stakeholders about the impacts of the project, some of them reported that the project will result in some adverse impacts on health; they recommended building the station away from the residential areas, while the majority of them reported that the project will not have adverse impacts on residents. - The majority of the interviewed people in the project area have no concerns about the construction of the station, while some of them have concerns about constructing the station near the residential units. - All of the stakeholders in the project areas agreed to participate in disclosure information about the importance of the projects and its impacts through conduct social meetings in the places that are preferred by the population such as mosques, cafes and restaurants.
<p>Project owner Egyptian Electricity Transmission company</p>	<p>Meetings were held with the officials of the Egyptian Electricity Transmission Company, in order to:</p> <ul style="list-style-type: none"> • Provide possible facilities for field work and extract the necessary permits to facilitate the task of researchers • Discuss the cognitive information to be disseminated among citizens about the project, and to clarify it in a simple way and in a language that appropriate with their culture, • Discuss and explain the grievance system in the Egyptian Electricity Transmission Company, in order to be discussed and explained to citizens in a simple way and in a language appropriate with their culture.

9.4.2 Summary of consultation outcomes

The consultation outcomes revealed that:

- A. The key message from the consultation events carried out for this project is that Public and government acceptance for and support to the project are very strong.
- B. The social housing area for youth is the nearest residential blocks adjacent to the site of the station. The site visit and field observations showed that there are no residents in the area presently, therefore the study recommends:
- The importance of taking into consideration the distance between the fence of the station and the internal structures of the station, at a sufficient distance from the nearest residential building
 - Conducting some of consultation activities with the population during the construction and operation phases;

In order to reduce the concerns of the community people and spread the knowledge the following is recommended:

- Conduct orientation session in the project area, especially in the places that are preferred by the population such as mosques that guarantee the presence of large number of people.
 - Engage the stakeholders from NGOs that are working in the project area in the awareness programs, due to their ability to communicate with large number of citizens.
- C. The study recommends the participation of the community people in sharing information about project with the other people especially the illiterate groups.)
- D. The study tried to raise awareness about the importance of the project, and inform the community people about grievance mechanism through individual and public consultation activities with the stakeholders.
- E. The study recommended to spread information among citizens through the stakeholders by using snowball method that enables them to exchange information verbally
- F. The study aimed to identify the most effective outreach channels that support continuous dialogue with the community, these channels are represented in:
- NGOs in the project area
 - Some government official

10. Grievances and Redress Mechanism

Objectives: The objective of a grievance procedure is to ensure that all comments and complaints from any project stakeholder are considered and addressed in an appropriate and timely manner.

EETC will inform Gamasa City Council about the time of commencing the construction activities. Here comes the role of Gamasa City Council to inform the community about it through the following website <https://almansoura.weladelbalad.com/>

Disclosure of the GRM: The Community people are fully informed about the Grievance procedures in simple language. The Consultant has disclosed information about GRM during the stakeholder engagement activities in May 2017 explaining the procedure, presenting the form structure, time frame and etc. Community people and the governmental units were informed about GRM through individual meetings and FGD.

Mode of Grievance: The contractor will accept all comments and complaints associated with the project from any stakeholder. Comments can be made via email, post, fax, on the telephone or in person. The comments and complaints will be summarized and listed in a Complaints/Comments Log Book, containing the name/group of commenter/complainant, date the comment was received, brief description of issues, information on proposed corrective actions to be implemented (if appropriate) and the date of response sent to the commenter/complainant. A telephone number will be available for the community people to tell their complaints. The site manager/EETC company will register all types of complaints.

Response to grievances: All comments and complaints will be responded to either verbally or in writing, in accordance to preferred method of communication specified by the complainant. The grievance should be responded to within a month maximum. Comments will be reviewed and taken into account in the project preparation; an individual response should be presented to each aggrieved person. The grievances should be documented in a Grievance log.

Registration of GRM: All grievances will be registered and acknowledged within 6 working days and responded to within one month. The project management will keep a grievance log and report on grievance management, as part of annual project progress reports, which will be available on the company (Misr El Wosta Distribution Company) website.

Grievance channels:

Comments and concerns regarding the project can be submitted verbally or in writing to EETC through the following channels.

- By telephone : 00202 22616537
- By post or hand delivered to: Egyptian Energy Transmission Company, Emtedad Ramsis St., Abbasiya, Cairo
- Using grievance boxes that are installed at the LGU/NGOs in the nearby villages
- During construction to site manager (Contractors' side, who will be responsible to relay the grievance to EETC's project management):
Site Manager : Eng. Gamal Gabr
Mobile : +2 01009867583

Confidentiality: Individuals have the right to submit their grievance anonymously if they wish to do so, and in case they agree to include their name they have the right for their name to be kept confidential.

Management of GRM: During construction of the project, grievances in relation to construction activities will be managed by the Company and the construction contractor(s). The Consultant has provide contact information for the contractor to residents of near hamlets.

A separate grievance mechanism is available in the same manner for workers, including employees of both the project-employed and contractors.

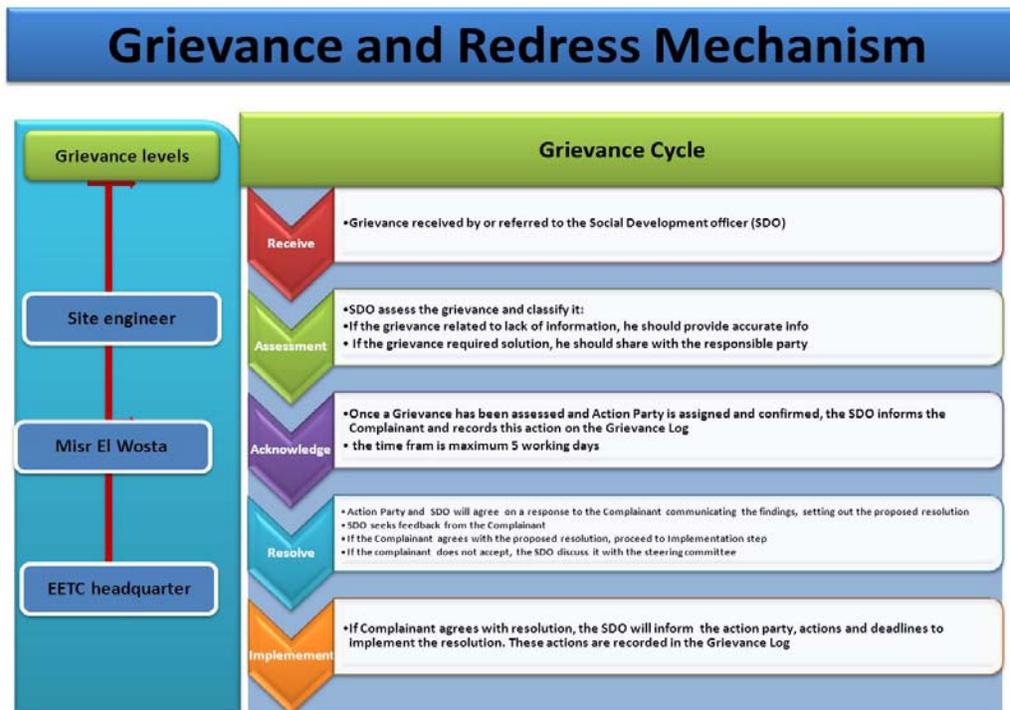


Figure 10-1: Grievance mechanism

10.1. Resources and Responsibilities

The Contractor site manager will take the overall responsibility for handling the consultation and information disclosure process and maintaining ongoing communication with identified stakeholders, collecting and processing comments/complaints, and responding to any such comments and complaints.

Depending on the nature of a comment/complaint, some comments or complaints will be given to the appropriate person in the company for a response.