

ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA)

**SUEZ Wind Energy BOO Wind Power
Plant 1.1. GW – SWE South (PLOT 2)**



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LIST OF ABBREVIATIONS

AC	Alternating Current
BOO	Build, Own and Operate
CAAs	Competent Administrative Authorities
CAPMAS	Central Agency for Public Mobilization and Statistics
CBO	Community Based Organization
CRM	Collision Risk Modelling
DC	Direct Current
DEM	Digital Elevation Model
E&S	Environmental and Social
EBRD	European Bank for Reconstruction and Development
EEAA	Egyptian Environmental Affairs Agency
EETC	Egyptian Electricity Transmission Company
EHS	Environment, Health, and safety
EHSS	Environmental, Health, Safety and Social
EIA	Environmental Impact Assessment
EMU	Environmental Management Unit
EPC	Engineering, Procurement, and Construction
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
GDP	Gross Domestic Product
GOE	Government of Egypt
GoS	Gulf of Suez
IBA	Important Bird Area
IEA	International Energy Agency
IFC	International Finance Corporation
IFIs	International Financial Institutions
IRENA	International Renewable Energy Agency
ISES	Integrated Sustainable Energy Strategy
ISO	International Organization for Standardization
Km	Kilometre
kWh	Kilowatt Hour
LoS	Line of Sight
MS	Management System
MSB	Migratory Soaring Birds
MV	Medium Voltage
MW	Megawatt
NREA	New and Renewable Energy Authority
NGO	Non-Governmental Organization
NTS	Non-Technical Summary
O&M	Operation and Maintenance
OHS	Occupational Health and Safety
OHTP	Occupational Health and Safety Plan
OHTL	Overhead Transmission Line
PPA	Power Purchase Agreement
PPS22	Planning Policy Statement 22
PR	Performance Requirement
PSs	Performance Standards
RCREEE	Regional Center for Renewable Energy and Energy Efficiency
SCA	Supreme Council of Antiquities
SCADA	Supervisory Control and Data Acquisition

SEP	Stakeholder Engagement Plan
ToR	Terms of Reference
TSP	Total Suspended Particulate
VP	Vantage Points
WDCALR	Wadi Dara Cooperative Association for Land Reclamation
WGS	World Geodetic System
WTG	Wind Turbine Generator
WWTP	Wastewater Treatment Plant

EXECUTIVE SUMMARY

The Project is located within the Gulf of Suez (GoS) around 290 km southeast of the capital city of Cairo. The total area of the Project site is 50 km².

Administratively, the Red Sea Governorate is divided into 7 Cities (also known as Districts), each headed by a Local City Council. The capital of the Governorate is Hurghada that is located around 91 km south of the Project site.

The Project is located within the Ras Gharib District and therefore administratively is under the Ras Gharib City Council. The Ras Gharib District is further divided into Ras Gharib city and two (2) rural (village) local units: Zaafarana and Wadi Dara. The closest community settlement to the Project site is Wadi Dara Village (located 0.9 km to the west).

Generating electricity through wind power is rather pollution-free during operation. Compared with the current conventional way of producing electricity in Egypt through thermal power, the clean energy produced from renewable energy resources is expected to reduce consumption of fossil fuels, and is to aid in reducing GHG emissions, as well as air pollutant emissions. The Project is to displace around 1.4 million metric tons of CO₂ annually.

The Project footprint (i.e. the area of disturbance), based on the Project's components, is significantly small, calculated at approximately 4.3 % of the total boundary of the Project area.

Table 1: Footprint of the Project Components

Component	Footprint	Description
Turbines	0.31km ²	Typically, each crane pad is around 4,000m ² in area, whereas each foundation typically consists of a circular footing of maximum 25m diameter with a maximum of 74 turbines.
Substation and Warehouse and Storage facilities	0.07km ²	Typically, footprint for substation and building facilities is around 0.05km ² .
Trenches for MV cables and communication cables	0.9km ²	This includes trenches with a calculated length of around 95.80 km and a width of 1m.
Road networks	0.9km ²	This includes the road network with a total length of 26.29 km and a width of 6m.
Total Project Footprint	2.18km ²	
Total Project site Boundary Area	50 km ²	Project footprint is approximately 4.3% of the total boundary of the Project area.

The table below provides a summary of the key Project components, along with a detailed description of each of those components to follow. It is important to note that the selection of wind turbines depend on a feasibility study as well as a technical and economical evaluation undertaken by the Developer.

Table 2: Summary of Key Project Components

Component	Description
Project Generation Capacity (MW)	550 MW
Technology Type	Envision
Number of Wind Turbines	69
Rated Power per Turbine (MW)	8.0 MW
Rotor Diameter (m)	171 m

Hub Height (m)	100 m
Infrastructure and Utilities	This includes: (i) internal road network; (ii) underground MV cables; (iii) warehouse and offices; (iii) substation; and (iv) associated facilities such as the high voltage overhead transmission line.

INTRODUCTION

The energy sector is a key driver for the socio-economic development of Egypt, representing around 13% of current GDP and thus making economic growth in the country contingent upon the security and stability of energy supply. To align and reinforce the sector with sustainable development, the Arab Republic of Egypt (through the Ministry of Electricity and Renewable Energy) had developed and adopted the Integrated Sustainable Energy Strategy (ISES) 2015 – 2035, which provides an ambitious plan to increase the contribution of renewable energy to 42% of the country's electricity mix by 2030, of which wind power is a key component, to be developed mostly in the Gulf of Suez (GoS) due to the wind characteristics in the area.

As a result, the GoE issued the Renewable Energy Law (Decree Law 203/2014) to support the creation of a favourable economic environment for a significant increase in renewable energy investment in the country and establishes the legal basis for the Build, Own and Operate (BOO) framework. Through the BOO mechanism, the Egyptian Electricity Transmission Company (EETC) invites private investors to submit their offers for solar and wind development projects, for specific capacities and the award is to be made to that bidder with the lowest Kilowatt Hour (kWh) price. In addition, the GoE (through the New and Renewable Energy Authority (NREA)) provides the land for the investors.

In accordance with the Law above, a consortium composed of ACWA Power and Hassan Allam Utilities B.V (hereafter referred to as the '**Developer**') is proceeding with developing a new wind power plant project (Suez Wind Energy – (SWE)) with a capacity of 1,100MW under the BOO scheme. SWE is to be developed over two (2) Plots – the first located within the northern parts of the Gulf of Suez (hereafter referred to as 'Plot 1') and the second located within the southern parts of the Gulf of Suez - Plot 2.

The Regional Centre for Renewable Energy and Energy Efficiency (RCREEE) is managing the Environmental and Social (E&S) process for the Project development on behalf of the Developer. RCREEE commissioned the consortium consisting of EcoConServ, ECO Consult and Safe Soar (hereafter referred to as the '**ESIA Consultant**') to carry out an Environmental and Social Impact Assessment (ESIA) for the Project.

As noted earlier, the above 1,100MW Project will be developed over two (2) plots. Given the geographical distance between the plots, from an environmental and social perspective, separate ESIA studies will be undertaken for each plot. This report represents the ESIA for Plot 2 / SWE North.

PROJECT DESCRIPTION

Project Setting

The Project is located in the Red Sea Governorate of Egypt, around 290 km to the southeast of the capital city of Cairo. More specifically, the Project is located near the Red Sea shoreline and within the Ras Gharib District of the Red Sea Governorate, where the closest residential areas include Wadi Dara Village (located 0.9 km to the west) refer to the figures below.

The Project is located within the NREA Concessionary Area, a 656 km² for which an Environmental Social and Impact Assessment was undertaken in 2007 to determine the potential environmental impacts of wind power development. The NREA Concessionary Area is to host the development of wind power amounting to 3,000 MW. The corresponding EIA informing the NREA Concessionary Area on impacts of wind turbine development identifies site-specific environmental and social constraints to be taken into account by the Project developer

throughout the planning and design phase of the Project in accordance with the three ‘zones’ of the NREA Concessionary Area and aligned with anticipated environmental impact among competing environmental interests: renewable energy development and conservation, particularly avi-fauna populations. The area starts about 20 km in the south of Ras Gharib and reaching up to the Gulf of Zayt (about 60 km in the North of Hurghada). The wind power target capacity for the area is between 2,000 – 3,000 MW by 2026/2027.



Figure 1: Project Site in Relation to the Capital City of Egypt



Figure 2: Project Site and Closest Villages

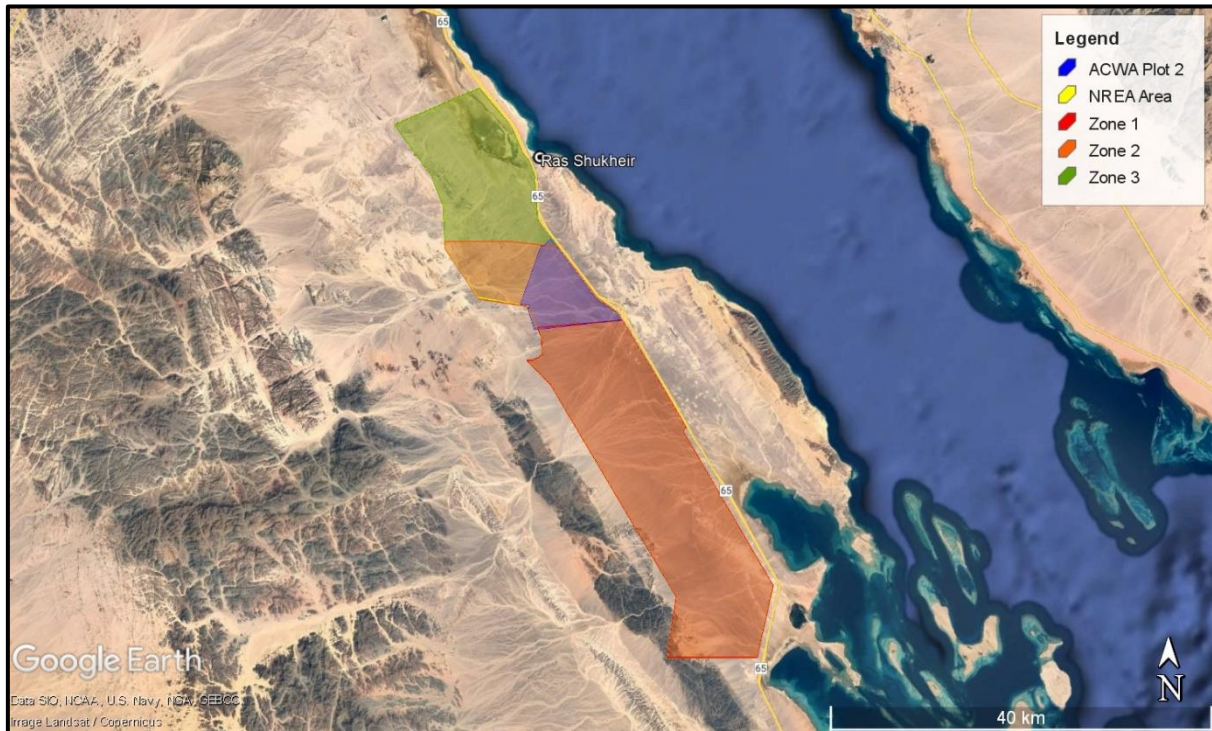


Figure 3: NREA Concessionary Area's 3 Zones with the Project site overlain in Zone 2

The Project site is located within the Ras Gharib City (or District) and therefore administratively is under the Ras Gharib City Council. The Ras Gharib District is further divided into Ras Gharib town as well as 2 rural (village) local units (Zaafarana and Wadi Dara). The closest community settlement to the Project site is Ras Gharib city (located 37.7 km to the northeast).

Ras Gharib City is the second-largest city in the Red Sea Governorate, and the most important Egyptian city in terms of oil production.

Table 3: Project Site Coordinates

Project Boundary Coordinates		
Point	Latitude	Longitude
1	28.052828°	33.252076°
2	28.050188°	33.276469°
3	28.003485°	33.316218°
4	27.991080°	33.338052°
5	27.984591°	33.341722°
6	27.975285°	33.250200°
7	27.998702°	33.241345°
8	28.000215°	33.230187°

Project Components

Wind turbine technology relies on harvesting the kinetic energy in wind (i.e. movement of wind) and turning it into mechanical energy which in turn is used for electricity generation. The key components of the Project include the following:

- **Wind Turbines:** a typical wind turbine is presented in the figure below. For this Project there are to be 69 wind turbines occupying the project site for a capacity of 8.0 MW, respectively. The turbines under either possibility will have a hub height of 100 m and a rotor diameter of 171 m, respectively.

- Supporting infrastructure and utility elements for the Project which will include:
 - Cables that will connect the turbines to an onsite substation
 - Substation that converts the output from the turbines to a voltage that is appropriate for connection with the National Grid
 - Onsite building infrastructure that will include an administrative building (offices) and a warehouse for storage of equipment and machinery
 - Road network for ease of access of various project components throughout the site
- Associated facilities which will mainly include an Overhead Transmission Line (OHTL) that will connect from the substation onsite to the National Grid.

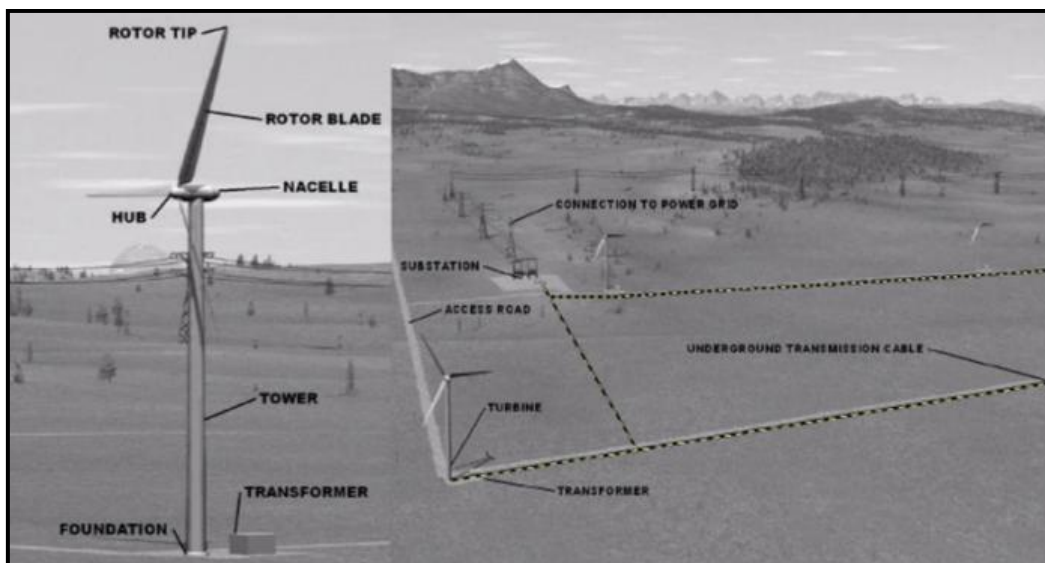


Figure 4: (a) Typical Structural Components of a Wind Turbine, (b) Typical Components of a Wind Farm

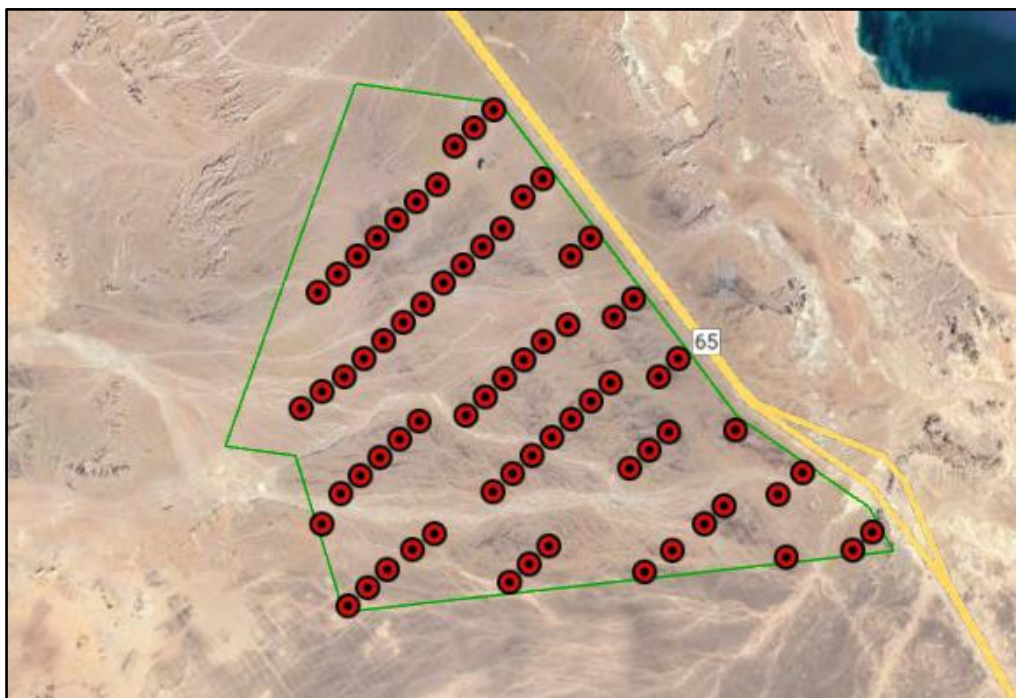


Figure 5: Project Site Turbine Layout

Project Phases

The Project will include 3 distinctive phases as follows:

- **Design and Construction Phase** that will include: (i) preparation of the detailed design, (ii) transportation of components to the site, (iii) site preparation activities (land clearing, excavations, etc.), and (iv) installation of components.
- **Operation Phase** that will include the normal daily operation of the wind farm and the undertaking of maintenance activities as required.
- **Decommissioning Phase** that will include the dismantling of the various Project components at the end of the life time.

According to the current timeline, construction of the Project is anticipated to commence approximately Q4 of 2024 and will require approximately 24 months for construction and commissioning (i.e. Q3 of 2026). Operation of the Project is therefore anticipated to commence in late 2026 (Q4) for a period of 25 years.

SUMMARY OF ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS & IMPACTS

i. Introduction

The Environmental and Social Impact Assessment (ESIA) comprised environmental and social baseline studies and an assessment of impacts. Mitigation measures, which are included in the ESMP, were identified for potential significant effects and the significance of residual effects determined. The impact assessment followed an assessment methodology developed to reflect current best practice. The key baseline and impact assessment findings are further discussed below.

Stakeholder Consultations

As part of the scoping process of the Project, targeted consultations were undertaken with key stakeholders that are relevant to the Project to include but not limited to: central governmental entities; local governmental entities; key Non-Governmental Organizations (NGOs); and local community representatives. Throughout the consultations, a handout (in Arabic language) was prepared and distributed to such stakeholder groups with key information to include but not limited to rationale for Project, Project location and setting, key components and activities of the Project and other as applicable.

The table below is a condensed breakdown of the stakeholder categories that were engaged in this process.

Table 4: Summary of Consultations

Stakeholder	Number	
	Males	Females
Ministry of Tourism and Archaeology, Red Sea Archaeology and Heritage Institute	2	
Nature Conservation Egypt (NCE)	1	-
Egyptian Environmental Affairs Agency EEAA	1	-
Egyptian Electricity Transmission Company EETC	-	4
EEAA Red Sea Branch	1	-
State property Department in the Red Sea Governorate	1	-
Ras Gharib City Council	1	-
local unit of Wadi Dara village	5	-
Red Sea Water and Wastewater Company	1	-
Department of Planning and Projects in the Red Sea Governorate	-	1
General Petroleum Company	1	-
General Administration of Ground Water in Red Sea	-	1
Etisalat Misr	2	-
Orange company		

Radio and Television Unit in Ras Ghareb and the Red Sea Governorate	4	-
Bedouin families in Ras Gharib	12	-
Total	32	6

Environmental & Social Baseline Conditions & Impacts

(i) Landscape and Visual

Visual impacts associated with wind energy projects typically concern the turbines themselves (e.g. colour, height, and number of turbines) and impacts relating to their interaction with the character of the surrounding landscape and the visual receptor which might be present.

Turbines are tall structures (185 for this Project) that can be seen from several kilometres away and impose a change on the landscape of the area where they are installed. However, visual impacts depend on several factors such as distance, size, visibility, landscape and geography, and the presence of potential sensitive visual receptors.

Nevertheless, visual impacts created from the development of the Project are not considered an issue of concern due to the following:

Potential sensitive receptors are located in Wadi Dara Village - 0.9km from the Project. However, Wadi Dara Village does not have a large permanent community with majority of population being workers and guards employed at the various poultry, livestock and agricultural farms within the settlement (mainly at a rotational basis). Based on this, aesthetical value for such a receptor loses some importance. Finally, based on consultations undertaken with Wadi Dara such impacts were explained but no issues were raised.

The rotating blades will be visible from vehicles passing across the Hurghada - Cairo Highway as well as the main road leading into Wadi Dara Village which also intersects the Project Site. The turbines can attract visual attention and potentially distract drivers passing along the highway.

Project area is considered a barren and desert area and in general is located within an industrial area with petroleum activities for which its aesthetical value loses some importance.

There are several existing and under construction wind farm developments in the area as well as several electricity distribution and transmission lines so the addition of this Project will not be a significant impact to the visual and landscape characteristics of the area.

Potential Impacts Overview: Construction Phase

- Site preparation activities include land clearing, leveling, excavation, and grading.
- Construction activities create temporary negative visual effects, especially near sensitive receptors like Wadi Dara Village.
- Visual impacts are noticeable during construction due to machinery and equipment.
- Impact magnitude is medium, considering the presence of sensitive receptors.
- Impact sensitivity is moderate due to the proximity of sensitive receptors.

Mitigation Measures: Construction Phase (in brief)

- Implement general housekeeping measures to maintain site orderliness.
- Remove unused machinery and equipment to reduce visual impacts.
- Ensure proper waste collection and disposal.

- Implement restoration measures post-construction.

Monitoring and Reporting Requirements:

- Conduct daily or monthly inspections to maintain site cleanliness.

Potential Impacts during the Operation Phase:

- Visual impacts from turbines include changes to landscape aesthetics.
- Turbines are visible from several kilometers away.
- Potential visual distraction for drivers passing by on highways.
- Impact magnitude is medium due to the visibility of project elements.
- Impact sensitivity is moderate considering key visual receptors.

Mitigation Measures: Operation Phase (in brief):

- Install clear and informative signage on highways to alert drivers and provide guidance.

Monitoring and Reporting Requirements:

- Inspect highways to ensure signage installation.

(ii) Land Use & Infrastructure

As mentioned earlier, the Project site is located within the NREA Concession Area, an area that is overall carved into three zones (Zones 1 – 3) prescribing varying restrictions and or recommendations on development. The Project site lies within Zone 2 within which require ornithological monitoring and verification prior to permitting wind farm development.

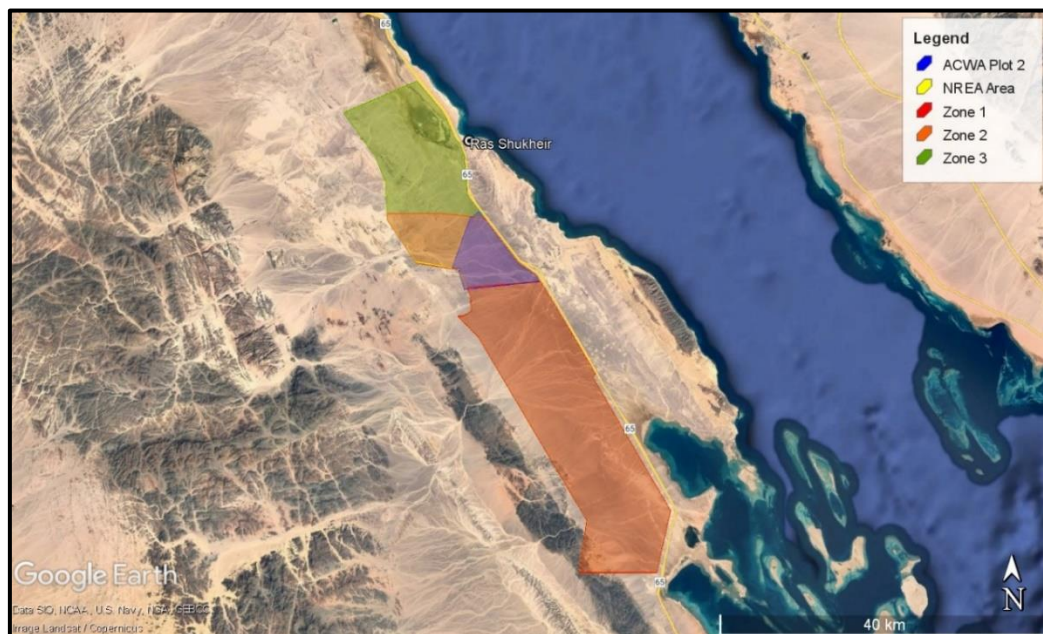


Figure 6: NREA Concessionary Area's 3 Zones with the Project site overlain in Zone 2

The Project site is also adjacent to Wadi Dara Village, entailing several receptors that are also near the project site with part-time residence (with one abandoned receptor recorded in the Project site and is to be removed).

The land use survey identified characteristics of land use in Wadi Dara Village which namely includes agricultural activities (businesses) and part-time residences.

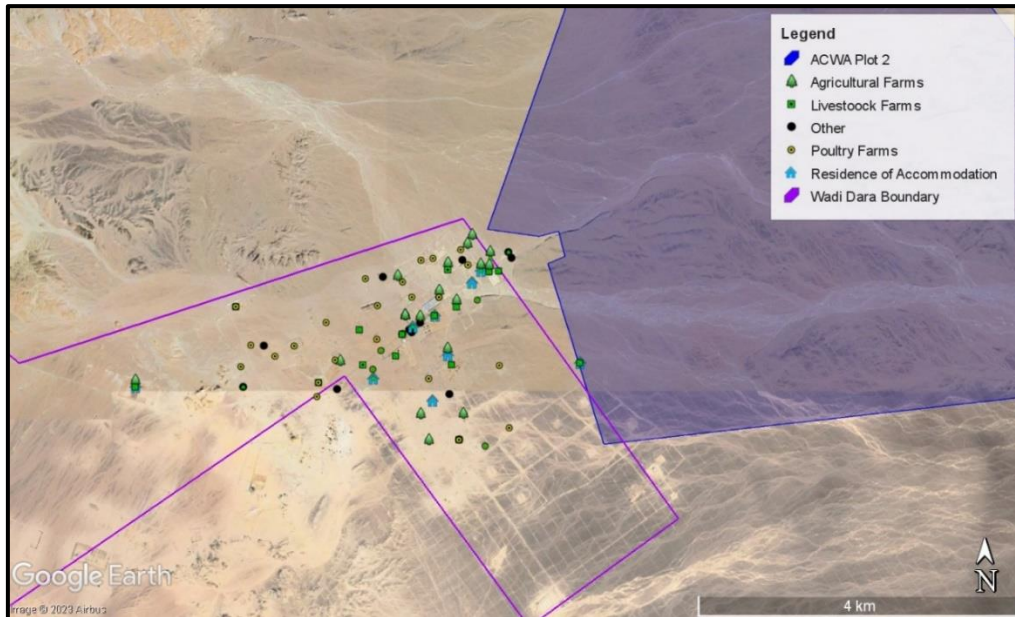


Figure 7: Land Use Survey for Wadi Dara

Additionally, the Wadi Dara Cooperative Association for Agricultural Remediation, which manages agricultural development and, in recent years, has implemented an activity to allocate lands to private sector investors. It was found that 0.1 km² of the NREA Concession area and Project site had been allocated under the Wadi Dara Cooperative's program. Following consultations, the area was ceded back to NREA and alternative lands, located on the western-side of Wadi Dara Village, of similar composition land has been allocated to the Cooperative by the Red Sea Governorate.

Within the Project site, there are indications of limited development including the landscaping (on the lands that were being managed by the Cooperative) and a former dumpsite, which at the time of the land-use survey, had indications of use such as recently disposed chicken carcasses. It's since been affirmed that the dumpsite is officially in disuse.

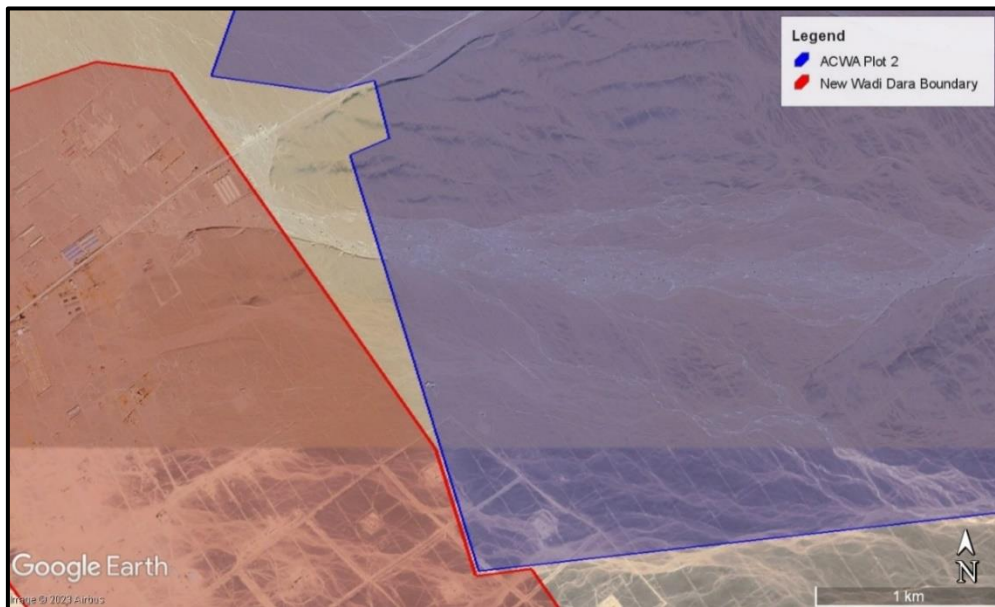


Figure 8: New Wadi Dara Boundary and Project Site

Gebel El Zeit is designated as both an IBA and a KBA (with concurrent boundaries) and the project area lies within the protected site. The site consists of a narrow, 100km long strip extending along the Gulf of Suez and Red Sea Coast.

A detailed land use survey was undertaken for the Project site to understand any informal land use activities undertaken such as physical activities (houses, structures, etc.) or economical activities (such as grazing, agricultural, etc.). It is important to note that area of the Project site is under the “Ghafra System” of Bedouin Groups (although they have no physical or economical activities within the site), which entails involving such Bedouin groups in the Project (through jobs, services, etc.) for their support. In particular, the key Bedouin Groups known in the area are the Tabbna and the Hamadin families. As per consultations, the ESIA team confirmed that there are no stable Bedouin communities in nor near the Project site (neither temporary nor permanent).

Potential Impacts Overview:

- The Project site overlaps with an area previously utilized by the Wadi Dara Cooperative Association and private investors.
- Formal objections and acknowledgments regarding land use need to be addressed.
- Failure to address land use issues could lead to long-term negative impacts and potential conflicts with Bedouin Groups and private investors.
- Impact significance is moderate due to potential disputes and impacts on land use, yet, as mentioned above, were addressed through the reallocation of lands to the Cooperative by the Red Sea Governorate.
- Consequential impacts of the dumpsite, located centrally within the Project site, if its contents were to remain on site in attracting birds

Mitigation Measures (in brief):

- Obtain formal approval from the Red Sea Governorate for removal of structures.
- Conduct formal consultations with private investors through the Wadi Dara Association.
- Coordinate with Bedouin Groups for employment and procurement opportunities.

- Implement a Social and Environmental Plan (SEP) focusing on Bedouin engagement and community development.
- Initiate community development programs outlined in the Community Engagement Plan (CEP) and Corporate Social Responsibility (CSR) program.

Monitoring and Reporting Requirements:

- Submit formal approval from the Red Sea Governorate.
- Submit final detailed designs or proof of consultation with investors.
- Monitor effectiveness of grievance mechanisms for the Bedouin community.
- Provide documentation of employment and procurement procedures including references for Bedouin groups.
- Submit evidence of coordination and agreement with Bedouin groups as part of the SEP.

(iii) Hydrology and Hydrogeology (Soil and Groundwater)

The project site is located in an area of wadi deposits, surrounded by local moderately to low productive aquifers with insignificant surface and limited sub-surface recharges. Surface water hydrology in the area of the project concerned mainly about the accumulation of rainwater in the watershed areas of dray wadies and the nature of flow along the main streams of them.

The height of the of the terrace above the ground level (the level of the following terrace) varies from 0.5 m to about 2 m at the west while it varies from 1 m to about 3 m at the west and southwest. This terrace composed of very coarse chert nodules, cobbles and boulders of granite, basalt, impeded in fine clay and sand. These wadi elevations.

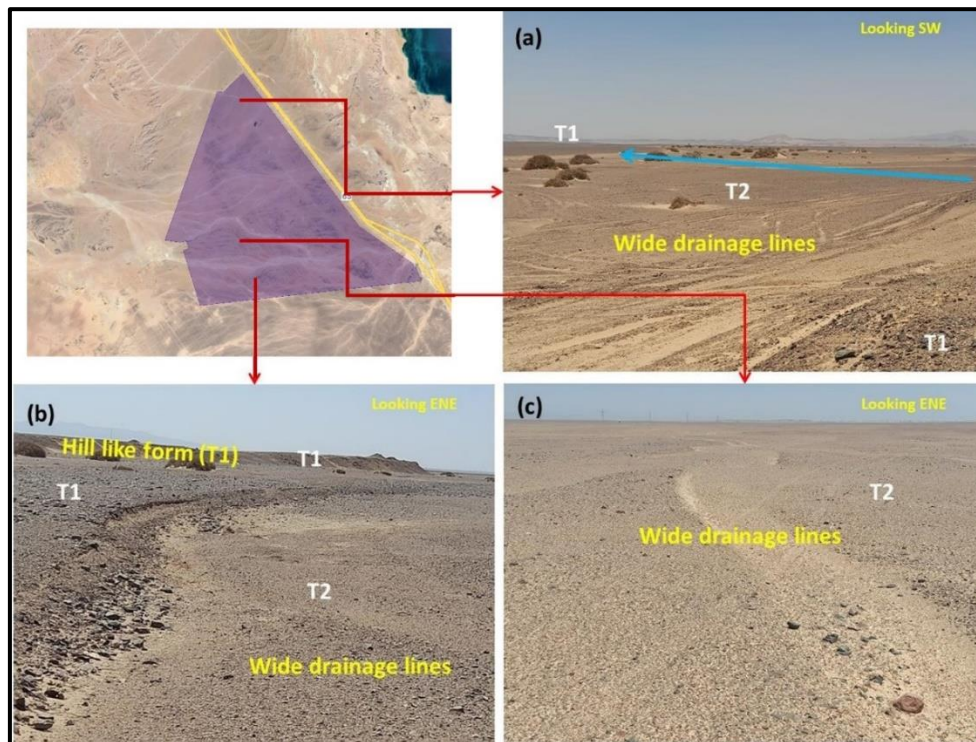


Figure 9: Field photographs of the terraces T1, T2. Note the shallow and very wide drainage lines crossing the T1 and floored by T2 (b) and the hill like form of T2 (b).

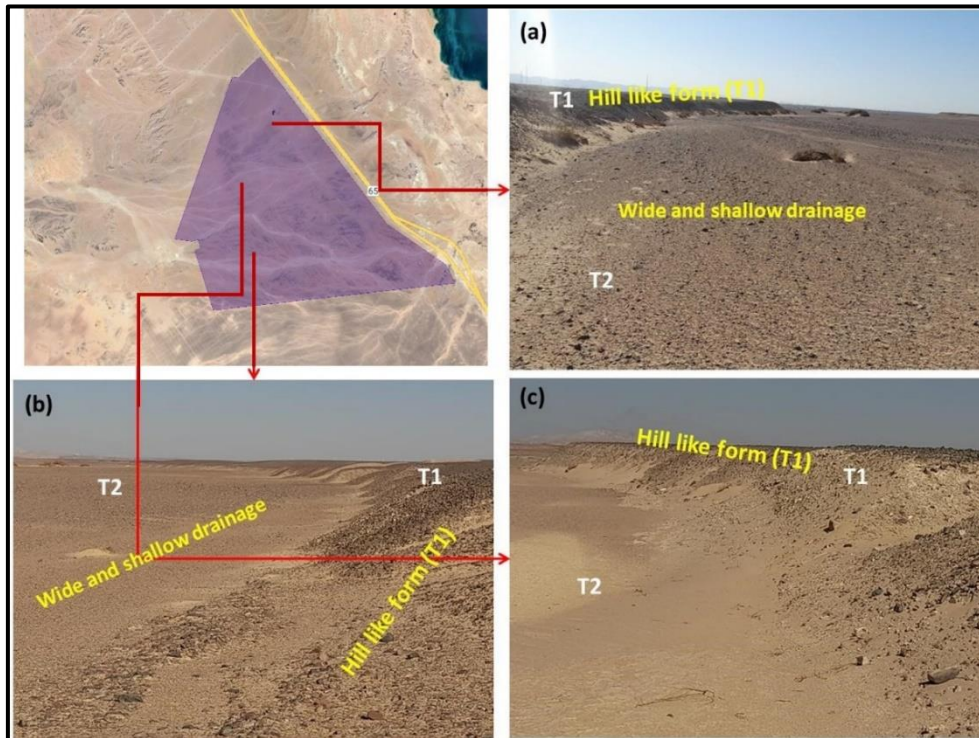


Figure 10: Drainage lines in the wadi (changes in elevation) T1 (ranging between 0.5m – 2 m from the wadi floor), T2 0.5m and lower with elevation generally decreasing from west to east toward the GoS

Pumped and observation wells were drilled by Desert Research Institute within the Wadi Dara area south of the project site (Sewidan et al., 1991), in addition to the wells drilled by RIGW, 2005, are the main source of the groundwater information in the study area as shown the figure below.

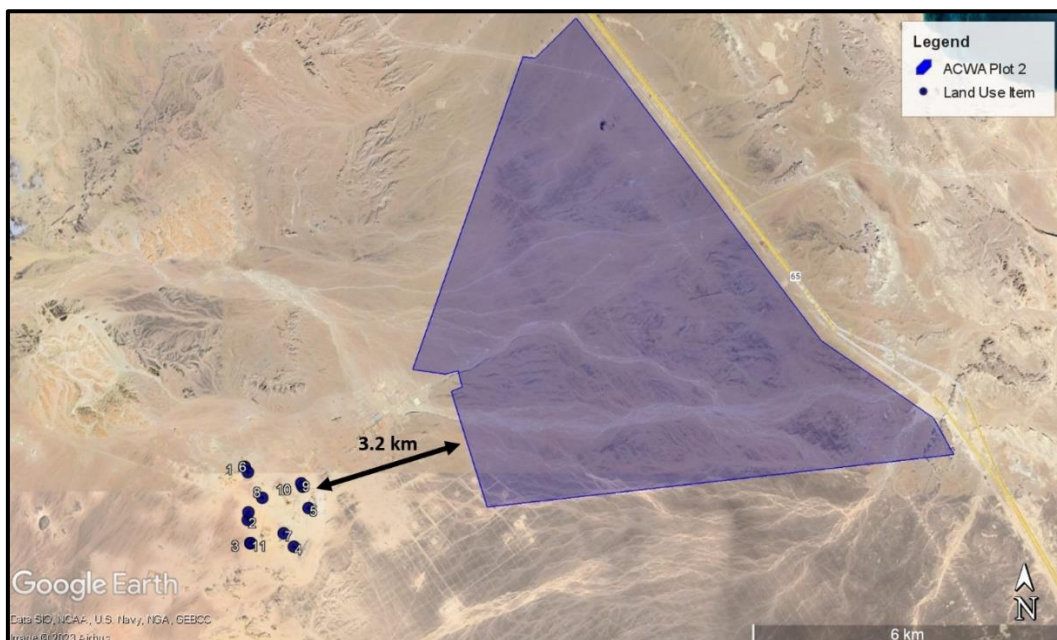


Figure 11: Location Map of the Drilled Wells at Wadi Dara

Potential Impacts Overview:

- Flood Risks
 - Local flood hazards during rainy seasons could damage Project components.
 - Failure to consider flood risks may result in infrastructure damage, health, and safety impacts.
 - Impact significance is moderate due to potential damages and risks.
- Improper Waste Management
 - Local flood hazards during rainy seasons could damage Project components.
 - Failure to consider flood risks may result in infrastructure damage, health, and safety impacts.
 - Impact significance is moderate due to potential damages and risks.
- Erosion and Runoff
 - Local flood hazards during rainy seasons could damage Project components.
 - Failure to consider flood risks may result in infrastructure damage, health, and safety impacts.
 - Impact significance is moderate due to potential damages and risks.

Mitigation Measures (in Brief):

- Undertake a flood risk assessment for the project site, incorporating simulated models based on climate satellite images, rainfall data, and digital elevation models.
- Conduct site visits to verify study results and model designs.
- Consider climate change impacts and risks in the assessment.

Potential Impacts from Improper Management of Waste Streams during Construction and Operation:

Potential Impact Overview:

- Improper management of waste streams could contaminate soil, pollute groundwater, and pose risks to workers' health and safety.
- Impacts can be controlled through best practice housekeeping measures during both construction and operation phases.

Mitigation Measures (in brief):

- Implement proper sorting, storage, and disposal of waste streams, distinguishing between solid non-hazardous and hazardous wastes.
- Coordinate waste collection and disposal with relevant authorities and contractors.
- Prohibit illegal disposal of waste to the land and ensure adherence to waste hierarchy principles.

Monitoring and Reporting Requirements:

- Regularly inspect waste management practices onsite.

- Review records and manifests for consistency in waste volume data.
- Provide regular environmental reports on waste management practices.

Additional Mitigation Measures for Specific Waste Streams:

Solid Waste Generation:

- Sort and store waste according to categories.
- Coordinate waste collection with the municipality or waste contractor.
- Prohibit fly-dumping and distribute litter bins appropriately.

Wastewater Generation:

- Coordinate wastewater collection with relevant authorities or contractors.
- Prohibit illegal disposal of wastewater and ensure proper maintenance of septic tanks.

Hazardous Waste Generation:

- Coordinate hazardous waste collection and disposal with licensed contractors.
- Ensure proper storage and labeling of hazardous waste.
- Prohibit illegal disposal and maintain records of hazardous waste management.

Hazardous Material:

- Store hazardous materials properly and maintain a register of their usage.
- Incorporate measures to prevent spills and leakage during handling and storage.
- Respond promptly to spills and report measures taken to minimize impacts.

Potential Impacts from Erosion and Runoff during the Construction Phase:

Potential Impacts Overview:

- Construction activities could increase erosion and runoff, leading to siltation of surface water.
- Adequate control measures are necessary to minimize these impacts.

Mitigation Measures:

- Avoid excavation works during aggressive weather conditions.
- Implement erosion control barriers and clear markers around the work site.
- Restore disturbed surfaces to their original condition as much as possible.

Monitoring and Reporting Requirements:

- Regularly inspect erosion and runoff control measures onsite.
- Conduct inspections to ensure implementation of mitigation measures.

(iv) Biodiversity

The biodiversity baseline assessment concludes that the Project site in general is barren and of low ecological significance and sensitivity. The assessment identified several flora, fauna and avi-fauna species within the Project site most of which are considered of least concern and common to such area habitats. There are no sensitive habitats recorded within the Project site.

Indications of animals of special conservation interest (identified as IUCN Vulnerable species) were observed including for the Spiny-tailed Lizard, the Red Fox and the Lesser Egyptian Gerbil (IUCN Least Concern species).

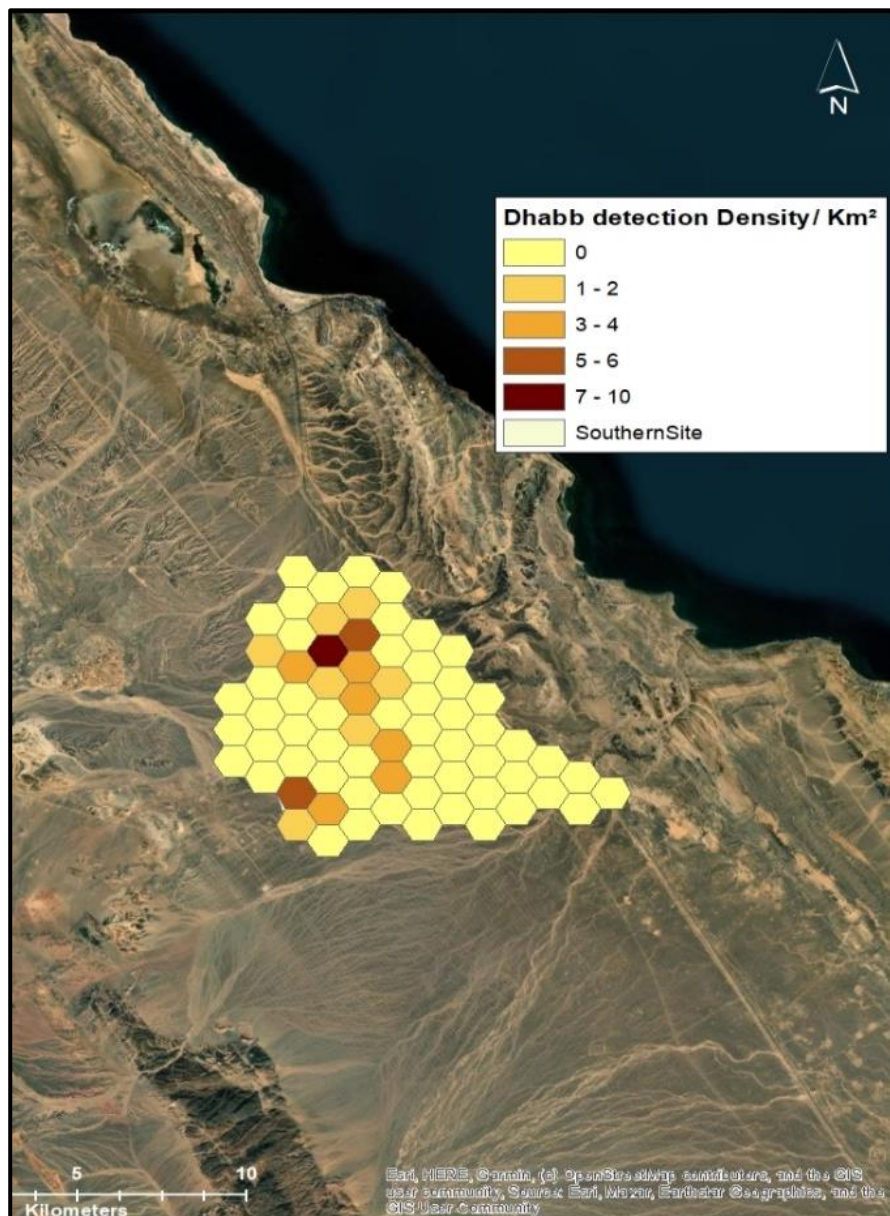


Figure 12 Spiny Tailed Lizard Density

The main impacts on biodiversity are mainly from improper conduct, traffic control and housekeeping practices by workers (i.e. hunting of animals, discharge of hazardous waste to land, etc.) during the construction and operation phase throughout the site to safeguard flora and fauna. The ESIA has identified adequate mitigation

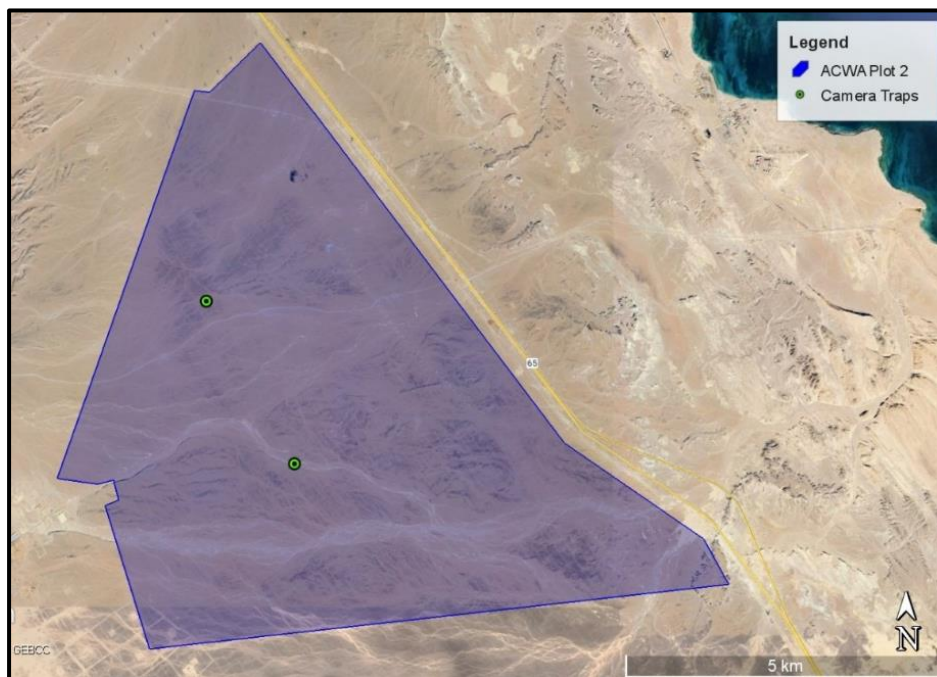


Figure 13: Location of Red Fox recordings during site surveys

measures which aim to control such impacts and ensure proper conduct and housekeeping practices are implemented. With the implementation of such measures the impact is considered potentially significant.

Potential Impacts Overview:

Habitat Loss, Fragmentation, and Degradation:

- Direct loss of natural habitats will occur due to site clearance and construction activities, impacting terrestrial fauna.
- Despite habitat loss, mitigation measures include enhancing around 2.0 km² of habitat using native planting in suitable areas within the project site to ensure no net loss of habitat.
- Infrastructure layout details are not finalized, but efforts will be made to minimize habitat loss.

Direct Impacts on Sensitive Receptors (Flora and Non-native Species):

- Imported non-native flora could establish and out-compete native species, leading to significant long-term impacts.
- Mitigation measures include conducting botanical surveys, avoiding areas with non-native species, mechanical control, and using local soil to prevent importing non-native species.

Direct Impacts on Sensitive Receptors (Vertebrates - Site Clearance and Earthworks):

- Construction activities will negatively impact sensitive vertebrate species, especially the Egyptian Spiny Tailed Lizard.

- Mitigation measures include pre-construction surveys, avoiding areas with nesting birds, and translocating lizards if necessary.

Direct Impacts on Sensitive Receptors (Vertebrates - Vehicle Collisions):

- Vehicle collisions pose a risk to vertebrates, with mitigation measures such as enforcing speed limits, installing signage, and regular checks for carcasses.

Direct and Indirect Impacts on Sensitive Receptors (Poaching, Collection, etc.):

- Poaching and disturbance of flora and fauna are possible, with strict controls and enforcement measures in place.

Direct and Indirect Impacts on Sensitive Receptors (Disturbance, Reduced Air Quality, Noise, Lighting, Littering, Waste Management, Pest Species):

- Various impacts including disturbance, reduced air quality, noise, lighting, littering, and pest species are addressed with mitigation measures such as induction training, regular monitoring, waste management plans, and pest control measures.

Mitigation Measures (in brief):

Habitat Loss, Fragmentation, and Degradation:

- Enhance around 2.0 km² of habitat using native planting to offset habitat loss.
- Minimize habitat loss associated with infrastructure by selecting suitable areas.

Direct Impacts on Sensitive Receptors (Flora and Non-native Species):

- Conduct botanical surveys before construction.
- Avoid areas with non-native species and use local soil to prevent importing them.
- Implement mechanical control and mapping of non-native species.

Direct Impacts on Sensitive Receptors (Vertebrates - Site Clearance and Earthworks):

- Conduct pre-construction surveys and avoid areas with nesting birds.
- Translocate sensitive species if necessary, with detailed protocols for capture and release.

Direct Impacts on Sensitive Receptors (Vertebrates - Vehicle Collisions):

- Enforce speed limits and install signage.
- Regular checks for carcasses and removal to reduce scavenging risks.

Direct and Indirect Impacts on Sensitive Receptors (Poaching, Collection, etc.):

- Enforce strict controls on poaching and disturbance.
- Implement a chance find procedure and sanctions for breaches.

Direct and Indirect Impacts on Sensitive Receptors (Disturbance, Reduced Air Quality, Noise, Lighting, Littering, Waste Management, Pest Species):

- Include biodiversity training in site induction.
- Monitor and manage disturbance, air quality, noise, and lighting.
- Implement waste management plans and pest control measures.

Monitoring and Reporting Requirements:

Habitat Loss, Fragmentation, and Degradation:

- Conduct regular assessments of planted habitat areas to ensure establishment and success.
- Monitor habitat connectivity and species movement through the area.
- Habitat and Flora monitoring within the area of influence to measure the success of habitat rehabilitation work to reasonably demonstrate no net loss of Natural Habitat as well as to record the presence of invasive / non-native flora. Monitoring will be completed in years 1, 2, 5, 10 and 15 including full-site walkover surveys as well as quadrat surveys will be completed.
- Monitoring of mammal and herpetofauna assemblages across the area of influence. Repeat of baseline surveys will be completed in years 1, 2, 5, 10 and 15. Population densities recorded in Year 5 will be compared to baseline levels and if required additional work will be completed.

Direct Impacts on Sensitive Receptors (Flora and Non-native Species):

- Conduct periodic botanical surveys to track the presence of non-native species.
- Monitor the effectiveness of mechanical control measures and mapping.

Direct Impacts on Sensitive Receptors (Vertebrates - Site Clearance and Earthworks):

- Conduct regular surveys for nesting birds and sensitive species.
- Monitor the success of translocation efforts and document any mortalities.

Direct Impacts on Sensitive Receptors (Vertebrates - Vehicle Collisions):

- Implement regular checks for carcasses and record any incidents.
- Monitor compliance with speed limits and signage.

Direct and Indirect Impacts on Sensitive Receptors (Poaching, Collection, etc.):

- Implement a reporting system for wildlife sightings and disturbance incidents.
- Monitor compliance with anti-poaching measures and enforcement actions.

Direct and Indirect Impacts on Sensitive Receptors (Disturbance, Reduced Air Quality, Noise, Lighting, Littering, Waste Management, Pest Species):

- Conduct regular assessments of noise levels and air quality.

- Monitor waste management practices and pest control measures.
- Document any instances of littering and take corrective actions.

Monitoring will be carried out by qualified ecologists and environmental consultants, with data recorded and analyzed regularly to ensure that mitigation measures are effective in minimizing impacts on biodiversity. Any deviations or issues identified during monitoring will trigger corrective actions to address them promptly and ensure compliance with environmental standards.

Potential Impacts Overview:

Habitat Loss, Fragmentation, and Degradation:

- Direct loss of natural habitats will occur due to site clearance and construction activities, impacting terrestrial fauna.
- Despite habitat loss, mitigation measures include enhancing around 2.0 km² of habitat using native planting in suitable areas within the project site to ensure no net loss of habitat.
- Infrastructure layout details are not finalized, but efforts will be made to minimize habitat loss.

Direct Impacts on Sensitive Receptors (Flora and Non-native Species):

- Imported non-native flora could establish and out-compete native species, leading to significant long-term impacts.
- Mitigation measures include conducting botanical surveys, avoiding areas with non-native species, mechanical control, and using local soil to prevent importing non-native species.

Direct Impacts on Sensitive Receptors (Vertebrates - Site Clearance and Earthworks):

- Construction activities will negatively impact sensitive vertebrate species, especially the Egyptian Spiny Tailed Lizard.
- Mitigation measures include pre-construction surveys, avoiding areas with nesting birds, and translocating lizards if necessary.

Direct Impacts on Sensitive Receptors (Vertebrates - Vehicle Collisions):

- Vehicle collisions pose a risk to vertebrates, with mitigation measures such as enforcing speed limits, installing signage, and regular checks for carcasses.

Direct and Indirect Impacts on Sensitive Receptors (Poaching, Collection, etc.):

- Poaching and disturbance of flora and fauna are possible, with strict controls and enforcement measures in place.

Direct and Indirect Impacts on Sensitive Receptors (Disturbance, Reduced Air Quality, Noise, Lighting, Littering, Waste Management, Pest Species):

- Various impacts including disturbance, reduced air quality, noise, lighting, littering, and pest species are addressed with mitigation measures such as induction training, regular monitoring, waste management plans, and pest control measures.

Mitigation Measures (in brief):

Habitat Loss, Fragmentation, and Degradation:

- Enhance around 2.0 km² of habitat using native planting to offset habitat loss.
- Minimize habitat loss associated with infrastructure by selecting suitable areas.

Direct Impacts on Sensitive Receptors (Flora and Non-native Species):

- Conduct botanical surveys before construction.
- Avoid areas with non-native species and use local soil to prevent importing them.
- Implement mechanical control and mapping of non-native species.

Direct Impacts on Sensitive Receptors (Vertebrates - Site Clearance and Earthworks):

- Conduct pre-construction surveys and avoid areas with nesting birds.
- Translocate sensitive species if necessary, with detailed protocols for capture and release.

Direct Impacts on Sensitive Receptors (Vertebrates - Vehicle Collisions):

- Enforce speed limits and install signage.
- Regular checks for carcasses and removal to reduce scavenging risks.

Direct and Indirect Impacts on Sensitive Receptors (Poaching, Collection, etc.):

- Enforce strict controls on poaching and disturbance.
- Implement a chance find procedure and sanctions for breaches.

Direct and Indirect Impacts on Sensitive Receptors (Disturbance, Reduced Air Quality, Noise, Lighting, Littering, Waste Management, Pest Species):

- Include biodiversity training in site induction.
- Monitor and manage disturbance, air quality, noise, and lighting.
- Implement waste management plans and pest control measures.

Monitoring and Reporting Requirements:

Habitat Loss, Fragmentation, and Degradation:

- Conduct regular assessments of planted habitat areas to ensure establishment and success.
- Monitor habitat connectivity and species movement through the area.
- Habitat and Flora monitoring within the area of influence to measure the success of habitat rehabilitation work to reasonably demonstrate no net loss of Natural Habitat as well as to record the presence of invasive / non-native flora. Monitoring will be completed in years 1, 2, 5, 10 and 15 including full-site walkover surveys as well as quadrat surveys will be completed.

- Monitoring of mammal and herpetofauna assemblages across the area of influence. Repeat of baseline surveys will be completed in years 1, 2, 5, 10 and 15. Population densities recorded in Year 5 will be compared to baseline levels and if required additional work will be completed.

Direct Impacts on Sensitive Receptors (Flora and Non-native Species):

- Conduct periodic botanical surveys to track the presence of non-native species.
- Monitor the effectiveness of mechanical control measures and mapping.

Direct Impacts on Sensitive Receptors (Vertebrates - Site Clearance and Earthworks):

- Conduct regular surveys for nesting birds and sensitive species.
- Monitor the success of translocation efforts and document any mortalities.

Direct Impacts on Sensitive Receptors (Vertebrates - Vehicle Collisions):

- Implement regular checks for carcasses and record any incidents.
- Monitor compliance with speed limits and signage.

Direct and Indirect Impacts on Sensitive Receptors (Poaching, Collection, etc.):

- Implement a reporting system for wildlife sightings and disturbance incidents.
- Monitor compliance with anti-poaching measures and enforcement actions.

Direct and Indirect Impacts on Sensitive Receptors (Disturbance, Reduced Air Quality, Noise, Lighting, Littering, Waste Management, Pest Species):

- Conduct regular assessments of noise levels and air quality.
- Monitor waste management practices and pest control measures.
- Document any instances of littering and take corrective actions.

Monitoring will be carried out by qualified ecologists and environmental consultants, with data recorded and analyzed regularly to ensure that mitigation measures are effective in minimizing impacts on biodiversity. Any deviations or issues identified during monitoring will trigger corrective actions to address them promptly and ensure compliance with environmental standards.

(v) Bats

The presents of bats was evaluated using a nocturnal acoustic survey and a manual search of possible roosting sites across and within the near proximity of the Project area. Eight (8) acoustic detectors were utilized across 24 locations that were aligned with intended wind turbine locations. Based on the literature review, several bat species of 'least concern' (IUCN Red List of Threatened Species) could be present in the area; however, the Project site is characterized by low vegetation coverage and limited habitat.

There was a single observation recorded during the entirety of the sixty-night acoustic survey.

Potential Impacts Overview:

- Key impacts anticipated on bats is during the operation phase and mainly related to risk of bat strikes and collisions with rotors of the operating wind turbines. Such impacts are anticipated to be not significant due to low activity excepted as roosting sites for bats were not observed on the Project site.

Mitigation Measures:

- Implement adaptive monitoring during post construction – fatality monitoring in accordance with international best practices

Monitoring Requirements:

- Post construction fatality monitoring around wind turbines

(vi) Archaeology and Cultural Heritage

An archaeological baseline survey has been carried for the Project site which concluded the absence of records of any sites of interests or significance within the Project area. Therefore, there are no anticipated impacts.

The main potential impact could occur during the construction phase from site preparation activities if a possible site of archeological remains is uncovered. Improper management (if such sites are discovered) could potentially disturb or damage such sites. Nevertheless, the ESIA requires the implementation of chance find procedures if such remains in the ground be discovered throughout the construction phase. With the implementation of such measures the impact is considered not significant.

Potential Impacts Overview:

- Site preparation activities, including land clearing, excavation, grading, etc., may disturb archaeological remains if improperly managed.
- Chance of discovering buried archaeological sites during construction activities.
- Potential negative impacts include disturbance or damage to discovered archaeological sites, with medium magnitude and low sensitivity.

Mitigation Measures (in brief):

- Notify the Supreme Council of Antiquities (SCA) during excavation activities to oversee and prevent disturbance of underground archaeological remains.
- Implement chance find procedures if archaeological remains are discovered, including halting construction, fencing the area, and notifying the Ministry of Tourism and Antiquities/Red Sea and Suez Antiquities Inspection Office.
- Resume construction activities only after clearance from the Ministry/Inspection Office, with no work allowed in the discovered area.

Monitoring Requirements:

- Submit formal communication with SCA regarding excavation activities.

- Monitor and report actions taken in case of new archaeological discoveries, including fencing, limiting site access, and notifying the Ministry of Tourism and Antiquities/Red Sea and Suez Antiquities Inspection Office. Prepare and submit a detailed report to the Ministry in such cases.

Note: There are no anticipated impacts during the operational phase of the project.

(vii) Air Quality and Noise

An air quality and noise baseline was undertaken for the Project area at three monitoring points for a period of 24 hours. The baseline concluded that pollutant levels for all parameters measured are significantly lower than the maximum allowable ambient air levels indicated within the legal limits. Similarly for noise, the results were within national limits for both day and night-time.

No key source of noise emission or activity were noted throughout the monitoring period. Therefore, the exceedance of noise levels is mainly attributed due to the intensity and speed of the wind at the measurement sites, despite efforts to mitigate the effect of wind speed on measurements.

Construction and operation activities of wind power project are passive in nature and do not result in any key emissions or significant noise sources. However, construction activities may increase level of dust and particulate matter emissions, which will temporarily impact ambient air quality due to the use of heavy machinery contributing to both noise levels and dust.

Potential Impacts Overview:

- Anticipated impacts on air quality and noise during both construction and operation phases of the wind farm.
- Construction phase activities expected to increase dust and pollutant emissions, as well as noise levels, temporarily.
- Potential health and nuisance effects on onsite workers and nearby receptors.
- Operation phase impacts primarily related to noise generated by wind turbines

Mitigation Measures:

- Identification and control of excessive dust and pollutant emissions from construction activities.
- Provision of Personal Protective Equipment (PPE) for workers exposed to high dust and noise levels.
- Implementation of dust control measures like regular watering of roads, proper stockpile management, and covering of trucks transporting materials.
- Inspection and maintenance program for vehicles and equipment to minimize unnecessary emissions.
- Identification and mitigation of excessive noise levels through source control and general noise suppression measures.

Monitoring and Reporting Requirements:

- Dust and noise monitoring on a quarterly basis at key construction points, including Total Suspended Particulates (TSP), PM10, PM2.5, and noise levels.
- Periodic inspections at nearby sites to assess dust and noise impacts from construction activities.

- Reporting of excessive pollutant/dust or noise levels and measures taken to mitigate impacts.

(viii) ***Infrastructures and Utilities***

Various items of infrastructure are found in and in the proximity of the Project site. Within the Project site is the decommissioned dumpsite, which in recent years had been subject to informal dumping, receiving animal carcasses from the nearby Wadi Dara Village.

Adjacent to the Project site's eastern border is Cairo-Hurghada Highway, from which the main, paved road leading to Wadi Dara Village intersects the Project site. A smaller dirt road also intersects the Project site.

There is a water desalination plant and a wastewater treatment plant, both of which are located north of the Project site along the Cairo-Hurghada Highway, located at distances 3 km and 9.1 km, respectively. Military units are located at distances 34 km and more from the Project site's northern border. Several communications towers also line the highway, two of which are adjacent to the Project site's eastern side. With the GoS being a hub of petroleum production, active petroleum activities are located along the coast, opposite the project site, and areas of former excavation activities (excavated and leveled land) north of the Project site within 4.4 km.

Servicing electricity transmission is the overhead transmission line (OHTL) that transects through the Project site's eastern side, leading to the wind farms of NREA Concessionary Area's Zone 3's wind farm projects.

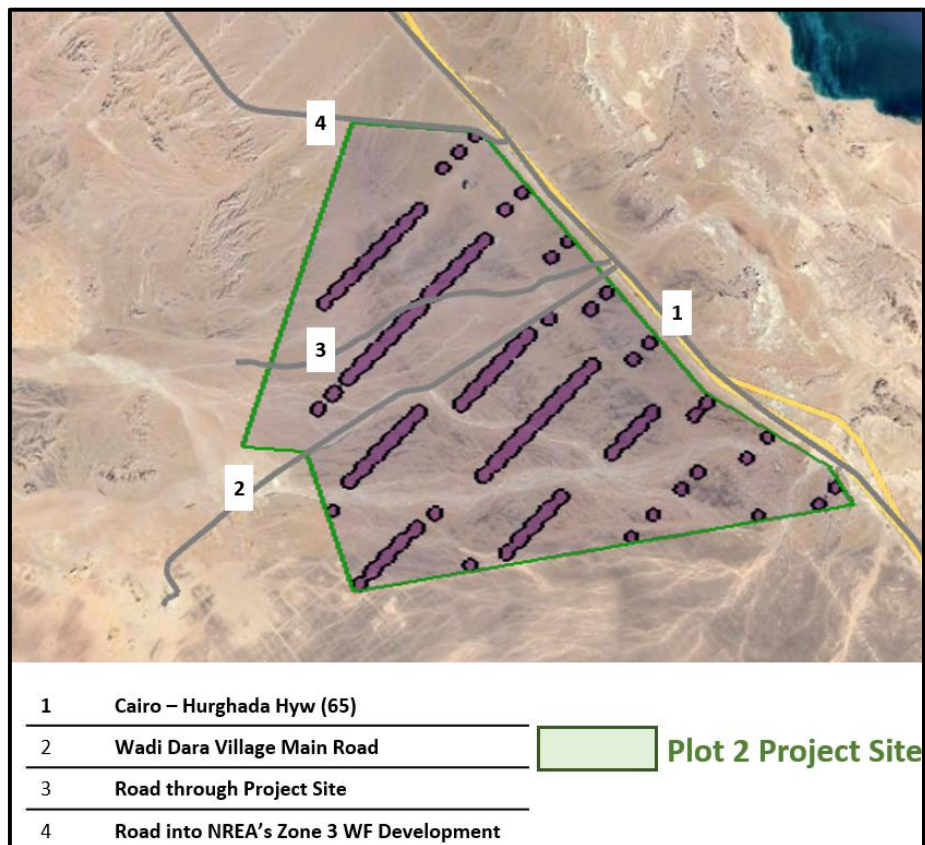


Figure 13: Vehicular Infrastructure



Figure 14: Decommissioned dumpsite located within Plot 2

Potential Impacts Overview:

Existing Roads and Networks:

- Highways and roads traverse the project site, facilitating access but potentially increasing traffic and associated risks.

Water Management:

- Wadi Dara Village lacks connection to the National Water Network, relying on water truck delivery.
- Groundwater salinity poses challenges for irrigation.
- Limited wastewater treatment facilities in the vicinity.

Waste Management:

- Observations of litter and active dumping within the project site.
- Limited solid waste disposal facilities in the region.
- No sewage network in Wadi Dara Village.

Civil and Military Radars and Aviation Infrastructure:

- Military units exist nearby, potentially affecting project operations.
- Communication towers and radio infrastructure could influence project activities.

Petroleum Facilities:

- Proximity to petroleum units and excavation areas may pose safety and environmental risks.

High Voltage Power Line:

- Overhead transmission line crosses the project site, raising concerns about electromagnetic fields.

Other Wind Farms:

- Presence of operating and planned wind farms in the region may impact project development and operations.

Mitigation Measures:

Baseline Assessment Methodology:

- Regular monitoring and management of dumpsite to prevent unauthorized waste disposal.

Existing Roads and Networks:

- Implement traffic management measures to minimize congestion and accidents.

Water Management:

- Explore options for improving water access and quality in Wadi Dara Village.
- Consider alternative irrigation methods to mitigate groundwater salinity issues.

Waste Management:

- Establish proper waste disposal practices and facilities within the project site.
- Coordinate with local authorities for waste management solutions.

Civil and Military Radars and Aviation Infrastructure:

- Coordinate with military units to minimize potential conflicts with project activities.
- Ensure compatibility of project operations with communication infrastructure.

Petroleum Facilities:

- Coordinate with petroleum companies to mitigate safety and environmental risks.
- Implement measures to prevent contamination from nearby petroleum activities.

High Voltage Power Line:

- Implement measures to minimize electromagnetic field exposure near the power line.

Other Wind Farms:

- Collaborate with other wind farm operators to address shared challenges and opportunities.

Monitoring and Reporting Requirements:

Baseline Assessment Methodology:

- Regular monitoring and management of dumpsite to prevent unauthorized waste disposal.

- Implement measures to discourage informal dumping and enforce waste management regulations.

Existing Roads and Networks:

- Implement traffic management measures to minimize congestion and accidents, such as speed limits and signage.
- Conduct regular maintenance of roads to ensure safety and accessibility.

Water Management:

- Explore options for improving water access and quality in Wadi Dara Village, such as establishing water treatment facilities.
- Implement water conservation measures to mitigate groundwater salinity issues, such as drip irrigation systems.

Waste Management:

- Establish proper waste disposal practices and facilities within the project site, including designated landfill areas.
- Coordinate with local authorities for waste management solutions, such as recycling programs and community clean-up initiatives.

Civil and Military Radars and Aviation Infrastructure:

- Coordinate with military units to minimize potential conflicts with project activities, such as adjusting construction schedules to avoid interference with military operations.
- Ensure compatibility of project operations with communication infrastructure, such as installing shielding to reduce electromagnetic interference.

Petroleum Facilities:

- Coordinate with petroleum companies to mitigate safety and environmental risks, such as implementing spill prevention measures and emergency response protocols.
- Implement measures to prevent contamination from nearby petroleum activities, such as installing barriers and monitoring groundwater quality.

High Voltage Power Line:

- Implement measures to minimize electromagnetic field exposure near the power line, such as adjusting turbine placement and installing shielding.
- Conduct regular inspections and maintenance of the power line to ensure safety and reliability.

Other Wind Farms:

- Collaborate with other wind farm operators to address shared challenges and opportunities, such as coordinating construction activities to minimize environmental impacts.

- Share best practices and lessons learned to optimize wind farm operations and maximize benefits for the community.

(ix) Socio-economic Conditions

The main impact anticipated on socio-economic conditions is related to potential job opportunities for local communities from the Project during construction and operation. However, such impacts are limited taking into account the nature of activities. No details are available at this stage on the number of job opportunities targeted to local communities, type of jobs, duration, etc; however, as many as 750 job opportunities are to be required during construction and 20 positions during operational phase.

Taking the above into account, the Project is committed to ensuring that priority for job opportunities are targeted for local community members to the greatest extent possible throughout the construction and operation phase for skilled and unskilled jobs.

At a later stage, a local recruitment procedure will be developed by the Contractors and Operator, under supervision from the Project. The procedure will identify the number of job opportunities targeted for local communities and recruitment process will be undertaken through the Governorate's Labour Office. Based on that, the recruitment procedure will also include a selection process that is fair, transparent and provides equal opportunities for all including females.

In addition, the Project will also implement a Social Responsibility Program that will be implemented for the local communities based on their needs and requirements.

Potential Impacts Overview:

Construction Phase:

- Creation of around 750 job opportunities, including skilled and unskilled positions, for approximately 24 months.
- Potential engagement of local communities in procurement opportunities along different segments of the value chain.

Operation Phase:

- Creation of around 20 job opportunities, including skilled and unskilled positions, for a duration of 25 years.
- Indirect positive benefits to the local community from increased demand for local services, supplies, and businesses.

Overall:

- Positive impact on socio-economic development through job creation and procurement opportunities.
- Contribution to enhancing the living environment for local inhabitants.
- Acknowledgement of the need for collective and coordinated actions beyond the project to promote socio-economic development in the area.

Mitigations (in brief):**Local Recruitment Procedure:**

- Develop a procedure to identify job opportunities targeted for local communities, ensuring fairness, transparency, and equal opportunities for all.
- Prioritize employment of local communities, including Bedouin groups, in skilled and unskilled positions.
- Explore collaboration with other wind farm developers in the area to maximize employment opportunities for the community.

Local Procurement Procedure:

- Develop a procedure to identify procurement opportunities targeted for local communities, ensuring fairness, transparency, and equal opportunities for all.
- Prioritize procurement from local suppliers, subcontractors, and service providers, including Bedouin groups.
- Explore collaboration with other wind farm developers in the area to maximize procurement opportunities for the community.

Social Responsibility Program:

- Implement a structured social responsibility program to benefit local communities based on priority development projects identified through needs assessment.
- Prioritize projects for local communities based on available budget, vision, timeline for implementation, and other factors to maximize positive impact.

Note: As the impacts discussed are mainly positive, no specific mitigation measures are identified. The focus is on enhancing positive impacts through recommended actions.

(x) Occupational Health and Safety and Worker Accommodation

During the construction and operation phase there will be occupational health and safety risks to workers, such as working on construction sites, exposure electric shock hazards during maintenance activities, working at heights, etc. The ESIA requires that the Contractor and Operator prepare an Occupational Health and Safety Plan (OHSP) tailored to the Project's site and activities. Such plans aim to ensure the health and safety of all personnel in order to concur and maintain a smooth and proper progress of work at the site and prevent accident which may injure personnel. With the implementation of such measures the impact is considered not significant.

In addition, the Contractors will prepare a worker accommodation plan, which will define the minimum health and safety standards and principles for worker accommodation and ensure impacts on community health and safety from worker influx are managed and controlled. This could include impacts related to pressure on infrastructure, services and utilities, introduction of new reservoirs of diseases, inappropriate code of conduct by workers towards local communities, possible increase in social vices, and other.

Potential Impacts Overview:

- Occupational health and safety risks include slips and falls, working at heights, working with tools, struck-by objects, moving machinery, working in confined spaces, exposure to chemicals, high temperatures, electric shocks, and risks from nearby operations like oil rigs.
- Risks considered of short-term duration during construction and long-term duration during operation, with potential for medium magnitude and high sensitivity leading to permanent impacts in extreme cases.
- Impacts are generally controlled through the implementation of best practices.

Mitigation Measures:**Occupational Health and Safety Plan (OHSP):**

- Develop OHSP tailored to construction and operation phases, compliant with national and international requirements, addressing roles and responsibilities, risk assessment, training, PPE, COVID-19 protocols, venomous species onsite, and incident procedures.

Emergency Preparedness and Response Plan:

- Establish organizational and operational measures for emergencies, including emergency responder team, drills, procedures for first actions, site evacuation, communication, control measures for various emergencies, real-time communication, assembly points, and roles/responsibilities.

Worker Grievance Mechanism:

- Develop a comprehensive procedure to register, document, resolve, and close out worker complaints, allowing grievances through various channels, ensuring timely handling and close-out reports.

Worker Accommodation:

- If onsite accommodation provided, ensure compliance with national and international standards, including living facilities, medical facilities, and management.

Monitoring and Reporting Requirements:**Inspection and Reporting:**

- Regular inspection to ensure OHSP implementation and compliance, reporting on health and safety performance, accidents/incidents/emergencies, measures taken, and accommodation compliance.

Submission of Plans:

- Submission of Emergency Preparedness and Response plan and Worker Grievance Mechanism.

(xi) Community Health, Safety, and Security

During construction and operation phase the main impacts on community health, safety and security include the noise, shadow flicker, trespassing by unauthorized personnel, and potential occurrence of incidences between site personnel and communities. These potential impacts are outlined below, accompanied by mitigation and monitoring measures in brief (full elaboration included in the ESIA).

Potential Impacts Overview:

Wind turbines produce noise and cast shadows (known as shadow flicker) during operation. As the rotor blades rotate, shadows pass over the same point causing an effect known as 'shadow flicker'. Both noise and shadow flicker could be a source of nuisances and disturbances. However, within the Project site and surrounding there are no sensitive receptors that could be affected by such impacts and therefore this is considered irrelevant.

Potential Impacts from Noise – Wind Turbine Operation

- Wind turbines produce noise from mechanical and aerodynamic sources, potentially affecting nearby receptors.
- Preliminary modelling indicates noise levels within acceptable limits but detailed assessment ongoing.

Potential Impacts from Shadow Flicker – Wind Turbine Operation

- Shadow flicker from wind turbines could cause nuisance and disturbance to nearby residents.
- Detailed assessment underway to identify potential effects on Wadi Dara Village.

Potential Impacts from Trespassing of Unauthorized Personnel:

- Unauthorized access to Project components could pose safety hazards and public safety concerns.
- Impact considered of moderate significance, mainly during operation phase.

Worker Influx During Construction:

- Impact considered of minor significance, mainly during construction phase.
- Inappropriate management of security issues and incidents by security personnel towards local communities could result in resentment, distrust and escalation of events.
- Influx of workers may introduce health risks, social issues and vices including inappropriate code of conduct (sexual exploitation and harassment (SEAH))

Security Personnel Management:

- Inappropriate management by security personnel could lead to resentment and distrust.
- Impact considered of minor significance, during both construction and operation phases.

Blade and Tower Glint:

- Reflection of sunlight off rotor blades or tower could impact nearby residences.
- Impact considered not significant due to absence of sensitive receptors and temporary nature of effect.

Blade/Ice Throws:

- Potential for blade or ice throws from turbines, with extremely low risk.
- Impact considered not significant due to low probability and absence of sensitive receptors.

Mitigation Measures:

Noise During Operation:

- Detailed noise modelling and assessment ongoing.

Shadow Flicker:

- Detailed assessment underway to identify potential effects on Wadi Dara Village.

Trespassing of Unauthorized Personnel:

- Implement Security Risk Assessment measures, including locked doors, fencing, onsite guards, and informative signs.

Worker Influx During Construction:

- Implement Worker Influx Plan, including medical examination, hygiene procedures, code of conduct, induction training, and COVID-19 procedures.

Security Personnel Management:

- Develop Security Management Plan adhering to IFC PS 4 and EBRD PR 2, ensuring appropriate hiring, conduct, training, and equipping of security personnel.

Blade and Tower Glint:

- Consider non-reflective finishes to mitigate potential impacts.

Monitoring and Reporting Requirements:

- A Security Management will be prepared which will identify appropriate measures for hiring, rules of conduct, training, equipping, and monitoring of security personnel to control and manage such issues.
- Implement a Worker Influx Plan addressing medical examinations, hygiene, and code of conduct.
- Provide induction training on contagious diseases and COVID-19 procedures.
- Development of a code of conduct for workers which takes into account appropriate behaviour by workers and EPC Contractor at all times, religious customs, traditional cultures and social norms in the area. In addition, it must include specifically requirements for social vices including gender-based violence, sexual harassment, alcoholism, drug abuse, etc.
- Induction training and awareness raising sessions on risks associated to the most common contagious diseases (e.g. influenza virus), communicable diseases, general measures for hygiene, code of conduct expected to be implemented and other as appropriate.

Environmental & Social Management

The ESIA includes an Environmental and Social Management Plan (ESMP) which provides a high-level outline plan for managing and monitoring the environmental and social impacts during construction, operation and decommissioning of the Project. The ESMP identifies the mitigation measures which aim to eliminate and/or reduce the potential impact to acceptable levels and monitoring actions to ensure that the identified mitigation measures are implemented.

In addition, the development and implementation of an Environmental and Social Management System (ESMS)

during the construction and operation is considered a key requirement under EBRD and IFC requirements. Therefore, IFP also prepared an ESMS Manual which includes the following:

- Identification of the overall structure and outline for the ESMS that will be implemented for the Project during both construction and operation;
- Identification and outline of the key procedures and plans to be developed at a later stage by the Contractors and Operator that will handle the key impacts and risks during construction and operation (e.g. air quality management plan, waste management plan, etc.)
- Identification of an institutional framework to ensure that such plans and procedures are implemented effectively and efficiently. This includes identification of roles and responsibilities, training requirements, monitoring and reporting requirements, and other as applicable;
- Identify approach for periodically auditing entities involved during the construction and operation phase to ensure that ESMS requirements are implemented effectively;
- Identification of a high-level framework for labour management that should be adhered to during the construction and operation phase; and
- Identification of a strategy and commitment in relation to local hiring and community support initiatives.

i. ESMP: Planning and Construction Phase across Environmental Attributes and Impacts

Table 5: ESMP for the Planning and Construction Phase

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
Landscape and Visual	Visual and landscape impacts due construction equipment and machinery.	Ensure proper general housekeeping and personnel management: (i) construction site is orderly at the end of each workday; (ii) equipment, and vehicles that are not in use should be removed and kept in locations to reduce visual impacts to the area. (iii) Ensure proper storage, collection, and disposal of waste streams	Mitigation	Visual inspections	At construction active areas	Daily / Weekly	EPC Contractor
Land Use	Potential for informal land use. This includes the Ghafra system of the Bedouin groups and existing petroleum facilities within the area.	(i) Coordinate with Bedouin Groups for inclusion and engagement in employment and procurement opportunities. (ii) Implement SEP that includes specific references for engagement and coordination with Bedouin groups.	Additional requirement	Signed agreement / MoM with Bedouin groups	Not applicable	Once before Initiation of construction	Developer
	Formal land uses include the allocation of land (shared with the proposed project site) under the WDCALR to its members	Cede said land back to NREA in exchange for alternate lands.	Additional requirement	Signed agreement with WDCALR	Not applicable	Before Initiation of Construction	Developer
	Former dumpsite located within the Project site	Optimal option – complete removal of the dumpsite	Mitigation	Notice issued, letter of request	Construction active areas, maintain site security measures	Before commencement of construction	Developer
Geology, Hydrology and hydrogeology	Solid waste management	Coordinate with Ras Gharib City Council for the collection of solid waste from the site to the municipal approved dumpsite	Mitigation	Submitted contract	Not applicable	Once before commencement of construction	EPC Contractor
		Prohibit fly-dumping of any solid waste	Mitigation	Visual inspections	Active Construction Sites	Daily / weekly	

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		Commitment to adherence to the waste hierarchy principle	Mitigation	Visual inspections	Active Construction Sites	Daily / weekly	
		Distribute litter bins and containers properly marked as "Municipal Waste"	Mitigation	Visual inspections	Active Construction Sites	Once before commencement of construction	
		Distribute a sufficient number of properly contained containers clearly marked as "Construction Waste" for the dumping and disposal of construction waste	Mitigation	Visual inspection	Active Construction Sites	Once before commencement of construction	
		Implement proper housekeeping practices	Mitigation	Visual inspections	Active Construction Sites	Daily / weekly	
		Complete removal of the dumpsite within the Project site to safeguard human, operational and conservation prerogatives	Mitigation	Excavation;	Dumpsite Location	Once	
		Maintain records of volumes of waste generated onsite, collected by contractor, and disposed	Mitigation	Submission of manifests	Not applicable	Throughout construction period	
	Wastewater management	Coordinate with Ras Gharib Water Company to hire a private contractor for the collection of wastewater from the site to the closest WWTP	Mitigation	Signed Contract	Not applicable	Once before commencement of construction	EPC Contractor
		Prohibit illegal disposal of wastewater to the land	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Ensure that constructed septic tanks during construction and those to be used during operation are well contained and impermeable to prevent leakage of wastewater into soil	Mitigation	Visual inspections	At applicable area	Once before commencement of construction	

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		Ensure that septic tanks are emptied and collected by wastewater contractor at appropriate intervals to avoid overflowing	Mitigation	Visual inspection	At applicable area	Daily/weekly	
		Maintain records and manifests that indicate volume of wastewater generated onsite, collected by contractor, and disposed of at the WWTP	Mitigation	Submission of manifests	Not applicable	Throughout construction period	
	Hazardous Waste Management	Hire approved private contractor for the collection of hazardous waste from the site to the approved hazardous waste disposal facilities	Mitigation	Signed contract	Not applicable	Once before commencement of construction	EPC Contractor
		Ensure that hazardous waste is disposed in a dedicated area that is enclosed, of hard surface, with proper signage and suitable containers as per hazardous waste classifications and that they are labelled for each type of hazardous waste	Mitigation	Visual inspections	At applicable area	Once before commencement of construction	
		Ensure hazardous waste storage area is equipped with spill kit, fire extinguisher and anti-spillage trays and a hazardous waste inventory is available	Mitigation	Visual inspections	At applicable area	Daily / weekly	
		Prohibit illegal disposal of hazardous waste to the land	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Possibly contaminated water (e.g. runoff from paved areas) must be drained into appropriate facilities (such as sumps and pits). Contaminated drainage must be orderly disposed of as hazardous waste	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Ensure that containers are emptied and collected by the contractor at appropriate intervals to prevent overflowing	Mitigation	Visual inspections	At construction active areas	Daily / weekly	

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		Maintain records and manifests that indicate volume of hazardous waste generated onsite, collected by contractor, and disposed of at the hazardous waste disposal facilities	Mitigation	Submission of manifests	Not applicable	Throughout construction period	EPC Contractor
	Hazardous material management	Hazardous materials are stored in an area that is of hard impermeable surface, flame-proof, accessible to authorized personnel only, locked when not in use, and prevents incompatible materials from coming in contact with one another, and includes secondary containment systems	Mitigation	Visual inspections	At applicable area	Once before commencement of construction	
		Maintain a register of all hazardous materials used and accompanying MSDS must present at all times. Spilled material should be tracked and accounted for	Mitigation	Visual inspections	At applicable area	Daily / weekly	
		Incorporate dripping pans at machinery, equipment, and areas that are prone to contamination by leakage of hazardous materials (such as oil, fuel, etc.)	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Maintenance activities and other activities that pose a risk for hazardous material spillage (such as refuelling) must take place at a suitable location (hard surface) with appropriate measures for trapping spilled material	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Ensure that a minimum of 1,000 liters of general-purpose spill absorbent is available at hazardous material storage facility.	Mitigation	Visual inspections	At applicable area	Daily / weekly	
		If spillage on soil occurs, spill must be immediately contained, cleaned-up, and contaminated soil disposed as hazardous waste	Mitigation	Visual inspection	At applicable area	Upon occurrence	

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
	Erosion and runoff management	Avoid executing excavation works under aggressive weather conditions	Mitigation	Visual inspections	At construction active areas	Upon occurrence	EPC Contractor
		Place clear markers indicating stockpiling area of excavated materials to restrict equipment and personnel movement, thus limiting the physical disturbance to land and soils in adjacent areas	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Erect erosion control barriers around work site during site preparation and construction to prevent silt runoff where applicable such as silt fences, gravel bas berms, fiber rolls, and other.	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Return surfaces disturbed during construction to their original (or better) condition to the greatest extent possible	Mitigation	Visual inspections	At construction active areas	Upon occurrence	
Biodiversity	Construction activities would disturb existing habitats (flora and fauna). In addition, other impacts could be from improper management of the site (e.g. improper conduct and housekeeping practices).	Implement Biodiversity Management Plan (BMP) which is provided as a standalone document.	Mitigation	Refer to BMP	At applicable area	Refer to BMP	EPC Contractor
		Undertake a detailed Egyptian Dabb Lizard survey through a biodiversity expert. The survey should focus on all construction activities areas and in particular the Wadi systems where such a species is likely to be located. Should burrows and/or records of this species be identified, relocation activities should be undertaken to nearby similar habitats.	Additional Survey	Submission of report	Prior to construction	Once; before construction	EPC Contractor
		Implement proper housekeeping practices on the construction site at all times	Mitigation	Visual inspections	At construction active areas	Daily / weekly	EPC Contractor
Birds (avi-fauna)		Implement proper housekeeping practices on the construction site at all times	Mitigation	Visual inspections	At construction active areas	Daily / weekly	EPC Contractor

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
	Construction activities could disturb existing habitats of birds breeding and/or nesting within the Project site.	Submission of mitigation measures sufficient to achieve No Net Loss (NNL) or even Net Gain (NG) status in accordance with Performance Standards (PS6-IFC/WBG) and Requirements (PR6-EBRD).	Mitigation, Additional Study and Requirement	Submission of Report	Prior to construction	Once – prior to construction	EPC Contractor
		Regarding Zone 2 (NREA Concession Area) submit Ornithological Study prior to commence construction	Additional Survey / Study and Requirement	Submission of Report	Prior to construction	Once – prior to construction	EPC Contractor
		Removal / excavation of dumpsite	Additional Precautionary Action	Excavation / Landscaping	Dumpsite located within site	Prior / during construction	Contractor
		Develop a protocol to swiftly report and dispose of any dead or injured wildlife or animals recorded onsite.	Mitigation	Submission of report	Prior to construction	Prior construction to	EPC Contractor
Archaeology and Cultural Heritage	Improper management of construction activities could disturb/damage archaeological remains which could be buried in the ground (if any).	As required by the SCA, SCA must be notified to to oversee the process	Mitigation	Submission of evidence of communication with SCA	Not applicable	Prior construction to	EPC Contractor
		Measures for construction activities to be halt upon discovery of archaeological finds; notify the Ministry of Tourism and Antiquities/Red Sea and Suez Antiquities Inspection Office. Work halts until confirmation clearance to resume the work is provided.	Mitigation	Visual inspections and submittal of chance find report	At applicable area	Upon occurrence	EPC Contractor
Air Quality and Noise	Probably increase in dust, particulate matter and pollutant emissions as well as noise which in turn will directly impact ambient air quality and noise levels.	If found to be excessive due to construction, the source of such emissions should be identified and adequate control measures must be implemented (as identified below)	Mitigation	Visual inspections	Active construction areas, nearby receptors and internal road networks	Upon occurrence	EPC Contractor

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		Comply with the Occupational Safety and Health Administration (OSHA) requirements and the Egyptian Codes to provide PPE for workers to protect against dust and noise.	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Apply basic dust control and suppression measures: (i) regular watering of roads; (ii) anticipate and manage dust-causing activities; (iii) manage stockpiles and excavated material via watering, containment, covering, bundling; (iv) cover trucks transporting aggregates and fine materials; (v) enforce site-speed limit of 15km/h	Mitigation	Visual inspections	At active construction areas	Daily / weekly	
		Develop a regular inspection and scheduled maintenance program for vehicles, machinery, and equipment for early detection to avoid unnecessary pollutant and noise emissions	Mitigation	Submission of maintenance program	Not applicable	Monthly	
		If noise levels were found to be excessive from construction activities, the source of such excessive noise levels should be identified and adequate control measures must be implemented	Mitigation	Visual inspections	At active construction areas and receptors to include petroleum storage facilities	Upon occurrence	
		Apply adequate general noise suppressing measures: well-maintained mufflers and noise suppressants for high-noise generating equipment and machinery, regular maintenance of all vehicles, machinery, and equipment.	Mitigation	Visual inspections	At construction active areas	Daily / weekly	

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
Infrastructure and Utilities	Traffic and transport management	Develop Traffic and Transport Plan to reduce risk of damage to the existing roads, highways, overpasses whilst ensuring public safety including analysis of the entire route; investigate constraints along the highways and identify accommodations which need to be taken into account.	Additional study	Submission of Traffic and Transport Plan and approval from local authorities	Not applicable	Once before commencement of construction	EPC Contractor
	Civil and Military Aviation	Provide information on the Project to relevant office and details of design to include setback distances if required (e.g. from radar systems if applicable) and navigational safety requirements (e.g. navigational lights, blade paintings, etc.)	Additional requirement	Submission of formal non-objection letter (or similar) with relevant entity	Not applicable	Once before commencement of construction	Developer
	Improper planning and design of project could affect petroleum facilities	Coordinate through NREA to the General Petroleum Company's head office in Cairo to discuss and determine requirements for the detailed design of the Project as well as coordination agreement requirement during the construction and operation phase (e.g. avoidance of areas, buffer distances to be considered, etc.)	Additional requirement	Coordination activities are initiated no less than six (6) months prior to construction Submission of formal communication letter (or similar) with relevant entity	Not applicable	Once before commencement of construction	Developer

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
	Water resources management	Coordinate with the Ras Ghareb Water Company to sector the water requirements of the Project	Additional requirement	Submission of formal communication letter (or similar) with Ras Ghareb Water Company	Not applicable	Once before commencement of construction	EPC Contractor
	Waste utilities	(i) coordinate with the Ras Ghareb Water Company to select authorized contractors for collection of wastewater from the site; (ii) coordinate with the Ras Gharib City Council to hire a private contractor for the collection of solid waste; and (iii) obtain list of authorized contractors for collection of hazardous waste	Additional requirement	Submission of formal communication letter with relevant entities	Not applicable	Once before commencement of construction	EPC Contractor
	Telecommunication and TV/Radio management	Coordinate through NREA/EETC to relevant entity and other applicable local agencies; provide information on the Project (location and specifications of turbines, etc.) and other requested requirements that may determine setback distances if required	Additional requirement	Coordination activities are initiated > (6) six months prior to construction Formal communication letter submitted	Not applicable	Once before commencement of construction	Developer
	Nearby Wind Farms	Further follow/communication with NREA to ensure if buffer distance of the Project from other nearby wind farm projects is sufficient	Mitigation	Submission of formal communication letter with relevant entities	Not applicable	Once before commencement of construction	Developer

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
Occupational Health and Safety	There will be some generic risks to workers health and safety from working on construction sites, as it increases the risk of injury or death due to accidents.	Develop and submit an Occupational Health and Safety Plan (OHSP) that is project and site specific to ensure the health and safety of all personnel in order to concur and maintain a smooth and proper progress of work at the site and prevent accident which may injure personnel or damage property.	Additional study	Submission of OHSP plan	Not applicable	Once before commencement of construction	EPC Contractor
		Develop and submit an Emergency preparedness and Response Plan that is project- and site-specific, accounting for all potential emergency situations onsite to ensure the health and safety of all personnel and property onsite.	Additional study	Submission of EPRP	Not applicable	Once before commencement of construction	EPC Contractor
Human Rights	Inappropriate management of the workforce resulting in human right risks and violations by employing entities: EPC Contractor and Project Operator. This could include, but not limited to, engaging child workers, confiscation of passports of foreign workers, unsuitable working hours, and other.	(i) Provide reasonable and lawful working conditions and terms of employment (ii) Recognize workers' rights to form and to join workers' organizations and to bargain collectively (iii) Prohibit child labour within the workforce (iv) Prohibition of forced labour (v) Non-discrimination throughout the entire work cycle (vi) Provide equal opportunities for all throughout procurement and employment opportunities including women groups (vii) Management of daily workers, migrant workers and third-party workers	Mitigation	(i) Monthly inspections against the developed HR procedure (ii) Submission of HR inspection report that identifying corrective measures undertaken	At applicable area	Monthly	EPC Contractor

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		(viii) All mitigation measures listed in Table 70 in ESIA (Initial Human Rights Assessment and Mitigation Measures)					
Supply Chain	OHS risks, forced labour, child labour, confiscation of passports of foreign workers, unsuitable working hours, provision of inadequate accommodation facilities and lack of access to grievance mechanism and impact on the environment relating to pollution of water supplies, soil and air.	Human Resource Procedure Management Plan Project Company to align with the measures and management plans already developed for similar wind projects to avoid duplication of efforts and ensure consistent application of best practices across all projects using the same suppliers. EPC contractor to comply with ACWA Powers' procurement and supply chain requirements. This includes implementing all mitigation and management plans developed for the management of suppliers, such as Supply Chain Management Plan, and adhering to monitoring requirements of suppliers. The EPC contractor should ensure any change in suppliers should be assessed to confirm compliance with ACWA Power and EBRD requirements.	Mitigation	In line with ACWA Power procurement and supply chain requirements. Align with measures and management plans already developed for similar wind projects using the same suppliers.			ACWA Power/ Project Company to align with the monitoring requirements already developed for similar wind projects using the same suppliers and ensure EPC compliance.

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
Public health and safety	Relatively large worker influx could result in H&S, Sexual exploitation and assault (SEA) issues such as risk of diseases, inappropriate code of conduct, social vices, etc.	Submit a worker influx plan which takes into account the following: (i) medical examination program for workers; (ii) procedures to maintain hygienic conditions onsite; (iii) code of conduct for workers; (iv) induction training and awareness requirements for risk of diseases, etc; (v) consider impacts from workers migration into nearby communities including pressure on rental accommodations and infrastructures	Additional study	Submission of worker influx plan	Not applicable	Once before commencement of construction	EPC Contractor
	Mismanagement of security issues and incidents by personnel towards local communities, resulting in resentment, distrust and escalation of events	Develop Security Management Plan identifying measures for hiring, rules of conduct, training, equipping, and monitoring of security personnel to control and manage such issues	Additional study	Submission of security management plan	Not applicable	Once before commencement of construction	EPC Contractor
Socio-economics	The Project is expected to provide job opportunities for local communities. This, to some extent, could contribute to enhancing the living environment for its inhabitants, elevate their standards of living, and bring social and economic prosperity	Local Recruitment Procedure: announce the number of job opportunities for local communities to include skilled and unskilled workers, including fresh graduates engineers, technicians, labourers, etc and selection process that is transparent and non-discriminatory. Local Procurement Procedure: Prioritization of procurement from local communities in a transparent and non-discriminatory means from announcement to selection.	Recommendation	Regular reporting on outcomes of Program implementation	Not applicable	Continuous	Project Developer/EPC Contractors

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		Social Responsibility Program: the Developer is to implement an SRP to benefit the local communities in a structured approach that identifies priority development projects benefitting local communities (e.g. based on a needs assessment if available). Based on that the SRP, projects can be prioritized based on available budget, company vision, timeline for implementation as well as other factors.					

ii. ESMP: Operational Phase across Environmental Attributes and Impacts

Table 6: ESMP for the Operation Phase

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
Geology, Hydrology and hydrogeology	Solid waste management	Coordinate with Ras Gharib City Council for the collection of solid waste from the site to the municipal approved dumpsite	Mitigation	Submit contract	N/A	Once, Prior to operation	Project Operator
		Prohibit fly-dumping of any solid waste to the land	Mitigation	Visual inspections	At active areas	Daily / weekly	
		Distribute litter bins and containers properly marked as "Municipal Waste"	Mitigation	Visual inspections	At active areas	Once, Prior to operation	
		Implement proper housekeeping practices onsite at all times	Mitigation	Visual inspections	At active areas	Daily / weekly	
		Maintain records indicating volume of waste generated onsite, collected by contractor, and disposed of at the landfill	Mitigation	Submit manifests	N/A	Throughout operational period	
	Wastewater management	Coordinate with Ras Gharib Water Company to hire a private contractor for the collection of wastewater from the site to the closest WWTP	Mitigation	Submit contract	N/A	Once, Prior to operation	Project Operator

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		Prohibit illegal disposal of wastewater to the land	Mitigation	Visual inspections	At active areas	Daily / weekly	
		Ensure that septic tanks are emptied and collected by wastewater contractor at appropriate intervals	Mitigation	Visual inspection	At applicable areas	Daily/weekly	
		Maintain records indicating volume of wastewater generated onsite, collected by contractor, and disposed of at the WWTP	Mitigation	Submit manifests	N/A	Throughout operational period	
	Hazardous waste management	Hire approved private contractor for the collection of hazardous waste (including electrical waste) to waste disposal facilities	Mitigation	Submit contract	N/A	Once, Prior to operation	Project Operator
		Ensure that hazardous waste is disposed in a dedicated, enclosed area, of hard surface and suitable, labelled containers for each classification of hazardous waste type	Mitigation	Visual inspections	At applicable areas	Once, Prior to operation	
		Ensure hazardous waste storage area is equipped with spill kit, fire extinguisher and anti-spillage trays and a hazardous waste inventory is available	Mitigation	Visual inspections	At applicable areas	Daily / weekly	
		Prohibit illegal disposal of hazardous waste to the land	Mitigation	Visual inspections	At active areas	Daily / weekly	
		Possibly contaminated water (e.g. runoff from paved areas) must be drained into appropriate facilities (such as sumps and pits). Contaminated drainage must be orderly disposed of as hazardous waste	Mitigation	Visual inspections	At active areas	Daily / weekly	

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		Ensure that containers are emptied and collected by the contractor on a regular basis	Mitigation	Visual inspections	At active areas	Daily / weekly	
		Maintain records of volumes hazardous waste generated onsite, collected by contractor, and disposed of at the hazardous waste disposal facilities	Mitigation	Submit manifests	N/A	Throughout operational period	
	Hazardous material management	Ensure that hazardous materials are stored in an area that is of hard impermeable surface, flame-proof, accessible to authorized personnel only, locked when not in use, and prevents incompatible materials from coming in contact with one another	Mitigation	Visual inspections	At applicable area	Once, Prior to operation	Project Operator
		Maintain a register of all hazardous materials used and accompanying MSDS must present at all times. Spilled material should be tracked and accounted for	Mitigation	Visual inspections	At applicable area	Daily / weekly	
		Incorporate dripping pans at machinery, equipment, and areas that are prone to contamination by leakage of hazardous materials (such as oil, fuel, etc.)	Mitigation	Visual inspections	At active areas	Daily / weekly	
		Maintenance activities and other activities that pose a risk for hazardous material spillage (such as refuelling) must take place at a suitable location (hard surface) with appropriate measures for trapping spilled material	Mitigation	Visual inspections	At active areas	Daily / weekly	

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		Ensure that a minimum of 1,000 liters of general-purpose spill absorbent is available at hazardous material storage facility.	Mitigation	Visual inspections	At applicable area	Daily / weekly	
		If spillage on soil occurs, spill must be immediately contained, cleaned-up, and contaminated soil disposed as hazardous waste	Mitigation	Visual inspection	At applicable area	Upon occurrence	
Biodiversity	Improper management of the site could disturb existing habitats (e.g. improper conduct and housekeeping practices).	Implement proper management measures to prevent damage to the biodiversity of the site.	Mitigation	Inspection	At applicable area	Continuous	Project Operator
Birds (avi-fauna)	Wind turbines are associated with impacts on birds from risks of strikes and collision on both migratory soaring birds and resident soaring birds in the area. Generally, such impacts depend on several factors but could affect the population levels of certain species especially those with international/national critical conservation status.	Avi-Fauna Monitoring and On-Demand Turbine Shutdown	Mitigation	Submission of report	At active areas	Continuous	Consultant
		Avi-Fauna Carcass Search during Operation	Additional requirement	Submission of report	At active areas	Continuous	
		Carcass Search Surveys	Additional requirement	Submission of report	At active areas	Continuous	
Bats	The potential impacts from the Project during operation are mainly related to risk of bat strikes and collisions with rotors of the operating wind turbines.	Undertake at height bat acoustic surveys for one (1) year during first or second year of operations. Such acoustic surveys will be done at the met masts and should be undertaken by a third-party entity with experience in bat assessments and studies.	Mitigation	Submission of report	At active areas	Once during operation	Project Operator

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		Carcass Search Surveys	Mitigation	Submission of report	At active areas	Continuous	Consultant
Infrastructure and Utilities	Water resources management	Coordinate with the Ras Gharib Water Company to sector the water requirements of the Project.	Additional requirement	Submit formal communication letter (or similar) with Ras Gharib Water Company	N/A	Once before commencement of construction	Project Operator
	Waste utilities	Undertake the following: (i) coordinate with the Ras Gharib Water Company and obtain list of authorized contractors for collection of wastewater from the site; (ii) coordinate with the Ras Gharib City Council to hire a competent private contractor for the collection of solid waste from the site; and (iii) obtain list of authorized contractors for collection of hazardous waste from the site	Additional requirement	Submit formal communication letter with relevant entities	N/A	Once before commencement of construction	Project Operator
Occupational Health and Safety	There will be some generic risks to workers health and safety from working on construction sites, as it increases the risk of injury or death due to accidents.	Develop and submit an Occupational Health and Safety Plan (OHSP) that is project and site specific to ensure the health and safety of all personnel in order to concur and maintain a smooth and proper progress of work at the site and prevent accident which may injure personnel or damage property.	Additional study	Submit OHSP plan	N/A	Once, Prior to operation	Project Operator
Human Rights		Providing reasonable working conditions and terms of employment to include but not limited to contract management, working hours, salaries/wages, annual and medical leaves, bereavement leaves, accommodation, etc.	Mitigation	Submit HR inspection report with corrective measures undertaken	N/A	Monthly	Project Operator

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
	Inappropriate management of the workforce during the construction phase could entail several human right risks and violations by employing entities such as the EPC Contractor and Project Operator. This could include but not limited to engaging child workers, confiscation of passports of foreign workers, unsuitable working hours, and other.	Recognizing workers' rights to form and to join workers' organizations and to bargain collectively	Mitigation	Submit HR inspection report with corrective measures undertaken	N/A	Monthly	
		Prohibition of child labour within the workforce	Mitigation	Submit HR inspection report with corrective measures undertaken	N/A	Monthly	
		Overall management of young workers within the labour force	Mitigation	Submit HR inspection report with corrective measures undertaken	N/A	Monthly	
		Prohibition of forced labour	Mitigation	Submit HR inspection report with corrective measures undertaken	N/A	Monthly	
		Non-discrimination throughout the entire work cycle in all its forms	Mitigation	Submit HR inspection report with corrective measures undertaken	N/A	Monthly	
		Providing equal opportunities for all throughout procurement and employment opportunities including women groups	Mitigation	Submit HR inspection report with corrective measures undertaken	N/A	Monthly	

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
		Overall management of daily workers, migrant workers and third-party workers	Mitigation	Submit HR inspection report with corrective measures undertaken	N/A	Monthly	
		All mitigation measures listed in Table 70	Mitigation	In line with Table 70 in ESIA report 'Initial human rights assessment and mitigation measures'			
Public Health and Safety	Public access of unauthorized personnel to the various Project components.	A Security Risk Assessment should be developed for the Wind Farm Project and which takes into account the following: (i) each turbine to be fitted with locked doors to prevent unauthorized access to the turbines; (ii) substation area to be completely fenced with concrete walls to prevent unauthorized access; (iii) onsite guards; (iv) post informative signs on the turbines and substation about public safety hazards and emergency contact information, and other as applicable.	Additional study	Submit Security Risk Assessment	N/A	Once, Prior to operation	Project Operator
	Inappropriate management of security issues and incidents by security personnel towards local communities could result in resentment, distrust and escalation of events	Prepare a Security Management Plan that identifies appropriate measures for hiring, rules of conduct, training, equipping, and monitoring of security personnel to control and manage such issues	Additional study	Submit security management plan	N/A	Once, Prior to operation	Project Operator
	Blade or tower glint can impact nearby receptors in the area	Consideration should be given to the use of non-reflective finishes to ensure potential impacts are not significant	Mitigation	Visual inspection	Turbines	Once, Prior to operation	Project Operator

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
	Noise impacts from the operation of wind turbines (also considers cumulative impacts from nearby wind farm)	As there are no significant negative impacts predicted from the wind farm, mitigation is limited to further monitoring to confirm that there are no negative noise impacts once the wind farm is operational. Upon completion of the construction of the wind farm, during the commissioning period a detailed long-term verification noise monitoring program should be implemented. The monitoring program should be carefully designed with specific planning of equipment, measurement locations and periods	Monitoring	No exceedance (zero exceedances)	N/A	Once during commissioning	Project Operator/ EPC contractor

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
	Shadow flicker impacts	As part of the SEP and prior to the operation phase, the Project Company will be required to undertake direct consultations with the residents of the 3 sensitive receptors identified and explain in detail the shadow flicker impacts and the results and outcomes of the assessment that indicated exceedance of allowable limits. In addition, the Project Company should also explain the stakeholder grievance mechanism. In the case that the residents do submit grievances related to shadow flicker (based on the assumptions identified above (i.e. window orientation and occupancy), the ACWA Power and Project Company should consider measures to eliminate such impacts could include installation of window blinds, installation of vegetative buffers, any other barriers around the property as applicable. This should be done in agreement and consultation with the residents of the property. A second scenario, based on real-case statistics can be undertaken if required. This will assess the effect raised by the inclusion of more local conditions, e.g., average daily sunshine hours and wind conditions. It is expected that with this analysis no exceedances will occur.	Mitigation	Zero grievances/complaints	N/A	Prior to operation and as required after (based on grievances/complaints received if any)	Project Operator

Environmental Attribute	Potential Impact	Measures	Code	KPI	Scope	Frequency	Oversight, Implementor
Socio-economics	The Project is expected at a minimum to provide job opportunities for local communities. This, to some extent, could contribute to enhancing the living environment for its inhabitants, elevate their standards of living, and bring social and economic prosperity	Local Recruitment Procedure: announce the number of job opportunities for local communities to include skilled and unskilled workers, including fresh graduates engineers, technicians, labourers, etc and selection process that is transparent and non-discriminatory. Local Procurement Procedure: Prioritization of procurement from local communities in a transparent and non-discriminatory means from announcement to selection. Social Responsibility Program: the Developer is to implement an SRP to benefit the local communities in a structured approach that identifies priority development projects benefitting local communities (e.g. based on a needs assessment if available). Based on that the SRP, projects can be prioritized based on available budget, company vision, timeline for implementation as well as other factors.	Recommendation	Regular reporting on outcomes of Program implementation	N/A	Continuous	Project Developer/ Operator

Stakeholder Engagement Plan (SEP)

A Stakeholder Engagement Plan (SEP) was developed which will be implemented for the Project. The SEP identifies in details the stakeholders that are relevant to the Project to include local communities, national governmental and permitting authorities, local government, Non-Governmental Organizations (NGOs) and other. The SEP identifies previous stakeholder engagement activities undertaken for the Project and the key outcomes of such engagement activities. This included in particular several entities such as Red Sea Governorate, Ras Gharib City Council, Bedouin Groups, General Petroleum Company and other. In addition, it also describes the outcomes of a public disclosure session that was undertaken in Ras Gharib City with local communities and other key local governmental entities.

The SEP also identifies in detail a future stakeholder engagement strategy and plan which identifies activities that will be undertaken throughout the Project duration, which provides an opportunity for all stakeholders, including local communities, to express their views and interact with the Project.

The SEP also includes a stakeholder grievance mechanism that is responsive to any concerns and complaints from affected stakeholders and communities.

ESIA Disclosure & Contact Details

It is of utmost necessity to ensure that stakeholders are kept well informed about the Project throughout its life cycle, thus information will be accessible to the public, key stakeholders, and local communities through dissemination of related documents.

The disclosure package will include the following key documents that are available publicly in Arabic and English language.

- Non-Technical Summary (NTS)
- Stakeholder Engagement Plan (SEP)
- Environmental and Social Impact Assessment (ESIA) including OHTL assessment
- Critical Habitat Assessment (CHA)
- Environmental and Social Management System (ESMS) Manual
- Biodiversity Management Plan (BMP)
- Flood Study
- Bat Addendum Report
- Environmental and Social Action Plan (ESAP)
- Scope of work: Project Strategic Environmental and Social Assessment and Cumulative Impact Assessment. Note: the study itself will be undertaken throughout the disclosure period
- Cumulative Effect Assessment (CEA)
- Biodiversity Action Plan (BAP)
- Bird Migration Study for Suez Wind Energy ACWA Power BOO Wind Power Plant 1.1 GW during Spring and Autumn seasons, 2022
- Spring Bird Migration Study Suez Wind Energy BOO Wind Power Plant 1.1. GW – SWE Plots 1 & 2, 2023
- Autumn Bird Migration Study Suez Wind Energy BOO Wind Power Plant 1.1. GW – SWE Plots 1 & 2, 2023

The above documents are available at the following avenues:

- African Development Bank (AfDB) website (<http://www.afdb.org/>)

- Developer Website **www.acwapower.com**. The documentation above will remain at the website for the life of the project.
- Hard copies available at

Red Sea Governorate

October 6, Hurghada,
Red Sea Governorate, Egypt
Tel: 065354627/06535546337

Ras Ghareb Local Governmental Unit

Location: Al-Mina Street City: 11432
Ras Ghareb – Red Sea
Tel: 01001318480 – 0120195877

- Soft copies can also be made available to stakeholders via email to:
arizk@acwapower.com

To communicate the outcomes of the above process, a public disclosure session will be announced and implemented to communicate with stakeholders.

An advertisement will be taken out in the national newspaper about the project, the availability of the disclosure package and the details about an upcoming disclosure event. The same will be done on the Project's website and LinkedIn. In addition, corresponding leaflets will be distributed in Ras Ghareb amongst the key stakeholders in the city, its Military Authorities, Governmental Institutions and the municipality.

The disclosure event will likely take the form of a Facebook Live event. A link and invite to this event will also be provided on the official page for Ras Ghareb city on Facebook. The event will also include a Q&A session. The whole event will be recorded and a summary report on the event and the Q&A session will be made available.

1. INTRODUCTION

1.1 Background

The energy sector is a key driver for the socio-economic development of Egypt, representing around 13% of current GDP and thus making economic growth in the country contingent upon the security and stability of energy supply. To align and reinforce the sector with sustainable development, the Arab Republic of Egypt (through the Ministry of Electricity and Renewable Energy) had developed and adopted the Integrated Sustainable Energy Strategy (ISES) 2015 – 2035, which provides an ambitious plan to increase the contribution of renewable energy to 42% of the country's electricity mix by 2030 of which wind power is a key component, to be developed mostly in the Gulf of Suez (GoS) due to the wind characteristics in the area.

As a result, the GoE issued the Renewable Energy Law (Decree Law 203/2014) to support the creation of a favourable economic environment for a significant increase in renewable energy investment in the country and establishes the legal basis for the Build, Own and Operate (BOO) framework. Through the BOO mechanism, the Egyptian Electricity Transmission Company (EETC) invites private investors to submit their offers for solar and wind development projects, for specific capacities and the award is made to that bidder with the lowest Kilowatt Hour (kWh) price. In addition, the GoE (through the New and Renewable Energy Authority (NREA)) provides the land for the investors.

In accordance with the Law above, a consortium composed of ACWA Power and Hassan Allam Utilities B.V (hereafter referred to as the '**Developer**') is proceeding with developing a new wind power plant project (Suez Wind Energy – (SWE)) with a capacity of 1,100MW under the BOO scheme. SWE is seeking to develop two (2) Plots – one is located within the northern part of the Gulf of Suez denoted as located north of El Sheikh Fadl – Ras Ghareb Road, designated as '**Plot 1**' and the second - located south of El Sheikh Fadl Road of the GoS, is '**Plot 2**'.

The Regional Centre for Renewable Energy and Energy Efficiency (RCREEE) is managing the Environmental and Social (E&S) process for the Project development on behalf of the Developer. RCREEE commissioned the consortium consisting of EcoConServ, ECO Consult and Safe Soar (hereafter referred to as the '**ESIA Consultant**') to carry out an Environmental and Social Impact Assessment (ESIA) for the Project.

As noted earlier, the above 1,100MW Project will be developed over two (2) plots. Given the geographical distance between the plots, from an environmental and social perspective, separate ESIA studies will be undertaken for each plot.

This report represents the ESIA for Plot 2 / SWE South.

1.2 Project Location and Components

The Project is located within the Gulf of Suez (GoS) around 290km southeast of the capital city of Cairo. The total area of the Project site is 50 km² (

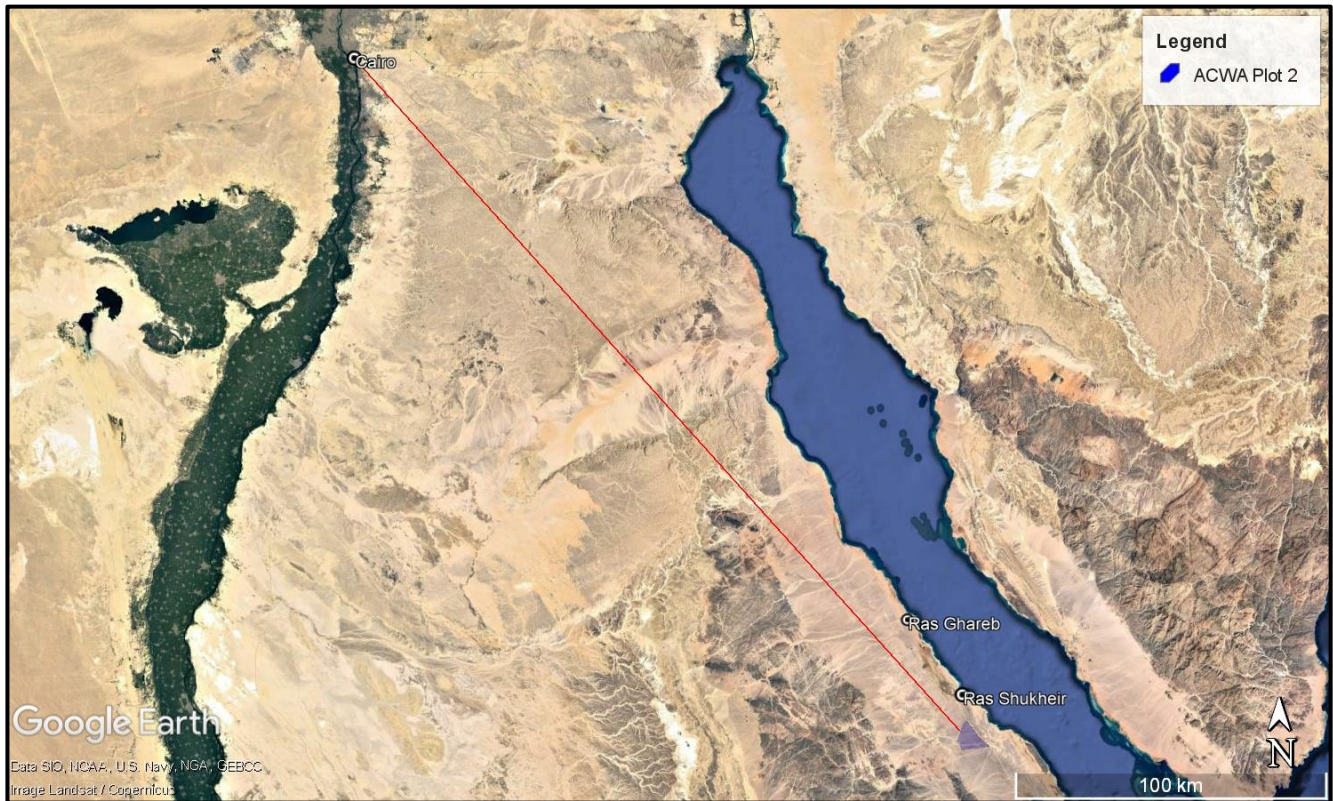


Figure 15).



Figure 15: Project Site's (Green) Distance from Cairo, Egypt

Administratively, the Red Sea Governorate is divided into 7 Cities (also known as Districts), each headed by a Local City Council. The capital of the Governorate is Hurghada that is located around 91 km south of the Project site.

The Project is located within the Ras Gharib District and therefore administratively is under the Ras Gharib City Council. The Ras Gharib District is further divided into Ras Gharib city and two (2) rural (village) local units: Zaafarana and Wadi Dara. The closest community settlement to the Project site is Ras Gharib city (located 37.7 km to the northeast) and Wadi Dara Village – 0.9 km to the west of the Project Site

The closest official community settlements to the Project Site are summarized in the table below along with selected and notable sites near and within the Project site.

Table 7: Distance of Nearby Communities to Project Sites

Distance from Nearby Communities to Project Sites (km)	
Settlement	Project
Ras Ghareb	37.7
Ras Shukeir (located in another District)	8.9
Wadi Dara	0.9

- **Ras Ghareb** is the second-largest city in the Red Sea Governorate, and the most important Egyptian city in terms of oil production. It has a population of about 60,000 individuals (about 17% of the total population of the Red Sea Governorate), most of whom work in the petroleum industry. Ras Ghareb is the leading hub of petroleum production in Egypt, producing about 70% of the country's total output.
- **Ras Shukeir** is located immediately alongside the highway and approximately 8.9 km from the Project site. It is not considered a community settlement as it mainly includes an oil and gas facility, workers accommodation, an airport – Ras Shukeir New Airport, and a recreation center.
- **Wadi Dara village** is located around 0.9 km from the Project site. Wadi Dara Village does not have a large

permanent community. Its total population is between 100-150 individuals, this includes 2 families that are there on a permanent basis while the reminder of the population are mainly workers and guards employed at the various poultry, livestock and agricultural farms within the settlement (mainly at a rotational basis).



Figure 16: Project Distances from Nearby Cities and Villages

1.3 Environmental and Social Impact Assessment Report

The environmental clearance for this Project is governed by the Egyptian Environmental Affairs Agency (EEAA) as stipulated by “Law No. 4 of 1994 – Law on Protection of the Environment”. Executive Regulations 1995 (Prime Ministers Decree 338) issued in accordance with the Law, classifies wind farm developments of such nature and capacity (i.e. this Project) as “Category C”, requiring a comprehensive Environmental and Social Impact Assessment (ESIA) in order to obtain the environmental clearance and permit, in order to commence with construction and operational activities.

The Project is seeking financing from International Financing Institutions (IFIs) and therefore the Developer wishes to design and manage the Project in accordance with Good International Industry Practice (GIIP), which also includes the ESIA that will be developed. This ESIA will be developed based on the following GIIP requirements:

- European Bank for Reconstruction and Development (EBRD) Environmental and Social Policy (2019) and associated Performance Requirements (PR); and
- International Finance Corporation (IFC) Policy on Environment and Social (E&S) Sustainability (2012), IFC Performance Standards (2012), and IFC Environment, Health and Safety (EHS) Guidelines including the IFC EHS Guidelines for the Wind Sector.
- African Development Bank (AfDB) Integrated Safeguards System Policy Statement and Operational Standards (2023)

This report is the ESIA report to be submitted by the ESIA Practitioner (EcoConServ and Eco Consult) to EEAA. This ESIA is undertaken in accordance with the “Law No. 4 of 1994” and its amendments as well as GIIP

requirements specified above. There are other complementary studies submitted as standalone documents which include the following:

- Non-Technical Summary (NTS)
- Stakeholder Engagement Plan (SEP)
- Cumulative Effects Analysis (CEA)
- Critical Habitat Assessment (CHA)
- Health, Safety, Social and Environmental (HSSE) Management System (MS) Manual

1.4 Document Structure

The following table provides an overview of the Chapters within this ESIA document. The ESIA includes a standalone Non-Technical Summary (NTS) a Stakeholder Engagement Plan (SEP).

Table 8: ESIA Document Structure

Chapter	Description of Content
Executive Summary	Summary of the nine chapters of the ESIA report with the ESMP matrix
Chapter 1 – Project Introduction	Introduction and background information on the Project
Chapter 2 – Project Description	Provides a detailed description of the Project in relation to its location, the key Project components and an overview of the proposed activities that are to take place during the various Project phases.
Chapter 3 – ESIA Approach and Methodology	Presents the methodology and approach that was adopted for the ESIA study.
Chapter 4 – Project Stakeholders and Consultations	Discusses in detail the stakeholder consultation and engagement plans which were undertaken as part of the ESIA process for the Project and provides an overview of the findings. In addition, this Chapter also discusses the future stakeholder engagement and consultation plans which are to take place at a later stage.
Chapter 5 – Policy, Legal, and Administrative Framework	Provides an overview of the environmental and social regulatory and policy framework applicable to the Project.
Chapter 6 – Analysis of Alternatives	This chapter investigates several alternatives to the Project development and the reasons for the preferred choice. This includes alternatives in relation to the Project site, selected technology, Project design, and finally investigates the ‘no action alternative’ – which assumes that the Project development does not take place.
Chapter 7 – Existing Physical, Biological, and Social Environment	This Chapter presents the baseline conditions within the Project site and surroundings. This includes the following: Landscape and Visual (Section 1267.1), Land Use (Section 7.2), Geology/Hydrology/Hydrogeology (Section 7.3), Climate (Section 7.4) Biodiversity (Section 7.5), Archaeology and Cultural Heritage (Section 7.6), Air Quality and Noise (Section 7.7), Infrastructure and Utilities (Section 7.8), Occupational Health and Safety (Section 7.9), Public Health and Safety (Section 7.10), and Socio-economics (Section 7.9.1).
Chapter 8 – Impact Assessment	This Chapter assesses the anticipated impacts from the Project throughout its various phases on such a receptor. For each identified impact a set of mitigation and monitoring requirements have been identified which aim to eliminate the impact and/or reduce it to acceptable levels. This includes the following: Overview of Strategic Environmental and Economic Impacts (Section 8.1), Landscape and Visual (Section 8.2), Land Use (Section 8.3), Geology/Hydrology/Hydrogeology (Section 8.4), Biodiversity (section 8.5), Archaeology and Cultural Heritage (Section 8.6), Air Quality and Noise (Section 8.7), Infrastructure and Utilities (Section 8.8), Occupational Health and Safety (Section 8.9), Public Health and Safety (Section 8.10), Socio-economics (Section 8.12), Summary of Anticipated Impacts (Section 8.13), and Assessment of Cumulative Impacts (Section 9).

Chapter 9 – Environmental and Social Management Plan (ESMP)	Presents the Environmental and Social Management Plan (ESMP) for the Project; which mainly summarizes the impacts identified as well as the mitigation measures and monitoring requirements to be implemented throughout the various Project phases. In addition, this Chapter describes the institutional framework and procedural arrangement for the ESMP implementation.
Chapter 10 – Assessment of Associated Facilities	This section presents an E&S assessment for the associated facilities for the Project. This mainly includes the Overhead Transmission Line (OHTL).

1.5 Key Involved Entities

Different entities are involved in the planning and implementation of the Project. The responsibilities of each key entity which is of relevance to the ESIA are listed in the text below along with a general description of their roles.

- Suez Wind Energy (SWE): The owner and developer of the Project (hereafter referred to as ‘the Developer’);
- Egyptian Environmental Affairs Agency (EEAA): the official governmental entity responsible for protection of the environment in Egypt. The EEAA is responsible for approval of the Environmental and Social Impact Assessment (ESIA) and making sure it complies with the “Environmental Protection Law No. 4 of 1994” and granting the environmental clearance for the Project;
- International Financing Institutions (IFIs): entities that will provide financing to the Developer for the development of the Project. Such IFIs will ensure that the Project is developed in accordance with GIIP requirements. At this stage, the IFIs have not been assigned yet.
- Engineering, Procurement, and Construction (EPC) Contractor: will be responsible for preparing the detailed design and layout of the Project; supply of the material and equipment (e.g. wind turbines); construction of the Project and its various components (turbines, internal roads, building infrastructure, and, etc.). The EPC Contractor for this Project has not been assigned yet;
- Owner’s Engineer (OE): engineering company appointed by the Developer to ensure EPC Contractor develops the Project with the required technical specifications. Owner’s Engineer is also responsible for supporting the Developer in ensuring EPC Contractor adherence to E&S requirements and obligations.
- Independent Environmental and Social Consultant (IESC): consultant that is engaged by and on behalf of the IFIs to ensure that the Project is being developed in accordance with their E&S requirements.
- Project Operator: NOMAC is responsible for Operation and Maintenance (O&M) of the Project.;
- Egyptian Electricity Transmission Company (EETC): will be the off taker of electricity and is the entity that signed the Power Purchase Agreement (PPA) with the Developer. In addition, they will also be responsible for designing, building and operating the associated interconnection facilities. This will include the Overhead Transmission Line (OHTL) that will connect from the Project site to the existing national grid.
- National New and Renewable Energy Authority (NREA): is entity responsible for allocation of the land for the development of the Project;
- Consultant (EcoConServ and Eco Consult): hereafter referred to as the ‘ESIA Team’ who is the ESIA Practitioner and the consultant commissioned by the Developer to prepare the ESIA for the Project in accordance with the requirements of the “Law No. 4 of 1994” as well as GIIP requirements.

2. PROJECT DESCRIPTION

This chapter provides a detailed description of the Project in relation to its location, the key project components and an overview of the proposed activities that are to take place during the construction, operation, and decommissioning phase.

2.1 Administrative Set-up and Project Location

Egypt is divided into 27 Governorates. The Project site is located within the Red Sea Governorate that is bordered by the Red Sea Coast to the east and Beni Suef, Minya, Assyut, Sohag, Qena, Luxor and Aswan Governorates to the west, Suez Governorate to the North, and North Sudan to the south. Red Sea Governorate's total area is around 120,000 km², forming 11.9% of the country's total area.

Administratively, the Red Sea Governorate is divided into seven (7) Cities (also known as Districts) (Figure 17), each headed by a Local City Council. The capital of the Governorate is Hurghada that is located around 100km south of the Project site.

The Project site is located within the Ras Gharib City (or District) and therefore administratively is under the Ras Gharib City Council. The Ras Gharib District is further divided into Ras Gharib town as well as 2 rural (village) local units (Zaafarana and Wadi Dara). As discussed earlier, the closest community settlements to the Project site would be Wadi Dara (0.9km from the Project site), Ras Shukier (9 km) and Ras Gharib (37.7 km).

Ras Gharib City is the second-largest city in the Red Sea Governorate, and the most important Egyptian city in terms of oil production.

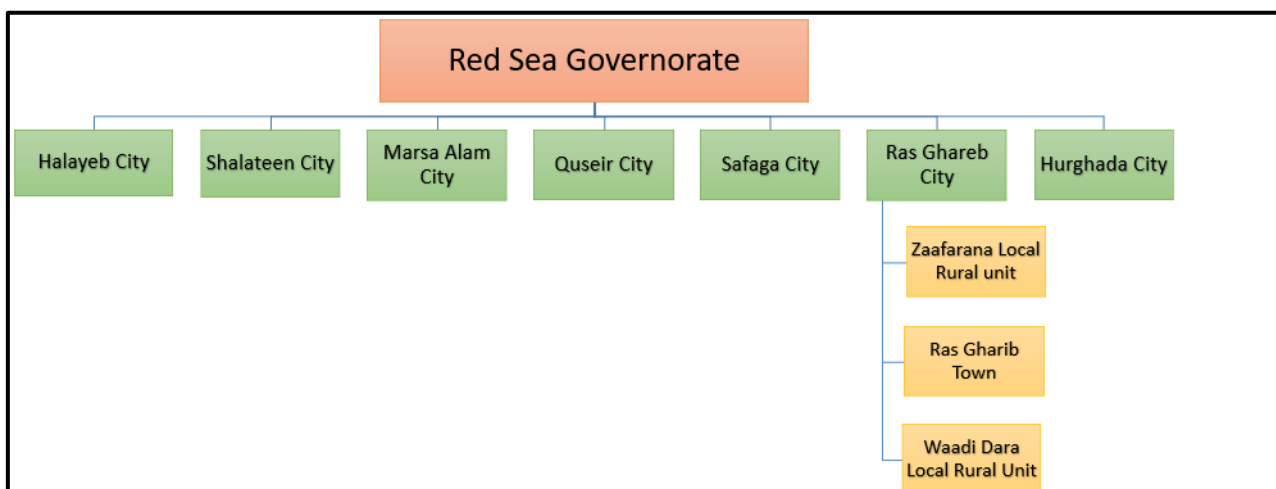


Figure 17: Administrative Division of Red Sea Governorate

As discussed in the Introduction, the Project is located within one of several areas in the GoS allocated by the GoE for wind farm development. A 146 km² plot largely located within the 300km² Strategic ESIA (area) allocated to NREA was in turn allocated to the Developer (see Figure 18).



Figure 18: Project Site and Closest Village

Table 9: Project Site Coordinates

Project Boundary Coordinates		
Point	Latitude	Longitude
1	28.052828°	33.252076°
2	28.050188°	33.276469°
3	28.003485°	33.316218°
4	27.991080°	33.338052°
5	27.984591°	33.341722°
6	27.975285°	33.250200°
7	27.998702°	33.241345°
8	28.000215°	33.230187°

2.2 Outline of Wind Turbine Technology

Wind turbine technology relies on harvesting the kinetic energy in wind (i.e. movement of wind) and turning it into mechanical energy which in turn is used for electricity generation. To capture wind, turbines consist of rotor blades which are elevated from the ground using towers to take advantage of faster and less turbulent wind. As wind speed increases, the rotor blades begin to rotate which then spins a shaft that is connected to a generator thereby converting wind energy to electricity.

Wind turbines produce electricity at a certain voltage which must be matched to the grid it connects to. Therefore, transformers are used to convert the output from the wind turbines to a higher voltage that matches the grid.

2.3 Project Components

The table below provides a summary of the key Project components, along with a detailed description of each of those components to follow. It is important to note that the final selection of wind turbines will depend on an ongoing feasibility study as well as a technical and economical evaluation being undertaken by the Developer.

Table 10: Summary of Key Project Components

Component	Description
Project Generation Capacity (MW)	550 MW
Technology Type	Envision
Number of Wind Turbines	69
Rated Power per Turbine (MW)	8.0 MW
Rotor Diameter (m)	171 m
Hub Height (m)	100 m
Tip height (m)	185.5m
Infrastructure and Utilities	This includes: (i) internal road network; (ii) underground MV cables; (iii) warehouse and offices; (iii) substation; and (iv) associated facilities such as the high voltage overhead transmission line.

2.3.1 Wind Turbines

Generally, a wind turbine consists of a foundation, tower, nacelle, rotor blades, a rotor hub, and a transformer (refer to Figure 19 below).

Foundations will be constructed to bolt the tower of the turbine in place (one for each turbine) for which each foundation generally consists of a circular footing of around 20m-25m diameter and a depth of 3m to 4m. The foundation will be built with concrete-reinforced with structural corrugated steel.

The tower contains the electrical conduits, supports the nacelle, and provides access to the nacelle for maintenance. Typically, three (3) blades are connected to the hub which then connects with the nacelle; the box-like component that sits atop the tower and which most importantly contains the gear box (which steps up the revolutions per minute to a speed suitable for the electrical generator) and the generator (which converts the kinetic energy into electricity).

In addition, each turbine is equipped with a transformer that converts/steps up the output from the turbine to a higher voltage (from 0.69kV to 33kV) to meet a specific utility voltage distribution level that is appropriate for connection with a substation (explained in details below).

Finally, next to each turbine will be a crane pad to accommodate cranes for the installation of the wind turbines and for maintenance activities during operation. The crane pads will be suitable to support loads required for the erection, assembly and operation and maintenance of the turbines. Generally, crane pads have an area of around 4,000m².

The planned turbines are to be characterized by a hub-height of 100m with a rotor diameter between 171m with a tip height of 185.5m.

In addition, Figure 22 below also presented the preliminary layout for both turbine options that is available at this stage that has been provided by the Developer.

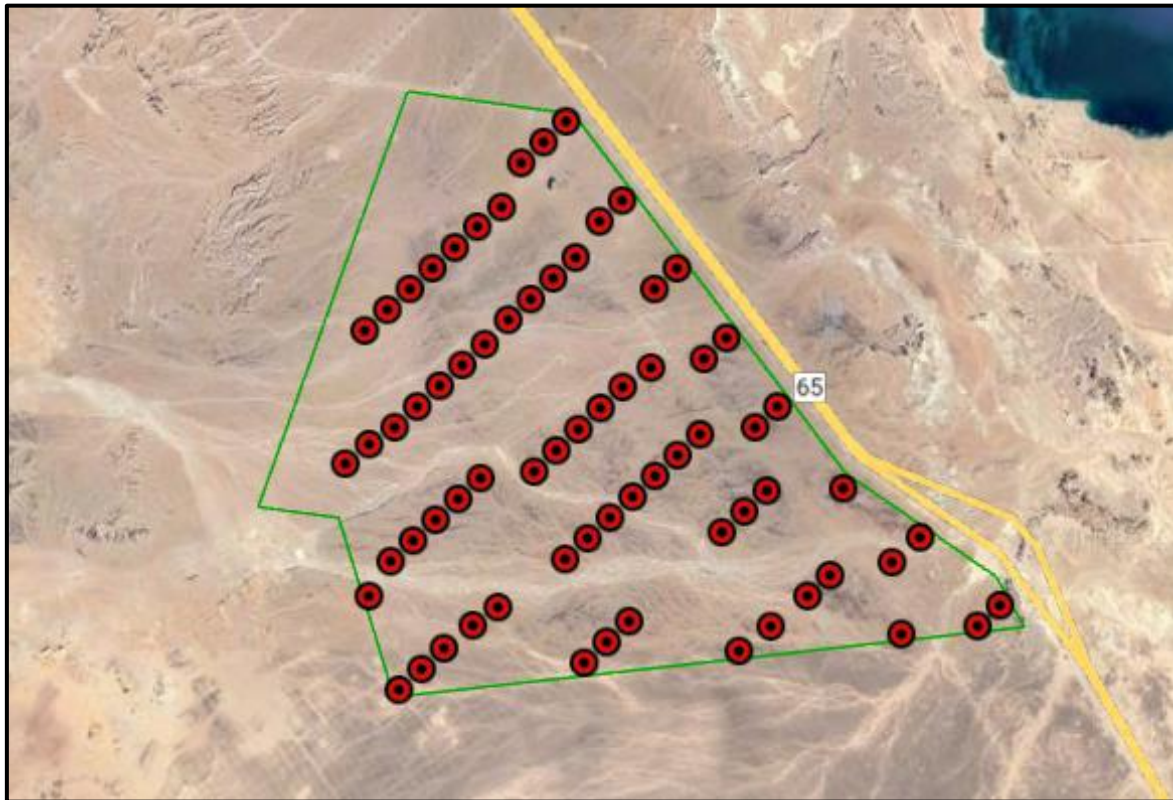


Figure 19: Turbine Layout (69 turbines)

2.3.2 Infrastructure and Utilities

The following highlights the key infrastructure and utility elements that will be required for the Project.

- **Medium Voltage (MV) Cables:** The wind turbines will be connected through medium voltage cables (or 33kV) to an onsite substation (discussed below). The connection between the turbines and the substation will be made using underground transmission cables buried in ground by trenches.
- **Communications Network:** The Project will have a Supervisory Control and Data Acquisition (SCADA) system for the remote operation of the facilities. A communication network will be installed which will consist of fiber optic cables connecting the turbines together to the SCADA system at substation. The communication system will be installed in the same trenches as the MV cables discussed above.
- **Substation:** The substation is a high voltage transformer unit that collects and converts the output from the turbines to a higher voltage (from 33 kV to 220 kV) that is appropriate for connection with the High Voltage National Grid (220 kV). The Project will include two (2) electric substations as shown in Figure 21 below.
- **Building Infrastructure:** Onsite building infrastructure will be required for the daily operation of the Project. Such buildings could include an administrative building (offices) used for normal daily operational related work, control room, workshop and a warehouse for storage of equipment and machinery such as spare parts, oil cartridges, fuel, lubricants, etc.;
- **Road network:** A road network will be required for installation of the turbines during the construction process and for ease of access to the turbines for maintenance purposes during operation. The following figure presents the internal access roads that will connect from the main road located just east of the Project site.

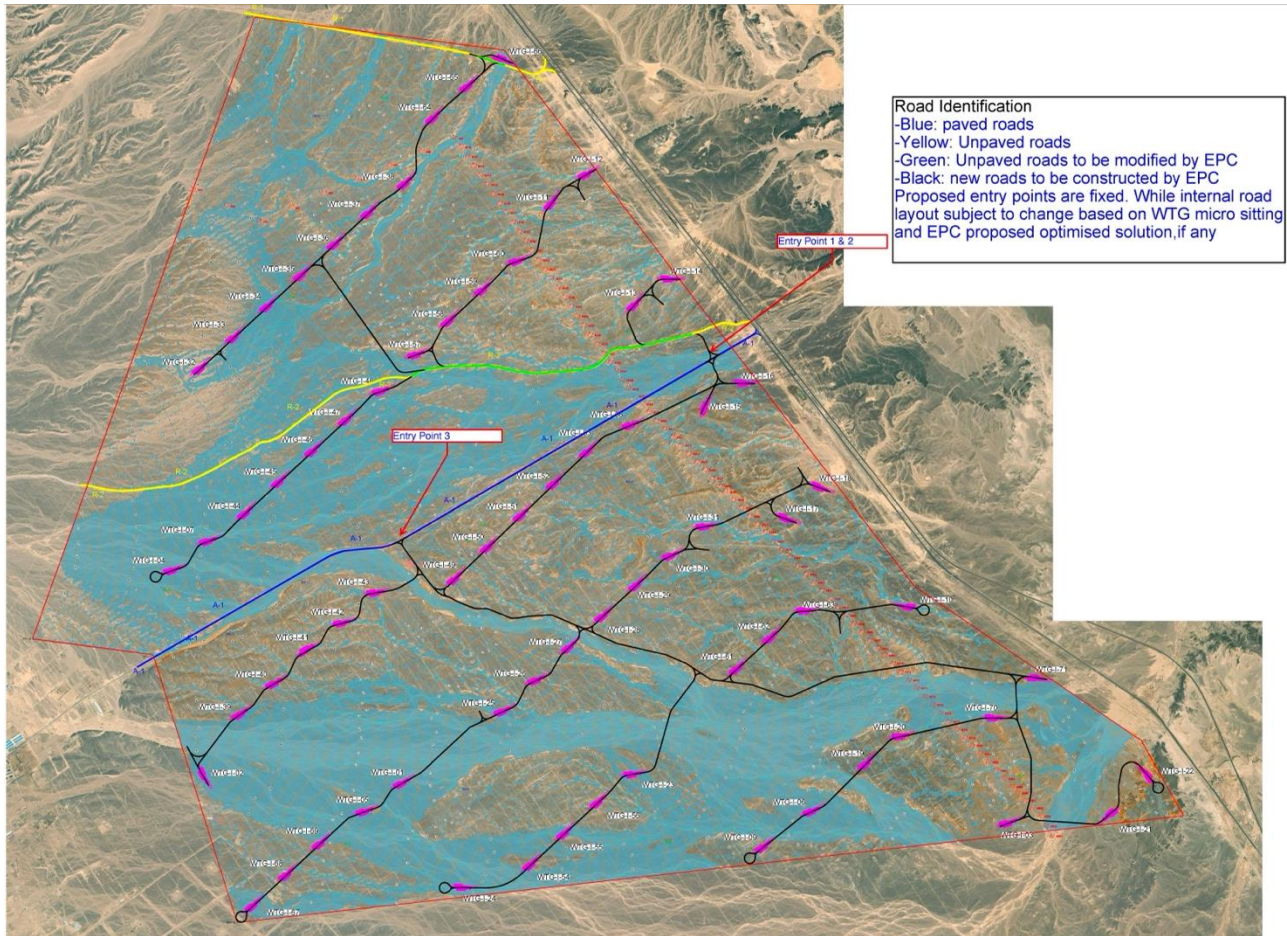


Figure 20: Project Site Access Roads

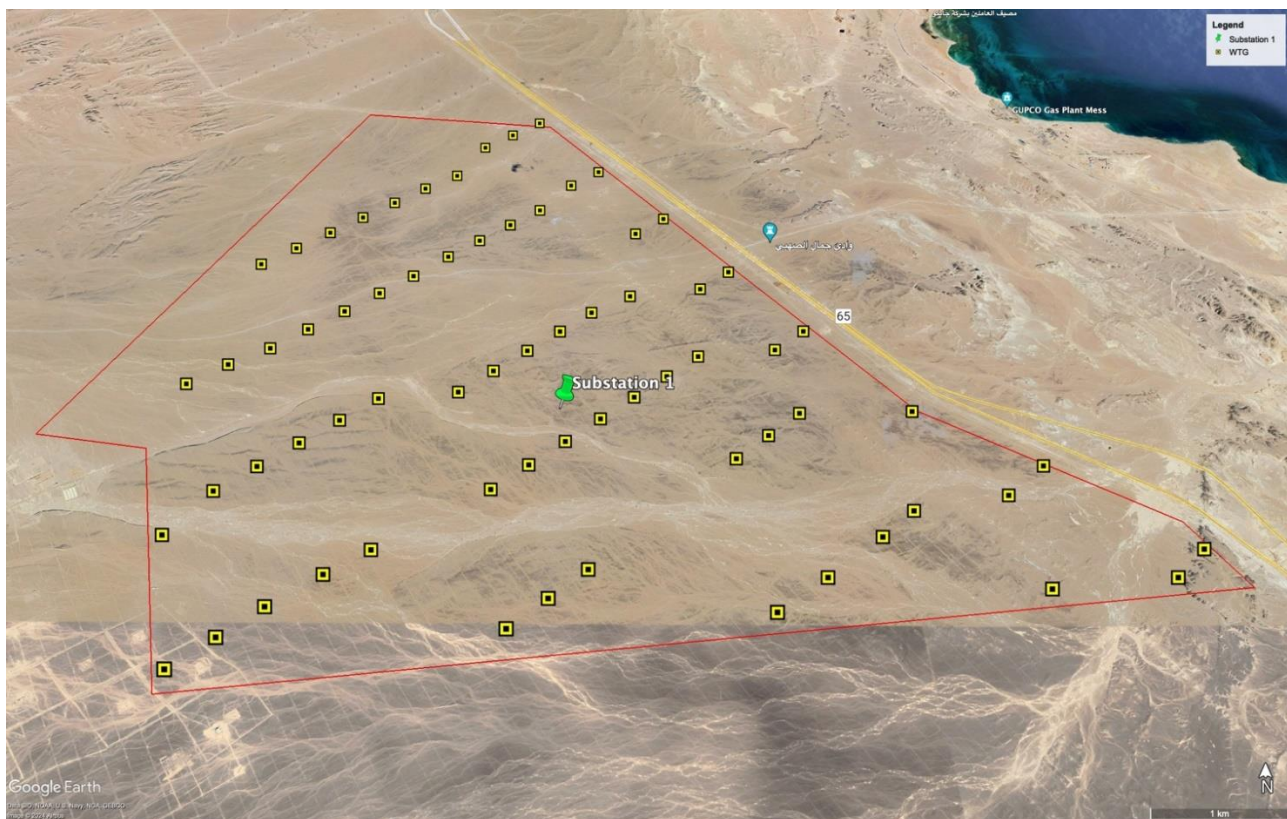


Figure 21: Location of Substation

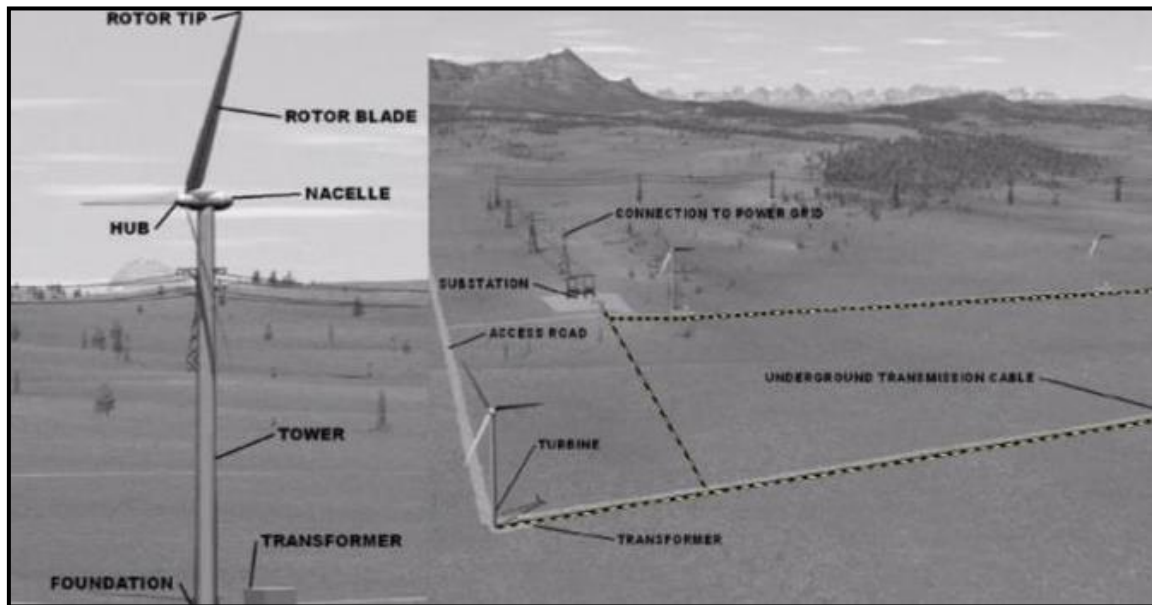


Figure 22: (a) Typical Structural Components of a Wind Turbine, (b) Typical Components of a Wind Farm (Source: EHS Guidelines for Wind Energy, IFC)



Figure 23: Typical 33/220kV Substation

2.3.3 Associated Facilities

EETC is to be responsible for off-site connection works from the onsite substation to the National Grid. This will be through a 220 kV Overhead Transmission Line (OHTL). EETC will be responsible for identification of the OHTL route, preparing the detailed design, undertaking construction activities, as well operation and maintenance activities. An E&S assessment has been undertaken for the OHTL and is presented as a standalone section. Please refer to “Section 11”.

2.4 Footprint of the Project Components

This section provides an estimate on the footprint of the Project taking into account the components discussed in the previous section and based on assumptions made by the ESIA team to determine footprint values. The turbine layout of Envision turbines was utilized to calculate the footprint. As noted in the table below, the total area of disturbance for the Project is calculated at around 4.3 % of the total area of the Project Site.

Table 11: Footprint of the Project Components

Component	Footprint	Duration	Description
Turbines	0.31km ²	Permanent	This includes the footprint for the foundation and the crane pad area for 69 turbines. Typically, each crane pad is around 4,000 m ² in area, whereas each foundation typically consists of a circular footing of maximum 25m diameter
Substation and Warehouse and Storage Facilities	0.07km ²	Permanent	Typically, footprint for each substation and building facilities is around 0.07km ² . The Project infrastructure is currently unknown but assumed as one substation
Trenches for MV cables and communication cables	0.9km ²	Temporary	This includes trenches with a calculated length of around 150km and a width of 6m.
Road Networks	0.9km ²	Permanent	This includes the road network with a total length of 4150km and a width of 6m.
Total Project Footprint	2.18km ²	Mix	--
Total Project Site Boundary Area	50 km²	-	Project footprint is around 4.3% of the total Project area

2.5 Overview of Project Phases

This section presents the likely activities to take place during the Project development and which will include three distinct phases: (i) planning and construction, (ii) operation, (iii) decommissioning and (iv) project schedule each of which is summarized below.

2.5.1 Planning and Construction Phase

The typical activities that will take place during the planning and construction phase for wind farms include the following:

- Preparation of the detailed design and layout of wind turbines within the Project site in addition to the various other infrastructure/utility elements (buildings, roads, substation, etc.);
- Site mobilisation and will involve transporting construction equipment, materials and personnel to the site. This includes setting up temporary facilities such as site offices and storage areas;
- Incorporation of findings from the comprehensive geotechnical study, which includes recommendations based on site investigations and subsequent laboratory testing and geotechnical analyses carried out in March 2023 for the Project, to inform the optimal placement and foundation design of wind turbines and associated infrastructure;
- Transportation of wind turbine components to the Project site. The components are expected to be transported to the closest marine port and then transported by road to the Project site;
- Site preparation of the turbine foundation. Such activities are limited to relatively small individual footprints of the foundations and will include excavations and land clearing activities for building the foundations;
- Installation of turbine components to include tower assembly, hub, rotor, blades and nacelle lift and rotor assembly which most likely will occur through onsite mobile cranes;
- In addition to the erection of each turbine, there is additional construction work (which could include

excavations, land clearing activities, electrical work, etc.) that must be conducted to connect each turbine to the power grid, this could include the installation and laying of transmission and communication cables, installation of substations, and installation of project transmission line; and

- Other construction works (which could include excavations, land clearing activities, etc.) for the potential access road construction or upgrade and for the building infrastructure (warehouse and offices).
- Where possible, the EPC contractor will connect to existing utilities, including the power supply. Where this is not possible, power will be supplied by temporary diesel generators. At the time of writing this ESIA report, the precise number of generators needed has not yet been determined.

2.5.2 Operation Phase

Wind turbines generally require limited operational activities as this mainly includes the following:

- Commissioning tests of the wind farm which usually involves standard electrical tests for the electrical infrastructure as well as the turbine, and inspection of routine civil engineering quality records. Careful testing at this stage is vital if a good quality wind farm is to be delivered and maintained. Commissioning of an individual turbine can take little more than two days with experienced staff;
- Normal daily operation of the wind farm. The long-term availability of a commercial wind turbine is usually in excess of 97 percent (i.e. 97% of the time, the turbine will be available to work); and
- Maintenance will also take place through a dedicated team. Typical routine maintenance time for a modern wind turbine is 40 hours per year. Non-routine maintenance may be of a similar order. Although minimal, maintenance activities may include turbine and rotor maintenance, lubrication of parts, washing of blades, maintenance of electrical components, full generator overhaul, etc.

2.5.3 Decommissioning Phase

According to the PPA agreement, the Project is expected to be operational for 25 years. In the case of complete decommissioning of a wind turbine, the tower and blades of the removed wind turbine will be taken down by crane, disassembled into components, and then the turbine will be refurbished at source and used elsewhere for another Project. The base will typically be left in place and covered by gravel and peat or loam. Tracks used for maintenance vehicles will be restored and can be kept as agricultural routes. Gates and fences will be removed.

2.5.4 Project Schedule

According to the current timeline information available by the Developer, construction of the Project is anticipated to commence around Q4 2024, and will require approximately 24 months for construction and commissioning. Operation of the Project is therefore anticipated to commence in Q4 2026 for a period of 25 years.

2.6 Workforce

According to information provided by the Developer, the Project will require the following workforce throughout the construction and operation phase:

- Around 750 job opportunities at peak during the construction phase for a duration of approximately 24 months. This will mainly include around skilled job opportunities (to include engineers, technicians, consultants, surveyors, etc.) and unskilled job opportunities (mainly labourers but will also include a number of security personnel).
- Around 20 job opportunities during the operation phase for a duration of 25 years. This will include skilled

job opportunities (such as engineers, technicians, administrative employees, etc.) and unskilled job opportunities (such as security personnel, drivers, etc.).

Taking the above into account, the Developer is aiming to hire local community members to the greatest extent possible throughout the construction and operation phase for skilled and unskilled jobs. The Developer is committed to adhering to transparent recruitment procedures which includes local community members as discussed in further details in “Sections 4”.

3. ESIA APPROACH AND METHODOLOGY

This chapter describes the approach and methodology that was adopted for the ESIA study including the following:

- Approach for the analysis of alternatives;
- Approach to stakeholder engagement;
- Approach to determining the spatial and temporal study area;
- Methodology for assessment of the baseline environmental and social conditions;
- Methodology used to assess the potential environmental and social impacts of the Project - including the approach to determining significance, development of mitigation measures and the assessment of residual effects;
- Approach used for the assessment of cumulative effects; and
- Approach for development of an ESMP.

3.1 Analysis of Alternatives

The Egyptian Regulations to include the “Guidelines of Principles and Procedures for Environmental Impact Assessment” (EEAA, 2009) requires that the ESIA identify and analyse alternatives and present the main reason for the preferred choice. The examination of alternatives is also considered to be a key element of the ESIA process under good international practice, to include but not limited to the: (i) IFC Performance Standard 1 (IFC, 2012) and the associated “IFC Guidance Note 1” (IFC, 2012); and (ii) EBRD Performance Requirement 1.

The analysis of alternatives is presented in “Chapter **Error! Reference source not found.**”. The chapter discusses and compared several alternatives to the Project development in relation to: (i) the Project site, (ii) the chosen technology, (iii) the Project design, and finally investigated the ‘no action alternative’ - which assumes that the Project development does not take place.

3.2 Stakeholder Engagement

Stakeholder consultation and engagement is an essential part of the ESIA process, and has been carried out in accordance with the regulatory requirements in Egypt and the requirements of IFC, EBRD and AfDB. The previous and future stakeholder consultation and engagement for the Project are summarized below and discussed in detail in “Chapter 4”.

The Project to date has included extensive stakeholder consultation and engagement with various stakeholder groups such as national governmental entities, local governmental entities, non-governmental organizations, and other as appropriate. This has been undertaken through bi-lateral meetings, e-mail communication, phone communication, formal letters, and other.

“Chapter 4” also discusses future stakeholder engagement and consultations which are to take place at a later stage. This mainly includes: (i) a public disclosure session with stakeholders to present the findings and recommendations proposed within the ESIA; and (ii) implementation of the Stakeholder Engagement Plan (SEP) by the Developer which describes the planned stakeholder consultation activities and engagement process’ to take place after the ESIA approval.

3.3 Delineation of Study Boundaries and Scope of Assessment

3.3.1 Definition of Area of Influence (AOI)

The overall Area of Influence (AOI) for the ESIA represents the potential area of influence of the Project. This is 'the area over which significant effects of the Project could reasonably occur, either on their own, or in combination with those of other developments and projects'.

In general terms, the AOI for the Project ESIA includes the footprint of Project disturbance as demarcated in the figure below. This includes the Wind Farm Project Site with a total area of 50 km².

However, for certain environmental and social parameters (such as landscape and visual, noise and shadow flicker, infrastructure and utilities, socio-economics, etc.), the AOI goes beyond the actual footprint of the Project site, and therefore an appropriate thematic study area is determined for each theme on a case-by-case basis. Such a thematic AOI is clearly identified within the relevant chapter it relates to throughout this ESIA.

In identifying this thematic AOI, the type and degree of the potential direct and indirect effects were taken into consideration. The core area where direct effects are likely to occur was determined, as well as the wider area of influence where indirect, combined and cumulative effects are likely to occur on the surrounding areas and communities.

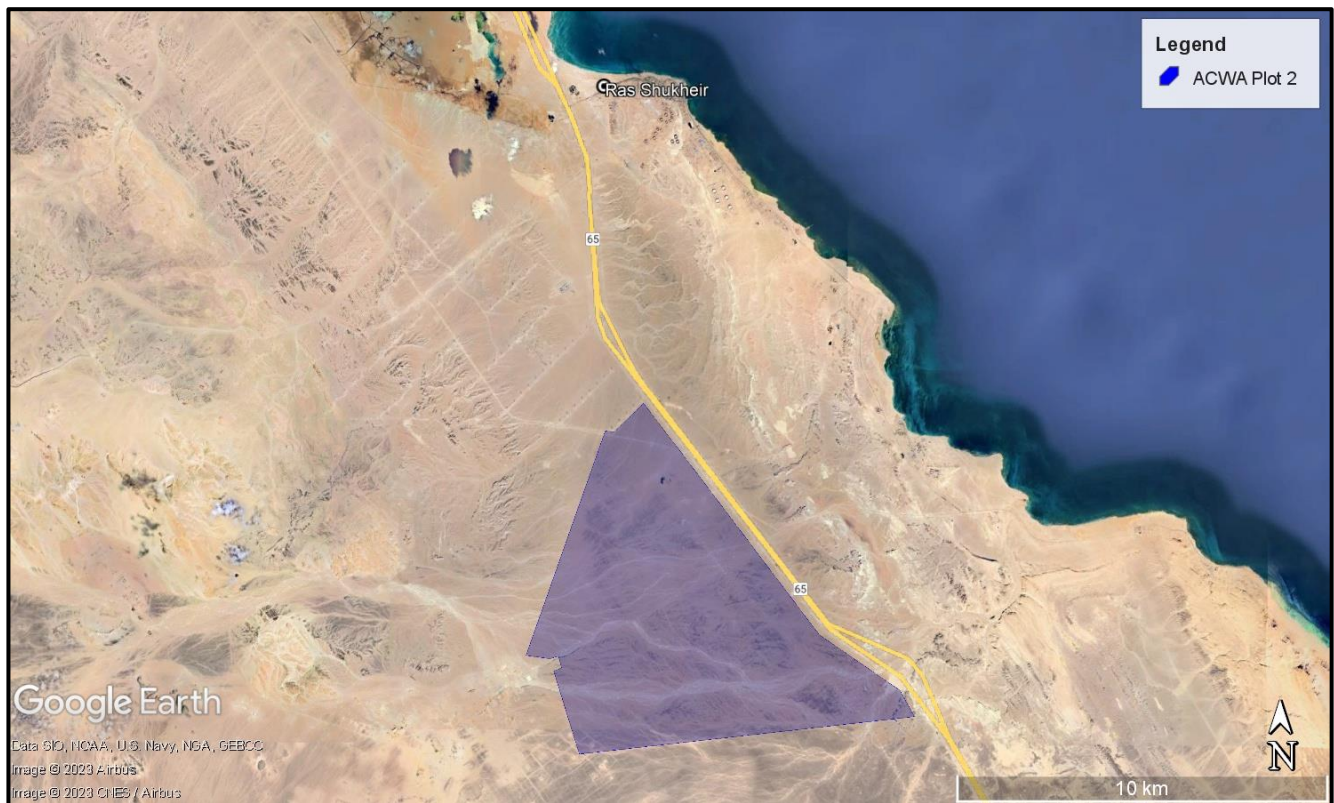


Figure 24: Study Area – Plot 2

3.3.2 Temporal Scope of the Assessment

The Project will be developed in a three-phase sequence as follows. The potential impacts are assessed throughout the various Project phases.

- Planning and Construction Phase;
- Operation Phase; and
- Decommissioning Phase.

(i) Planning and Construction Phase

This includes onsite construction activities which will be undertaken by the EPC Contractors under the guidance of the Developer. This mainly includes preparing the detailed design and layout of the turbines, transportation of Project components onsite, construction of the substation, as well as onsite site preparation and construction activities for installation of wind turbines.

(ii) Operation Phase

This includes activities to be undertaken by the Project Operator. Activities expected to take place mainly include the normal daily operation of the Project and the routine maintenance activities.

(iii) Decommissioning Phase

Generally, the anticipated impacts throughout the decommissioning phase are similar in nature to impacts assessed during the construction phase – and specifically in impacts related to soil and groundwater (from improper management of waste streams), air quality and noise, and occupational health and safety. Therefore, the assessment of impacts for those receptors and mitigation identified during the construction phase is assumed to apply to this phase in particular without the need to reiterate or emphasize this throughout subsequent chapters.

3.4 Environmental and Social Baseline Conditions

As part of the ESIA process, the baseline environmental and social conditions of the study area were established. Describing the baseline includes identifying and defining the importance and sensitivity of the various environmental and social resources and receptors likely to be impacted, i.e. within the AOI. Understanding the value or sensitivity of the resources and receptors to impacts and changes is an important consideration when determining the significance of effects, and allows for better identification of the most appropriate measures that could be employed to avoid impacts, and to mitigate any adverse impacts.

The description of environmental and social baseline conditions has considered a wide range of data and information gathered from various sources, including:

- Desk-based studies and literature reviews;
- Data from statutory and non-statutory stakeholders; and
- Field surveys and site investigations.
- These studies have covered all the environmental and social aspects related to the Project. The baseline conditions are treated as those conditions which would prevail in the absence of the Project.

Studies of the environment and social baseline are described in “Chapter 7” to include the following: landscape and visual; land use; geology/hydrology/hydrogeology; biodiversity (birds (avifauna), bats and other);; archaeology and cultural heritage; air quality and noise; infrastructure and utilities; and socio-economic conditions. Within each chapter, the methodology which was undertaken throughout 2023 (with exception of the biodiversity and avifauna surveys which have been undertaken in 2022 and 2023). This also included accounting for seasonal factors for biodiversity, avifauna, and bats – refer to Chapter 7.5 for additional details on timing of surveys undertaken.

3.5 Impact Assessment Methodology

Given the scale and type of the Project, the ESIA commences with an assessment of the positive environmental and economic impacts on the strategic and national level given the current challenges the energy sector in Egypt faces – as highlighted in “Section 8.1”.

It then moves forward into the main body of the ESIA undertaking the assessment of impacts on environmental and social parameters for each receptor under the relevant chapter, from “Section 8.2” to “Section 8.13”. The following section provides a description of the approach, methodology and process adopted for the impact assessment presented within this ESIA.

3.5.1 Approach to Assessment of Impacts

The adverse and beneficial environmental and social impacts of the Project have been identified and assessed against the established baseline. A consistent approach to the assessment of impacts was followed to enable environmental and social impacts to be broadly compared across the ESIA. A set of generic criteria were used to determine significance (see below) which were applied across the various environmental social and environmental parameters.

As far as possible, environmental and social impacts were quantified. Where it was not possible to quantify impacts, a qualitative assessment was conducted using professional experience, judgment and available knowledge, and including the consideration of stakeholder views. Where there were limitations to the data, and/or uncertainties, these have been recorded in the relevant chapters, along with any assumptions that were taken during the assessment.

In order to determine the significance of each impact, two overall factors are considered:

- The importance and/or sensitivity of the environmental and social receiving parameter, as determined during the assessment of baseline conditions; and
- Magnitude and Nature of the impact.

3.5.2 Sensitivity of the Receiving Parameter:

Receiving parameter sensitivity was determined using information taken from the baseline description on the importance, significance or value of the social or environmental component under examination. It is important to understand the sensitivity of the receiving parameter, as this is a measure of the adaptability and resilience of an E&S parameter to an identified impact. The following categories of sensitivity were applied to the assessment:

- High: The E&S parameter/receptor is fragile and an impact is likely to leave it in an altered state from which recovery would be difficult or impossible.
- Medium: The parameter/receptor has a degree of adaptability and resilience and is likely to cope with the changes caused by an impact, although there may be some residual modification as a result; and
- Low: The parameter/receptor is adaptable and is resilient to change.

3.5.3 Magnitude and Nature of the Impact:

The magnitude of the impact is the scale of change which the impact may cause compared to the baseline and how this change relates to accepted thresholds and standards. The following categories were applied to the assessment:

- High: a large change compared to variations in the baseline. Potentially a clear breach of accepted limits;
- Medium: change which may be noticeable and may breach accepted limits; and

- Low: when compared with the baseline, change which may only just be noticeable. Existing thresholds would not be exceeded.

Furthermore, in determining the magnitude of the impact it is important to take into account and consider several other factors which define the nature of the impact. This includes the following:

Type of Impact

- Positive: applies to impacts that have a beneficial E&S result, such as enhancement of conditions; and
- Negative: applies to impacts that have a harmful aspect associated with them such as loss or degradation of environmental resources.

Type of Effect

- Direct: applies to impacts which can be clearly and directly attributed to a particular E&S parameter (e.g. generation of dust directly impacts air quality); and
- Indirect: applies to impacts which may be associated with or are subsequent to a particular impact on a certain E&S parameter (e.g. high levels of dust could affect occupational health and safety).

Duration (how long the stressor or its effect last)

- Short Term: applies to impacts whose effects on the environment will disappear within a 1-year period, or once construction activities are completed;
- Medium Term: applies to impacts whose effects on the environment will disappear within a 5-year period; and
- Long Term: applies to impacts whose effects on the environment will disappear in a period greater than 5 years.

Reversibility

- Reversible: applies to impacts whose significance will be reduced and disappeared over time (either naturally or artificially), once the impacting activity ceases; and
- Irreversible: applies to impacts whose significance will not be reduced nor disappeared over time (either naturally or artificially), once the impacting activity ceases.

3.5.4 Assessment of Impact Significance

The concept of 'significance' is central to the ESIA process and aids the identification and categorization of E&S effects. As noted, in order to determine impact significance, the sensitivity of each E&S parameter/receptor is considered in combination with the magnitude of the impact. The table below demonstrates how these parameters are considered in the assessment of significance.

Table 12: Determination of Significance

Sensitivity of Receiving Parameter/Receptor \ Magnitude of Impact	Low	Medium	High
	Low	Medium	High
Low	Not significant	Minor	Minor
Medium	Minor	Minor	Moderate
High	Minor	Moderate	Major

While the above matrix provides a framework for the determination of significance, and enables comparison across E&S parameters, a degree of professional judgement must be used and some parameter-specific factors to be considered in making the determination of significance. Below provides additional guidance to the degrees of significance used in this ESIA. Note that positive impacts are defined, but are not rated for significance.

- **Major significance:** requires thorough investigation in the ESIA. These impacts have been studied extensively by consulting expertise in the areas of the identified impacts to design needed mitigation and environmental management measures. Moreover, conducting specific studies and assessments to some of the key issues identified;
- **Moderate significance:** requires reasonable investigation in the ESIA. These impacts have been studied by expertise in the areas of the identified impacts to design needed mitigation and environmental management measures.
- **Minor significance:** must be listed, and addressed in some way, but which did not require detailed assessment in the ESIA.
- **Not significant:** for completeness, impacts which have been included in the assessment but determined not to be significant, are rated formally as 'not significant'.

3.5.5 Management Measures

Based on the impact assessment undertaken a set of management measures are identified for each impact which aims to address it. Management measures include the following:

- **Additional Requirements:** those are generally regulatory requirements which have been identified and which must be taken into account at a later stage.
- **Additional Studies:** for certain E&S receptors additional studies must be undertaken at a later stage. Such studies and their scope, timing, etc. have been highlighted where relevant.
- **Mitigation Measures:** a vital step in the ESIA process is the identification of measures that can be taken to ensure that impacts are mitigated or reduced to acceptable levels. The ESIA will firstly consider the significance of any impacts caused by the Project and then assigned mitigation options through applying the following hierarchy:
 - Avoiding or 'designing out' impacts wherever possible;
 - Considering alternatives or modifications to the design to reduce the impacts wherever possible;
 - Applying measures to minimize and manage impacts on the receptor; then
 - As a last resort, identifying fair compensation, remediation and offsetting measures to address any potentially significant residual effects.

Some negative impacts can be easily mitigated, whilst others cannot or are too difficult and costly to mitigate. The various potential impacts are described in this ESIA, along with the provision of 'feasible mitigation measures' that can be implemented.

- **Recommendations:** for positive impacts it is not possible to identify mitigation measures, but rather recommendations have been identified which aim to enhance the positive impact.

3.5.6 Assessment of Residual Significance

If there are mitigation measures it is then necessary to make an assessment of the ‘residual significance’ after mitigation has been taken account. A re-assessment of Project impacts is then made, taking into account the effect of the proposed mitigation measures in order to determine the significance of the residual effects. Residual effects are discussed for each E&S theme in the ESIA chapters, and their significance determined and summarized in an Impact Assessment Table in “Section 8.13”.

3.6 Assessment of Cumulative Impacts

For each of the impacts assessed, the ESIA investigates the cumulative impacts which could result from incremental impacts from other known existing and/or planned developments in the area, and based on currently available information on such existing/planned developments. Assessment of cumulative impacts is presented in “Section 9”.

3.7 Development of Environmental and Social Management Plan (ESMP)

Based on the results of the impact assessment, development of management measures, and development of monitoring plan, an ESMP was compiled into a single table that details all of the above. The ESMP will be a key document and will list the environmental/social requirements and detail the procedures necessary for managing the significant environmental/social issues connected to proposed Project activities. The ESMP will be developed specifically to provide flexibility in the nature and exact location of operations, while ensuring all potential impacts are identified and properly mitigated and monitored throughout the later stages of the Project. This ESMP can be used as a stand-alone document during the different phases of the Project by the Developer, EPC Contractors, EEAA, and other responsible parties.

4. STAKEHOLDER CONSULTATION AND ENGAGEMENT

This Chapter discusses in details the stakeholder consultation and engagement plans which were undertaken as part of the ESIA process for the Project and provides an overview of the findings. In addition, this Chapter also discusses the future stakeholder consultation and engagement plans which are to take place at a later stage of the ESIA process as well the Project development.

4.1 Introduction

Stakeholder engagement is an integral part of ESIA good practice and is a statutory requirement of the national EIA legal framework in Egypt and within under good international practice, to include IFC, EBRD and AfDB ISS requirements. The Developer is committed to a technically and culturally-appropriate approach to consultation and engagement with all stakeholders affected either directly or indirectly by the Project. The consultation program for the Project is based on informed consultation and participation in line with good international practice requirements with affected people, and is designed to be both fair and inclusive. Consultation activities have been an ongoing process since the commencement of the ESIA study in April - June 2023.

Stakeholders are persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively. These groups also include persons belonging to vulnerable groups (refer to Subsection 4.4.), which may be defined and comprised of persons who are expected to be disproportionately affected by project impacts due to their race, color, sex, language, religion, political opinion, national or social origin, gender, ethnicity, culture, physical or mental disability or otherwise.

Stakeholders, in general, may include: (i) locally affected communities or individuals and their formal and informal representatives, (ii) national or local government authorities, politicians, religious leaders, civil society organisations and groups with special interests, (iii) the academic community, or other businesses.

Stakeholder consultation is an inclusive process for sharing information that enables stakeholders to understand the risks, impacts, and opportunities of a development or project, allowing them to express their views and articulate their perceptions towards it. Project stakeholders and vulnerable groups were consulted as part of both the targeted consultations and the public scoping session.

4.2 Objectives

The objective of stakeholder consultation is to ensure that a participatory approach takes place, which in turn documents concerns of all stakeholder groups and makes sure that such concerns are considered, responded to, and incorporated into the decision-making process of the development. Stakeholder consultation needs to be a two-way communication process that imparts information to stakeholders, but also obtains additional and on-the-ground information from them. Stakeholder consultation and engagement must take place at the inception phase of the ESIA process and implemented all through the study period.

The specific objectives of this chapter are to:

- Summarize national and international legal & policy requirements for stakeholder engagement;
- Describe and identify the stakeholders affected and/or with an interest in the Project;
- Summarize stakeholder engagement and consultation conducted to date. In addition, describe how the views and issues raised have informed and influenced the development of the Project; and
- Outline the future plans and approach to stakeholder engagement.

4.3 Requirements for Stakeholder Engagement

Egyptian Legislation Requirements

Stakeholder consultation and engagement under the Egyptian requirements, is primarily linked to the Environmental and Social Impact Assessment (ESIA) study as stipulated in the “Law of Environment No. 4 of 1994 and its amendments in Law No. 9 of 2009”. According to the last updated executive regulation and the ministerial decree No. 26 of 2016, the ESIA system classifies the projects into four categories based on different levels of ESIA requirements according to severity of possible impacts and location of the establishment and its proximity to residential settlements.

In specific, wind farm development projects in general are categorized as “Category C” (projects which require a comprehensive ESIA study) and which require consultations under two (2) phases as part of the ESIA study: (i) environmental and social scoping phase which requires targeted consultations; and (ii) disclosure phase which requires a public disclosure session for ESIA outcomes.

The scoping should include targeted stakeholder consultations with key stakeholders as relevant to the Project, while the public disclosure consultation must include the following entities:

- Representatives of the Egyptian Environmental Affairs Agency (EEAA)
- Related governmental authorities
- Representatives of the Governorate and local units where the project is located
- Affected groups including local businesses and communities
- Non-governmental Organization (NGOs) and civil society groups

The EEAA guidelines methodology identifies the following articles covering the guidelines on conducting the public consultation as part of the ESIA study are as follows:

- Paragraph 6.4.3.1 Scope of Public Consultation
- Paragraph 6.4.3.2 Methodology of Public Consultation
- Paragraph 6.4.3.3 Documentation of the Consultation Results
- Paragraph 7 Requirement and Scope of the Public Disclosure

Financing Requirements

Stakeholder engagement activities undertaken as part of the ESIA meets international best practice requirements to include the relevant environmental and social requirements of IFIs as follows:

- African Development Bank (AfDB) Integrated Safeguards System (ISS) (2023) Environmental and Social Operational Safeguards (ESOS) to include:
 - ESOS 1: Assessment and Management of Environmental and Social Risk Impact; ESOS 2: Labour and Working Conditions; ESOS 4: Community Health, Safety and Security; ESOS 10: Stakeholder Engagement and Information Disclosure

The EBRD “PR 10: Information Disclosure and Stakeholder Engagement” addresses stakeholder engagement and sets out the following requirements:

- Ensure that stakeholders are appropriately engaged on E&S issues that could potentially affect them through a process of information disclosure and meaningful consultation.

- Maintain a constructive relationship with stakeholders on an ongoing basis through meaningful engagement during project implementation
- Stakeholder Engagement is an on-going process that may involve: stakeholder identification and analysis, information disclosure, meaningful consultation, and external and ongoing reporting to Affected Communities.
- A Stakeholder Engagement Plan (SEP) must be developed and implemented that is scaled to the project risks and impacts and development stage, and be tailored to the characteristics and interests of the Affected Communities.
- Affected Communities will be provided with access to relevant information on: (i) the purpose, nature, and scale of the project; (ii) the duration of proposed project activities; (iii) any risks to and potential impacts on such communities and relevant mitigation measures; (iv) the envisaged stakeholder engagement process; and (v) the grievance mechanism.
- When Affected Communities are subject to identified risks and adverse impacts from a project, a process of consultation will be undertaken in a manner that provides the Affected Communities with opportunities to express their views on project risks, impacts and mitigation measures, and allows the client to consider and respond to them.
- The extent and degree of engagement should be commensurate with the project's risks and adverse impacts and concerns raised by Affected Communities.
- The consultation process will be tailored to language preferences of Affected Communities, their decision-making process, and the needs of disadvantaged or vulnerable groups.
- For projects with potentially significant adverse impacts, the client will conduct an informed consultation and participation.
- A grievance mechanism will be established to receive and facilitate resolution of Affected Communities' concerns and grievances about the client's environmental and social performance.

In addition, the IFC Performance Standard (PS) 1 "Assessment and Management of Environmental and Social Risks and Impacts" identifies similar requirements to those of EBRD identified above.

4.4 Stakeholder Identification and Analysis

The purpose of stakeholder identification is to identify and prioritise Project stakeholders for consultation. Stakeholder identification is an ongoing process, and thus key stakeholders will be identified during different stages of the Project. A systematic approach is used to map the stakeholders based on the Project zone of impacts. In this approach, by mapping the zone of social impacts, stakeholders are identified by the impact area.

As a result of the stakeholder mapping, Project stakeholders are categorised into the following main categories:

1. People and groups who will be directly or indirectly affected by the project (such as local communities);
2. People and groups who may participate in the implementation of the project (such as investors and lenders);
3. People and groups who are not affected by the project development per se may but have a possibility to influence and make decisions on implementation of the Project (such as Ministries or regulatory agencies).

The main groups of stakeholders identified so far are listed in the table below (**Table 13**). The list can be updated and modified in the course of the Project development and as a result of cooperation of the parties.

Vulnerable Groups

The stakeholder list also includes vulnerable groups and is defined as groups that are expected to be disproportionately affected by project impacts due to their race, color, sex, language, religion, political opinion, national or social origin, gender, ethnicity, culture, physical or mental disability, and other. Vulnerable groups are context-specific and depend on a range of issues which must be understood such as project location, socio-economic, historical, and demographic context, as well as the nature of the development and type of impacts anticipated.

The vulnerable groups within this context were identified to include:

- Women groups of the local community. Cultural norms in Egypt and within the local communities, in specific, could limit their participation in decision-making in general as well as their employment opportunities as opposed to their male counterparts. Even though such cultural norms are considered applicable within local communities, however Bedouin women in particular are considered much more vulnerable than mainstream women in Upper Egypt.
- Disabled Groups: are considered vulnerable groups mainly due to physical disability which could limit their access to information on the Project and could limit their participation in decision-making in general as well as their employment opportunities as opposed to able-bodied groups.
- Elderly Groups: are considered vulnerable groups mainly due to age limitations which could limit their access to information on the Project and could limit their participation in decision-making in general.

Given the nature and location of the Project there are no additional groups considered as vulnerable that would require special consideration throughout the consultation process.

Table 13: Stakeholder Identification

Level of Stakeholder interest in/involvement to the Project
1. Stakeholders who may be directly or indirectly affected by the Project
Residents of the nearby villages of the Project to include <u>Wadi Dara Settlement</u> and <u>Ras Gharib Town</u> which are administratively under Red Sea Governorate and Ras Ghareb City (or District) along the Hurghada-Cairo highway entering the Gulf of Suez and into the Village of Wadi Dara. For the above, this includes the following groups within the local communities in specific: ▪ <u>Community Members</u>: local community members have a vested interest in the project due to mainly potential for job opportunities. In addition, local community members could be impacted by other potential negative impacts (e.g. worker influx, noise & shadow flicker, etc.). Such impacts are discussed and identified within the ESIA. ▪ <u>Community Leaders</u>: They are socially active members and known figureheads for local community members, who may or may not hold government positions. Community leaders involved in the project are the heads of affected communities. ▪ <u>Business Community (local subcontractors)</u>: such groups have a vested interest in the project due to mainly potential for procurement opportunities such as subcontracting works (e.g. civil works, provision of food and amenities, etc.) <u>Women groups</u> within local communities, such groups have a vested interest in the project due to mainly potential for job opportunities. In addition, such groups could be impacted by other potential negative impacts (e.g. worker influx, Gender Based Violence and Harassment (GBVH), sexual exploitation and abuse (SEA), etc.) Such impacts are discussed and identified within the ESIA. <u>Bedouin Groups</u>: the key Bedouin group known in the GOS area are the Tabbna, Hamadin and Khoshman. Tabbna and Hamadin settle permanently in key cities such as Ras Ghareb, Zaafarana. The Khoshman are nomadic groups that settle within the mountain ranges located west of the area in general. All these Bedouin groups apply a type of customary ownership within the Project area lands which is known as 'Urfi Contracts' and 'Ghafra System'. Such tribes would be helpful in providing security and protection and could also have a vested interest in employment

and procurement opportunities (such as security guards, provision of raw materials, provision of food supplies and water to the workers, etc.). Responsibility of Ghafra system for the Project site is Hamadin family.
Residents of Ras Shukeir that is located around 8km to the northeast of the Project site. This settlement is used by petroleum companies in the area as housing/accommodation units, offices, and also includes some petroleum facilities. No key impacts are anticipated on Ras Shukeir and they could have a vested interest in obtaining updated information on the Project in general.
2. Stakeholders who may Participate in Implementation of the Project
<u>Investor/Lender</u> : entities that will provide financing for the Project development. In particular, they have interest in ensuring that the Project is developed and implemented in accordance with their E&S requirements and standards, and will monitor the compliance of the Project against such requirements.
<u>Workers</u> : This includes all Project workforce to include but not limited to workers from Developer team, workers from EPC Contractor, Project Operator and any involved subcontractor(s).
3. Stakeholders who may have a possibility to influence and make decisions on implementation of the project and/or may have an interest in the Project
Central Government
<u>The Egyptian Environmental Affairs Agency (EEAA)</u> : state body regulating environmental management. For this Project, this will include review and approval of ESIA, issuance of environmental permit, monitoring implementation of Environmental and Social Management Plan (ESMP) and compliance with other conditions, as applicable.
<u>Egyptian Electricity Transmission Company (EETC)</u> : off-taker and entity that signed the Power Purchase Agreement (PPA) with Developer. They will also be responsible for designing, building, and operating the associated interconnection facilities (i.e. Overhead Transmission Line).
<u>New & Renewable Energy Authority (NREA)</u> : national focal point for expanding efforts to develop renewable energy technologies to Egypt in coordination with other concerned national institutions. In addition, NREA also the entity responsible for allocation of the land for the development of the Project.
<u>Ministry of Labour</u> : official governmental entity responsible for setting labour policies and legislations as well as ensuring protection of labour rights and working conditions. Has a vested interest in ensuring that labour rights and proper working condition are maintained for the Project in accordance with Egyptian laws and regulations.
<u>Ministry of Civil Aviation</u> : Official governmental entity responsible for civil aviation management in Egypt and responsible for issuing permits for projects with specific height requirements.
<u>Armed Forces Operations Authority</u> : Official governmental entity responsible for military aviation management in Egypt and responsible for issuing permits for projects with specific height requirements.
<u>Ministry of Tourism and Archeology</u> : The ministry is the entity responsible for the preservation and protection of the heritage and ancient history of Egypt, under which operates all inspector offices in the governorates.
<u>Ministry of Interior</u> : The Ministry is responsible for national and local security, as well as approving emergency response and firefighting plans for establishments/projects.
<u>General Petroleum Company</u> : a national State-owned company engaged in exploration, production, and development of hydrocarbons, is responsible for the management of oil and gas exploration and production activities on behalf of the State. It is one of the subsidiary companies affiliated to the Ministry of Petroleum. It could have right of concession for petroleum exploration in some parts of the Project area and adjacent areas.
<u>National Telecom Regulatory Authority</u> : Responsible for overall regulation and administration of the telecommunication sector in Egypt including interface with telecommunication companies and their infrastructure elements such as broadcasting towers. Given that project could impact such infrastructure elements, approvals are required.
<u>Telecommunication Operators</u> : Could own and operate telecommunication infrastructure within the area. This includes mainly Orange, Etisalat and Vodafone. Given that project could impact such infrastructure elements, approvals are required.
<u>Radio and Television Union</u> : Responsible for overall regulation and administration of the radio and television sector in Egypt including infrastructure elements. Given that project could impact such infrastructure elements, approvals are required.
Local Governmental Agencies
Red Sea Governorate: Governorate's main role is supporting the Project in all aspects as required to include providing required permissions. They key departments of the Governorate that are related to the Project include the following:

- Environmental Administration that is responsible for monitoring compliance to environmental requirements along with EEAA; - Labour Office that is responsible for overall management of the labour force in Red Sea Governorate, monitoring recruitment by development projects within the Governorate, monitor labour grievances and other; - Roads Directorate: responsible for services and development of external roads in the governorate and issuing permits for any construction work on the external roads - Public Health Directorate: provide the health services and facilities to the local districts and ensure overall local community health and safety	
<u>Ras Gharib Local City Council</u>: main role is supporting the Project in all aspects as required to include providing required permissions. In addition, the Council is also responsible for supervision and follow-up for monitoring compliance to environmental requirements along with EEAA and Red Sea Governorate, and also has overall responsibility for solid waste management and disposal within their area of influence.	
<u>Wadi Dara Local City Council</u>: responsible for providing key services for Wadi Dara such as land allocations, electricity services, waste services, etc.	
<u>Wadi Dara Cooperative Association</u>: Wadi Dara Cooperative Association was established in 1994/1995 through an official governmental decision, through which the government allocated land areas in Wadi Dara to the Association for agricultural reclamation. The Association is the responsible entity that manages the overall agricultural development process within Wadi Dara, including dividing and allocates lands within these areas and selling them to private sector investors. The Association works closely with the Red Sea Governorate.	
<u>Directorate of Social Solidarity Ras Gharib</u>: official governmental entity that acts as the overall management, organization and registration of local community associations, foundations, and NGOs. They could have a vested interest in obtaining updates on employment and procurement opportunities provided by the Developer as well as any social responsibility programs.	
<u>Red Sea Water and Wastewater Company</u>: official entity that is responsible for water and wastewater management within the Governorate. In addition, it will be the entity that will be responsible for providing the Project's requirements of water as well as disposal of wastewater.	
<u>Red Sea Governorate Antiquities Inspector Offices</u>: Official governmental entity representing the Ministry of Antiquities within the Red Sea Governorate. They will be responsible for protection and management of archaeology and cultural heritage resources in the area as well as implementation of chance find procedures by development projects.	
<i>Non-Governmental Organizations (NGOs) and Other Organizations</i>	
NGOs are Organizations with direct interest in the Project, and which may have useful data or insight into local issues of relevance to the Project. These organizations can also influence the views of others regarding the Project, both nationally and international and in general NGOs are responsible for sharing information with the community. The key NGOs active within the area are summarized below.	
NGOs/ CBOs	Scope
Orban El-Saharaa	Social Development
Association for the Conservation of the Environment in Red Sea (HEPCA)	Environmental protection
Red Sea Ecotourism	Social and cultural services
Environmental protection in the Red Sea	Environmental protection
Ababdeh Sons Association in Ras Ghareb	Community Development
Resala Association	Social and family services
Firdous Association	Social and family services
Egyptian Red Crescent	Community Development
<u>Nature Conservation Egypt (NCE)</u>: this is considered one of the most important and key NGOs in Egypt that is involved in biodiversity protection and conservation. NCE is also the Egyptian partner of the Bird Life International. They have a vested interest in the impacts of the Project on biodiversity in general and avifauna in particular and they key mitigation and monitoring programs that will be implemented.	
<u>Education providers (in particular technical / vocational training institutes)</u>: Provides knowledge and skills required for various occupations, including renewables and solar power in specific that is delivered through formal, non-formal and informal learning processes. The education curriculum in undergraduate, postgraduate, or Technical and Vocational Education and Training (TVET) could be reviewed and revised to match the market and workforce requirements.	

Media (Newspaper, Television, Internet): They could disclose potential information and updates about the Project.
Regional Center for Renewable Energy and Energy Efficiency (RCREEE): responsible for managing certain aspects of the overall development process on behalf of the Developer. This includes in specific the overall management of the ESIA process with the Consultant. In addition, during the operation phase, RCREEE will be responsible in particular for the implementation of the Active Turbine Management Plan (ATMP).

4.5 Stakeholder Consultation and Engagement to Date

4.5.1 Targeted Consultations

As part of the scoping process of the Project, targeted consultations were undertaken with key stakeholders that are relevant to the Project to include but not limited to: (i) central governmental entities; (ii) local governmental entities; (iii) key Non-Governmental Organizations (NGOs); and other.

The objective of such consultations was to:

- Introduce project (rationale, objective, location, key components, etc.)
- Explain and discuss overall methodology for ESIA study
- Explain and discuss key anticipated impacts as relevant
- Identify and determine additional requirements or key issues of concern to be taken into account for the ESIA study

Throughout the consultations a handout was prepared and distributed to such stakeholder groups with key information to include but not limited to rationale for Project, Project location and setting, key components and activities of the Project and other as applicable.

The table below is a condensed breakdown of the stakeholder categories that were engaged.

Table 14: Summary of the consultation activities that were conducted in project area

Stakeholder	Number	
	Males	Females
Ministry of Tourism and Archeology; Red Sea Archeology and Heritage Institute	2	
Nature Conservation Egypt (NCE)	1	-
Egyptian Environmental Affairs Agency EEAA	1	-
Egyptian Electricity Transmission Company EETC	-	4
EEAA Red Sea Branch	1	-
State property Department in the Red Sea Governorate	1	-
Ras Gharib City Council	1	-
local unit of Wadi Dara village	5	-
Red Sea Water and Wastewater Company	1	-
Department of Planning and Projects in the Red Sea Governorate	-	1
General Petroleum Company	1	-
General Administration of Ground Water in Red Sea	-	1
Etisalat Misr Orange company	2	-
Radio and Television Unit in Ras Ghareb and the Red Sea Governorate	4	-
Bedouin families in Ras Gharib	12	-
Total	32	6

The table below presents summary for the outcomes of the stakeholder consultations undertaken.

Table 15: Stakeholder Engagement Strategy and Plan in Relation to the Project

No.	Entity	Outcomes
1	Ministry of Tourism & Red Sea Archeology and Heritage Institute	Attendant(s): - Head of the Egyptian Antiquities Sector - Director of the Red Sea Antiquities Key points: - The nearest known archaeological and heritage sites are located in El Qusayr 232 km from the project site in Jabal El Zayt and 284 km from the Project site in the Gulf of Suez - An appropriate procedure should be in place prior to construction works in order to respond to the potential archaeological and cultural finds at the sites. As part of the procedure, the expectation is that construction works are halted temporarily until the Supreme Council of Antiquities is notified and legal procedures for the documentation and study of the artifact are commenced. Following the Council's further instruction, construction works would resume. Recommended actions include the following: - Desk-based studies by experts (including literature and historic map reviews) - An archeologically survey prior to the commencement of construction.
2	Nature Conservation Egypt (NCE)	Attendant(s): - Director of the NCE Key points: - The project site is located within a critical migration pathway and home to the Egyptian Lizard. - Delivering and incorporating insights on the cumulative impact on biodiversity, and birds in particular, of developed and future wind farms into ESIA's is critically needed. - The attendant is currently conducting a biodiversity survey for a nearby area, which was also allocated for wind farm development. The information and data contained wherein may be provided when it (the survey results) is available for use in the development of the ESIA.
3	Egyptian Environmental Affairs Agency (EEAA)	Attendant(s): - Director of the Energy Projects Impact Assessment Department Key points: - The locations of the project sites are important to biodiversity, particularly for migrating birds. - The discussion (echoing above statements) emphasized that there needs to be greater understanding of the cumulative impacts of the wind energy projects operating and being developed as well as the infrastructure connecting them to the OHTLs in the Gulf of Suez and Jabal al Zeit Areas. - Adherence to guidelines for community and stakeholders consultation in the development of ESIA's as established by the EEAA.
4	Egyptian Electricity Transmission Company (EETC)	Attendant(s): - General Manager of the Environmental and Social Assessments Units - Environmental and Social Specialists for Electricity Generation Projects Key Points: - Adherence to environmental standards during construction and operation

		The sooner the initial paths for the OHTL infrastructure are drawn for each station, the easier it may be to determine and account for their potential impact on migrating birds. EETC has been in the process of meeting with EEAA officials to determine the cumulative impacts of constructing OHTLs on bird and migrating bird populations as well as identifying mitigation measures to reduce such impacts on biodiversity overall.
5	EEAA Red Sea Branch	Attendant(s): - Head of the EEAA Red Sea Branch Key points: - Observing environmental standards during all phases of the project and mitigating impacts that may be detrimental to biodiversity and migrating birds.
6	State Property Department in the Red Sea Governorate	Attendant(s): - Director of the State Property Department in the Red Sea Governorate Key points: - The land allocated for the development of wind farms is state property. There is no ongoing dispute over land nor property rights in the project area. - There are no projects for agricultural reclamation and animal production except for the area designated for Wadi Dara Association, which is still in the development phase, and does not intersect with the land allocated for energy production projects. - Promoting the participation of local communities would likely be aided by the advertisement and provisioning of job opportunities to locally based individuals during the course of the project. Coordinating with the respective City Council(s) was also advised.
7	Ras Gharib City Council	Attendant(s): - Head of the Ras Gharib City Council Key points: - The City Council is supportive of the wind energy projects and investors coming to the area. Wind energy projects are considered the only investment initiative that's come along other than oil projects. - Echoing the statement from above, local communities and key local stakeholders would be motivated to participate and be supportive of the initiative if employment opportunities were offered to the local community. Announcements for employment can be done through the Ras Gharib City Council and through the Council's social media. - The CSR that has been discussed and / or implemented in past years has been limited in scope (typically being designed to support the projects of developers) and have rarely addressed the core interests of the local community including employment opportunities for youth and aiding groups of the local community to be able to develop and promote sustainability.
8	Wadi Dara Representatives	Head of the local unit of Wadi Dara; President of Wadi Dara Valley Association; and employees/ workers within the village The following points were made: The head of the Wadi Dara Association and the head of Wadi Dara local unit stated that the village lacks many services and the services it does have are inadequate due to increased population of its communities. Their main concerns in this regard are the provisioning of electricity for economic activities such as poultry farms. Additionally, they emphasized their interest in agricultural reclamation.

		- He mentioned that the allocation of lands by NREA for the development of energy project in January of this year had resulted in the annexation of parts of the association's lands which was allocated to around 4 investors. Alternative lands of state property were annexed to Wadi Dara Association instead of the land that was included in energy projects as compensation; however, no compensation was provided for these landowners given that they have undertaken some early preparatory works on these lands to include levelling works, demarcation, some excavations, etc. - There is no objection to the alternative land provided by the Red Sea Governorate as it is considered acceptable.
9	Red Sea Water and Wastewater Company (RSWWC)	Attendant(s): - Head of the Red Sea Water and Wastewater Company Key Points: - There are considerable issues regarding the quality (namely high salinity) of groundwater in the governorate, which depends on groundwater for irrigation. The water is non-potable due to its high salinity. - The Project Area is considered uninhabited desert areas and do not contain water nor sanitation infrastructure. - The Petroleum and energy production projects that are already established in the area depend on water purchased from water trucks from Ras Gharib city by contractors. - The Ras Gharib Water and wastewater Company provides services to the urban residences and the area's oil companies including water supplies to Wadi Dara village. - RSWWC's branch located in Ras Gharib could facilitate the site's water needs during the construction and operation phases.
10	Department of Planning and Projects Department of the Red Sea Governorate	Attendant(s): - Staff of Planning and Projects Department of the Red Sea Governorate Key Points: - Gas exploration by General Petroleum Company has been the only other development in the area prior to the Presidential Decree for energy projects in 2016. - The project site is not included in any other of the department's future plans for the development of the Red Sea Governorate. - Because flash flooding has become a concern in recent years, the General Administration of Groundwater in the Red Sea constructed dams within the last five years to control flash flooding. - Request for the locations of oil and gas infrastructure should be made directly and officially to the General Petroleum Company.
11	General Administration of Ground Water in Red Sea	Attendant(s): - Staff civil engineer of the General Administration of Groundwater of the Red Sea Key Points: - In the past three years, the General Administration of Ground Water has implemented projects in Ras Gharib with the aim of reducing the risk of floods to the city and the surrounding villages. - The projects were implemented according to plans and studies prepared by experts from the Water Resources Research Institute of the Ministry of Irrigation. - These studies included field and hydrological surveys of the affected area, identified hazards in the area, and outlined structural mitigation measures to be implemented.

		■ The General Administration of Ground Water has constructed lakes, dams, and an industrial canal with a length of 12 km, in addition to rainwater drainage at the bottom of Sheikh Fadl Road, which were established by the General Administration of Roads and Bridges. ■ The GOS area in general includes a number of important valleys that must be studied for flood risks before starting the Project, including: - El Huwayshiah Valley, high risk - Abu Hadd Valley, high risk - El Duhel Valley, medium to high risk - Dara Valley, medium to high risk ■ The following projects have been implemented in different areas of these valleys to reduce risks: - 4 lakes were built - 3 dams - 2 culverts were built to drain rainwater - An industrial canal with a length of 12 km has been established parallel to the Ras Gharib-Hurghada Road
12	Telecommunications Companies Etisalat Misr and Orange company	Attendant(s): ■ Government Relations Officer at Etisalat Misr ■ Network Engineer for Orange Company Key Points: ■ Officials from the telecom companies confirmed that the Project area has two telecom towers, one for Etisalat Misr and the other for Orange Company. They are located along the Ras Ghareb Al Shaikh road to the south of the project site. ■ The officials requested that Project-related details be made available at least six (6) months prior to the start of construction works in order to avoid potential impacts on the communications network, including: - information related to maximum turbine tip and blade height; - wind turbine fan diameter, - distance from turbine and existing communication tower, - and plans for future development of wind farms. ■ All of the communication towers are constructed near the main roads
13	Radio and Television Unit of Ras Ghareb and the Red Sea Governorate	Attendant(s): ■ Radio engineering officers ■ Network maintenance technicians Key Points: ■ Paths of the radio and television towers paths are close to the project site, extending from Zafarana to Ras Ghareb to Hurghada, in addition to other towers in the direction of Sheikh Fadl Road. ■ The distance between each tower is about 60 km, depending on the terrain of the area ■ The existing radio and television towers receive and transmit microwave signals, and for radio waves - FM, TV and VHF waves

		The consultant sent a fax to Eng. Ashraf Hamed, Head of the Broadcast Engineering Sector at the National Media Authority, including an introduction to the project, the coordinates of the proposed project sites, and awaiting a response in this regard. The response letter affirms (with reference to Presidential Decree No. 116 of 2016, outlining the land allocated to NREA in the Gulf of Suez for the production of electricity from renewable energy sources and the establishment of wind stations) that the Project Site is not in conflict with the services of the radio and television transmission stations in Ras Gharib.
14	Bedouin groups	Two (2) meetings were held with the key representatives and heads of Bedouin families' tribes. The consultant presented the project and the proposed sites for wind farms in Jabal El Zeit and Gulf of Suez areas through maps. In addition to the positive impacts of the project were emphasized in terms of providing temporary job opportunities during construction phase and some limited opportunities during operation phase. The results indicated the following: - There are no settled Bedouin communities in the two project sites. The only settled villages of Bedouin families in the desert area of Ras Gharib are in El Zafarana, and some families (3 families) settled in Wadi Dara village adjacent to the project site in Jabal El Zayt. In addition to some families from the nomadic Bedouins of El Khashman tribe who travel between the valleys in the mountainous area, which is about more 20 km away from the project sites. - The project site or its surrounding areas do not have any major land use activities such as grazing or farming activities. However, the area in general is subject to the Ghufrah system, which is divided between two families, Tababneh family and El Hamadin family. Responsible for the Ghufrah of the project sites is Hamadin family. - The heads of the families explained that the Ghufrah takes place according to predetermined arrangements and agreements between the Bedouin families, according to which the area of jurisdiction of each family is determined. Bedouin families highly respect these agreements because they regulate relations between them. Sheikh Eid representative of El Hammadin family, stated that the agreement defining the areas of jurisdiction of each family was signed by all heads of families in the area, and the Security Directorate in Ras Gharib city was notified of it, because according to this agreement, Bedouin families become responsible for the security of activities that take place in the area. - All attendees emphasized their welcome to wind energy projects in the area, because they represent a source of livelihood for them, and these projects do not conflict with the areas in which some Bedouin families settle or move. Also, this type of investment will not affect the current use of the lands because they are not used for grazing or any other activity other than oil exploration or limited sites for quarry equipment (crushers).



Consultation at Red Sea Antiquities with Head of the Egyptian Antiquities sector



Consultation with the Director of Energy Projects Evaluation Unit of the EEAA



Consultation with officials of the Environmental Department of the EETC



Consultation with the Head of the EEAA Red Sea Branch



Consultation with the Head of Ras Gharib City Council



Consultation with staff of the Planning and Projects Department of the Department of Planning and Projects of the Red Sea Government



Consultation with the General Manager of Petroleum Fields of General Petroleum Corporation



Consultation with Beodoun Groups within the Project Area
Figure 25: Selected photos from the consultations conducted

4.5.2 Public Scoping Session

A public consultation session was held in Ras Gharib City, Red Sea Governorate (Four Seasons venue) on May 24, 2023. The public consultation was an open session for anyone to attend that was announced through an advertisement that was published in El Akbar Newspaper two (2) weeks prior to the session.

Invitations were provided directly to certain stakeholder groups identified by RCREEE and the ESIA consultant to include: EEAA Headquarters and its regional branch, NREA, EETC, Red Sea Governorate (including its environmental office), Ras Gharib City Council, key NGOs / CBOs in the area (including women NGOs/CBOs), local community representatives, and Bedouin groups. Invitees were subsequently informed of the date, location and were provided an executive summary of the Project provided as hard and soft copies and through fax.

A total of 93 participants attended the session.

Table 16: Distribution of Participants

Attendance	No.
Egyptian Environmental Affairs Agency EEAA	2
EEAA - Red Sea	2
Egyptian Electricity Transmission Company EETC	2
Regional Center for Renewable Energy and Energy Efficiency RCREEE	3
New and Renewable Energy Authority NREA	2
Red Sea Electricity Company	1
Suez Winds Energy Company/ Developer	3
Environment Department in Red Sea Governorate	2
Ras Gharib City Council	3
Local community members (Ras Gharib)	32
Bedouin Communities	7
Clergy	2
Youth	4
NGOs	8
Academic institutions	2
Wind energy projects	6
General Petroleum Company and other oil and Gas companies	5
Directorate of Social Solidarity Red Sea	1
National Council for Women Red Sea	2
Total	89

The session was moderated by the following key entities: (i) Representatives from the Suez Wind Company (as the Developer); (ii) Director of the Environment Department in the Red Sea Governorate as a representative of the Red Sea Governor; (iii) RCREEE, EEAA, NREA and EETC representatives and (iv) ESIA consultant.

The public consultation began with a welcome speech by the representatives of all the aforementioned parties and underscored the opportunity for community discussion on the projects impacts, especially energy projects that help to increase investment projects and development.

The ESIA consultant presented the details of the ESIA process which was followed by an open discussion, in which attendees were given the chance to comment/ raise concerns. Among the comments raised by the attendees were related to the economic impact of the intended project, the potential impact of the occurrence of flash floods in the area on the wind farm, potential health impacts on the community and the result of decommissioning of the project.

Regarding the first point, the planning, construction and operation of wind farms in the GoS, as part of GoE's ongoing initiative, has generated an interest on the part of the participants from the local communities in the potential benefits that the project may make available. The range of inquiries, in this regard, included the scale of employment opportunities for local persons and training, as well as the potential for subsidies on the cost of electricity. In response to employment, there are efforts to provide training, in collaboration with the Red Sea Governorate in conjunction with the formation of a Wind Energy Investors Association, to local residents to maximize local recruitment. Additionally, due to the significance of the GoS as a geographic area amid the international bird flyway and the potential risk to migrating birds the operation of the wind farm may pose, there is to be an initiative centered on recruiting and training Beduins in bird identification and classification to enhance monitoring of the Project's impact in this regard. As far as subsidies on electricity is governed and within the jurisdiction of the government. While the Project supports the GoE's objectives in increasing the share of electricity generated by renewable sources, there is currently no defined activation of the Project to provision subsidies on electricity costs in this way.

On the topic of flooding, there is a dam and artificial lake located within the Project site that fills during rainfall. To avoid risks that may be associated with flooding, such as damage to project infrastructure, inspections have been conducted to inform the placement of turbines and roads.

An inquiry was expressed about the safety and exposure to electromagnetic waves from the Project. The attending project team affirmed that wind energy generators emit minimal electromagnetic waves and that there is currently little evidence to suggest they impose a negative impact.

In general, the timeline for decommissioning is defined by the perceived viability of the project as well as by the scope of tenders offered by the Renewable Energy Authority.

4.6 Future Stakeholder Engagement and Consultation

Future stakeholder engagement and consultations will mainly include the following, each of which is discussed in further details.

4.6.1 Disclosure of the ESIA document

The below documents will be disclosed to allow any stakeholder to review the studies and comment on the scope of work undertaken, key issues identified and any other issues of concern they might have. At the end of the disclosure period, all received comments will be addressed and taken into account and an updated as appropriate.

- Non-Technical Summary (NTS)
- Stakeholder Engagement Plan (SEP)
- Environmental and Social Impact Assessment (ESIA) including OHTL assessment
- Critical Habitat Assessment (CHA)
- Environmental and Social Management System (ESMS) Manual
- Biodiversity Management Plan (BMP)
- Flood Study
- Bat Addendum Report
- Environmental and Social Action Plan (ESAP)
- Scope of work: Project Strategic Environmental and Social Assessment and Cumulative Impact Assessment. Note: the study itself will be undertaken throughout the disclosure period
- Cumulative Effect Assessment (CEA)
- Biodiversity Action Plan (BAP)

- Bird Migration Study for Suez Wind Energy ACWA Power BOO Wind Power Plant 1.1 GW during Spring and Autumn seasons, 2022
- Spring Bird Migration Study Suez Wind Energy BOO Wind Power Plant 1.1. GW – SWE Plots 1 & 2, 2023
- Autumn Bird Migration Study Suez Wind Energy BOO Wind Power Plant 1.1. GW – SWE Plots 1 & 2, 2023

The above documents are available at the following avenues:

- Developer Website **www.acwapower.com**. The documentation above will remain at the website for the life of the project.
- Hard copies available at

Red Sea Governorate

October 6, Hurghada,
Red Sea Governorate, Egypt
Tel: 065354627/06535546337

Ras Ghareb Local Governmental Unit

Location: Al-Mina Street City: 11432
Ras Ghareb – Red Sea
Tel: 01001318480 – 0120195877

- Soft copies can also be made available to stakeholders via email to:

arizk@acwapower.com

4.6.2 Public Disclosure Session

A public disclosure session will be undertaken. The list will involve targeted stakeholders that will be identified by the “ESIA Team” in coordination with EEAA and other authorities. The session will be undertaken in the GoS primarily targeted for local governmental institutions and local communities – this session will be announced through newspaper advertisement at least one week in advance. The objective of the sessions is to:

- Introduce the Project to stakeholders;
- Identify the key anticipated impacts;
- Present the methodology for the ESIA study;
- Present key outcomes and conclusions; and
- Comments on scope of work undertaken, key issues identified and any other issues of concern.

As discussed earlier, once the public disclosure session is completed (and at the end of the 60-day disclosure period), all received comments will be addressed and taken into account and an updated ESIA will be submitted.

4.6.3 Stakeholder Engagement Plan

Stakeholder Engagement is an on-going process that involves: stakeholder analysis & planning, disclosure & dissemination of information, consultation & participation, grievance mechanism, and on-going reporting to Affected Communities. A Stakeholder Engagement Plan (SEP) is developed and implemented that is scaled to the Project risks and impacts and development stage, and be tailored to the characteristics and interests of the Affected Communities and key stakeholders.

The SEP for the Project describes the planned stakeholder consultation activities and engagement process and includes the following:

- Define the Project’s approach to future stakeholder engagement;

- Identify stakeholders within the area influenced by the Project;
- Profile identified stakeholders to understand their priorities;
- Propose an action plan for future engagement with identified stakeholders; and
- Set out the grievance/project complaints mechanism.
- The Developer is committed to implementing the requirements of the SEP throughout the lifetime of the Project. The SEP is provided as a standalone document.

5. REGULATORY AND POLICY FRAMEWORK

This chapter first provides an overview of the environmental clearance process for the Project. The Chapter then discusses the regulatory context which is directly related to environmental compliance which must be adhered to by all parties involved in the Project throughout the planning and construction, operation, and decommissioning. The Chapter goes on to summarise the relevant international agreements and conventions to which Egypt is a signatory.

Finally, as the Project is seeking financing from IFIs, this Chapter highlights the E&S policies and requirements of the IFIs which must be adhered to by the Developer.

5.1 Egyptian Environmental Institutional Framework

Egyptian Environmental Affairs Agency (EEAA)

The EEAA is an authorised state body regulating environmental management issues. Egyptian laws identify three main roles of EEAA:

- A regulatory and coordinating role in most activities, as well as an executive role restricted to the management of natural protectorates and pilot projects.
- The responsibility of formulating the Environmental Management (EM) policy framework, setting the required action plans to protect the environment and follow their execution in coordination with Competent Administrative Authorities (CAAs).
- The responsibility of EEAA in reviewing and approving the ESIA studies for new projects/expansions undertaken as well as monitoring the implementation of the ESMP.

Environmental Management Unit (EMU)

The Environmental Management Unit (EMU), at Governorate and district level, is responsible for the environmental performance of all projects/facilities within the Governorates premises. The Governorate has established EMUs at both Governorate and city/district levels. EMUs are responsible for the environmental protection within the Governorate boundaries. They are mandated to undertake both environmental planning and operation-oriented activities. EMU is mandated to:

- Follow-up the environmental performance of the projects within the Governorate during both construction and operations phases to ensure the project is in compliance with the laws and regulations as well as with the mitigation measures included in its ESIA approval.
- Investigate any environmental complaints filed against projects within the Governorate.
- EMUs are administratively affiliated to the Governorate, yet technically to EEAA. EMUs submit monthly reports to EEAA with their achievements and inspection results.
- The Governorate has a solid waste management unit at Governorate and district level. The units are responsible for the supervision of solid waste management contracts.

Competent Administrative Authorities (CAAs)

The Competent Administrative Authorities (CAAs) are the entities responsible for issuing licenses for project construction and operation. The ESIA is considered one of the requirements of licensing. The CAA for this project is NREA. NREA is thus responsible for receiving the ESIA studies, checking the information included in the

documents concerning the location and for the suitability of the area to the project activity. It is also responsible for ensuring that the activity does not negatively impact the surrounding activities and that the location is in compliance with the ministerial decrees related to the activity. NREA forwards the documents to EEAA for review and to issue its response in 30 days period. They are the main interface with the project proponents in the ESIA system. The CAA is mandated to:

- Provide technical assistance to Project Proponents
- Ensure the approval of the Project Site
- Receive ESIA Documents and forward it to EEAA
- Follow-up the implementation of the ESIA requirements during post construction field investigation (before the operation license).

Other related national government & permitting authorities

Table 17: Other Related National Government & Permitting Authorities

Entity	Scope
EETC	Purchase of electrical energy produced from power plants, which authorizes local and foreign investors to create, and sell them on the ultra-effort networks. The implementation of projects for the electricity transmission
NREA	NREA act as the national focal point for expanding efforts to develop and introduce renewable energy technologies to Egypt on a commercial scale together with implementation of related energy conservation programs. NREA is entrusted to plan and implement renewable energy programs in coordination with other concerned national and international institutions within the framework of its mandate
GPC	A national State-owned company engaged in exploration, production and development of hydrocarbons, is responsible for the management of oil and gas exploration and production activities on behalf of the State. It is one of the subsidiary companies affiliated to the Ministry of Petroleum It has the right of concession for petroleum exploration in some parts of the project area and adjacent areas. Represents the main investment activity in the project area
Ministry of Defence: Army Intelligence force, Border guards	They also provide permissions to get into the desert area. Secure and support the project.
Red Sea Governorate	The main role of the governorate is supporting the project by providing the various permissions needed, and infrastructure maps in case if needed.
Ras Gharib City Council	Involved in several requirements to include: (i) provide permits for any construction activities within their area of jurisdiction; (ii) supervision and follow-up from the Environmental Department in Ras Gharib City Council during the construction phase; and (iii) provide services related to solid waste collection and disposal.
Water and wastewater Company in Ras Ghareb	Provide the project needs of water and wastewater disposal during the construction phase; through the construction contractors (In the case of contracting with them).
Public Health: Directorate of Health in Red Sea Governorate, Ras Ghareb General Hospital	They provide the health services and facilities to the local districts.
Manpower Directorate: Labour Office in Red Sea Governorate	Data of the labour force in Suez Governorate and complaints of workers. Monitor labour recruitment standards during construction.
Roads Directorate in Red Sea Governorate	Services and development of external roads in the governorate. Issuing permits for any construction work on the external roads.

Entity	Scope
Ministry of Interior	MI is responsible for national and local security, as well as approving emergency response and firefighting plans for establishments/projects.
EEAA	Issues the Environmental approval for the project. Monitors the compliance with the conditions of approval.
Ministry of Electricity and Renewable Energy	The ministry of electricity is the responsible entity for the generation, transmission and distribution of electricity in Egypt, under which operates NREA, Egyptian Electricity Holding company and EETC.
Ministry of Environment	The ministry of Environment is the entity responsible for the formulation of environmental policies. The preparation of necessary plans for environmental protection and environmental development projects and following up on the implementation of all of the above. Under the ministry, the EEAA and the Nature protection bureau operate.
Ministry of petroleum and mineral resources	The ministry of petroleum is the entity responsible for the supervision of the exploration, production, marketing and distribution of oil, gas and other natural resources
Ministry of Antiquities	The ministry of antiquities is the entity responsible for the preservation and protection of the heritage and ancient history of Egypt, under which operates all inspector offices in the governorates
Red Sea Governorate antiquities inspector offices	First contact in case of any chance finds during construction. Responsible for protecting and managing antiquities in the area.
Ministry of Civil Aviation	Civil aviation approval might be necessary for large-scale wind farms. The impact of wind turbines on air traffic control systems, radar, and aircraft operations is evaluated by the civil aviation authority.
Ministry of Transportation	Provide the necessary permissions and approvals related to potential traffic disruptions during the construction phase, such as the transportation of blades.

5.2 Egyptian Environmental Clearance Process

The ESIA is governed by the Law No. 4 of 1994 and its amendments, the Law on Protection of the Environment and its Executive Regulations 1995 and its amendments (Prime Ministers Decree 338). According to Law 4 of 1994, applications for a license from an individual, company, organization or authority, an assessment of the likely environmental impacts of development projects should be undertaken. An ESIA is required for all electricity generation projects including renewable energy projects.

Based on the categorisation of development projects included within the Guidelines for EIA issued by the EEAA in 2009, wind farm projects are considered under Category C projects (projects with high potential impacts) which require undertaking a full ESIA study.

The involvement of the public and concerned entities in the EIA planning and implementation phases is mandatory for Category C projects through the public consultation process with concerned parties. Consultation is undertaken twice during the EIA process the first in the phase of identifying the scope of the project EIA, and the second is after the preparation of the draft EIA.

Before the public consultation on the draft EIA, the draft technical summary in Arabic should be disclosed to all concerned parties. After the EIA process is complete, the EIA report will be stored at EEAA's central library or that of the RBO of the projects region. Moreover, the executive summary of the final EIA will be available at EEAA website. The project proponent should identify in a letter attached to the EIA the parts that he/she does not wish to disclose. These include sections that may have sensitivity related to trade, technology, or security.

An individual chapter in the EIA should be prepared for public consultation including:

- Methodologies used to inform and involve concerned parties in the EIA process
- Analysis of the data and information gathered and feedback acquired.
- Table with all aspects that have been discussed during the public consultation meetings and how the project will address or mitigate the aspects
- Methodologies followed by the project proponent to ensure the continuity of the consultation process during the construction and, operation phases and until the project reaches the closure phase.
- Commitments of the project owner to improve surrounding environment and support the neighboring community

An Annex in the EIA should be prepared for public consultation including: Documentation of public meetings and meetings including dates, name of attendees as well as agenda and topics of discussion.

The ESIA process is set according to the guidelines issued by the EEAA including: EIA Guidelines (2009), and the Environmental Impact Assessment Guidelines and Monitoring Protocols for Wind Energy Development Projects along the Rift Valley/Red Sea Flyway with a particular reference to wind energy in support of the conservation of Migratory Soaring Birds (MSB) (2013).

The key requirements for a full ESIA as per the requirements above include the following:

- Environmental and Social (E&S) Regulatory and Legal Review
- Project Description
- Description of the Baseline Environment (physical, biological, social)
- Identification and Analysis of Impacts
- Analysis of Alternatives
- Public Consultation (on the draft ESIA)
- Environmental Management Plan (EMP) (mitigation measures, monitoring program, institutional arrangements)
- Upon submission of the ESIA report by the ESIA Practitioner to the CAA in charge of issuing licences, sends the ESIA to EEAA for evaluation. The EEAA shall review the ESIA and provide comments or feedback within 30 days. The CAA in charge of issuing licences in case of wind power projects is the NREA.
- After submission of an ESIA for review, the EEAA may request revisions in the ESIA report within 30 days, including additional mitigation measures, before issuing the report approval.

5.3 Egyptian E&S Regulatory Context

This section lists those legislations that are directly related to environmental and social compliance that must be adhered to by all parties involved in the Project throughout the planning and construction, operation, and decommissioning phase. These legislations include: (i) those issued by EEAA (laws, regulations and instruction), and (ii) the relevant national legislations issued by other line ministries (laws, regulations, instructions, standards).

The table below lists the key relevant legislation and regulator/entity relevant to each of the environmental and social parameter being studied and assessed within this ESIA. Throughout the following Chapters, reference to the requirements set out within those legislations is provided under each relevant parameter.

Table 18 Relevant Legislation and Regulations of Environmental and Social Parameters

Legislation	Relevant Article	Requirements
Land Use		
Electricity Law 87/2015	Article 53	Stipulates the right of proper compensation for the affected persons due to the establishment of Electricity projects
	Article 55	- Identifies the Right of Way that should be avoided for the OHTL and the underground cables: 25 meters from the centre for extremely high voltage OHTL 13 meters from the centre for the high voltages OHTL 5 meters for the medium voltage OHTL 5 meters for the high and extremely high voltage cables 2 meters for low and medium voltage cables - The Owner of the land should be compensated in case of land acquisition. The right of way stated in article 55 should be abided by
Law 10/1990	The project will not entail land acquisition	The main site is located on a state-owned land which does not trigger any expropriation activities, according to law no. 10/1990.
Law 577/1954	Law 577/54, later amended by Law 252/60 and Law 13/162	- Establishes the provisions pertaining to the expropriation of real estate property for public benefit and improvement. - The project will not entail any land acquisition activities
Civil code 131/1948	Articles 802-805	- Recognises private ownership right. - Article 802 states that the owner, pursuant to the Law, has the sole right of using and/or disposing his property. - Article 803 defines what is meant by land property - Article 805 states that no one may be deprived of his property except in cases prescribed by Law and would take place with an equitable compensation. - Land for the Project was allocated by NREA and was not previously owned and thus no compensation would be needed
Unified Building Law No. 119 of year 2008	Article 39	- Apply and receive the construction permit before start of the implementation - Ensure that all designs abide by the building codes of Egypt
Geology, hydrology, hydrogeology		
Law 4/1994	Article 33 of the Executive regulations of Law 4/1994	The owner of the project is responsible to decontaminate the area/soil in case of relocation or decommissioning

Management of solid waste and hazardous waste generated from the facility during generation, handling, transportation and disposal		
Law 4/1994 amended by Law 9/2009 and ER 1095/2011 amended by Decree 710/2012)	Articles 28, 29, 33, 37, 39	- Identification: Using the HW lists issued by the competent authority. - Minimization: strive to reduce quantitatively and qualitatively the generation of the HW - Segregation: HW is to be separated from other types of non-hazardous waste. In addition, the different types of HW must not be mixed together. - On site Storage: HW is to be stored in a designated area, and containers must be made of suitable materials and be properly sealed to avoid any leakages or spills into the surroundings. - Off-site transportation: HW is to be submitted to authorized HW contractors. - Obtaining a license from the competent authority to handle Hazardous waste
	Article 22 and Article 17 of the Executive Regulations	The establishment should maintain an environmental register in accordance with Annex 3 of the Executive regulations
	Article 39 and Article 41 of the Executive Regulations	- Article 39: The establishment should maintain the cleanliness of garbage bins and vehicles. Garbage collection bins shall be tightly covered and waste shall be transported at suitable intervals. - Article 41: The establishment shall undertake necessary precautions to secure the safe storage and transportation of waste. These precautions include the following: - Construction waste storage is to be carried out at site such that it does not obstruct movement of vehicles and personnel. - Waste subject to emission should be covered to avoid air pollution - Waste is to be submitted to authorized waste contractors
	Articles 26, 28 and 29 of the Executive regulations	The establishment should maintain a register for the hazardous waste should be maintained as well as record for the hazardous substances used
Law 202/2020 on waste management and its executive regulation 722/2022	Article 10	The waste generators or holders shall safely dispose of the wastes of their establishment or their projects or entities after the delivery or initial operation of the new or renovated projects, or after the completion of the works from which wastes are generated, whatever their purpose, within a period not exceeding twenty days starting from the date of delivery or initial operation of the project or works, in the event that these wastes are located outside the boundaries of these establishments. or projects. The generators or possessors of the waste shall also abide by the measures and requirements set out in the appendices attached to this regulation.
	Article 36	All entities and individuals, when carrying out demolition and construction works, are obligated to manage safe transportation, recycling and final disposal through entities licensed and authorized to do so.
	Article 50	The owner of the facility or the person in charge of its management whose activity produces hazardous waste, in accordance with the provisions of the law, must keep a paper or electronic record, or both, of these wastes, and how to dispose of them, as well as the parties contracting with them for any management operations of these wastes, and in the event that the activity of the facility is transferred or

		suspended The owner of the facility or the person responsible for its management must clean it and the soil in which this activity was carried out, in accordance with the requirements and standards set out in Appendix No. (8) attached to this regulation.
Control of the wastewater discharge into the sewage system and public network.		
Ministerial Decree 44/2000, Decree of Law 93/1962	Article 14	- The law prohibits the disposal of domestic, industrial and commercial wastewater, treated or untreated, in public drainage system without obtaining a prior approval. - Article 14 of the executive regulations set the parameters required regarding the quality of the wastewater discharged to the public sewage network. - The owner of the project should abide by the limits stated in article 14 of the Executive regulations of Law 93/1962
Biodiversity, Birds, and Bats		
Law 4 of 1994	Article 28, as amended by Law 9 of 2009. Annex 4 of the Executive Regulations of law 4/1994, amended by Prime Minister Decree 1095 of 2011	- Defines fauna and flora which are forbidden to be hunted or disturbed. - Ensure that no species are being disturbed and implement all mitigation measures needed to reduce the impact on any fauna and flora in the vicinity of the project
Environmental Impact Assessment Guidelines and Monitoring Protocols for Wind Energy Development Projects along the Rift Valley/Red Sea Flyway with a particular reference to wind energy in support of the conservation of Migratory Soaring Birds (MSB)	Section One Guidelines for Environmental Impact Assessment for Wind Energy Development in Egypt 1.5 Description of EIA Study Components for Wind Farm Projects – 0.7 Project Environmental Setting	- Defines the ecological components of plant, animals and their habitats, including threatened species and areas that have been identified as protected areas or IBAs and requests the review IUCN Red List of Threatened Species. - Defines baseline information requirements for birds at Wind Farm Projects.
	Section Two Guidelines on Mitigation, Monitoring and Training 2.2 Monitoring Protocols	- Defines standard methods and models to predict risk for migratory birds. - Define standard methods used in pre- and post-construction studies of Wind Energy Facilities are focused on assessing impacts on birds. - Define standard protocol to be implemented building on results of species recorded and numbers of passage birds recorded during studies.
Archaeology and cultural heritage		
Law 117/1983	Article 1	Defines a monument as a building or movable property produced by different civilizations or by art, sciences, literature and religions from prehistoric era and during successive historical eras until a hundred years ago or historical buildings.

	Article 2	States that any building or movable property that has an historical, scientific, religious, artistic or literary value could be considered as a monument whenever the national interest of the country imposes its conservation and maintenance without adherence to the time limit contained in the preceding Article no.1
	Article 5	States that the Supreme Council of Antiquities (SCA) is the competent authority responsible for antiquities in Egypt.
	Article 20	- States that license of construction in archaeological sites or land is not permitted. It is prohibited to make any installation or landfill or digging channels, construct roads, agricultural land or for public benefits in the archaeological sites or land within its approved border lines. - The Article additionally, states that a buffer zone around the monument or the site is defined as three kilometres in the uninhabited areas or any distance determined by the SCA to achieve environmental protection of the other parts of the monument in the surroundings (article 20-Ch.1). - The provisions of this article (20) apply on land which appears to the SCA - based on conducted studies – that there is a probable existence of monuments in the subsoil. - The provisions of this article are also applied to desert and areas where quarrying work is licensed.
	Article 22	- States that license of construction in the immediate vicinity of archaeological sites within populated areas could be delivered by the competent authority, after the approval of SCA. - The competent authority must state in the license the conditions which the SCA emphasizes to guarantee that the building does not have a negative visual impact on the monument and its direct buffer zone protecting the archaeological and historical surroundings. - The SCA has to pronounce its verdict on the license demand within 60 days of the date of submission. Otherwise, the elapsing of this period is regarded as a decision of refusal.
	Article 23	- States that the SCA should take the necessary steps to expropriate land that is found in or kept in place and registered according to the rules of this Law. (Article 23- Ch.1). [These rules are defined in the second chapter of the Law 117 – articles 26-30]. - The Ministry of State for Antiquities must be notified in the event that an unrecorded ruin is found by any person (Article 23).
	Article 24	- States that everyone finding by chance part or parts of a monument in its place must promptly inform the nearest administrative authority within forty-eight hours. - Although there are no cultural heritage areas in the site vicinity, the ESIA report will refer to relevant regulations for unexpected cases of chance finds.
Air quality and noise		
Law 4/1994 amended by Law 9/2009 and ER 710/2012	Article 42 of Law 4/1994 amended by Law 9/2009	Maximum allowable limits for ambient noise intensity and maximum exposure duration

	Article 44 of ER 710/2012	Open burning of garbage and non-hazardous solid waste is strictly prohibited, and garbage and solid waste shall only be dumped or treated in designated areas away from residential, industrial, agricultural and waterways.
		- Dumping areas should be bound by a wall, away from obstruction, traffic and pedestrians and take into account the coverage of volatile soil so as not to cause air pollution. - Transporting waste and dust resulting from excavation, demolition and construction in special containers or using transport vehicles prepared and licensed for this purpose. (A) The vehicle shall be equipped with a special box or a tight cover that prevents the spread of dust and debris to the air or falling on the road. (B) The vehicle shall be equipped with special equipment for loading and unloading. (C) The car should be in good condition according to the rules of safety, durability and lights and equipped with all safety devices.
	Article 38 of ER	Ensure that the places to which this type waste transported so that a distance of not less than 1.5 km from the residential areas and be of a low contour level and settled after filling and filling.
ERs (amended by Decree 1095/2011 amended by Decree 710/2012)	Annex 5	Maximum limits of ambient air pollutants
	Annex 6	Permissible limits of air pollutants in emissions
	Annex 8 and Annex 9	Maximum allowable limits for air emissions, heat stress, ventilation rates within the work environment
Modified ERs (710/2012) of Law 4/1994	Article 37	Maximum allowable limits for exhaust gases from machines, engines and vehicles.
Law 4/1994	Article 36	It is prohibited to use machines, engines or vehicles whose exhaust emissions exceed the limits set by the executive regulations of this Law.
Law 4/1994 and its modified ERs	Article 35 of Law 4/1994 and article 34 of its modified ERs	Maximum allowable limits for ambient air pollutants stated should be met by the contractors and operator throughout the lifetime of the plant.
Infrastructure and utilities		
Petroleum pipelines Law 4/1988	Decree 292/1988	The owner of a property should allow the passing of pipelines transporting liquid or gaseous hydrocarbons beneath the ground surface in accordance with the procedure mentioned in the executive regulations
	Article 2	- Specifies that no buildings or trees, other than agricultural land trees, should be constructed or planted at a distance less than 2 m on each side of the pipeline inside urban and 6 m on each side of the pipeline outside the urban areas. - If it is necessary to place the pipelines at a closer distance than what is specified in the law, it is allowed through a decision from the chairman of Egyptian General Petroleum Corporation (EGPC); taking into consideration the necessary safety precautions. - also specifies that if the activities done in accordance to the law will result in damage to the property, the

		owner has the right to a fair compensation to be decided by a committee formed by a decision from the Minister of Petroleum, and the executive regulations include the guidelines for compensation estimation.
Occupational health and safety		
Law 4/1994	Articles 43 – 45 of Law 4/1994, which address air quality, noise, heat stress, and the provision of protective measures to workers.	▪ The owner of the project should abide by the limits stated in Annex 7 of the Executive regulations ▪ In case the limits are exceeded, special protective equipment should be made available (earmuffs, masks...) ▪ In case the limits are exceeded, the workers should have rests as specified by the limits (especially for noise and vibration from electric jack hammers or any other ramming equipment) ▪ Conduct regular medical check-ups for workers that are facing noise, vibration or heat stress exceeding the limits
Law 12/2003 on Labour and Workforce Safety	Articles 80-87	▪ Regulates working hours and rest times for workers ▪ The working hours shall include a period of one or more meals and rest not less than one hour in total and the period shall not exceed five consecutive hours. The competent minister may, by a decision, determine the cases or works which are imperative for technical reasons or operating conditions. ▪ Work hours and rest periods should be organized so that the period between the beginning and the end of working hours does not exceed ten hours per day.
		▪ Work shall be organized at the facility so that each worker shall receive a weekly rest of not less than 24 hours after six working days at most. In all cases, weekly rest shall be paid. ▪ The employer shall put on the main doors used by the workers for entry, as well as in a visible place in the establishment a schedule showing the weekly rest day, working hours and rest periods for each worker and the amendment to this schedule.
	Book 3 - Single worker contract: Article 32	▪ The employer shall be obliged to issue the contract in writing in Arabic in three copies. The employer shall keep one and deliver a copy to the worker. In particular, the contract shall include the following data: ▪ Name of employer and place of work. ▪ The name of the worker, ▪ his qualification, ▪ his profession or craft, ▪ his insurance number, ▪ his place of residence and what is necessary to prove his identity. The nature and type of work being contracted. ▪ If there is no written contract for the worker, the unit to prove his rights, all methods of proof. The employer shall be given a receipt for the papers and certificates he has deposited with him.

Law 12/2003 on Labour and Workforce Safety and Book V on Occupational Safety and Health (OSH) and assurance of the adequacy of the working environment	Minister of Labour Decree 48/1967. Minister of Labour Decree 55/1983. Minister of Industry Decree 91/1985 Minister of Labour Decree 126/2003. Minister of Industry Decree 134/2003	▪ The owner of the project is bound with the provision of protective equipment to workers and fire-fighting/emergency response plans. Moreover, the following laws and decrees should be considered: ▪ The contractors should have appropriate number of first aid kits in relation to the size of the site and the number of workers on site ▪ Work-related accidents, injuries, fatalities and diseases should be notified and bi-annual OHS statistics reporting should be developed. ▪ Types of establishments needing to establish OHS services and committees.
	Article 211 and article 34 of the Decree of the Minister of Labour and Manpower no. 211/2003	▪ The establishment should prepare records/reports/register for chemical safety
Law 137/1981	Article 117	▪ The employer should inform his workers of the hazards associated with non-compliance with safety measures
Decree 458/2007		▪ Egyptian Drinking Water Quality Standards should be met for all water bought and stored on site for the workers' use.
Decree 162, 2019	Articles 5, 9, 11, 19.	▪ Without prejudice to article 17 of the Labour Act (No. 12 of 2003), all parties, including Government entities and their affiliated bodies, public sector companies, the public business sector, the private sector, trade-union and professional associations and youth employment agencies are prohibited from employing workers subject to this regulation other than via the competent department in the Directorate of Manpower and within whose competence the activity falls. ▪ Labour, occupational safety and health inspectors are required in the course of conducting their inspections to monitor the informal
Decree 162, 2019	Articles 5, 9, 11, 19.	▪ Without prejudice to article 17 of the Labour Act (No. 12 of 2003), all parties, including Government entities and their affiliated bodies, public sector companies, the public business sector, the private sector, trade-union and professional associations and youth employment agencies are prohibited from employing workers subject to this regulation other than via the competent department in the Directorate of Manpower and within whose competence the activity falls. ▪ Labour, occupational safety and health inspectors are required in the course of conducting their inspections to monitor the informal workers in the establishments under inspection and to notify employers that they are required to proceed to the competent department of the Directorate to register these workers, regularize their status and take the requisite legal measures as per the provisions of the Labour Act and its implementing ministerial decisions. ▪ Without prejudice to the social insurance and pensions system in force, the employer shall at his own expense provide first aid to any worker subject to the provisions of this regulation who suffers injury during work and he shall transport him to the requisite provider treatment.

		Labour, occupational safety and health and employment inspectors shall monitor the employment of workers subject to the provisions of this regulation and the enforcement of the rules for employment set out in this regulation.
Law 94/2003		- The Law on Establishing the National Council for Human Rights (NCHR) aims to ensure respect, set values, raise awareness and grant observance of human rights. - At the forefront of these rights and freedoms are the right to life and security of individuals, freedom of belief and expression, the right to private property, the right to resort to courts of law, and the right to fair investigation and trial when charged with an offence. - This Constitution came into force after a public referendum on 11th September 1971 and was amended on 22nd May 1980 to introduce the Shoura Council and the press.
EEAA EIA guidelines	Paragraph 6.4.3.1 Scope of Public Consultation Paragraph 6.4.3.2 Methodology of Public Consultation Paragraph 6.4.3.3 Documentation of the Consultation Results Paragraph 7 Requirement and Scope of the Public Disclosure	- Conduct a public consultation as part of the ESIA study according to the EEAA guidelines methodology. The involvement of the public and concerned entities in the EIA planning and implementation phases is mandatory for Category C projects through the public consultation process with concerned parties. - Preparation of the Public Consultation Plan before starting the consultation activities in the EIA scoping phase, the project proponent prepares a plan indicating the methodology of the public consultation to be adopted in the two public consultation phases (EIA scoping phase and consultation on the draft EIA). The plan should indicate the concerned parties that will be consulted, method of consultation and other points. - An individual chapter in the EIA will be prepared for public consultation - Disclosure of relevant material is an important process and should be undertaken in a timely manner for all Category C projects. This process permits meaningful consultations between the project proponent and project-affected groups and local NGOs is required to take place. Before the public consultation on the draft EIA, the draft technical summary in Arabic should be disclosed to all concerned parties. - workers in the establishments under inspection and to notify employers that they are required to proceed to the competent department of the Directorate to register these workers, regularize their status and take the requisite legal measures as per the provisions of the Labour Act and its implementing ministerial decisions. - Without prejudice to the social insurance and pensions system in force, the employer shall at his own expense provide first aid to any worker subject to the provisions of this regulation who suffers injury during work and he shall transport him to the requisite provider treatment. - Labour, occupational safety and health and employment inspectors shall monitor the employment of workers subject to the provisions of this regulation and the enforcement of the rules for employment set out in this regulation.

Socio-economics		
Law 94/2003 EEAA EIA guidelines	Paragraph 6.4.3.1 Scope of Public Consultation	▪ The Law on Establishing the National Council for Human Rights (NCHR) aims to ensure respect, set values, raise awareness and grant observance of human rights. ▪ At the forefront of these rights and freedoms are the right to life and security of individuals, freedom of belief and expression, the right to private property, the right to resort to courts of law, and the right to fair investigation and trial when charged with an offence. ▪ This Constitution came into force after a public referendum on 11th September 1971 and was amended on 22nd May 1980 to introduce the Shoura Council and the press. ▪ Conduct a public consultation as part of the ESIA study according to the EEAA guidelines methodology. The involvement of the public and concerned entities in the EIA planning and implementation phases is mandatory for Category C projects through the public consultation process with concerned parties. ▪ Preparation of the Public Consultation Plan before starting the consultation activities in the EIA scoping phase, the project proponent prepares a plan indicating the methodology of the public consultation to be adopted in the two public consultation phases (EIA scoping phase and consultation on the draft EIA). The plan should indicate the concerned parties that will be consulted individual chapter in the EIA will be prepared for public consultation ▪ Disclosure of relevant material is an important process and should be undertaken in a timely manner for all Category C projects. This process permits meaningful consultations between the project proponent and project-affected groups and local NGOs is required to take place. Before the public consultation on the draft EIA, the draft technical summary in Arabic should be disclosed to all concerned parties., method of consultation and other points.
	Paragraph 6.4.3.2 Methodology of Public Consultation	
	Paragraph 6.4.3.3 Documentation of the Consultation Results	
	Paragraph 7 Requirement and Scope of the Public Disclosure	

5.4 International Agreements

Egypt has signed and ratified a number of international conventions committing the country to the conservation of environmental resources and protection of workers' health & safety and labour rights. The following Table lists the key conventions:

Table 19: Relevant Egyptian International Conventions and Agreements

Name of Multilateral Environmental Agreement	Date of ratification	Ratification date by Egypt
<i>Biodiversity and Natural Resources</i>		
International Plant Protection Convention	1951	September 12, 1954
Agreement for the Establishment of a Commission for Controlling the Desert Locust in the Near East	1965	July 10, 1963.
Convention on Wetlands of International Importance Especially as Water Fowl Habitat (RAMSAR)	1971	October 24, 1982
Convention Concerning the Protection of the World Cultural and Natural Heritage	1972	May 14, 1975
Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)	1973	September 30, 1976
Convention on the Conservation of Migratory Species of Wild Animals	1979	April 30, 1980
Protocol to Amend the Convention on Wetlands of International Importance Especially as Water Fowl Habitat	1982	September 25, 2002
Convention on Biological Diversity (CBD)	1992	June 2, 1993
Agreement for the Establishment of the Near East Plant Protection Organization	1993	December 5, 1953
United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa	1994	October 8, 1996
Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean	1995	December 1, 1995
African Convention on the Conservation of Nature and Natural Resources (revised)	2003	November 29, 2006
International Tropical Timber Agreement	2006	February 27, 1995
<i>Hazardous Materials and Chemicals</i>		
Convention Concerning Prevention and Control of Occupational Hazards Caused by Carcinogenic Substances and Agents	1974	May 14, 1979
Convention on the Prohibition of the Development, Production and Stock-Piling of Bacteriological (Biological) and Toxin Weapons, and on their Destruction	1972	September 8, 1972
Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal	1976	March 10, 1997
Convention on the Prohibition of Military or any other Hostile Use of Environmental Modification Techniques	1976	June 30, 1981
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	1989	September 24, 1984
Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa	1991	May 26, 1995
Amendment to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	1995	July 15, 1992
Stockholm Convention on Persistent Organic Pollutants (POPs)	2002	May 17, 2005

Atmosphere, Air Pollution and Climate Change		
Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies	1967	January 12, 1984
Vienna Convention for the Protection of the Ozone Layer	1985	April 2, 1988.
Montreal Protocol on Substances that Deplete the Ozone Layer	1987	March 28, 1990
(London) Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer	1990	September 25, 1990.
United Nations Framework Convention on Climate Change	1992	June 11, 1994
(Copenhagen) Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer	1992	September 19, 2005
Name of Multilateral Environmental Agreement		
Kyoto Protocol	1997	February 27, 2005
Paris Agreement under the United Nations Framework Convention on Climate Change	2015	November 4, 2016
Health and Worker Safety		
International Labour Organization Core Labour Standards	1936	1957-1967
Convention Concerning the Protection of Workers Against Ionizing Radiation	1960	October 14, 1961.
Convention Concerning the Protection of Workers Against Occupational Hazards in the Working Environment due to Air Pollution, Noise and Vibration	1977	June 28, 1976
Occupational Safety and Health Convention	1979	June 28, 1976

5.5 Requirements for Project Financing – IFI's Requirements

The Project will be seeking financing from IFI. Therefore, the E&S requirements of such IFI's must be considered throughout the Project development, which require the Project development to adhere to specific E&S requirements which reflect international best practice.

For the purpose of the ESIA, it will be based on the International Finance Corporation (IFC) E&S requirements, as well as the European Bank for Reconstruction and Development (EBRD) E&S requirements, both of which are discussed below.

5.5.1 IFC E&S Requirements

The IFC E&S requirements are considered the most comprehensive. The IFC of the World Bank provides a range of guidance documents related to the assessment and management of E&S issues in project development. Not only does IFC guidance provide a generally accepted basis for good practice, but it also provides the technical cornerstone for the Equator Principles which set out the E&S requirements of banks for project finance. The IFC requirements have become the *de facto* international E&S performance benchmark for project financing.

Summarized below are the requirements for the IFC.

IFC Policy on E&S Sustainability (2012)

The IFC policy on E&S Sustainability puts into practice IFC's overall commitments to E&S sustainability. The policy seeks to: (i) enhance the predictability, transparency, and accountability of IFC's actions and decision making; (ii) help clients manage their environmental and social risks and impacts and improve their performance; and (iii) enhance positive development outcomes on the ground. In addition, the Policy identifies IFC's commitments, its roles and responsibilities and other as applicable.

One of the key outputs of the Policy is the E&S Categorization of projects, which are summarized as follows:

- **Category A:** Business activities with potential significant adverse environmental or social risks and/or impacts that are diverse, irreversible, or unprecedented.
- **Category B:** Business activities with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures.
- **Category C:** Business activities with minimal or no adverse environmental or social risks and/or impacts.
- The IFC does not provide specific details on what wind farm projects should be classified.

IFC Performance Standards (2012)

The IFC Performance Standards (PS) on Social and Environmental Sustainability set out a framework for managing and improving project performance from planning and assessment, through construction and operations to closure. The Performance Standards requirements are summarized in the table below.

Table 20: IFC Performance Standard Requirements

IFC PS	Key Points
PS1: Assessment and Management of Environmental and Social Risks and Impacts	▪ PS1 underscores the importance of managing social and environmental performance throughout the life of a project by using a dynamic social and environmental management system. Specific objectives of this Performance Standard are: ▪ To identify and assess social and environment impacts, both adverse and beneficial, in the project's area of influence; ▪ To avoid, or where avoidance is not possible, minimize, mitigate, or compensate for adverse impacts on workers, affected communities, and the environment; ▪ To ensure that affected communities are appropriately engaged on issues that could potentially affect them; and ▪ To promote improved social and environment performance of companies through the effective use of management systems.
PS2: Labour and Working Conditions	The requirements set out in this PS have been in part guided by a number of international conventions negotiated through the International Labour Organization (ILO) and the United Nations (UN). Specific objectives of this Performance Standard are: ▪ To establish, maintain and improve the worker-management relationship; ▪ To promote the fair treatment, non-discrimination and equal opportunity of workers and compliance with national labour and employment laws; ▪ To protect the workforce by addressing child labour and forced labour; and ▪ To promote safe and healthy working conditions, and to protect and promote the health of workers.
PS 3: Resource Efficiency and Pollution Prevention	This Performance Standard outlines a project approach to pollution prevention and abatement in line with international available technologies and practices. It promotes the private sector's ability to integrate such technologies and practices as far as their use is technically and financially feasible and cost-effective in the context of a project that relies on commercially available skills and resources. Specific objectives of this Performance Standard are: ▪ To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities; and ▪ To promote the reduction of emissions that contribute to climate change.
PS 4: Community Health, Safety and Security	This PS recognizes that project activities, equipment, and infrastructure often bring benefits to communities including employment, services, and opportunities for economic development. However, projects can also increase risks arising from accidents, releases of hazardous materials, exposure to diseases, and the use of security personnel. While acknowledging the public authorities' role in promoting the health, safety and security of the public, this PS addresses the project sponsor's responsibility in respect of community health, safety and security.
PS 5: Land Acquisition and Involuntary Resettlement	Involuntary resettlement refers both to physical and economic displacement as a result of project-related land acquisition. Where involuntary resettlement is unavoidable, appropriate measures to mitigate adverse impacts on displaced persons and host

IFC PS	Key Points
	communities should be carefully planned and implemented.
PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	This Performance Standard reflects the objectives of the Convention on Biological Diversity to conserve biological diversity and promote the use of renewable natural resources in a sustainable manner. This Performance Standard addresses how project sponsors can avoid or mitigate threats to biodiversity arising from their operations as well as sustainably manage renewable natural resources. Specific objectives of this Performance Standard are: ▪ To protect and conserve biodiversity; and ▪ To promote the sustainable management and use of natural resources through the adoption of practices that integrate conservation needs and development priorities.
PS 8: Cultural Heritage	Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to protect irreplaceable cultural heritage and to guide project sponsors on protecting cultural heritage in the course of their business operations.

Note: PS 7 (Indigenous Peoples) is not considered to be applicable to this Project. The Indigenous World 2018 Report (IWGIA, 2018) states that Egypt is not classified as a country with indigenous people. In addition, this was confirmed based on previous experiences on E&S assessments with IFIs in Egypt where such standard was not triggered.

IFC EHS Guidelines

In addition, to the Performance Standards, the IFC have sector-specific EHS guideline documents. With regards to the project the following are applicable:

- IFC General EHS Guidelines (2007): identifies detailed EHS management and technical recommendations which are applicable for all development projects;
- IFC EHS Guidelines for Wind Energy (2015): identifies the key E&S impacts that should be investigated and provides detailed management and technical recommendations with regards to Industry-Best Practice. The IFC EHS Guidelines identifies the following key issues:
 - Landscape and visual
 - Noise
 - Biodiversity (to include birds and bats)
 - Shadow flicker
 - Water quality
 - Occupational health and safety
 - Blade and ice throws
 - Aviation
 - Electromagnetic interference
 - Public access
 - Abnormal load transportation
- IFC EHS Guidelines for Electric Power Transmission and Distribution (2007): this in particular could be applicable for the associated facilities of the Project (i.e.

- for connection with the grid). The Guideline identifies the key E&S impacts that should be investigated and provides detailed management and technical recommendations with regards to Industry-Best Practice. The IFC EHS Guidelines identifies the following key issues:
 - Biodiversity (to include birds and bats)
 - Electric and magnetic fields
 - Hazardous materials
 - Occupational health and safety
 - Community health and safety

5.5.2 EBRD Requirements

EBRD's 2019 Environmental and Social Policy seek to ensure, through its environmental and social appraisal and monitoring processes, that the projects it finances:

- Are socially and environmentally sustainable;
- Respect the rights of affected workers and communities; and
- Are designed and operated in compliance with applicable regulatory requirements and good international practice.

In addition, EBRD's E&S policy identifies large scale wind power projects as 'Category A' which are projects that could result in potentially significant environmental and/or social impacts that require an environmental and social impact assessment.

To translate this objective into successful practical outcomes, EBRD has adopted a comprehensive set of Performance Requirements (PRs) covering key areas of environmental and social impacts and issues.

EBRD is committed to promoting European Union (EU) environmental standards as well as the European Principles for the Environment, to which it is a signatory, and which are also reflected in the PRs. EBRD expects clients to assess and manage the environmental and social issues associated with their projects so that projects meet the PRs.

The EBRD Performance Requirements applicable to this project are summarized in the table below.

Table 21: Overview of Key Points of EBRD Performance Requirements of Relevance to the Project

EBRD PR	Key Points Relevant to the Project
PR 1: Assessment and Management of E&S Risks and Impacts	This PR outlines the process of appraising, managing and monitoring environmental and social issues associated with a project consistent with the European Union environmental impact assessment directive (85/337/EEC as amended).

EBRD PR	Key Points Relevant to the Project
PR 2: Labour and Working Conditions	This PR assures that human resources policies, procedures and standards will meet the following minimum requirements during the life of the Project with regards to labour and working conditions: - Establish and maintain a sound worker-management relationship and promote the fair treatment, non-discrimination and equal opportunity of workers; - Promote compliance with any collective agreements to which the client is a party, national labour and employment laws, and the fundamental principles and key regulatory standards embodied in the applicable ILO conventions; and - Protect and promote the health of workers, especially by promoting safe and healthy working conditions. - In addition, EBRD requires compliance with applicable EU Occupational Health and Safety requirements and, where such requirements do not exist, applicable IFC Occupational Health and Safety guidelines (IFC PS2).
PR 3: Resource Efficiency and Pollution Prevention and Control	Pollution prevention and abatement are key ingredients of a sustainable development agenda and EBRD - financed projects must meet good international practice in this regard. The impacts and issues associated with polluting activities need to be considered in all economic activities, and from effluents and emissions at the facility level, to impacts at a regional and global level where appropriate. This performance requirement assures that all aspects of the Project will meet the following objectives: - To avoid or, where avoidance is not possible, to minimize adverse impacts on human health and the environment by avoiding or minimizing pollution directly arising from projects; - To assist clients in identifying project-related opportunities for energy and resource efficiency improvements and waste reduction; and - To promote the reduction of project-related greenhouse gas emissions.
PR 4: Health, Safety and Security	While bringing many positive benefits to local communities, projects can also increase the potential for community exposure to risks and impacts arising from temporary or permanent changes in population; transport of raw and finished materials; construction, operations and decommissioning; accidents, structural failures, and releases of hazardous materials. This performance requirement addresses the project proponent's responsibility to identify and to avoid or minimise the risks and adverse impacts to community health, safety and security.
PR 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Involuntary resettlement refers both to physical and economic displacement as a result of project-related land acquisition. Where involuntary resettlement is unavoidable, appropriate measures to mitigate adverse impacts on displaced persons and host communities should be carefully planned and implemented.
PR 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	EBRD recognises the need for the protection and conservation of biodiversity in the context of projects in which it invests. In pursuing these aims, EBRD is guided by and supports the implementation of applicable international law and conventions and applicable EU Directives: - To protect and conserve biodiversity; - To avoid, minimize and mitigate impacts on biodiversity and offset significant residual impacts, where appropriate, with the aim of achieving no net loss or a net gain of biodiversity; - To promote the sustainable management and use of natural resources; - To provide for fair and equitable sharing of the benefits from project development and arising out of the utilization of genetic resources; - To strengthen companies' license to operate, reputation and competitive advantage through best practice management of biodiversity as a business risk and opportunity; and - To foster the development of pro-biodiversity business that offers alternative livelihoods in place of unsustainable exploitation of the natural environment.

EBRD PR	Key Points Relevant to the Project
PR 8: Cultural Heritage	Cultural heritage is important as a source of valuable historical and scientific information, as an asset for economic and social development, and as an integral part of a people's cultural identity, practices, and continuity. EBRD requires the protection of cultural heritage from project activities.
PR 10: Information Disclosure and Stakeholder Engagement	EBRD considers stakeholder engagement as an essential part of good business practice and corporate citizenship. In particular, effective community engagement is central to the successful management of risks and impacts on communities, as well as central to achieving enhanced community benefits. The specific objectives of this PR are: ▪ To identify people or communities that are or could be affected by the Project, as well as other interested parties; ▪ To ensure that such stakeholders are appropriately engaged on environmental and social issues that could potentially affect them through a process of information disclosure and meaningful consultation; and ▪ To maintain a constructive relationship with stake holders on an ongoing basis through meaningful engagement during project implementation.

Note: PR 7 (Indigenous Peoples) is not considered to be applicable to this Project. The Indigenous World 2018 Report (IWGIA, 2018) states that Egypt is not classified as a country with indigenous people. In addition, this was confirmed based on previous experiences on E&S assessments with IFIs in Egypt where such standard was not triggered. In addition, PR 9 (Financial Intermediaries) is also not considered applicable.

5.5.3 AfDB Requirements

The AfDB's has an Integrated Safeguards System (2015) to manage environmental and social risks. The Integrated Safeguards System (ISS) is a cornerstone of its strategy to promote growth that is socially inclusive and environmentally sustainable. The ISS is a powerful tool for identifying risks, reducing development costs and improving project sustainability, thus benefiting affected communities and helping to preserve the environment.

The Integrated Safeguards System not only promotes best practices in these areas but also encourages greater transparency and accountability. It upholds the voices of people who are affected by Bank-funded operations, especially the most vulnerable communities, by providing, for example, project-level grievance and redress mechanisms—a structured, systematic and managed way of allowing the voices and concerns of affected people to be heard and addressed during project planning and implementation.

The following safeguards are particularly relevant:

Table 22: AfDB Integrated Safeguards System (ISS)

AfDB - OS	Key Points
OS 1: Environmental and social assessment	OS1 includes the requirements for identifying, assessing, and managing the potential environmental and social risks and impacts of a project, including climate change issues. The safeguard document includes requirements for the different stages of the assessment process. The Integrated Environmental and Social Impact Assessment (ESIA) process guidelines are published in the Safeguards and Sustainability Series in three sets (Volume 2 issued in 2015). Based on OS1 states 'borrower or client shall be responsible for conducting and providing evidence of meaningful consultation'. Consultation should be based on stakeholder analysis and is preceded by disclosure of adequate project information and environmental and social information to ensure that participants are fully informed.

OS 2: Involuntary resettlement, land acquisition, population displacement and compensation.	Involuntary resettlement, land acquisition, population displacement and compensation.
OS 3: Biodiversity and ecosystem services	Biodiversity and ecosystem services. Requires, inter alia, that as part of the environmental and social assessment, the borrower or client identifies and assesses the potential opportunities for, risks to, and impacts on biological diversity and ecosystem services, including direct, indirect, cumulative and pre-mitigation impacts. It also requires the borrower or client to apply the mitigation hierarchy.
OS 4: Pollution prevention and control, hazardous materials and resource efficiency	Pollution prevention and control, hazardous materials and resource efficiency. This safeguard covers the range of key impacts of pollution, waste, and hazardous materials for which there are agreed international conventions, as well as comprehensive industry-specific and regional standards, including greenhouse gas accounting, that other multilateral development banks follow.
AfDB - OS	Key Points
AfDB states <i>'the borrower or client shall apply pollution prevention and control measures consistent with national legislation and standards, applicable international conventions, and internationally recognized standards and good practice – particularly the World Bank Group Environmental, Health and Safety (EHS) Guidelines'</i> .	
OS 5: Labour conditions, health and safety	Labour conditions, health and safety. Includes requirements regarding working conditions, such as the management of worker relationships, workers organizations, non-discrimination, retrenchment, and the grievance mechanism, and it includes safeguards for the pretention of the workforce, addressing, for example, child labour.

In specific, the following AfDB policies and standards have been adopted:

- The Integrated Safeguards System (ISS) Policy adopted in December 2013
- The Gender Policy (2001) and Bank Group Gender Strategy (2013)
- AfDB Civil Society Engagement Framework (2012)
- Disclosure and Access to Information Policy (2012)
- Policy on Poverty Reduction (2001)
- Policy for Integrated Water Resources Management (2000)
- Environmental and Social Assessment Procedures (ESAP)
- AfDB ISS Guidance Materials
- AfDB ISS Sector Key sheets
- The Presidential Directive on Exploitation, Abuse and Sexual Harassment (PD. 2021.02)

6. ANALYSIS OF ALTERNATIVES

6.1 Site Selection Alternatives

The GoE has allocated to the NREA through Prime Ministerial Decree No. (37/4/15/14) of 2015 land for development of renewable energy projects through usufruct rights.

The area was proposed by the National Centre for Land-use Planning and was approved by the Council of Ministers. In line with the decree, the government assigned about 7,600km² in the GoS, east and west of the Nile, Benban and Kom Ombo regions, of which about 5,700km² are for wind projects (75% share) and about 1,900 km² for solar energy projects (25% share). This includes an area of 1,220 km² in the GoS with a total capacity of 3,550 MW for wind power projects (IRENA, 2018).

Of the 1,220 km² area in the GoS, currently an area of around 300km² is being developed for multiple wind farm projects as noted in the figure below. The key factors taken into account for selection of this area include the following:

- The area is under governmental ownership and, therefore, does not require land acquisition measures;
- The area is mostly free from competing uses;
- The area is presumed to be one of the areas in Egypt with the highest wind power potential;
- The area mostly consists of vast desert grounds;
- The geomorphology of the area is favourable for wind power development requiring limited construction and landscape modification measures; and
- The access to the area can be considered to be easy requiring only limited road construction measures.

Based on the above, NREA granted the Developer full access rights to the specific Project for the development of a 1.1 GW Wind Farm Project, comprised of two plots (one north of Rasghare, and the other – Plot Two – south of the city). Therefore, taking the above into account, there are no site alternatives that were considered by the Developer in this case.

The Developer had no authority, influence or decision in the site selection process as the site was handed over by the Government to the Developer for development of the Project. In addition, the entire Gulf of Suez area is now planned for new and additional wind farm and/or green hydrogen developments further restricting availability of any alternative lands within the area. The above information has been included within the section as well.

6.2 Technology Alternatives

This section discusses several alternatives besides the development of a wind farm project. This mainly includes other renewable energy alternatives suitable for Egypt, as well as other technological alternatives for power generation such conventional thermal power plants.

6.2.1 Renewable Energy Development Projects

As discussed earlier, the GoE has taken bold steps to adopt an energy diversification strategy with increased development of renewable energy and implementation of energy efficiency, including assertive rehabilitation and maintenance programs in the power sector (IRENA, 2018).

To this extent, in 2013, the Arab Republic of Egypt (through the Ministry of Electricity and Renewable Energy) had developed and adopted the ISES 2015 – 2035, which provided an ambitious plan to increase the contribution of renewable energy to 20% of the electricity generated by the year 2022, through hydro, wind,

and solar and its efforts are ongoing.

Egypt enjoys favourable solar radiation intensity and it is considered one of the most appropriate regions for exploiting solar energy both for electricity generation and thermal heating applications. Similar to the wind power development process, the GoE is developing many solar development projects (to include solar Photovoltaic (PV) and concentrated solar power) through the BOO mechanism and other (such as the Feed-In Tariff mechanism). Such development projects have been identified within key areas that provide the most favourable potential and conditions for solar development – this includes but not limited to Kom Ombo, West Nile, Hurghada, Zaafarana, Benban and other.

With regards to hydropower, the main hydro resource in Egypt is the Nile River, with the highest potential in Aswan where a series of power stations are located. Within this context, several projects have been realised and several other hydroelectric plants are being developed.

Taking the above into account, with regards to the Project site in specific it is best utilised for wind power projects. According to Egypt's Wind Atlas (Wind Atlas for Egypt Measurement and Modelling 1991-2005; Figure 26), the country is endowed with abundant wind energy resources, particularly in the GoS area. This is one of the best locations in the world for harnessing wind energy due to its high stable wind speeds that reach on average between 8 and 10 m/s at a height of 100m, along with the availability of large uninhabited desert areas.

Therefore, as discussed earlier, the GoE has allocated to the NREA through Prime Ministerial Decree No. (37/4/15/14) of 2015 an area of 1,220km² in the GoS for wind development projects.

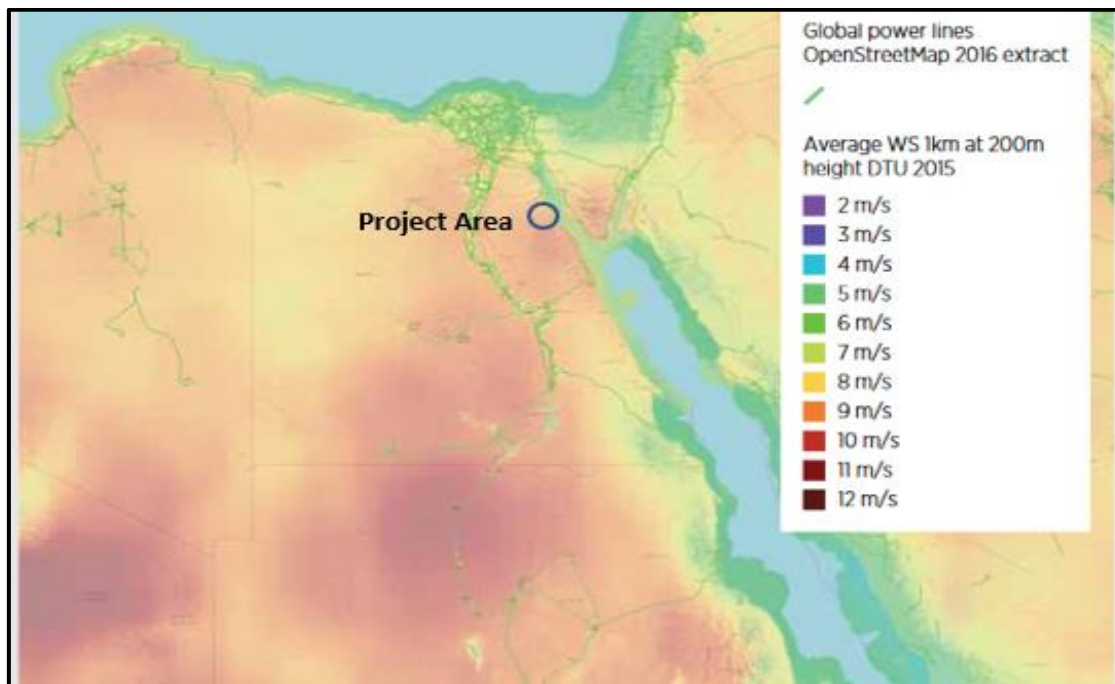


Figure 26: Egypt's Wind Atlas (Source: IRENA, 2018)

6.2.2 Thermal Power Plants

Other energy generation alternatives suitable to be built in Egypt include conventional thermal power plants, similar to others already existent in the country. Despite the advantages that a solution of this kind would entail - such as a potential bigger energy generation capacity or the creation of more jobs during both construction and operation - the disadvantages would be significant; especially those related to environmental impacts. Conventional thermal power plants are well known for their environmental impacts when compared to this Project and could include significantly higher water consumption, generation of air pollutants and greenhouse gas emissions, etc.

More importantly, as noted earlier such developments would not be in line with the Government's ISES 2015 –

2035” which in broad terms advocates for the diversification of energy resources and increasing the share of renewable energy to 20% in 2022.

6.3 Design Alternatives

As discussed earlier, currently an area of around 300km² in the GoS is being developed for multiple wind farm projects. NREA has granted the Developer full access rights to the specific Project for the development of a 1.1 GW Wind Farm Project, a portion of which is to be implemented within the NREA Concessionary Area as well as the Gebel El Zeit Important Bird Area (IBA).

6.3.1 NREA Concessionary Area

Among the objectives of this ESIA is to build on the outcomes of the Environmental Impact Assessment study (2007) undertaken to determine the potential environmental impacts of wind power development in the 656 km² NREA Concessionary Area, which is to be utilized for the development of wind power amounting to 3,000 MW. The corresponding EIA informing the NREA Concessionary Area on impacts of wind turbine development identifies site-specific E&S constraints to be taken into account by the Project developer throughout the planning and design phase of the Project.

The NREA Concessionary Area was zoned according to the weight of the expected environmental impact among competing environmental interests: renewable energy development and conservation, particularly avi-fauna populations. The area starts about 20 km in the south of Ras Gharib and reaching up to the Gulf of Zayt (about 60 km in the North of Hurghada). The wind power target capacity for the area is between 2,000 – 3,000 MW by 2026/2027.

The following environmental surveys were carried out for the “NREA concession area”:

- Reconnaissance survey to assess the present landuse in the area
- A survey on the fauna (others than avifauna) and flora
- An autumn and spring monitoring of bird migration and bird habitat
- A geological survey

The assessments evaluated the possibility of environmental impacts brought on by the development and operation of wind farm development in the NREA Concession Area and its corresponding Feasibility Study for a Large Wind Farm at Gulf of Zayt (DECON, 2007). The results of the assessments affirmed that, overall, environmental and social impacts would be negligible due to the remoteness of the area, lack of residences and native ecosystems. However, concerning risks posed to migrating avi-fauna, they (perceived potential impacts) were determined to be significant.

In order to find a middle ground within the NREA Concessionary Area between the area’s exceptionally high wind power potential and the land’s inherent significance to the migration flyway for avifauna, three zones were defined to elaborate on requirements for development:

- Zone 1: While this zone comprises nearly 60 % of the Concessional Area, wind park construction is banned.
- Zone 2: Wind Park development is permitted yet subject to further ornithological monitoring and verification. Based on the results of the ornithological monitoring and verification exercise, the proposing wind farm initiative may be permitted.
- Zone 3: Any wind farm installation in this zone would require technical avoidance and mitigation measures exemplary of the best practicable standard. A post-installation monitoring programme would need to be executed to assess the impacts of the wind park and whether additional measures are required.

Plot 2 is situated within Zone 2 (Figure 27).

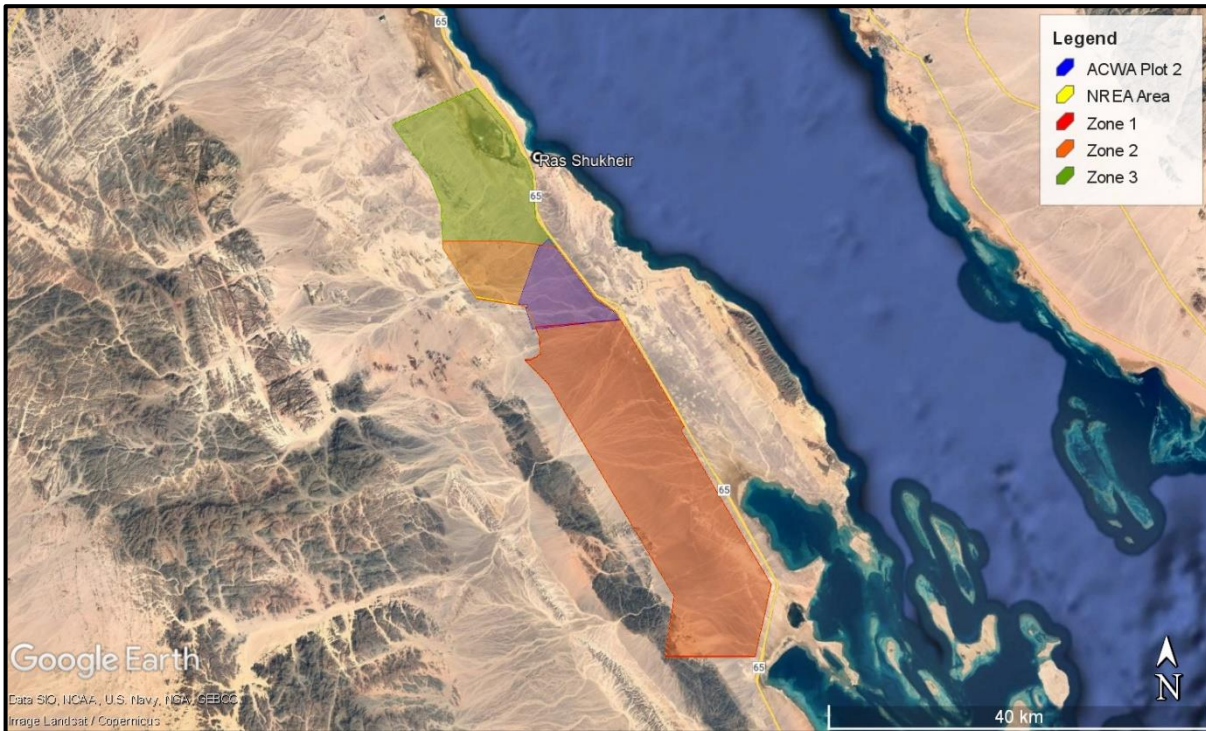


Figure 27: NREA Concessionary Area's 3 Zones with the Project site overlain in Zone 2

Table 23: Summary Outcomes of NREA's Feasibility Study for a Large Wind Farm in the Gulf of El Zayt (2008)

E&S Attributes	Outcomes of Strategic ESIA	Additional Requirements in Strategic ESIA
Landscape and Visual	No concerns reported as the landscape is sparse (desert plains) of sensitive receptors as well as ecological elements.	No additional requirements to be considered
Landscape and Use	Area is mostly desert landscape (compacted gravel or rocky) and not ecologically sensitive. Very little deterioration expected.	Site-specific mitigation and housekeeping procedures.
Geology, Hydrology, Hydrogeology	Negligible impacts on groundwater and surface water. A minimum distance of 150 m from wind turbines to existing groundwater wells of the Ras Shukheir water supply is required. Within the NREA Concession area, there are plans to construct service buildings, such as store, control and apartment buildings, of which will be connected to the existing water pipeline and equipped with an appropriate waste water treatment system (e.g. septic tank with underground seepage and regular sludge collection).	Turbines should be installed at a distance of 150 m from existing groundwater wells of Ras Shukheir water supply.
Biodiversity	No serious impacts on biodiversity anticipated. The landscape is sparse in vegetation. Animals that were recorded are not included in the Red List of Threatened Species, both internationally or nationally.	Site-specific mitigation and monitoring requirement.

E&S Attributes	Outcomes of Strategic ESIA	Additional Requirements in Strategic ESIA
Birds (avi-fauna)	As the NREA area is located next to an registered Important Bird Area (IBA), the Gabal el Zayt IBA area, and near or partially in a major flyway area of migrating birds, impacts of wind power utilisation on migrating birds were likely to be significant. The disturbance on the flyway against the heavy wind during spring were determined to be critical.	Regarding Zone 2, in which the Project area is defined, wind farm installation is subject to further ornithological study in order to commence.
Archaeology and Cultural Heritage	None reported	Precautionary Principle to be applied and coordination with the Ministry of Antiquities
Air Quality and Noise	Some additional dust will occur locally during construction works; however, it is not anticipated to be critical due to the absence of population or wildlife, that would otherwise be affected. Similarly for noise, the closest sensitive receptors reported are in Wadi Dara. The noise emissions from wind turbines were significantly below 30 Decibel.	Site-specific mitigation and monitoring requirement.
Infrastructure and Utilities	Water supply: Wind farms' water requirement not to affect the overall water supply in the region Transport: Wind power development is not anticipated to cause traffic bottlenecks in the greater area	Domestic waste water originating from the construction yard facilities or permanently constructed service buildings shall undergo simplified treatment (septic tank) and infiltrated to the sandy underground for further natural treatment. Site-specific mitigation (waste gathering and proper disposal) and monitoring requirement. A co-operation with the Rhas Gharib waste collection system is recommended. Turbines shall not be installed in wadis. The wind park internal grid shall be made by underground cables. Any wind park, which would be erected on the NREA area, shall be connected to a substation to be built by EEHC/ETC. The interconnections shall be either by underground cable or built according to accepted bird protection guidelines
Occupational Health and Safety	General risks associated to persons involved in construction, operation and decommissioning of wind farms.	Adhering to international standards of health and safety guidelines.
Socio-economics	Few people reside in the immediate surrounding of the NREA area, who may be affected by wind power development. Windpark construction will create employment.	No additional requirements to be considered

Overall, the following mitigation measures are strongly recommended as part of the EIA Study of the NREA Concessionary Area pertaining to the mitigation of wind turbines' potential impact on avi-fauna:

- Avoid wind turbines with a maximum height of more than about 100m, because the majority of birds migrate well above 100m
- Avoid turbines with lattice towers in order to reduce suitable perching sites.
- Avoid lighting of turbines. If lighting of turbines is absolutely required, use the minimum number of intermittent flashing white lights of lowest effective intensity
- Paint turbine blades to increase blade visibility according to HODOS (2003): a single, solid blackblade or a single blade with thin stripe patterns paired with two white blades.
- Avoid small turbines with high-speed rotors and with turbines closely packed together.
- Maintain a corridor aligned with main flight directions (south-southeast in autumn and north-northwest in spring) with a breadth of more than 1 km between wind farms at reasonable distances.
- Implement a detailed post-construction monitoring programme in order to:
 - Verify the assumptions gathered within the impact assessment and determine significant deviations from predicted impacts;
 - Determine the weight and significance of proposed impacts (especially collision rate);
 - Examine behaviour of migrating birds in the vicinity of the proposed wind power plant;
 - Examine the conditions in which collisions occur and the cause-and-effect chain of collisions;
 - Test the effectiveness of mitigation measures;
 - (if so) identify critical wind turbines;
 - (if necessary) maintain further mitigation measures (acoustical deterrents, temporal shutdown of critical turbines);
 - (if necessary) remove problem turbines associated with unacceptable mortality

NOTE: all of the above requirements have been considered within this ESIA as applicable. However, for requirement: (i) are outdated (e.g. requirement related to maximum top height of 100m where the GoE not allow developments up to 220m) or (ii) will be updated based on the updated environmental permit that will be issued by EEAA for this project (e.g. maintaining a 1km corridor)

6.4 No-Project Alternative

The 'no Project' alternative assumes that the Project will not be developed. Should this be the case, then the Project site area would remain the same. The land area would remain with its current characteristics – a vast desert grounds with sparse vegetation.

Should the Project not move forward, then the Project-related negative environmental impacts discussed throughout this ESIA would be averted. However, as noted throughout the ESIA, generally such impacts do not pose any key issues of concern and can be adequately controlled and mitigated through the implementation of the ESMP discussed in "Chapter 9". Nevertheless, should the Project not move forward; the significant and crucial positive economic and environmental benefits would not be realised. Such benefits include the following:

This development allows for more sustainable development and shows the commitment of the GoE to realizing the energy strategy;

Contribute to increasing energy security through development of local energy resources and reducing dependency on external energy sources;

The clean energy produced from renewable energy resources is expected to reduce consumption of alternative fuels for electricity generation, and will thus help in reducing greenhouse gas emissions, as well as air pollutant emissions; and

Project is expected during the construction and operation phase to generate local employment and commit to other social responsibilities. As such, this is expected, to a certain extent, to subsequently enhance the socio-economic conditions and standards of living of the local communities.

In conclusion, an ESIA must investigate all potential positive and negative impacts from a project development. In the case of this Project, it is important to weigh the significant positive economic and environmental impacts incurred from the Project development, against the negative environment impacts anticipated at the site-specific level – in which generally this ESIA concludes to be minor in nature and can be adequately controlled. The comparison in this chapter clearly concludes that the 'no Project' alternative is not a preferable option.

7. EXISTING PHYSICAL, BIOLOGICAL AND SOCIAL ENVIRONMENT

7.1 Landscape and Visual

This section provides an assessment of baseline conditions within the project site and surrounds in relation to landscape and visual aspects.

7.1.1 Baseline (Site) Assessment Methodology

A site assessment was undertaken to characterize the general landscape and topography characteristics of the Project site.

In addition, the site assessment also focused on identifying any key critical visual receptors within the Project site and a 5km radius from the area. Moreover, based on desktop review and consultations with relevant stakeholders (Red Sea Governorate), any current plans in the area as well as key visual receptors within a 10 km radius from the project site were identified.

Such distance (10 km radius) was considered, given that based on several European guidelines and regulations, four zones of potential visual impact are identified which can be distinguished as noted in the table below.

Table 24: Classification of Different Zones of Potential Visual Impact

Distance	Perception of tall, man-made structures	Impact
Up to 2 km	perceptible, likely to be a prominent feature in the landscape	high impact
2 to 5 km	regularly perceptible, relatively prominent	moderate impact
5 to 10 km	only perceptible in clear visibility, seen as part of the wider landscape	low impact
> 10 km	only occasionally seen in very clear visibility, only minor element in the landscape (if at all)	no relevant impact

7.1.2 Results

Landscape and Topography

The Project site is an open area with flat topography. The ground surface of the whole project area is covered by clastic sediments of gravels, pebbles and sometimes boulder of different rock fragments impeded in fine sand and silt (Figure 28). The project site is devoid of any vegetation. Short, wide and shallow dry wadies (the outlet fringes of Wadi Dara) cross the project area on their way from WNW down to ESE direction). Based on the topographic maps of the area and the site field reconnaissance, it is clear that the major part of the site area is penplain with very gentle slope to east. In the middle part of the site and to the further south and west, dissected hills with wide and shallow drainage lines are well recognized.

Due to the ease of the topography in addition to the presence of a network of roads, either asphaltic or paved, the project site can be accessed and move in easily. The reason for the establishment of this road network is due to the activity related to oil exploration and extraction operations in the region. The main asphaltic road leading to the village of Dara passes through the main stream of the Wadi Dara in the southern part of the site.

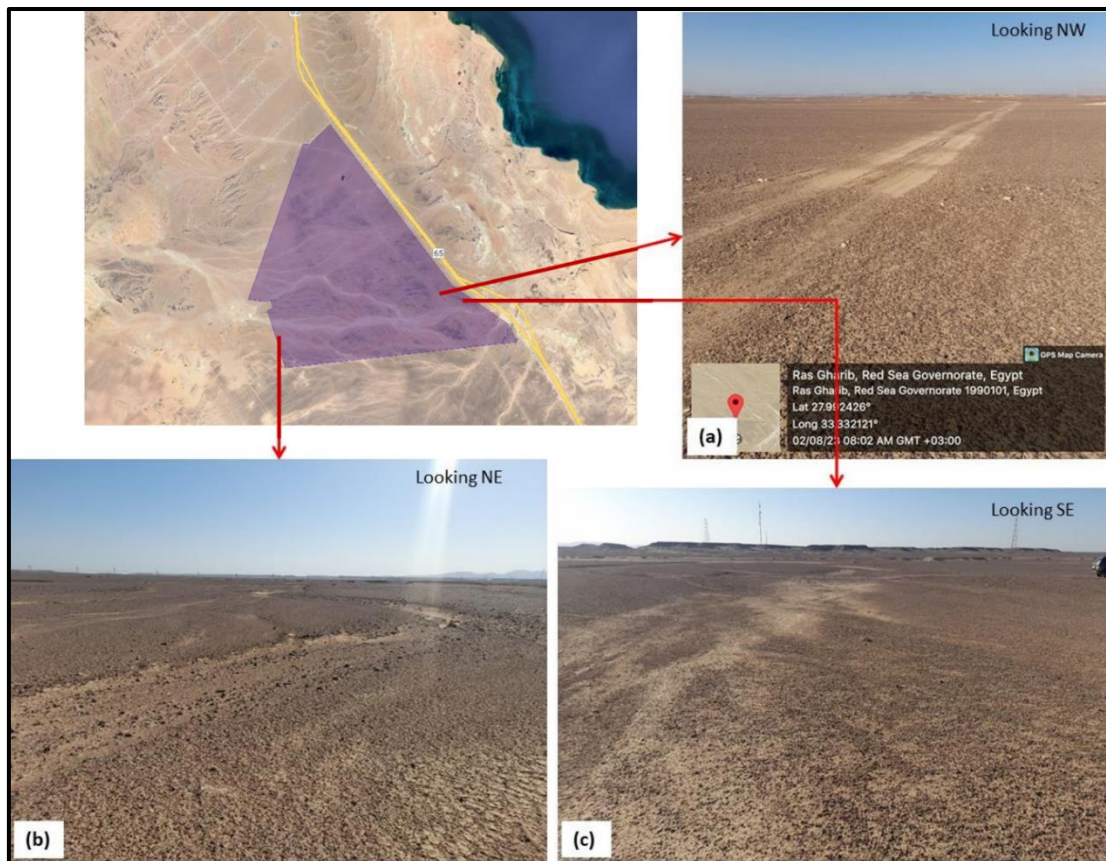


Figure 28: ESIA for SWE 1.1. GW Wind Power – ESIA Report for Plot 2

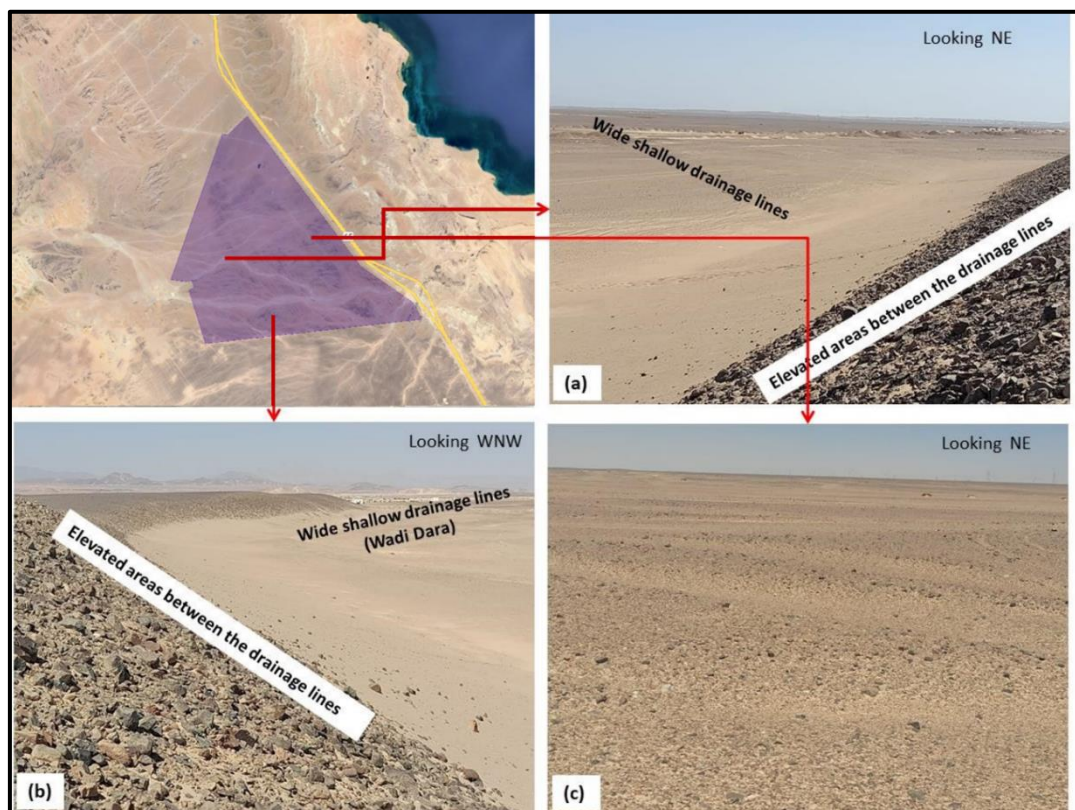


Figure 29: Regional topography of the project site. Note the slightly elevated lands (a & b), crossed by wide and shallow drainages of Wadi Dara (c)

From a regional point of view, the physiographic features of the area that includes the location of the project and the surroundings could be differentiated into a high, medium and low relief unit (Figure 30).

This unit comprises the mountainous area which is composed essentially of Pre-Cambrian basement rocks and representing the main catchments area of Wadi Dara basin. This area rises more than 400 m above mean sea level.

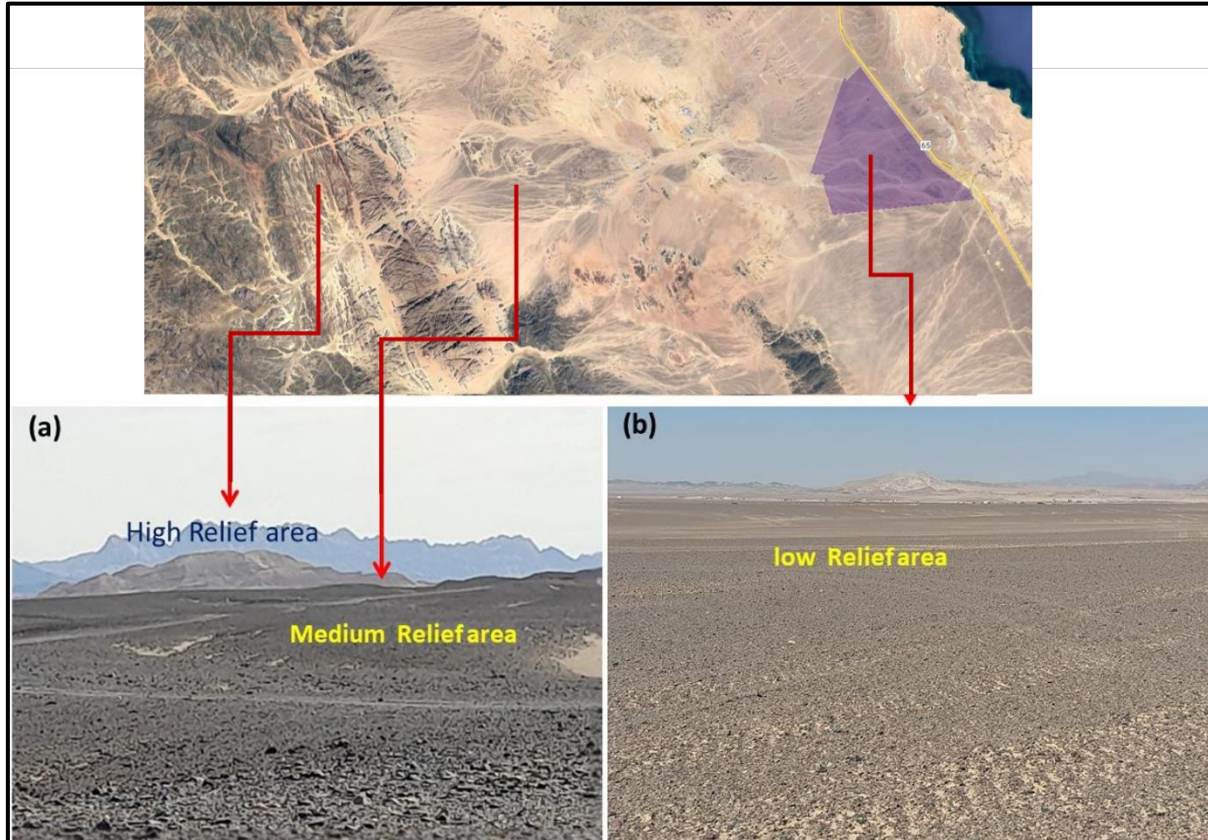


Figure 30: Field photographs showing the high, med and medium relief areas where they are completely out of the project site

In the area of Medium relief, which occupies the eastern foot slopes of the mountainous area, there is a hilly dissected and weathered zone ranging in elevation from 200 to 400 m (amsl) with wide shallow drainage with dissected hills (Figure 30a).

The unit occupies the low land area between the hilly unit and the Gulf of Suez. The ground surface elevation of this unit is less than 200 m (amsl). It is a wide peneplain area dissected by many shallow and wide drainage lines. Two series of alluvial terraces are distinguished along the borders of the drainage lines of Wadi Dara basin (Figure 31 b). It has a ground elevation ranging between zero to about 200 m (amsl), with a general surface slope towards the east.

The wadi channel unit (Figure 31 b, c); it is occupying the main channels of the Wadi Dara. The coastal plain unit; it occupies a limited zone towards the east between the dissected alluvial plain and the Gulf of Suez shore line. This coastal plain is completely out of the site area to the East. It receives the finer sediments (fine clay) carried by the surface low.

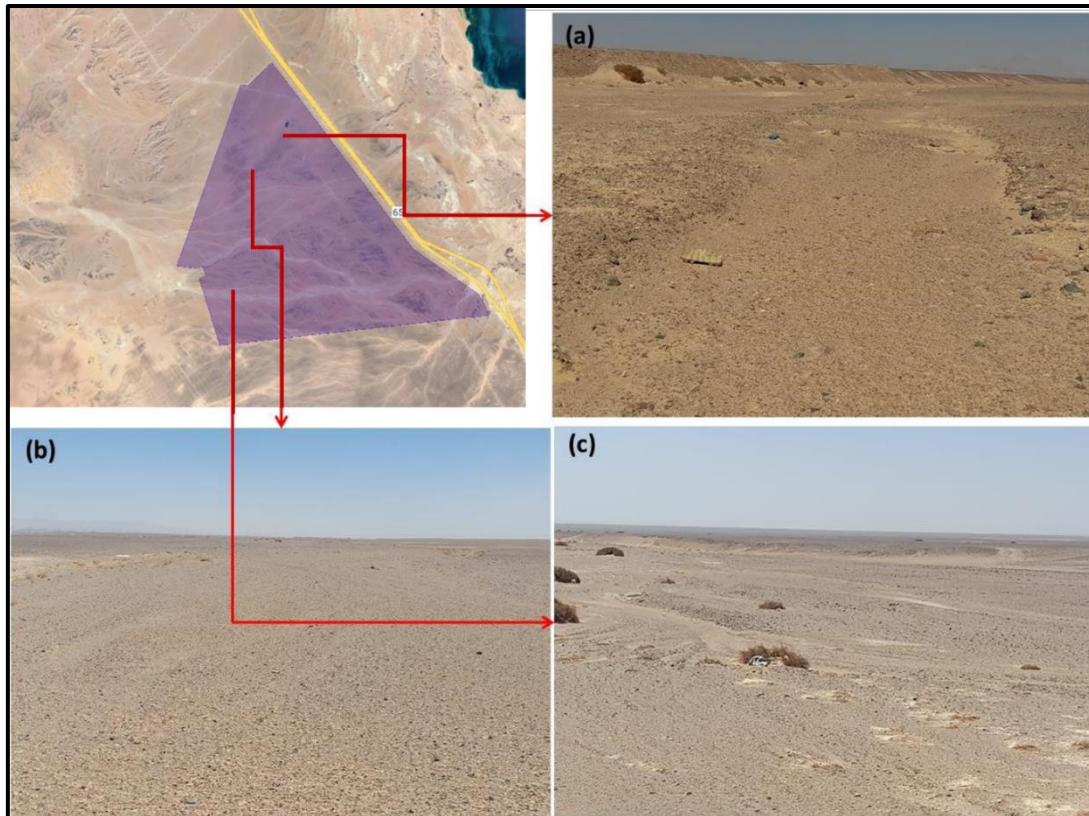


Figure 31: The low relief unit (piedmont plain) which occupies almost the entire Project area.

Very wide and shallow drainage lines running from the west and southwest toward east and northeast. These drainage lines crossing a thick clastic sedimentary cover for a distance of more than 20 km after leaving the Red Sea mountains until the border of the site (Figure 32).

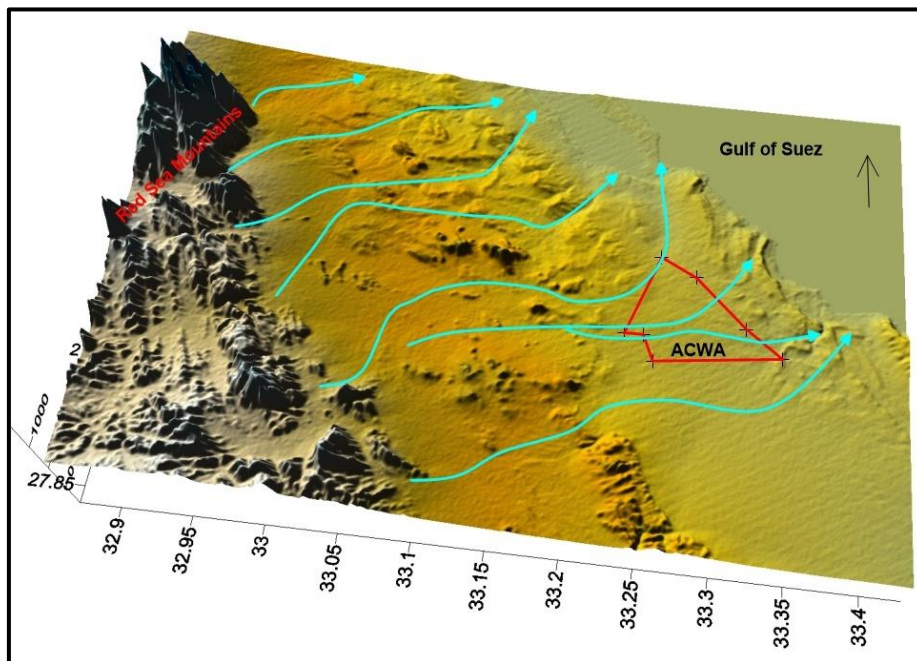


Figure 32: 3D elevation model of the project area and its surroundings. The model was prepared from the SRTM satellite images of Egypt using GIS software.

Focusing on the site of the project, the project concession is located in a low relief area characterized by:

- Wide plain with a very gentle slope towards Gulf of Suez.
- Complete absence of any deep drainage lines and or well-developed alluvial fans.
- The main drainage lines traversed the project site are very weak, shallow and the surface signs of their existence are disappeared in the way to the Gulf of Suez except Wadi Dara at the southern part of the site.
- Going further west and south west of the project site, Upper Cretaceous - Miocene sediments are exposed forming wide distance separated dissected hills of highly weathered contrary rock.
- A complete absence of strong and well-developed geomorphic features like deep wadies, depressions, steep slope scarps, conspicuous hill heights. Therefore, the project site is very ideal concerning the accessibility. One can move in the site without any big effort.

As a result, the major part of the site's area is characterized by simple relief except the upstream part of Wadi Hawashyia.

Due to the ease of the topography in addition to the presence of a network of roads, either asphaltic or paved, the project site can be accessed and move in easily. The reason for the establishment of this road network is due to the oil exploration activities in the region. It is an asphalt road that crosses the site from south to north and passes to serve the quarrying activity in the areas to the west and north of the site.

Visual Receptors

Critical visual receptors are identified as those normally seen as valuable by the human perception and include recreational activities, environmental reserves, local community settlements, remarkable historical or cultural sites, and other.

Based on the literature review and consultations, several critical visual receptors were identified within the 10km radius. The area in general includes the following:

- Wadi Dara Village, the administrative boundary of which the project site overlaps, contains several types of receptors:
 - A Mosque
 - Units of agricultural and economic activities (poultry, livestock and palm farming)
 - Residential units
- Existing Overhead Transmission Lines (OHTL);
- Dumpsite;
- Telecommunication towers;
- Several planned and existing wind farms;
- Gebel El Zeit Important Bird Area (overlaps with the Project site).

Description and location of all of the above facilities is provided in more details in "Section 7.8". The closest visual receptor that can be identified would be the Village of Wadi Dara east of the project site as well as Gebel El Zeit, within which Plot 2 is located entirely. There are no archaeological nor historic sites within range of the project area.

7.2 Land Use

The description of land use and utilities depended on the consultant's past experience in the area, literature review, and site visit.

7.2.1 Baseline Assessment Methodology

The baseline assessment of the 'formal' land use was based on collection of secondary data and plans available from the relevant governmental entities including items such as: (i) formal land use planning for Ras Gharib; and (ii) area of critical environmental concern planning. In addition, the ESIA Team reviewed the different studies undertaken for the area.

Understanding and characterising the informal, customary, or actual land use of the Project site was required a detailed land use survey for the Project site and encompassing a 2km radius. This was to enable an understanding of any informal land use activities undertaken in and around the Project site such as physical activities (houses, structures, etc.) or economical activities (such as grazing, agricultural, petroleum activities, etc.). The ESIA Team incorporated consultations with relevant stakeholders to further understand any informal, customary, or actual land use practices as identified throughout the text below.

7.2.2 Formal Land Use

Strategic Planning

Consultations were undertaken with the Ras Gharib Local Unit to understand the formal land use plan set for the Project area. According to such consultations, the specified area for the project is not in the City's plan and based on "Presidential Decree No. 116 of the year 2016", it has been allocated to NREA for the development of wind farm projects. These plots have been allocated to various developers by NREA.

Land Ownership

The Government of Egypt (GoE) allocated to the NREA through "Presidential Decree No. 116 of the year 2016", land for development of renewable energy projects through usufruct rights. The area was proposed by the National Centre for Land-use Planning and was approved by the Council of Ministers. In line with the decree, this includes an area of 1,220 km² in the Gulf of Suez (GoS) with a total capacity of 3,550 MW for wind power projects in which the Project site is located.

Based on the above, NREA has granted the Developer full access rights to the specific Project for the development of a 600MW Wind Farm Project (i.e. PLOT 2). Therefore, the land is currently under the ownership of NREA.

Wadi Dara

As discussed earlier, Wadi Dara is located just west of the Project site. The figure below presents the overlap area of the Project site with Wadi Dara. As noted in the figure below, there are two (2) areas in which the Project site overlaps with for an area of 0.1km². As provided in further details later throughout this section, this is mainly due to encroachment of Wadi Dara Association into the NREA concession area allocated for wind farm developments.

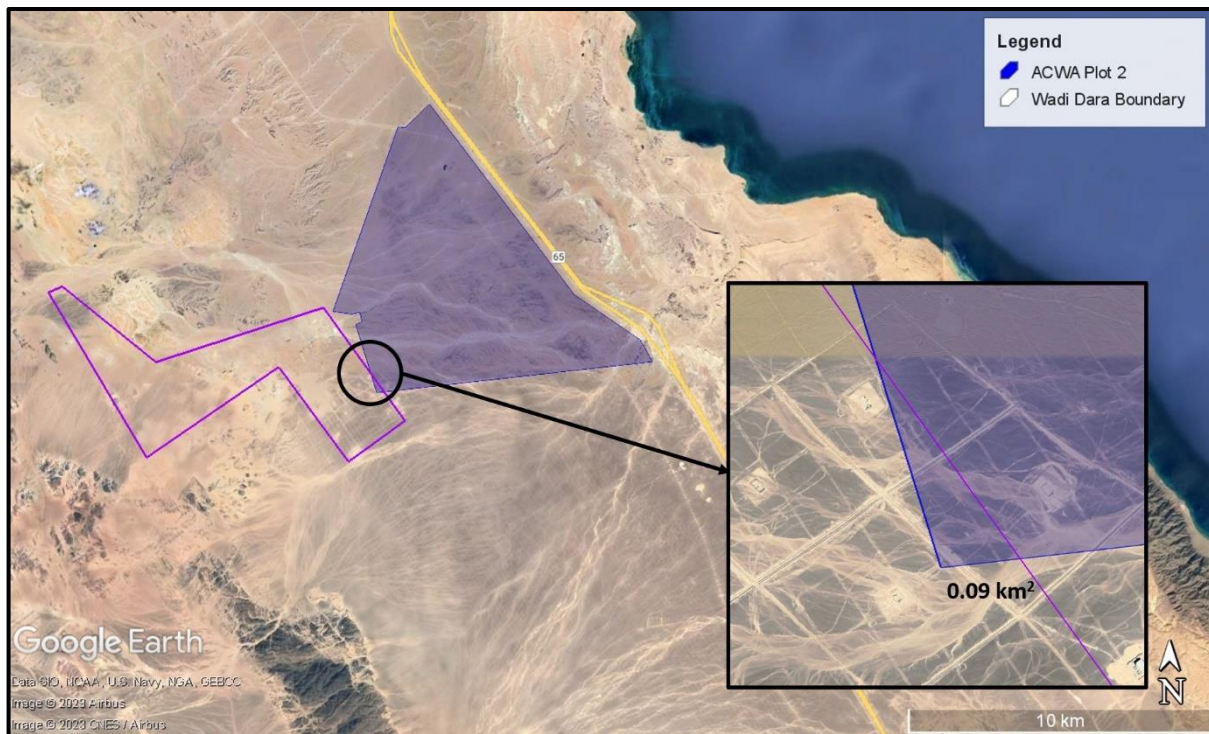


Figure 33: Project Site and Wadi Dara Official Boundaries

In general, Wadi Dara doesn't have a large stable community where the total population is between 100-150 – this includes 2 families while the remainder of the population are mainly workers and guards employed at the various poultry, livestock, and agricultural farms within the settlement. Wadi Dara is officially allocated by the city council and Red Sea Governorate as an area for poultry, livestock, and agricultural farming. Generally, farms in Wadi Dara have an average size of 0.02 km² (equivalent to 5 Egyptian Feddan) and are categorized into 3 types: (i) Palm Tree Farms, (ii) Poultry Farms, and (iii) Livestock Farms.

A detailed land use survey has been undertaken for Wadi Dara in 2022 and updated in 2023. At each receptor a questionnaire was filled out in consultation with the people residing within such structures. The following information was obtained:

- Coordinates
- Pictures
- Type of Structure: (i) Poultry Farm; (ii) Livestock Farm; (iii) Agricultural Farm; (iv) Other (this mainly included a mosque, electricity unit, governmental buildings, and a car repair workshop)
- Occupancy: (i) full-time residents; or (ii) part-time residents. Full-time residents were considered as follows:
 - Structures which have workers and/or guards residing at a full-time basis. In general, these farms either have guards residing within such structures and/or worker accommodation units for workers. Generally, the guards and workers reside there for a couple of months continuously and then take some time off after which they return to the farm. Such workers could also change every couple of months. A total of 36 full-time structures were recorded.
 - Structures used permanently for residence of a family (only 2 structures were recorded in particular – structure #55 and Structure #61)
 - Part-time residents include mainly workers that work in the farm during the day and then leave to another village/city at the end of the day (e.g., Ras Ghareb).



Figure 34: Poultry Farms



Figure 35: Livestock Farms and Slaughterhouses



Figure 36: Agriculture Farms

The figure below presents the location of these receptors. As noted, none of the above structures / receptors were located within the Project site. Only 1 receptor was recorded within the Project site as a part-time residence or accommodation, however this structure is for the Red Sea Governorate and have been abandoned and is not in use. Red Sea Governorate indicated that these are no longer required and have no objection on removal of these structures.

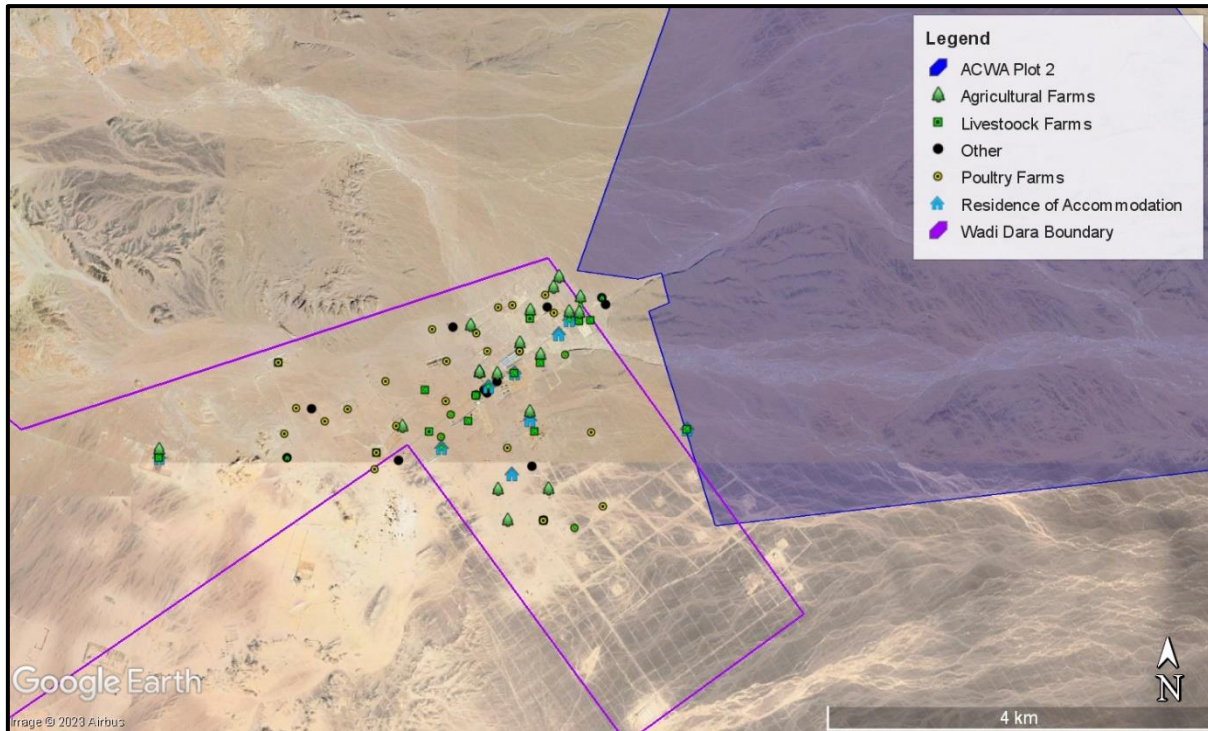


Figure 37: Land Use Survey for Wadi Dara

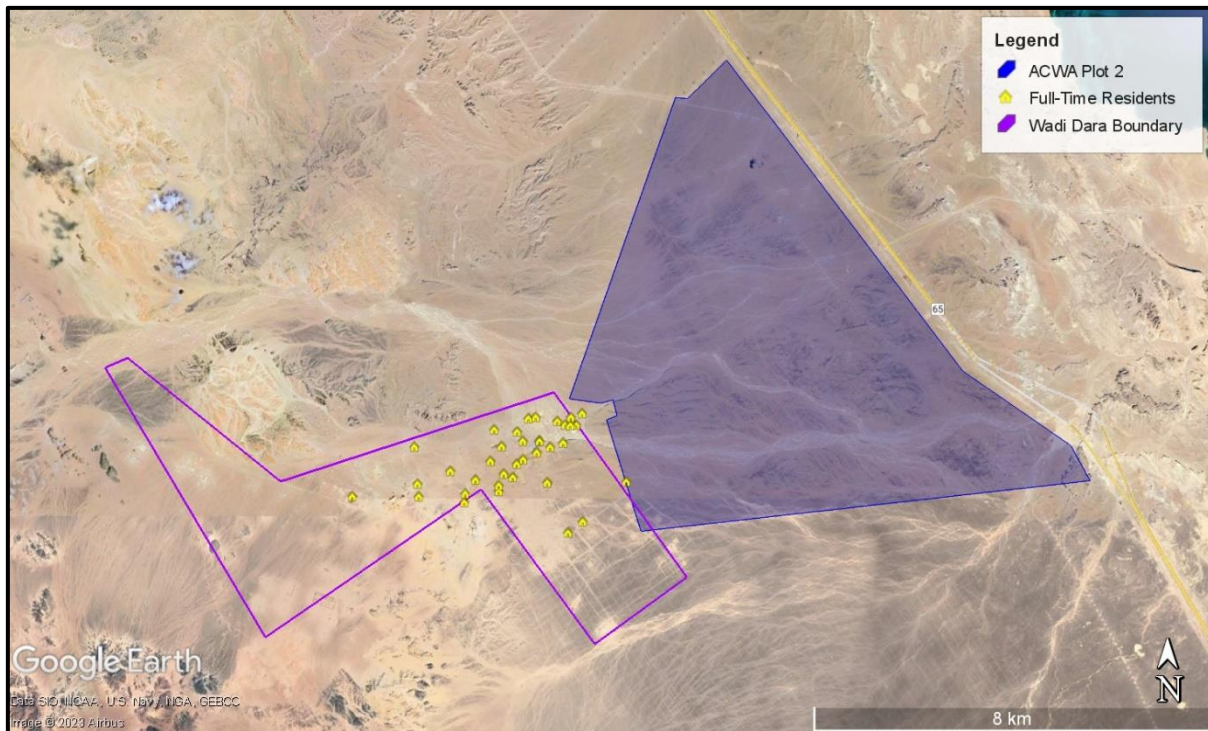


Figure 38: Land Use Survey for Wadi Dara (Full-time residents)

Wadi Dara Cooperative Association was established in 1994/1995 through an official governmental decision, through which the government allocated land areas in Wadi Dara to the Association for agricultural reclamation. The Association is the responsible entity that manages the overall agricultural development process within Wadi

Dara, including dividing and allocates lands within these areas and selling lands to private sector investors. The Association works closely with the Red Sea Governorate.

NREA issued a formal letter dated 17 January 2023 to the Wadi Dara Cooperative Association explaining that Wadi Dara boundaries have encroached on the allocated lands for NREA in accordance with the “Presidential Decree 116 for the year 2016” to be used for development of electrical energy.

The Wadi Dara Cooperative Association provided a letter acknowledging the above and indicated that an area of around 103 Fiddan (equivalent to 0.4km² – part of which is 0.1km² which the Project overlaps with as noted in figure earlier) is located within the NREA allocated area and given the situation the Association will concede this area to NREA given that an alternative land is being provided through the Red Sea Governorate. In addition, alternative lands have also already been provided by the Red Sea Governorate that are of similar area and of similar characteristics.

The figure below presents the new areas for Wadi Dara which were adjusted for the encroachment into the NREA area.

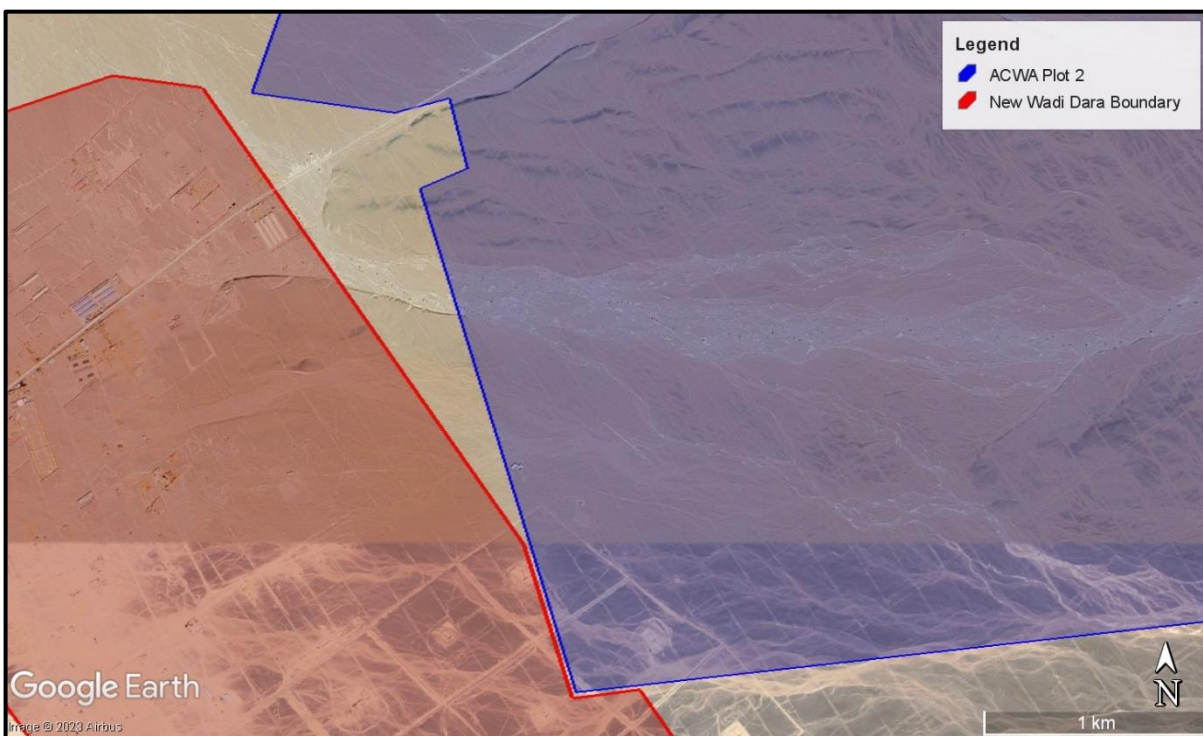


Figure 39: New Wadi Dara Boundary and Project Site

The figure below presents the new 103 Fiddan allocated area provided to replace the encroached areas in the NREA concession.

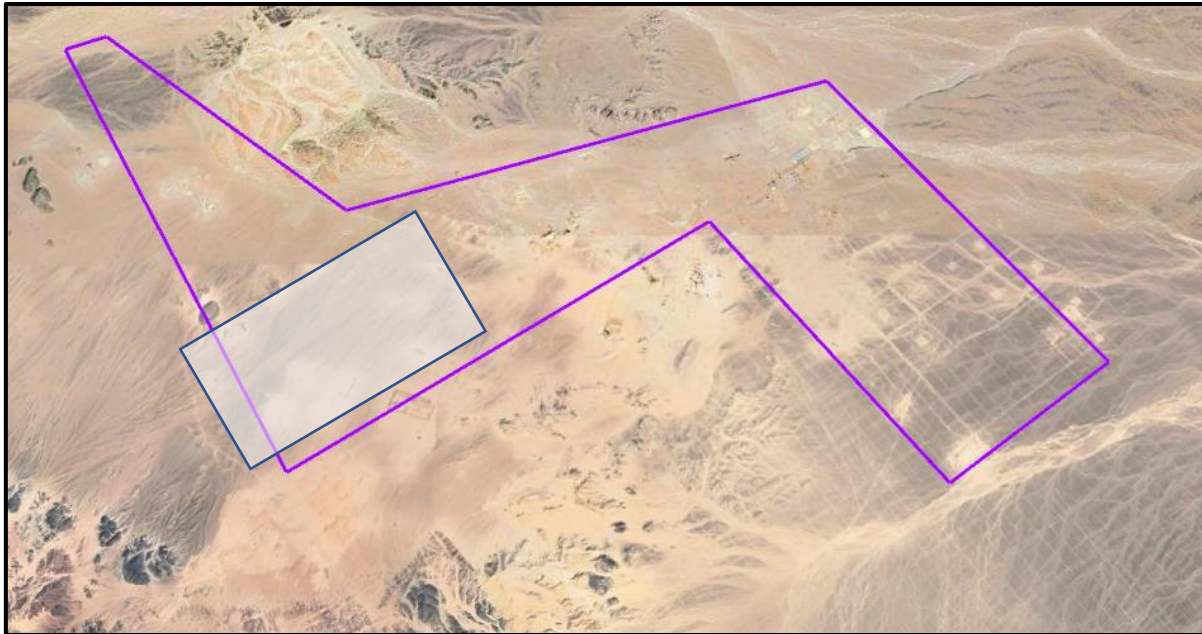


Figure 40: New Alternative Lands Provided

Based on consultations undertaken with the Wadi Dara Cooperative Association, the following was indicated:

- Lands within the 103 Fiddan area (equivalent to 0.4km² – part of which is 0.1km² which the Project overlaps with as noted earlier) have been sold a long time ago to around 4 private sector investors in accordance with the above (however it is not clear as provided in further details later in this section how they were sold if there has been an encroachment issue into the NREA area). These investors have undertaken some early preparatory works on these lands to include levelling works, demarcation, some excavations, etc. and then stopped any activities. However, there were never any agricultural activities actually undertaken within these lands.
- Given the encroachment issue, the Association has no objection to the alternative land provided by the Red Sea Governorate as it is considered acceptable. The alternative lands are also considered of equal areas and of similar characteristics. Wadi Dara Association allocated 4 alternative plots of land similar in size (25 acres per plot) for each.
- However, as mentioned earlier, the formal communication provided from Wadi Dara Association to NREA does not state or mention this issue and clearly provides a non-objection on the entire process.

An updated site visit was undertaken by the ESIA consultant to the above identified overlap areas and below are the key outcomes:

- There are no formal or informal activities within the 0.01km² area
- Within the 0.09km² area there are four plots with the following characteristics:
 - Some plots had indication of early preparatory works for division of land
 - One plot had early preparatory works for the establishment of water reservoir that is in very bad conditions and degraded
 - Some plot had indication of early levelling works
 - One plot had very old dry fruitless trees and some irrigation networks that are in very bad condition and degraded
 - All of the above are extremely old indications of pervious land uses (probably around 10 years ago) and can be considered to be abandoned

The pictures below present the above.



Figure 41: Landscaping and excavation works within the 0.09 km²

It is not clear whether Wadi Dara Association consulted with these landowners on the avoidance process and provision of alternative lands as provided by the Red Sea Governorate as explained above. But they confirmed that the association had allocated four (4) alternative plots of land similar to the same area and closer to the road.

The ESIA consultant required additional information on the selling process that was followed by Wadi Dara Association of these lands as well as the contact details for these private sector investors from the Wadi Dara Association so that direct consultations can be undertaken as part of the ESIA process. The Association indicated that two of the investors are no longer in Egypt and are in Canada while the two others they are no longer responding to any direct inquiries from the Association. Therefore, no further details could be obtained on this issue.

7.2.3 Informal Land Use

As discussed earlier, a detailed land use survey was undertaken for the Project site to understand any informal land use activities undertaken such as physical activities (houses, structures, etc.) or economical activities (such as grazing, agricultural, etc.).

Few activities may occur and no such structures other than the Buhaira One Dam and decommissioned petroleum wells and pools were identified (Refer to Section 7.8). No evidence of such activities (e.g. ploughing marks, abandoned structures, livestock remains, etc.) were observed indicating the land's use for herding, recreation nor residence. However, various infrastructure elements were recorded within the Project site and which are discussed in further details under "Section 8.8". This includes telecommunication towers, closed oil wells, high voltage lines, etc.

In general, Bedouin tribes claim rights to lands within the GoS based on their knowledge of the area and the alleged history of their family living there for generations, even though they do not have official documents to support such claims. This practice is followed up by "Urfi" contracts however such documents are not considered by the GoE as official documents and are not considered to be supported legally.

However, a key point to be considered under informal land use is related to Bedouin Groups. The key Bedouin group known in the area is the Tabbna and the Hamadin families. In general, local Bedouin tribes do not abide

to the legal process required to own land. Therefore, Bedouins apply a type of customary ownership which is not an official process known as Urfi Contracts and Ghafra System.

Bedouin tribes claim rights of these lands based on their knowledge of the area and the alleged history of their family living there for generations, even though they do not have official documents to support such claims. This practice is followed up by “Urfi” contracts however such documents are not considered by the GoE as official documents and are not considered to be supported legally. Furthermore, aiming at declaring their possession of the lands, separate houses are built and scattered in such lands. The residents construct the houses with no legal license.

Consultations were undertaken with the head and elders of such Bedouin families (refer to Section 4.5.) Key outcomes are summarised below:

- There are no stable Bedouin communities in or near the Project site (i.e. Bedouin communities that settle either permanently, temporarily or nomadically). The only settled villages in the desert for Bedouin families are in Zaafarana and Wadi Dara Village itself;
- The Project site or the surrounding areas does not have any key land use activities for them such as grazing or farming activities. However, the area in general is subject to their Ghafra System that is divided between two families, the Tabbna and the Hamadin families as discussed earlier.

7.3 Geology, Hydrology and Hydrogeology

This section provides an assessment of baseline conditions within the Project site and surrounds in relation to geology, hydrology, and hydrogeology. In general, the hazard of seismic activity indicated in the “Egyptian Code of Loads and Forces in Structural and Building Works” for structures in the area of Ras Ghareb city, a peak round acceleration of 0.20 g should be adopted in the seismic design of the project structures. Given the soil conditions, the soil layers below foundation level of the wind turbines could be classified as Soil Class B.

7.3.1 Baseline Assessment Methodology

The assessment was based on review of secondary data to include literature review of previous publications and studies related to geology, hydrology and hydrogeology. In addition, a site assessment was undertaken to confirm and verify the outcomes of the literature review and document conditions on the ground.

7.3.2 Geology

Site geology is one of the most important fundamentals concerning the base line study of any project. The area lies on a wide coastal plain east of the northern part of Red Sea Mountain series. This section will consider in detail the stratigraphy of the area regarding the different exposed rock units, the soil and the important structure anomalies detected.

The Gulf of Suez Region forms a distinct structural unit that was involved throughout time in movements that brought it under the sea for almost the entire length (Figure 42). The gulf area was subjected to tectonic movements that led to the accumulation of a great thickness of sediments in this continuously subsiding area (Said, 1962). According to the “Uniform Building Code” (1997), the soil profile type does not indicate geologic hazards (such as soil liquefaction) in the event of an earthquake as no groundwater was encountered.

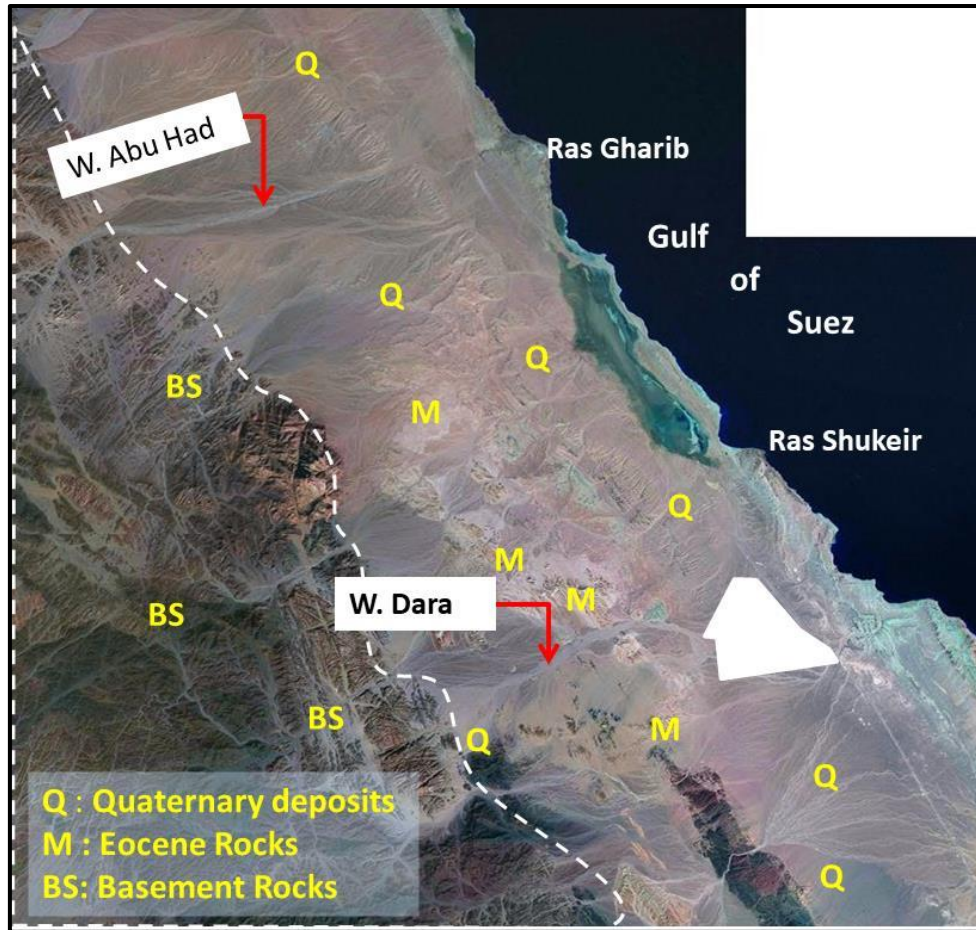


Figure 42: Land sat image showing the location of the project site.

Geological Setting

The project site is a part of Gharib plain (Figure 43). The plain extends NW-SE parallel to the Gulf of Suez and bounded from the west by the higher mountainous range, a part of Red Sea mountainous series, which composed of igneous and metamorphic rocks, and from the east by western coast of the Gulf of Suez. Based on Conoco and the Egyptian General Petroleum Company (EGPC) 1987 and Conoco 1989, the basement (Igneous and metamorphic rocks of Precambrian age) outcrops to the west represent the watershed of the dry wadies drained the area especially Wadi Dara. The upper Miocene evaporites (Gypsum & anhydrites) are well exposed a way to the west from the project site forming highly weathered cone hills. Quaternary deposits (Post-Miocene) are the main exposed sediments covering the whole project area.

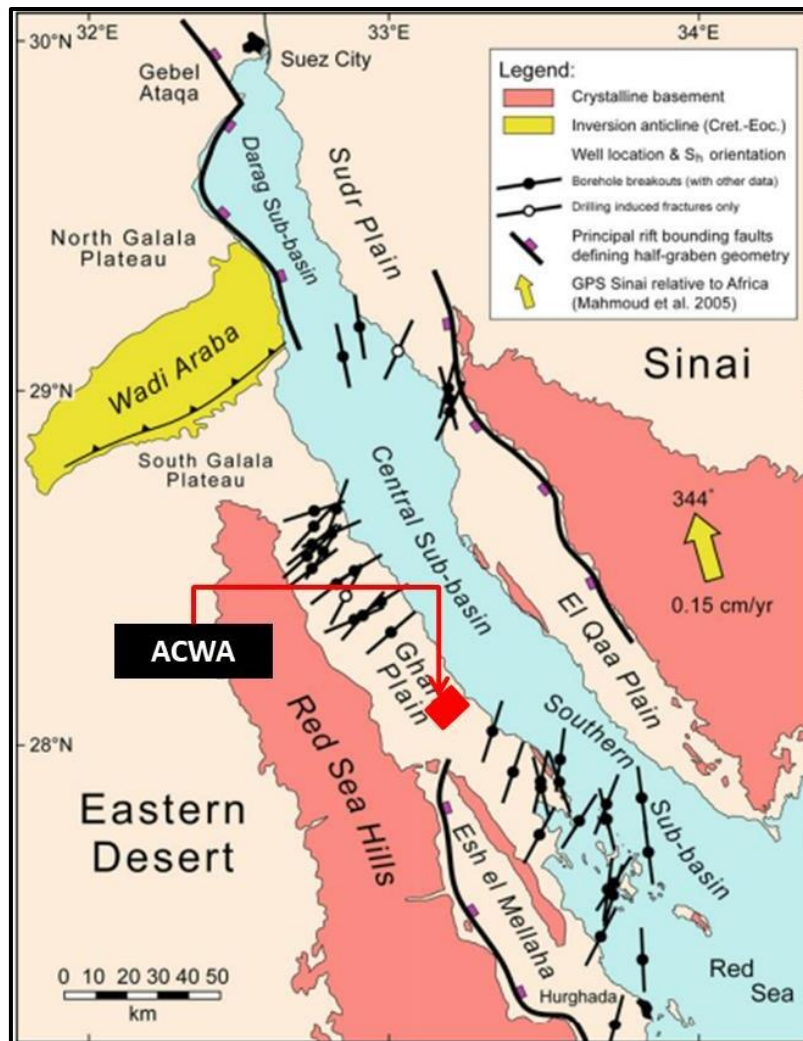


Figure 43: The structure domains of the Gulf of Suez. The project is located in Gharib plain. (Bosworth and Durocher 2017).

The Post-Miocene deposits which are composed of gravels and sands are represented by large thickness in study area. These deposits are very thin layer above the Miocene evaporite or sometimes Cretaceous deposits at the western part of the site, while its thickness increase in the down stream direction due to east reaching more than 100 m at the extreme east near Gulf water.

Stratigraphy

The exposed rock units in the area and its surroundings are represented by various lithologic associations ranging in age from Late Paleozoic to Quaternary.

As shown in the geologic map below, the rock units that could be recognized in the project location are mainly Quaternary deposits. During the field study, with the help of Land sat images, some rock units were found, dating back to earlier ages, and may reach the Upper Cretaceous – Tertiary rocks exposed to the northwest and southeast of the project site. This is shown in the map below.

The following is a focus on the rocks and sediments that exposed in the areas close to the project site based on what was identified during the field visit from old to young.

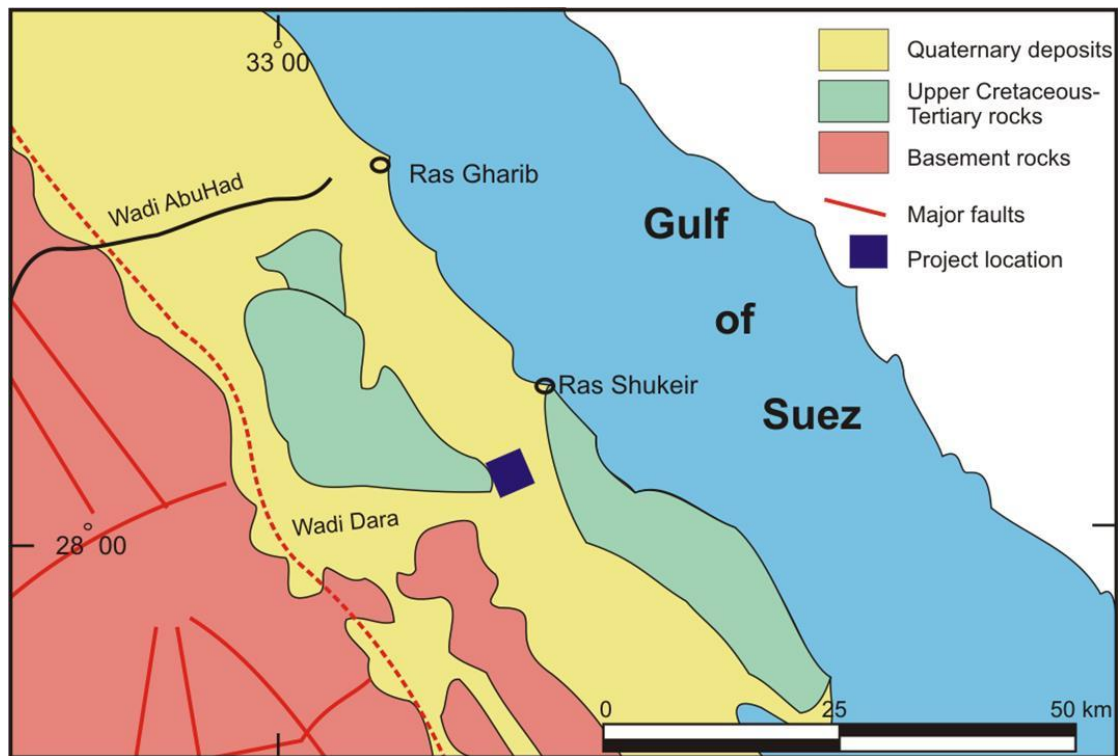


Figure 44: Regional geologic map of the area. Modified from the geologic map of Egypt

Basement Rocks

The exposed rock units of the basement rocks close to the project site are the two types of granitic rocks; older and younger granites.

Older granite or gray granite: forming low relief bodies has gray and whitish gray colors, medium to coarse grained equi-granular and sometimes contains xenoliths in different sizes. It composed mainly of diorite, quartz diorite tonalities and granodiorites. It is highly weathered and easily eroded by running water. So, fragments in different sizes of this granite are much distributed in the surface deposits cover the whole surface area of the project site.

Younger granite or red granite: forming highly elevated conspicuous peaks with sharp contacts with the adjacent rock units. It is composed of oligoclase feldspar, quartz, K-feldspar, and mafic minerals like biotite. Weathered fragments of this granite are distributed in the surface deposits in whole area of the project.

Upper Cretaceous (clastics and carbonates)

These are mainly composed of intercalating beds of shale, carbonate and chalk (Figure 45). These rocks are recognized at site location where the lower Cretaceous clastics are not exposed in the sites. They appear as tilted faulted block dipping toward SW.

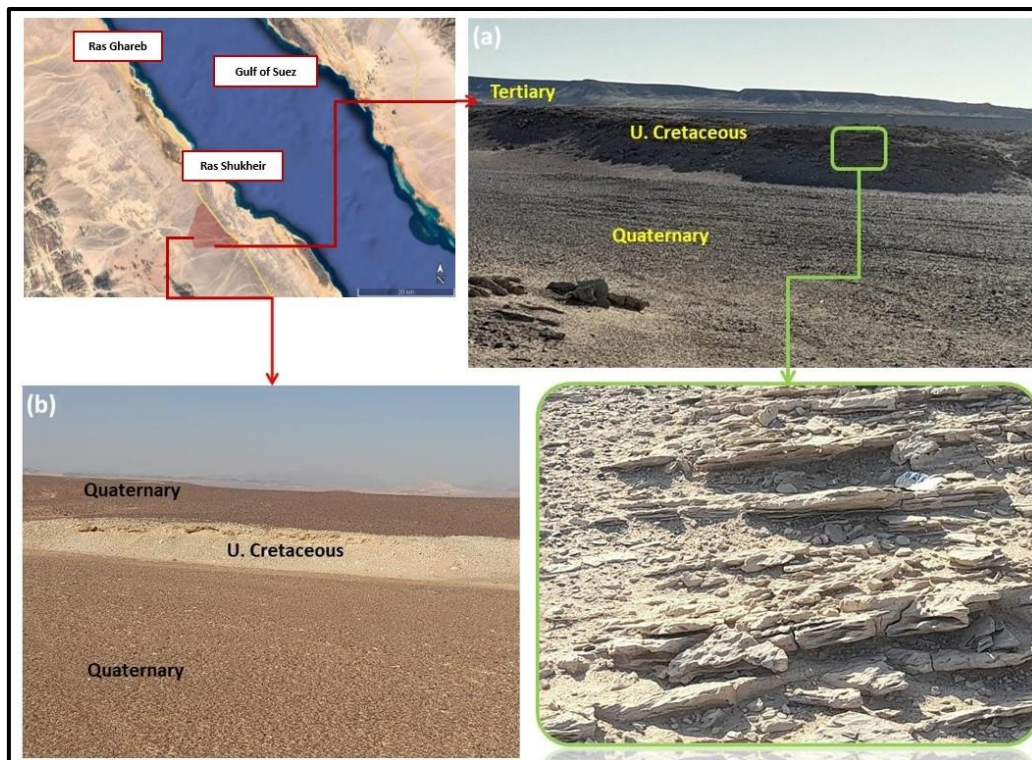


Figure 45: The lower Miocene clastics of fine sand and shale.

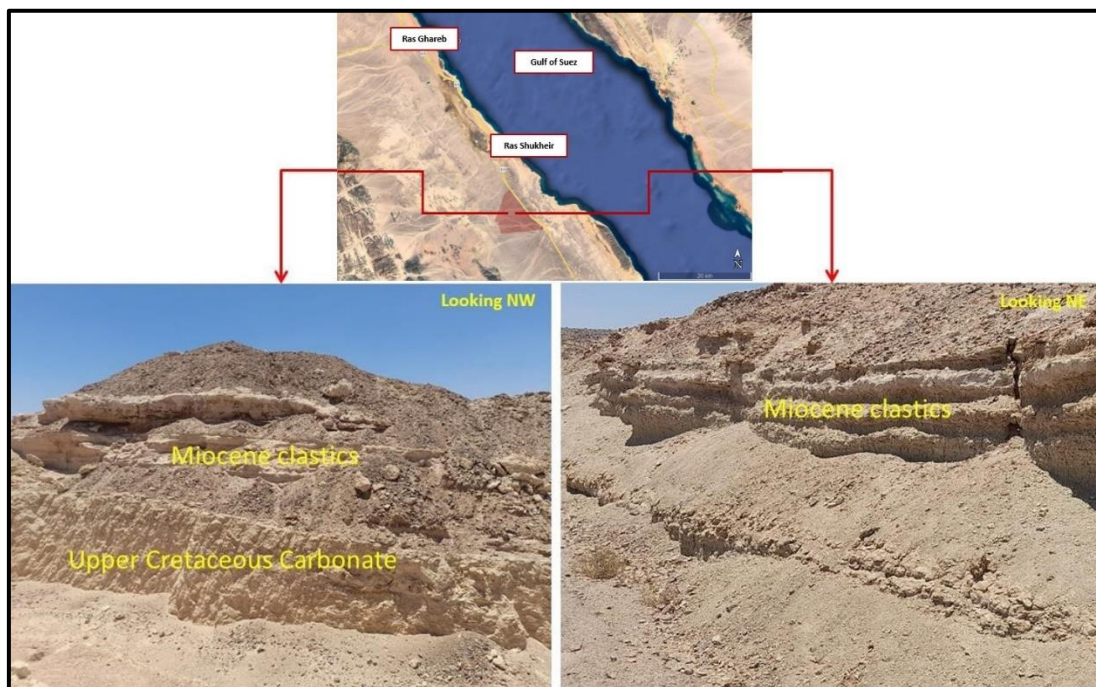


Figure 46: Lower Miocene clastics overlay the Cretaceous carbonates

Upper Miocene Evaporites

These deposits exposed at the western and southwestern parts of the site. They have been recognized as slope former terraces of highly weathered evaporites dissected by wide and shallow drainage lines.

Quaternary Deposits (Post Miocene)

The Quaternary deposits (Post – Miocene) cover all the area of the project site as previously shown on the map. These deposits composed of gravels, sand, clay, aeolian sand sheets and sand accumulations. They are mainly clastic sediments of different textures ranging from silt to gravel size.

The composition of the Quaternary deposits is mainly the weathering products of the surrounding exposed rocks. In the area around the project the Red Sea mountainous series exposed at the far west and southwest of the site. These rocks composed of igneous and metamorphic rocks. The Quaternary deposits cover the almost the major part of the site area is predominantly dark as it consists of fragments of older granite, younger granite and feldspars imbedded in fine grain sand and clay. All these clastics are the weathered product of the exposed rock units.

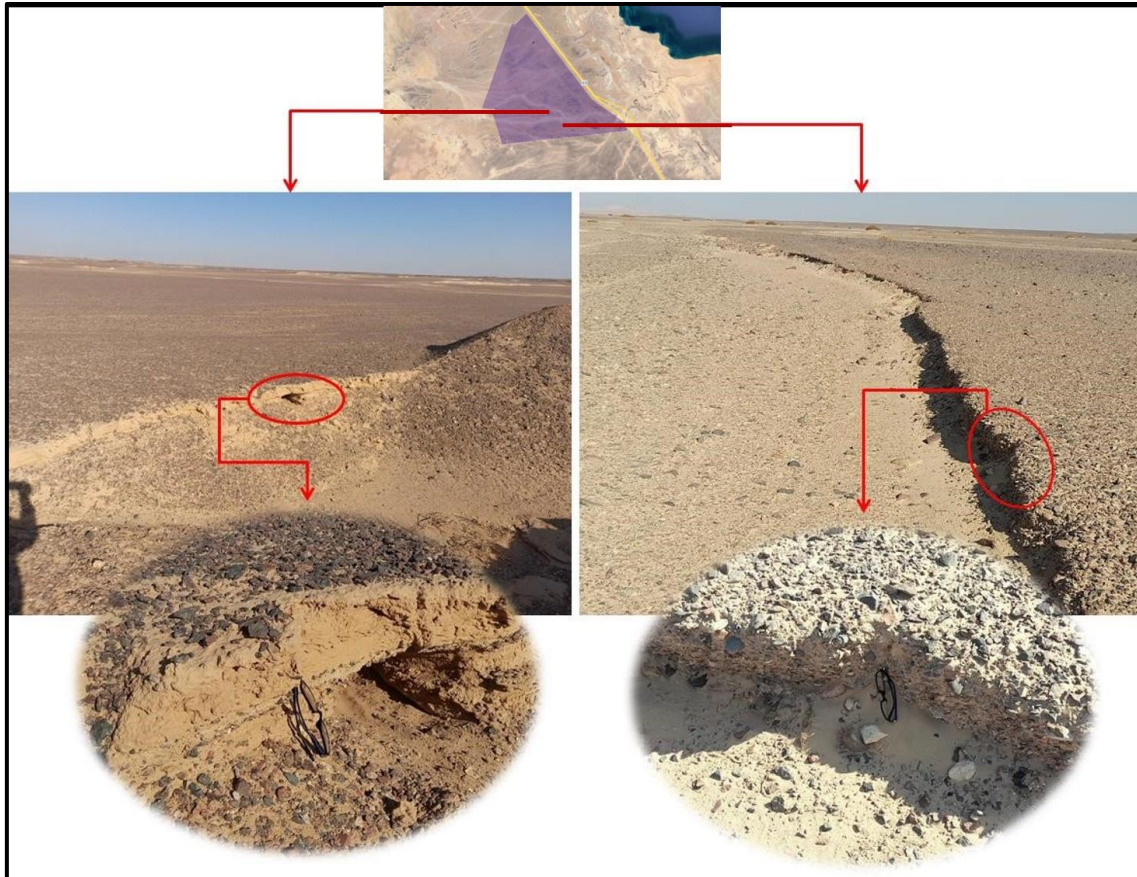


Figure 47: Field photograph of the Quaternary deposits at the middle part of the site.

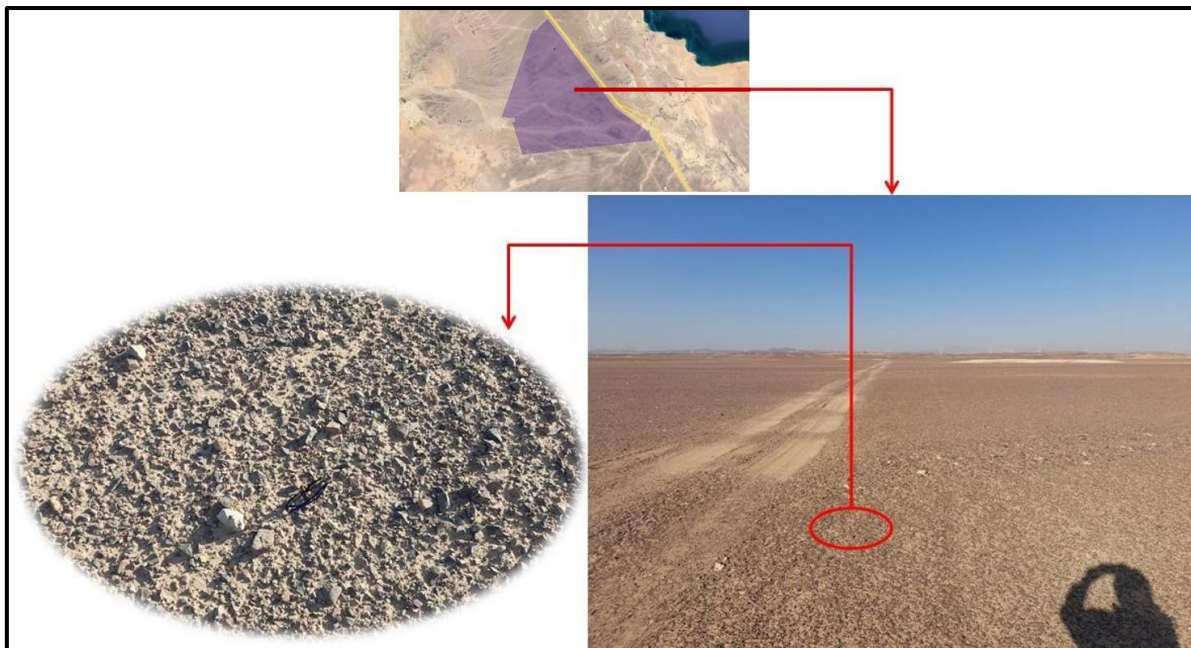


Figure 48: Field photograph of the Quaternary deposits cover the ground surface of most of the eastern part of the site. Coarse to very coarse gravels of chert and rock fragments surrounded by fine grain sand silt and clay

The soil (Quaternary deposits) covers almost all the projects area, and is located in the form of chains of alluvium terraces. Two alluvium terraces have been described in the project area and in the surrounding area during the site visit; T1, and T2.

Terraces differ in their height from the floor of the wadi in addition to the type and size of their components. T1 (the oldest terraces) are well distinguished at the west and south west of the site. Their elevation above the ground surface ranges from 0.5 to about 2 meters. They composed of very coarse to coarse gravels surrounded by low percentages of fine sand, silt and clay. These terraces are exposed as elevated lands between the courses of the wide drainage lines. Going to east and northeast the drainage lines become very wide and almost disappeared except at the outlet of Wadi Dara at the south. The younger terraces formed on low lying level, T2. The youngest formed terraces (T2) are distributed along the floor of the shallow drainage that crossing the T1 and characterized by a successive layer of different deposits varies in grain size and thin layer of mud transported by sheet flow of rainwater. These terraces will be dealt with in some detail below.

T1 – The Older Terrace

These terraces represent the top of the elevated land and the longitudinal shallow dissected hills at the west and south west and extended east to the middle part of the site with gradually reduction in their elevation. These old terraces have been dissected by shallow and wide tributaries drain eastward to the Gulf of Suez. The maximum elevation of the terraces at the west and southwest part is about 2 m (refer to the following figures).

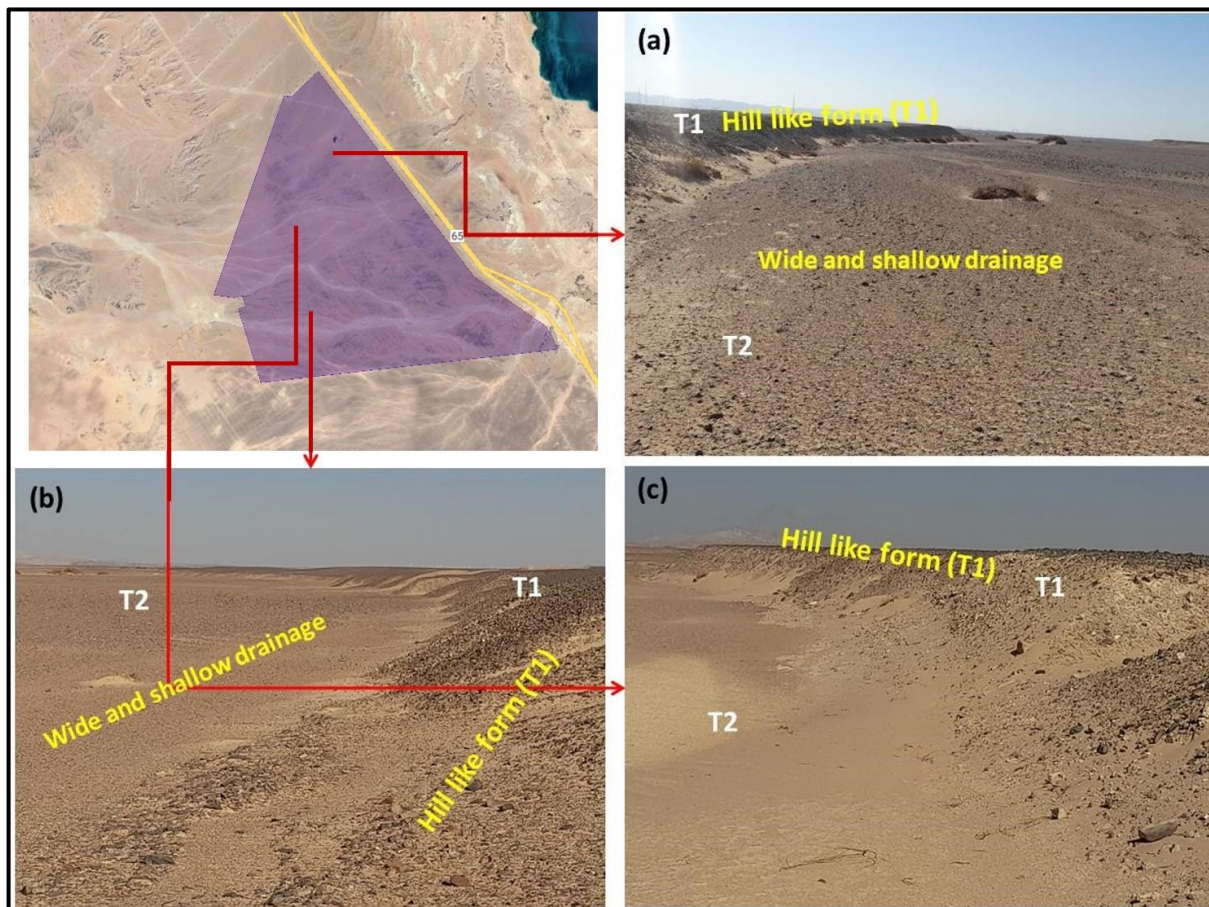


Figure 49: Field photographs of the terraces T1, T2. They appear in different parts of the site. their elevation decreased from west to east

The height of the of the terrace above the ground level (the level of the following terrace) varies from 0.5 m to about 2 m at the west while it varies from 1 m to about 3 m at the west and southwest. This terrace composed of very coarse chert nodules, cobbles and boulders of granite, basalt, impeded in fine clay and sand.

The surface of the old terraces characterized by the presence of very shallow and irregular drainage lines directed to the wide drainages that crossing the T1 to form a series of hill like forms of T1 Figure 50).

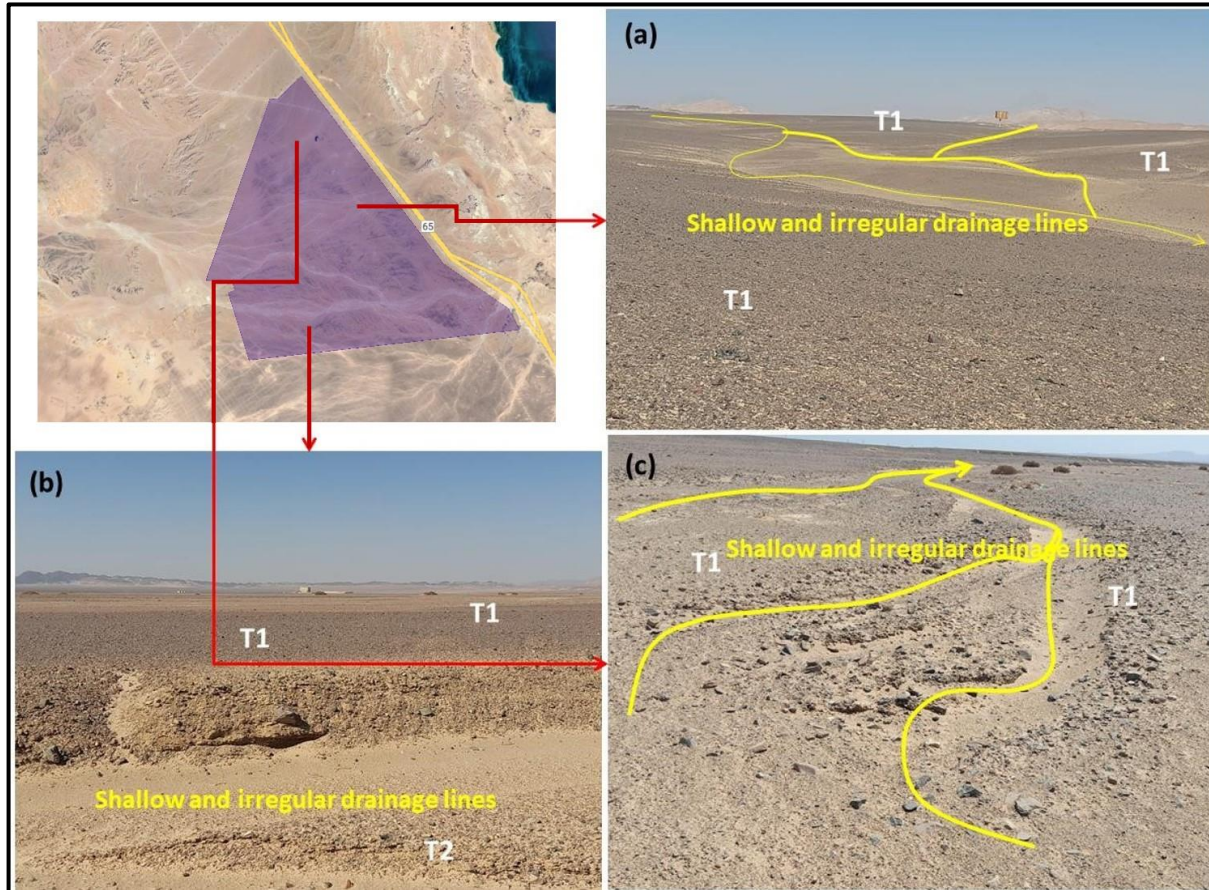


Figure 50: Field photographs of the terraces T1. Note the shallow, irregular and short drainage lines on the surface.

The fine clay and sand fraction is lower than that in the preceding terrace (T2).

T2: Older Terrace and Sand-Clay Fractions

These terraces are exposed along the floor of the tributaries cutting through the terrace T1 (Figure 51). This terrace represents the floor of most of the site area and composed of medium sized chert nodules, fragments igneous rocks impeded in fine clay and sand (Figure 52). The fine clay and sand fraction is greater than that in the previous terrace (T1).

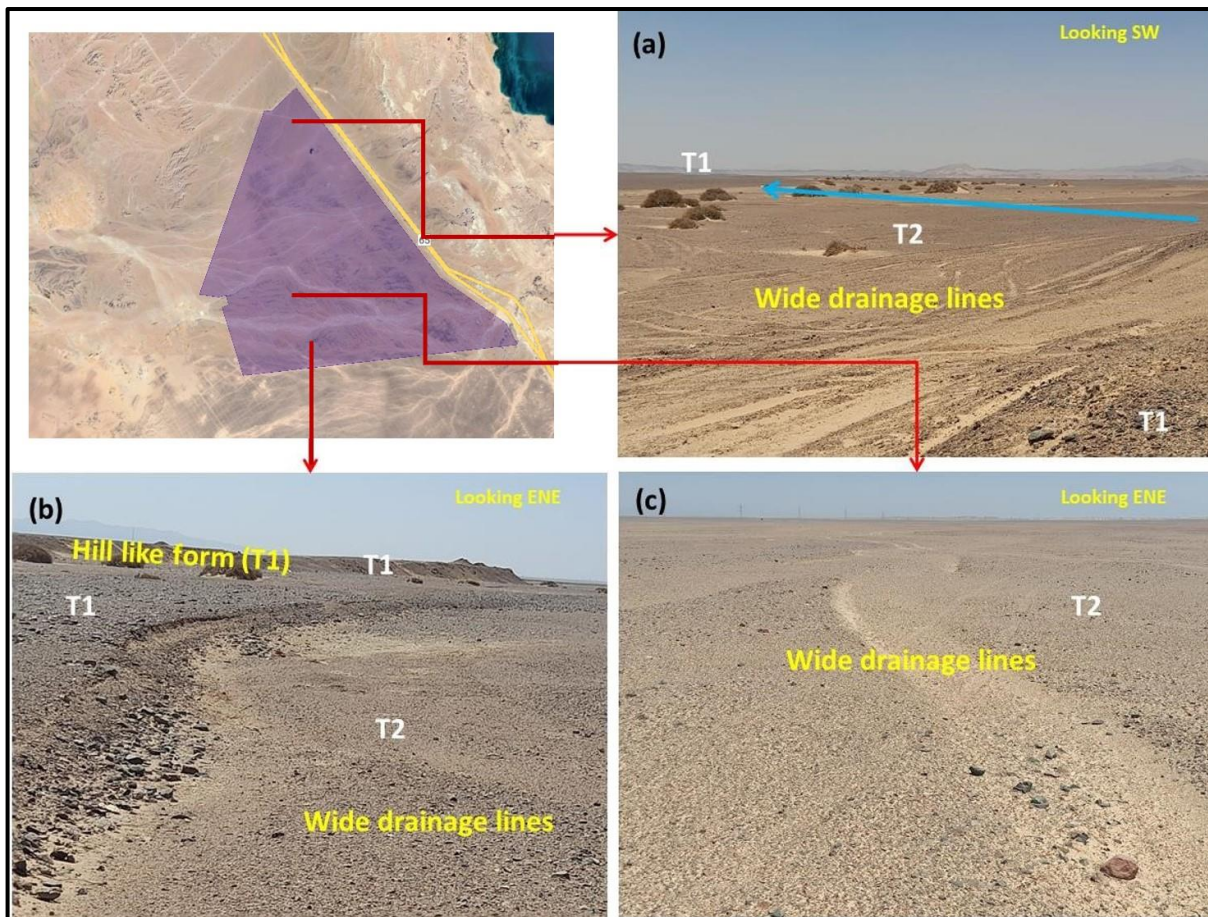


Figure 51: Field photographs of the terraces T1, T2. Note the shallow and very wide drainage lines crossing the T1 and floored by T2 (b) and the hill like form of T2 (b).

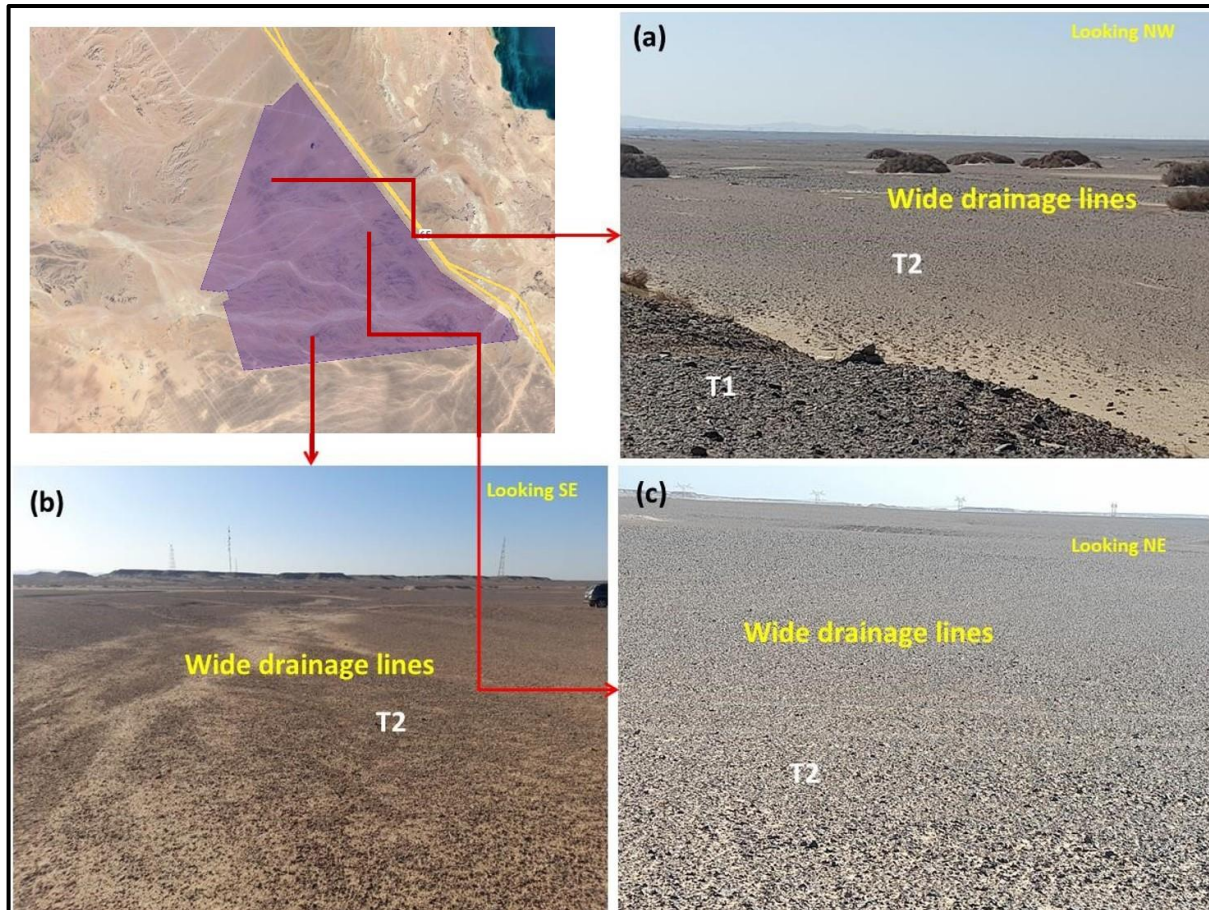


Figure 52: Field photographs of the terraces T2. Note the shallow and very wide drainage lines crossing the T1 and floored by T2.

At the southeast corner of the site, where the outlet of Wadi Dara there is a rain water collection area. This area characterized by the presence of very fine mud layer in the form of mud cracks above the T1 deposits.

Subsurface Geology

The project site is located in a tectono-stratigraphic basin called Gharib basin. The area is characterized by a gentle topography and slopes gradually eastwards. It is mainly made up of basement rocks forming high and rugged mountains. The main part of the site area is covered with wadi fill sediments forming small hill like forms crossing by wide and shallow drainage lines. The relief of most of the site area is low, while at the west and SW parts it is to some extent moderate.

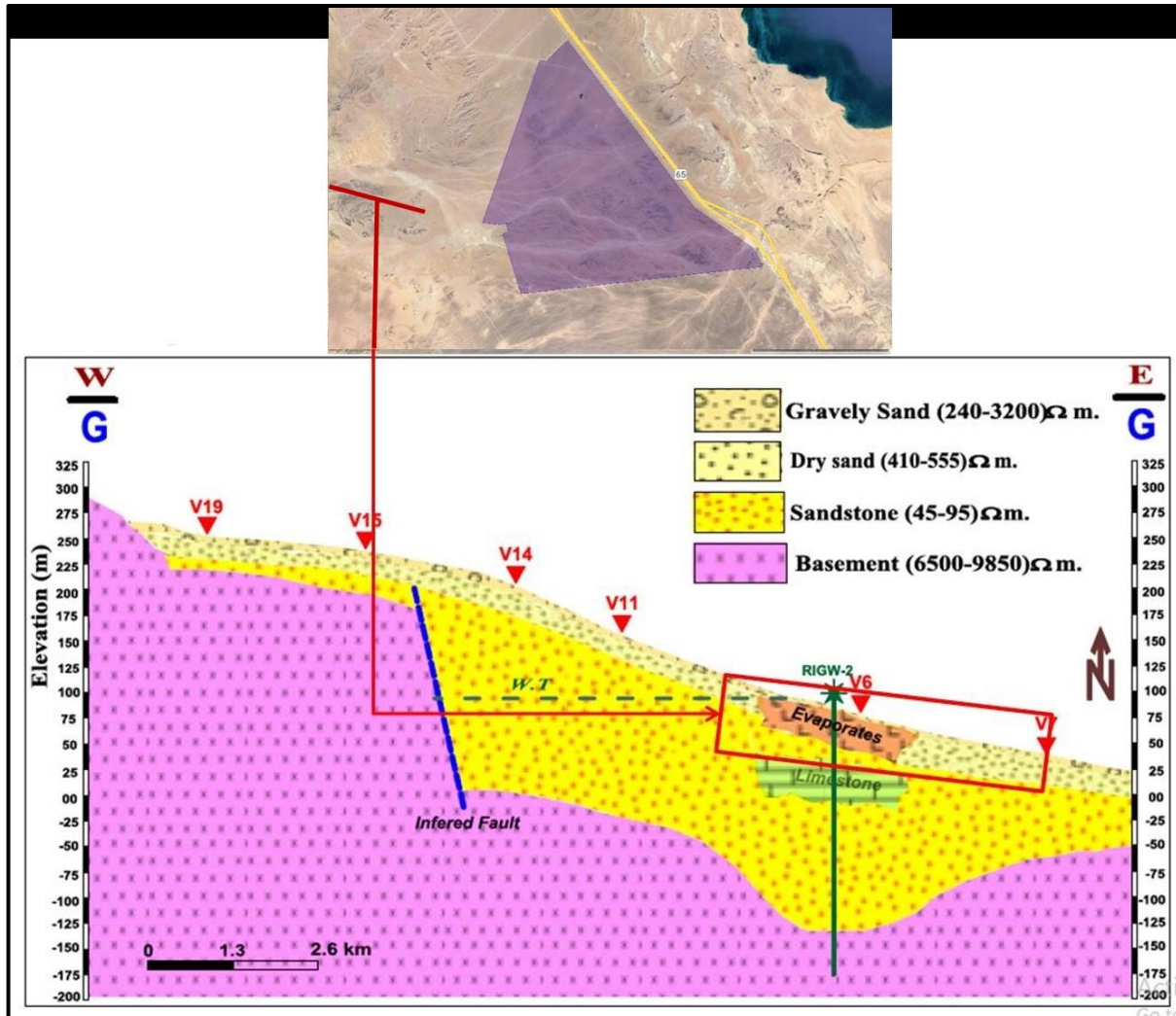


Figure 53: Geoelectrical cross section G – G and its lithologic unit at Wadi Dara. (Source, Bedair 2015)

Structures

The GoS rift basin is about 325 km long and 90 km wide at its broadest in the south at the junction with the northern Red Sea as shown in the figure below. The basin is subdivided into three large-scale mega-half grabens. The main dip in the Southern sub-basin is toward NE-direction, in the Central sub-basin is SW-dipping, and in the northern sub-basin is to the NE. Between the opposing-dip domains are regions of complex structure referred to as accommodation zones (Bosworth, 1985 Rosendahl, 1987) or transfer zones (Morley et al., 1990; Patton et al., 1994).

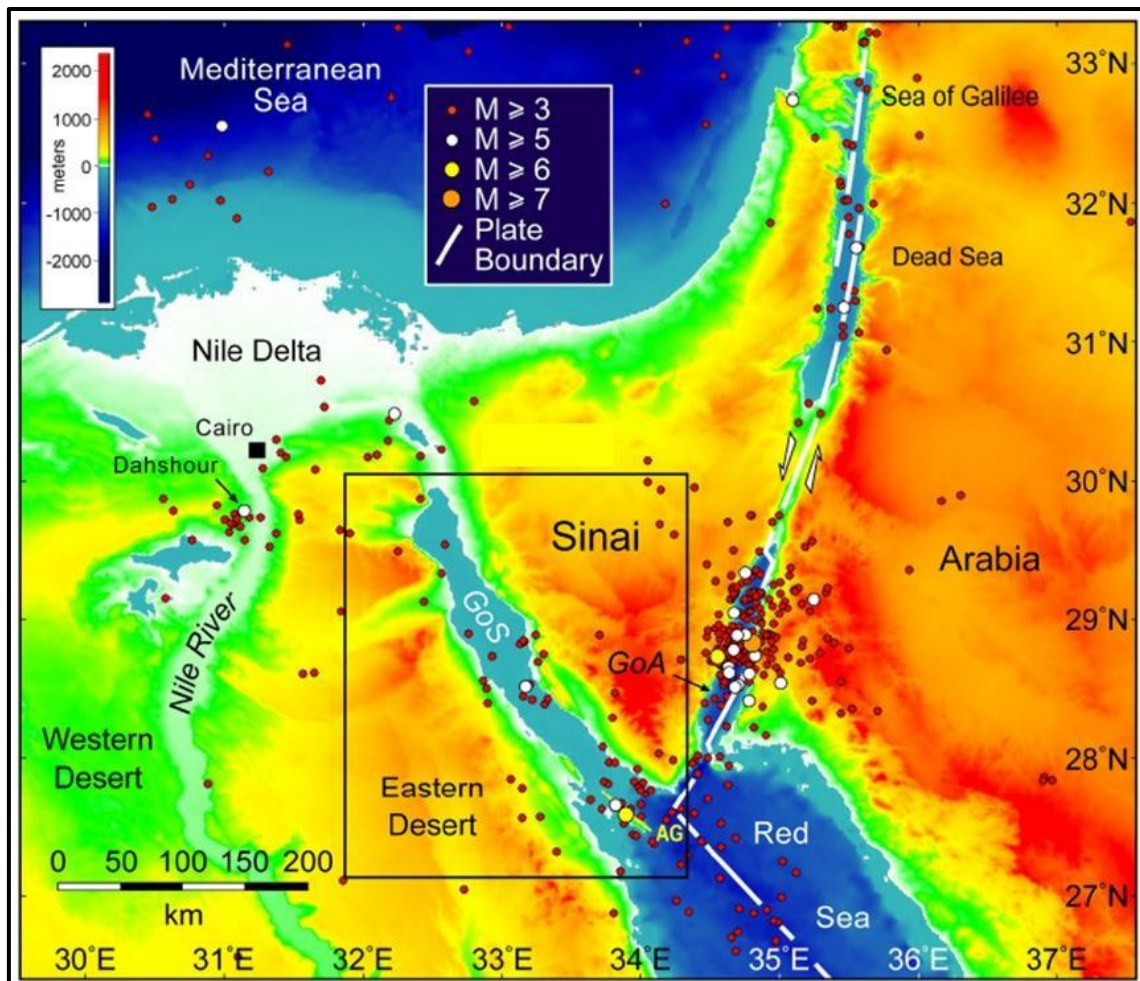


Figure 54: Plate tectonic setting of the Gulf of Suez. (Bosworth & Durocher, 2017)

Despite the low extension rate, a broad belt of extensional faults developed along the central western margin of the Gulf of Suez in the Gharib alluvial plain where the project site located. The location of the site may be observed in the map presented below. Associated surface fault-line scarps are formed in partially lithified sands and gravels. The scarps are largely uneroded except where they are cut by the active wadi systems. The deformed sands and gravels overlie Late Miocene evaporate beds and are themselves overlain by the terraces. Their age is therefore post-Miocene to early-Pleistocene. The deformation appears to have been purely dip-slip although no fault plane kinematic data have been observed. The faults are very straight with an average strike of 145° belt probably developed in a stress field similar to that present.

The Gharib fault today in the Central sub-basin and accommodated rift-normal extension. Because this fault array lies above Late Miocene evaporites it is possible that none of the faults is directly linked to basement structures. However, the straight fault pattern is not suggestive of basin-ward mass wasting or three-dimensional flow above rising salt domes or ridges.

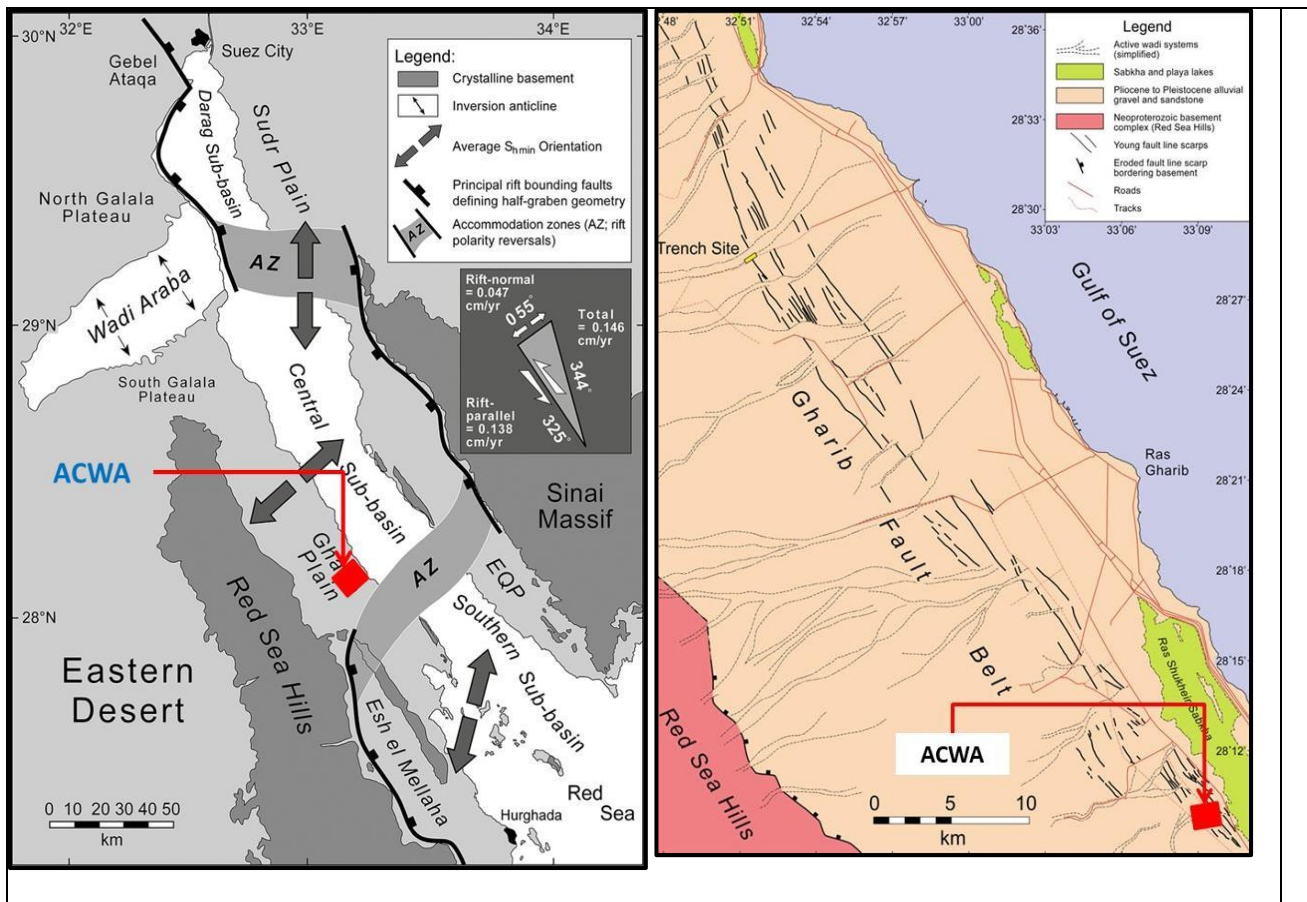


Figure 55: (At Left) Average S_{hmin} (minimum horizontal stresses) orientations in the sub-basins of the Gulf of Suez. The Central sub-basin (Gharib plain, where the project is located) presently displays S_{hmin} parallel to the long-term NE-SW extension direction that prevail. (At Right): Young fault-line scarps in Pliocene-Pleistocene alluvium on the west flank of the central Gulf of Suez (Gharib fluvial plain). Faults are straight and most are down-thrown toward the NE (Boswerth et al., in Rasil & Stewart, 2019)

7.3.3 Hydrogeology

The area of the project is located within the Middle Western part of the GoS. This part was studied by several authors in the fields of geology, hydrology, hydrogeology and geophysics.

The groundwater accumulations could exist in the weathered zone of hard rocks, Paleozoic to Lower Cretaceous sandstones, paleo-karstified carbonates of upper Cretaceous – Eocene as well as alluvium deposits and controlled mainly by the presence and configuration of underlying clays. Faulting could have likely brought impervious formations down against pervious rocks supporting this aquifer, thus cutting off groundwater discharge to the east.

In the Gulf of Suez, groundwater is used mainly for tourist and industrial purposes. According to the rates of groundwater withdrawal with respect to water requirements, the Gulf province includes areas into which the groundwater represents 10-40% of the utilized water supplies. The daily discharge ranges from 260 to 3000 m³/day at Wadi Araba and El Sukhna-Zafrana localities respectively (Sewidan and Misak, 1992). The continuous use of such water potentially stresses its quantity and quality. Attention must be paid toward its protection and sustainability to cope with the excessive needs of the development programs as shown in the figure below.

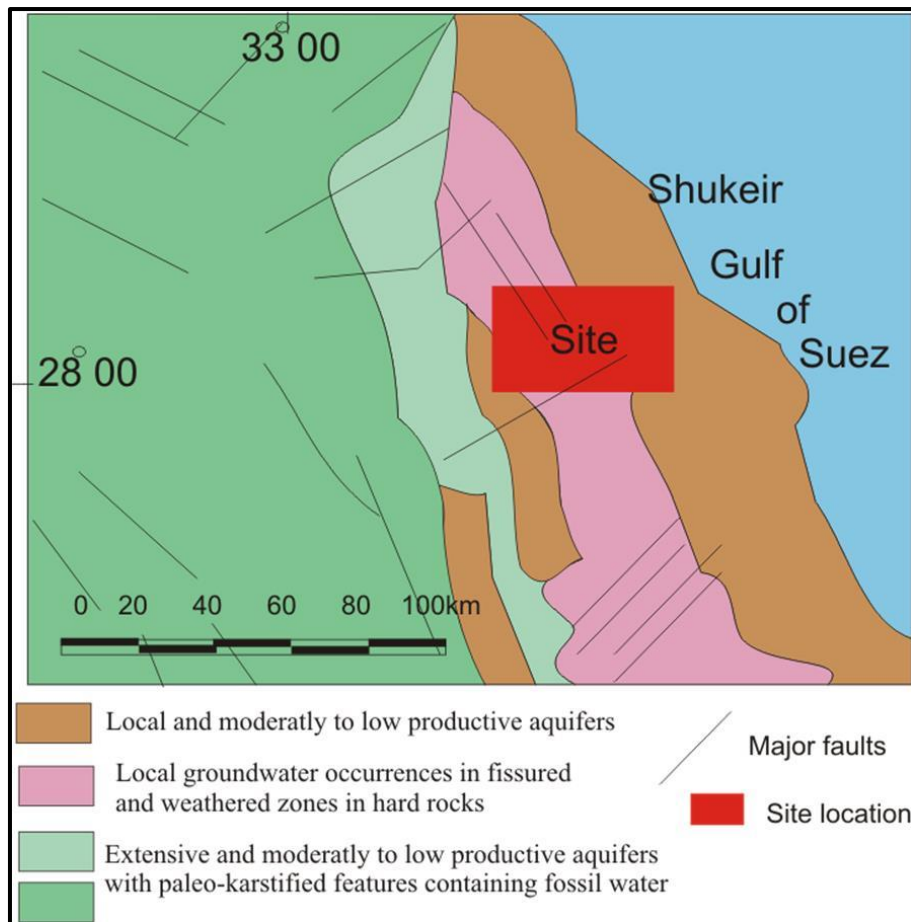


Figure 56: The hydrogeological map of the area around the project site.

In Wadi Dara, the groundwater has been utilized only for land reclamation but its Total Dissolved Solids “TDS” is high to be incompatible with the domestic purposes. The aquifer has a thickness varying from 100 m to 300 m and generally decrease west wards. The depths are displayed in the map below. This also confirmed by the results obtained from the drilled well. The depth to water varies between 9 m to 120 m. The water quality in the aquifer is brackish.

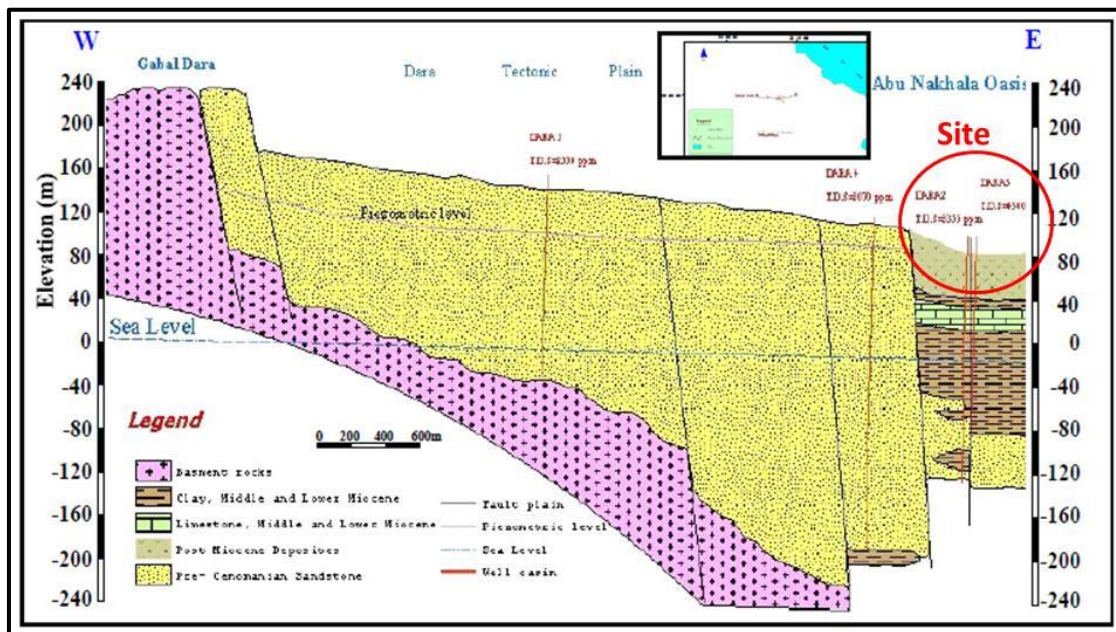


Figure 57: Cross section of the hydrological foundation under Wadi Dara

Pumped and observation wells were drilled by Desert Research Institute within the Wadi Dara area south of the project site (Sewidan et al., 1991), in addition to the wells drilled by RIGW, 2005, are the main source of the groundwater information in the study area as shown in Figure 58. The available well data and coordinates are included in Table 25.

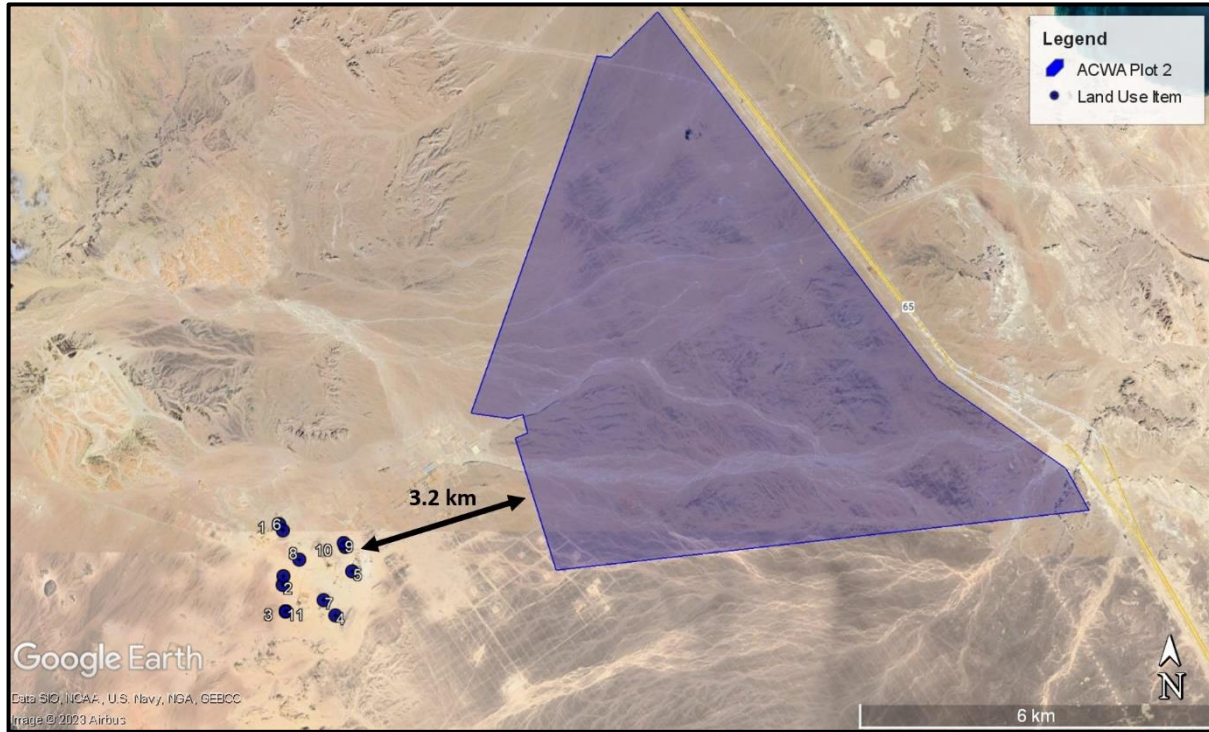


Figure 58: Location Map of the Drilled Wells at Wadi Dara

Table 25: The available well data in wadi Dara area (Bediar 2015)

No	Lat. N	Long. E	Gl m amsl	DW m	TDS gm/l	WL m
1	27°58'56.9"	33°12'12.2"	121.9	11.34	3400	110.5
2	27°58'31.8"	33°12'12"	128	16	3650	112
3	27°58'27.1"	33°12'11.57"	135	26.6	2720	108.3
4	27°58'10.1"	33°12'43.7"	151	39.2	2675	111.8
5	27°58'33.8"	33°12'54.2"	109	Flowing	6750	105
6	27°58'59.7"	33°12'10.5"	154	44.4	2550	109.5
7	27°58'18.6"	33°12'36.7"	120	93	3250	27
8	27°58'40.7"	33°12'21.8"	97.2	94.9	7630	2.32
9	27°58'49.4"	33°12'49.4"	150.6	9	3400	141.6
10	27°58'47.8"	33°12'50.2"	121.9	7.78	8200	114
11	27°58'13"	33°12'13"	134.5	24	2800	110.5

Discussed in section 6.3.1., the NREA's Feasibility Study for Large Wind Farm Development in the Gulf of El Zeit (2008) contained a guideline pertaining to groundwater of Ras Shukheir water supply and installation of wind turbines, stipulating a required distance of 150m from existing ground water wells.

7.3.4 Surface Hydrology

There are no permanent fresh surface water bodies or streams in or close to the site. There are, however, shallow dry drainage lines traversing the site, through which occasional precipitation on the Red Sea Mountains finds its way to the Gulf of Suez. These flash floods could represent serious events resulting in extensive loss of life and property. The Red Sea area is subjected to seasonal flash floods which are characterized by their high velocity and low duration with a sharp discharge peak. The recorded history indicates the occurrence of significant flash floods that affect the coastal areas along the Red Sea. These floods threaten people and man-made structures along their main streams and the outlet of their catchments either to save a quantity of rain for consumption or save inhabitants and constructions from the danger of flood.

7.4 Climate

The meteorological data utilized for this assessment has been meticulously compiled from a reliable online source; Meteoblue, the data obtained spans over three decades, encompassing hourly weather records from 1985 to the present day. It's important to emphasize that this extensive dataset serves as a solid foundation for characterizing the climate of the project area. The baseline relied on the data obtained with coordinates of 28.01°N 33.28°E. The climatic features of the project area could be characterized as follows:

7.4.1 Temperature

Situated at an elevation of 57 m above sea level, Wadi Dara experiences a sub-tropical desert climate characterized by distinct seasonal variations. Winters tend to be warm, while summers can be quite hot. Notably, the highest monthly average for maximum temperatures is typically observed in July and August, reaching up to 42°C, whereas the lowest monthly average occurs in January, at around 23°C. Conversely, the highest monthly average for minimum temperatures occurs during July and August, averaging around 20°C, while the lowest values are recorded in January and February, often dropping to approximately 5°C. Table 26 shows the average monthly temperature in both areas.

Table 26: Average monthly temperatures in the Project Area (based on data from 30 years of observation)

Air Temp.	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max °C	23	25	29	34	38	41	42	42	40	35	29	24
Min °C	5	5	8	12	16	18	20	20	18	15	10	6
Mean °C	14	15	18.5	23	27	29.5	31	31	29	25	19.5	15

Source: Meteoblue

Rainfall

Rainfall distribution in Egypt exhibits its highest levels along the Mediterranean coast, with a significant decline as one moves southward. Over the past three decades, the mean annual precipitation in the project area has averaged 12 mm, accompanied by approximately 4.2 rainy days each year. The highest precipitation occurs in January, with an average of 3 mm. Conversely, the months of June, July, August, September, and November typically experience minimal to virtually no precipitation. Table 27 and Figure 59 show the average rainfall data in the project areas.

Table 27: Average rainfall data in the Project Area (based on data from 30 years of observations).

Rainfall	Month												Annual
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(mm/month)	3	1	3	2	1	0	0	0	0	1	0	1	12

Source: Meteoblue

The following figure displays an illustration of the varying temperatures and precipitation in the project site.

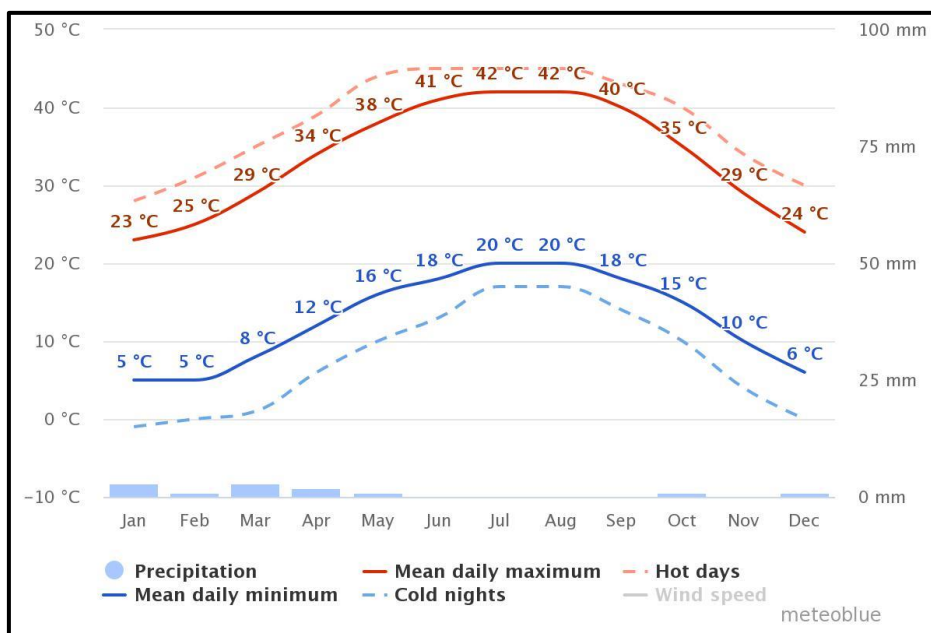


Figure 59: Average temperatures and precipitation measures data in the Project Area (based on data from 30 years of observations) Source: Meteoblue

7.4.2 Humidity

Wadi Dara, being situated in a sub-tropical desert climate region, maintains an average humidity level of approximately 52.04%. This percentage signifies the amount of moisture present in the air relative to its maximum capacity at a given temperature. Humidity plays a pivotal role in shaping the climate and overall environmental conditions in this area.

To provide a more detailed perspective, the following table illustrates the average relative humidity for each month in the Ras Gharib governorate:

Table 28: Relative Humidity in Wadi Dara

Humidity	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
%	57.7	54.39	50.48	47.12	44.24	43.79	45.65	47.48	52.45	59.07	61.96	60.15

Source: weather & climate

7.4.3 Wind Speed

According to Meteoblue meteorological data, the average monthly wind speed ranges between 11 Km/h and 15 Km/h. Dry hot dust-laden which blows mainly from south and southeast as Khamasin winds blows occasionally for about 50 days during spring. The prevailing winds at the project area blow from the North West direction.

Table 29: Average monthly wind speed in the Project Area (based on data from 30 years of observations)

Wind Speed	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max. (Km/h)	15	17	18	18	18	20	17	18	18	15	14	15
Min. (Km/h)	6	6	7	6	7	11	9	10	10	7	6	6
Avg. (Km/h)	10.5	11.5	12.5	12	12.5	15.5	13	14	14	11	10	10.5

Source: Meteoblue

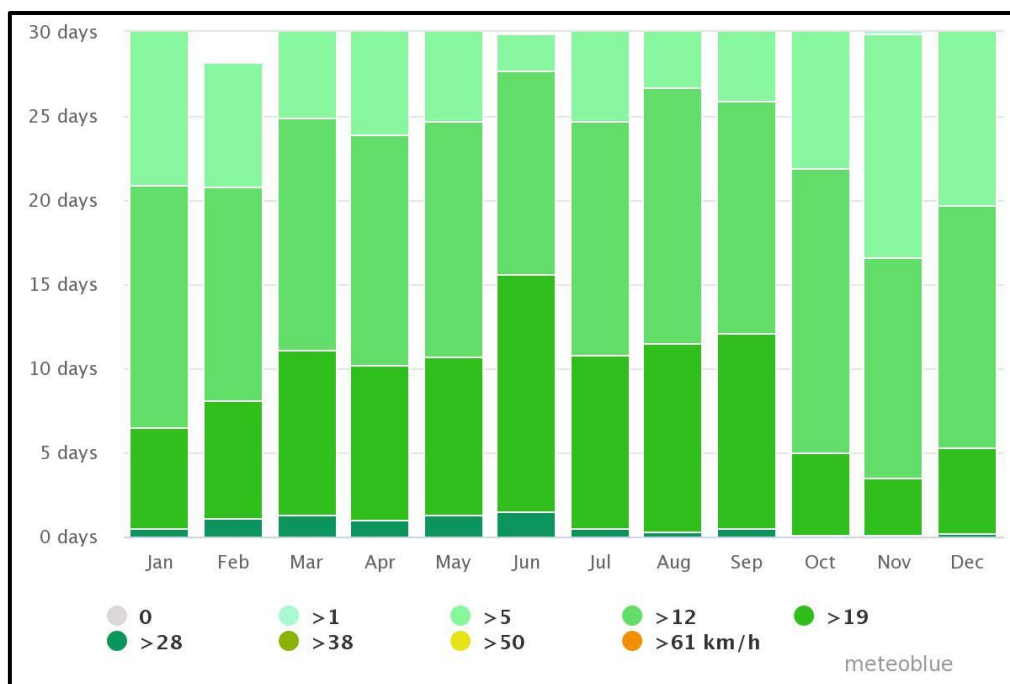


Figure 60: Average monthly wind speed and direction in the Project Area (based on data from 30 years of observations) Source: Meteoblue

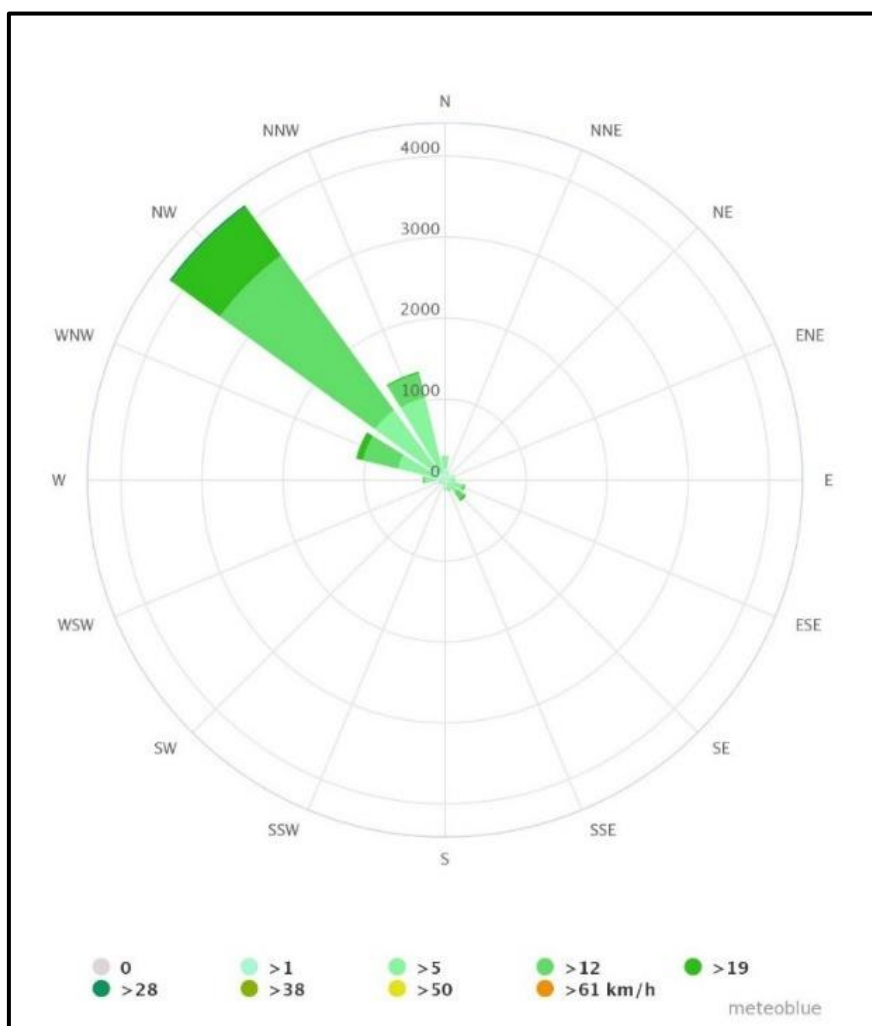


Figure 61: Wind-Rose in the Project Area
Source: Meteoblue

7.5 Biodiversity

This section provides an assessment of baseline conditions within the Project site and surrounds in relation to biodiversity.

7.5.1 Desktop Review

Protected Areas

The location of Protected Areas within 50 km of the site boundary were taken from a range of sources including, but not limited to, Protected Planet¹, IUCN², Birdlife Datazone IBA³ and Key Biodiversity Areas⁴. The results of the search are as follows:

- Protected Areas
 - Gebel El Zeit KBA IBA
 - El Qa Plain KBA IBA
 - Hurgada Archipelago KBA IBA
 - Red Sea Islands
- Potential Protected Areas
 - Wadi Qena
 - Malahet Ras Shukeir
 - Shaieb El-Banat

Gebel EL Zeit IBA and KBA

Gebel El Zeit is designated as both an IBA and a KBA (with concurrent boundaries) and the project area for Plot 2 lies within the protected site. The site consists of a narrow, 100km long strip extending along the Gulf of Suez and Red Sea Coast. Gebel El Zeit is a mountain reaching 457m while the IBA/KBA itself extends from Ras Gharib to the bay of Gubbet El Gemsa. Habitats include mountains, coastal plain, saline bays, intertidal mud, saltmarsh and small vegetated wadis.

IBA Designation

The Gebel El Zeit area is a very important migration corridor for soaring migrants, particularly birds of prey and storks. Because of the geography of the Gulf of Suez as a whole and the micro-geographic configuration of the Gebel El Zeit area, which is the narrowest point in the southern part of the Gulf of Suez, over 250,000 White Stork (*Ciconia ciconia*) and many other migrant soaring birds are funnelled through this stretch of coast on both spring and autumn migrations. Birds of prey, storks and pelicans migrate through and usually land, rest or roost near the coastline and on the surrounding desert plains and hills. Resting and roosting storks, especially, utilize the two bays of Ghubbet El Zeit and Ghubbet El Gemsa and the saltmarsh at Sabkhet Ras Shukheir.

¹ <https://www.protectedplanet.net>

² <https://www.iucnredlist.org>

³ <https://datazone.birdlife.org>

⁴ <https://www.keybiodiversityareas.org>

Information on bird species which trigger the IBA Criteria is shown in the table below.

Table 30: Populations of IBA Trigger Species

Species		IUCN Category	Season	Year(s) of Estimate	Population at Site	IBA Criteria Triggered
Common Name	Scientific Name					
White-Eyed Gull	<i>Larus leucophthalmus</i>	LC	Non-breeding	1998	common	A1
Eastern Imperial Eagle	<i>Aquila heliaca</i>	VU	Passage	1992-1994	19 Individuals	A1
Pallid Harrier	<i>Circus macrourus</i>	NT	Passage	1992-1994	4 individuals	A1
Lesser Kestrel	<i>Falco naumanni</i>	LC	Passage	1998	Uncommon	A1
A4iv Species Group – Soaring birds/cranes	n/a	n/a	Passage	1989-1998	250,000 individuals	A4iv

In terms of other fauna there are seven species of sea grass in the bay of Ghubbet El Zeit forming one of the most diverse and extensive sea-grass beds in the northern Red Sea. These beds are potential feeding grounds for Dugong (*Dugong dugon*), an IUCN VU species, and endangered marine turtles.

KBA Designation

This site qualifies as a Key Biodiversity Area of international significance because it meets one or more previously established criteria and thresholds for identifying sites of biodiversity importance (including Important Bird and Biodiversity Areas, Alliance for Zero Extinction sites, and Key Biodiversity Areas).

Oil pollution from onshore and offshore oil facilities, as well as passing vessels is the most immediate threat to birds. It is recommended that development in this area is carried out with careful consideration of migratory birds. Information on bird species which trigger the KBA Criteria is shown in the table below.

Table 31: Populations of KBA Trigger Species

Taxonomic Group	Scientific name	Common name	IUCN Red List Category	KBA Criteria	Legacy Criteria
Birds	<i>Aquila heliaca</i>	Eastern Imperial Eagle	VU		Y
Birds	<i>Circus macrourus</i>	Pallid Harrier	NT		Y
Birds	<i>Falco naumanni</i>	Lesser Kestrel	LC		Y
Birds	<i>Larus leucophthalmus</i>	White-eyed Gull	LC		Y

El Qa Plain IBA and KBA

El Qa Plain lies approximately 31km east from Plot 2 and is both designated as a IBA and KBA.

IBA Designation

El Qa Plain lies across the Gulf of Suez and consists of a wide plain that flanks the South Sinai Mountain massif on the west and separates it from the Gulf of Suez. The IBA is mostly concerned with the coastal portion of the plain, and extends from Wadi Feiran in the north to Ras Mohammed in the south, where migratory birds tend to concentrate and often land in vast numbers. The plain is dissected by many wadis that flow from the mountains of Sinai into the Gulf of Suez. To the north of El Tor a narrow mountain range separates the plain from the Gulf of Suez. This mountain, immediately overlooking the Gulf, is thought to be a very important departure point for many of the soaring birds that attempt to cross the Gulf of Suez in autumn. Sparse scrub

vegetation and scattered Acacia trees cover sizeable sections of the plain. The town of El Tor is located within the area of concern and is the only major human settlement in the region.

Information on bird species which trigger the IBA Criteria is shown in the table below.

Table 32: Populations of IBA Trigger Species

Species		IUCN Category	Season	Year(s) of Estimate	Population at Site	IBA Criteria Triggered
Common Name	Scientific Name					
Eastern Imperial Eagle	<i>Aquila heliaca</i>	VU	Passage	1998	Present	A1
Pallid Harrier	<i>Circus macrourus</i>	NT	Passage	1998	Uncommon	A1
Lesser Kestrel	<i>Falco naumanni</i>	LC	Passage	1998	Uncommon	A1
A4iv Species Group – Soaring birds/cranes	n/a	n/a	Passage	1998	200,000 individuals	A4iv

The mammal fauna present within the IBA is limited to Dorcas Gazelle (*Gazella dorcus*) which is categorised as IUCN Vulnerable and is thought to be the largest remaining population of this species in Sinai.

KBA Designation

This site qualifies as a Key Biodiversity Area of international significance because it meets one or more previously established criteria and thresholds for identifying sites of biodiversity importance (including Important Bird and Biodiversity Areas, Alliance for Zero Extinction sites, and Key Biodiversity Areas).

Threat from tourism and development is the most immediate threat for this KBA, particularly for migratory birds in the Spring. Details on bird species which trigger the KBA are shown in the table below.

Table 33: Bird Species that Trigger KBA Designation

Taxonomic Group	Scientific name	Common name	IUCN Red List Category	KBA Criteria	Legacy Criteria
Birds	<i>Aquila heliaca</i>	Eastern Imperial Eagle	VU		Y
Birds	<i>Circus macrourus</i>	Pallid Harrier	NT		Y
Birds	<i>Falco naumanni</i>	Lesser Kestrel	LC		Y

Hurgada Archipelago KBA IBA

IBA Designation

An archipelago of 22 uninhabited islands which lies 37km south of Plot 2, plus a handful of very small islets, scattered from the Straits of Gubal (at the mouth of the Gulf of Suez) to Hurghada. Most are small or medium-sized and fairly flat coralline islands, such as Tawila and Ashrafi, but some are quite large and hilly. Shadwan is the largest of the Egyptian Red Sea islands, being c.56 km² in area and reaching some 300 m at its highest point. The area of the IBA includes adjacent marine waters.

The Hurghada Archipelago holds the largest known breeding population of White-eyed Gull (*Larus leucophthalmus*) in the world. A total of 6,500 adults was counted attending the sprawling Hurghada city rubbish-dump in May 1996. It is almost certain that all these birds breed on the Hurghada archipelago and, probably, represent only part of the local breeding population. The fact that all birds counted were adults in breeding plumage indicates that the total population of the area, if immatures and juveniles are accounted for, should be much larger than the previous estimate of 1,500–2,000 pairs. The current estimate made here for the

Hurghada archipelago is of at least 3,000 breeding pairs, or a total population of some 10,000 birds. In addition, the Hurghada archipelago supports a considerable diversity of other breeding seabirds and waterbirds. At least 15 species are known to breed or to have bred: *Sula leucogaster*, *Phaethon aethereus*, *Butorides striatus*, *Egretta gularis*, *Platalea leucorodia*, *Pandion haliaetus*, *Falco concolor*, *Charadrius alexandrinus*, *Larus hemprichii*, *Sterna caspia*, *Sterna bergii*, *Sterna bengalensis*, *Sterna anaethetus* and *Sterna repressa*.

Table 34: IUCN Red List Categories

Species	Current IUCN Red List Category	Season	Year(s)	Population estimates at site	IBA criteria met
White-eyed Gull <i>Larus leucophthalmus</i>	LC	breeding	-	3,000 breeding pairs	A1, A4i
Caspian Tern <i>Hydroprogne caspia</i>	LC	breeding	-	200 breeding pairs	A4i
White-cheeked Tern <i>Sterna repressa</i>	LC	breeding	-	1,500 breeding pairs	A4i
Lesser Crested Tern <i>Thalasseus bengalensis</i>	LC	breeding	-	500 breeding pairs	A4i
Sooty Falcon <i>Falco concolor</i>	VU	breeding	-	44 breeding pairs	A4ii

KBA Designation

This site qualifies as a Key Biodiversity Area of international significance that meets the thresholds for at least one criterion described in the Global Standard for the Identification of KBAs. The islands south of 27°15 N are protected as part of the Elba National Park, declared by Prime Ministerial Decree 450/1986, adjusted by Prime Ministerial Decree 1186/1986 and Prime Ministerial Decree 642/1995. Islands further north are not protected, but are proposed for protection. Species triggering the KBA designation are shown the Table 35 below.

Table 35: KBA Triggering Species

Taxonomic Group	Scientific name	Common name	IUCN Red List Category	KBA Criteria	Legacy Criteria
Birds	<i>Falco concolor</i>	Sooty Falcon	VU	A1b, D1a	Y
Birds	<i>Larus leucophthalmus</i>	White-eyed Gull	VU	B1, D1a	Y
Birds	<i>Sterna bengalensis</i>	Lesser Crested Tern	LC		Y
Birds	<i>Sterna caspia</i>	Caspian Tern	LC		Y
Birds	<i>Sterna repressa</i>	White-cheeked Tern	LC		Y

Red Sea Islands

The Red Sea Islands has been a Marine Protected Area and Developing Resources Protection Area since 2006. It lies 30km south of Plot 2 and is designated on a national level. Its reported area is 1800.00 km². The reason for designation is not clear. The IUCN category of this site is not reported and accordingly it is assumed to be of lower importance than sites meeting criteria within lenders environmental standards.

Proposed Protected Areas

Shaieb El-Banat

Shaieb El-Banat has been a proposed Terrestrial and Inland Waters Protected Area since 1999. It overlaps Plot 2 and is designated on a national level. Its reported area is 4,855.85 km². The reason for designation is not clear. The IUCN category of this site is not reported and accordingly it is assumed to be of lower importance than sites meeting criteria within lenders environmental standards.

Malahet Ras Shukeir

Malahet Ras Shukeir has been a proposed Terrestrial and Inland Waters Protected Area since 1999. It lies 20km north of Plot 2 and is designated on a national level. Its reported area is 107.19 km². The reason for designation is not clear. The IUCN category of this site is not reported and accordingly it is assumed to be of lower importance than sites meeting criteria within lenders environmental standards.

Wadi Qena

Wadi Qena has been a proposed Terrestrial and Inland Waters Protected Area since 1999. It is 45km west of Plot 2 and is designated on a national level. Its reported area is 8006.56 km². The reason for designation is not clear. The IUCN category of this site is not reported and accordingly it is assumed to be of lower importance than sites meeting criteria within lenders environmental standards.

7.5.2 Ecology Site Visit

In April 2023 Turnstone Ecology completed a Site Visit to the Project AoI. During the Scoping Survey all bird Vantage Points were visited and viewsheds verified, static bat detectors surveys were set-up with locations for static detectors agreed and detectors placed around the site to commence the survey effort. Turnstone Ecology also undertook training sessions in the use of SM4BAT detectors and data management.

7.5.3 Habitats and Flora

Methods: Habitats and Flora

A standard sampling method was applied across the project AoI. Sixty sampling points were chosen across the AoI, with a minimum distance of 1km between each sample to maintain comprehensive coverage and to avoid double sampling.

For the floral survey, a protocol was devised and surveys consisted of five 10 x 10m sample plots (quadrats) in a radius of 50m from each sampling point as shown in **Figure 62**. All plant species present within each quadrat were recorded (including their abundance and % of cover), in particular, threatened species, weeds and invasive species. For each sample plot, photographs of the landscape and plants were taken using a digital camera.

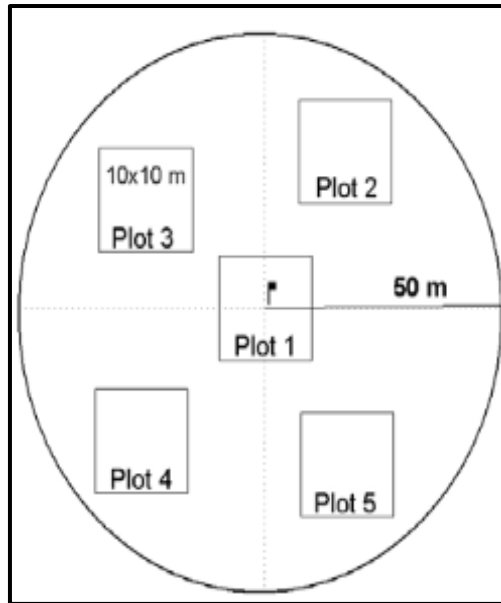


Figure 62: Floral Quadrat Survey Sampling Methodology

Following field sampling, calculations to account for the Shannon-Wiener Biodiversity Index and Importance Value Index of the flora of species per site were undertaken and pooled for the entire Aoi. Refraction curves were created to ensure adequate coverage of the Aoi.

Results: Habitat and Flora

During the 2023 surveys a total of 15 plant species were recorded across the Project Aoi (Table 36). The majority of these species were in the herb and shrub communities with *Acacia tortilis* and *Tamarix nilotica* representing the tree community in low numbers.

Table 36: Results of Spring 2023 Survey

Species Scientific Name	Total Abundance	Frequency	IUCN Status
<i>Acacia tortilis</i> subsp. <i>raddiana</i> (Savi) Brenan.	1	1	LC
<i>Astragalus vogelii</i> (Web) Bornm.,.	4	1	LC
<i>Astragalus</i> sp.	5	9	LC
<i>Cornulaca monacantha</i>	14	1	LC
<i>Fagonia arabica</i> L.	6	1	LC
<i>Fagonia mollis</i> Zohary.	51	1	LC
<i>Ochradenus baccatus</i>	15	3	LC
<i>Stipa</i> SP.	173	1	LC
<i>Stipagrostis</i> SP.	150	2	LC
<i>Zilla spinosa</i> (L.) Prantl in Engl. & Prantl.	4	18	LC
<i>Zygophyllum coccineum</i> L.	66	1	LC

No species that are listed on the IUCN Red List as Critically Endangered, Endangered, Vulnerable or Near Threatened were recorded during the survey. Species such as *Stip* sp. and *Zilla spinosa* were noted as having height value for local livestock.

The collective Shannon-Wiener Biodiversity Index for the Aoi was 1.649, while the same calculated for each sampling site ranged from 0.00 to 1.32. The species count for the Aoi was 15 species, which ranged from one

species to five species between sampling sites with the species richness across the Aol being 2.60. This shows limited spatial diversity between sites.

The floral diversity and species richness across the Aol was highest in the centre of the site and lowest in the southern and western periphery areas, with a decline in diversity between these areas.

The habitats present on the site do not meet any of the criteria for Annex I or Priority Habitats and are assessed as being of Low to Medium Sensitivity.

7.5.4 Reptiles and Amphibians

Methods: Reptiles and Amphibians

Field studies were carried out according to generally accepted zoological methods for identifying species composition. No amphibian species are known to be present within the Aol. Three survey methods were undertaken for reptiles and these included:

- **Diurnal Active Searching** – thorough searches of suitable basking spots and resting places such as rocks, logs, within soil and leaf litter, soil cracks and holes. Areas surrounding trees and large shrubs, primarily Acacia, were checked for snakes.
- **Nocturnal Searching** – torchlight surveys for primarily nocturnal species such as geckos and snakes.
- **Pitfall Trapping** – traps made out of plastic buckets placed into pre-dug holes in the ground which are used to catch terrestrial reptiles and amphibians as they travel. No chemical substances are used within the buckets and individuals are captured, identified and released. The pitfall traps remain open for seven consecutive nights at each sampling location. Data recorded within the pitfall trapping was recorded to compute local occupancy of each species.

All reptile species were identified to species level according to the national reptiles and amphibians guidebooks.

Spiny-Tailed Lizard (Dhab Lizard) *Euromastix aegyptia*

Spiny Tailed Lizard (*Euromastix aegyptia*) are recognized as an IUCN Vulnerable species and therefore dedicated surveys were undertaken for this species along with general reptile surveys. These were designed to not just be representative but to cover all individuals and burrows in the AOI.

Results: Reptiles and Amphibians

The results of the reptile surveys completed are shown in Table 37 and are summarised below.

In general, the composition of the herpetofauna within the Project Aol is characterized as low densities of common and widespread species. Six species of reptile were recorded throughout the survey effort. Of the species recorded, none are of international conservation concern.

No amphibians were recorded and as such amphibians are therefore not discussed further in this report.

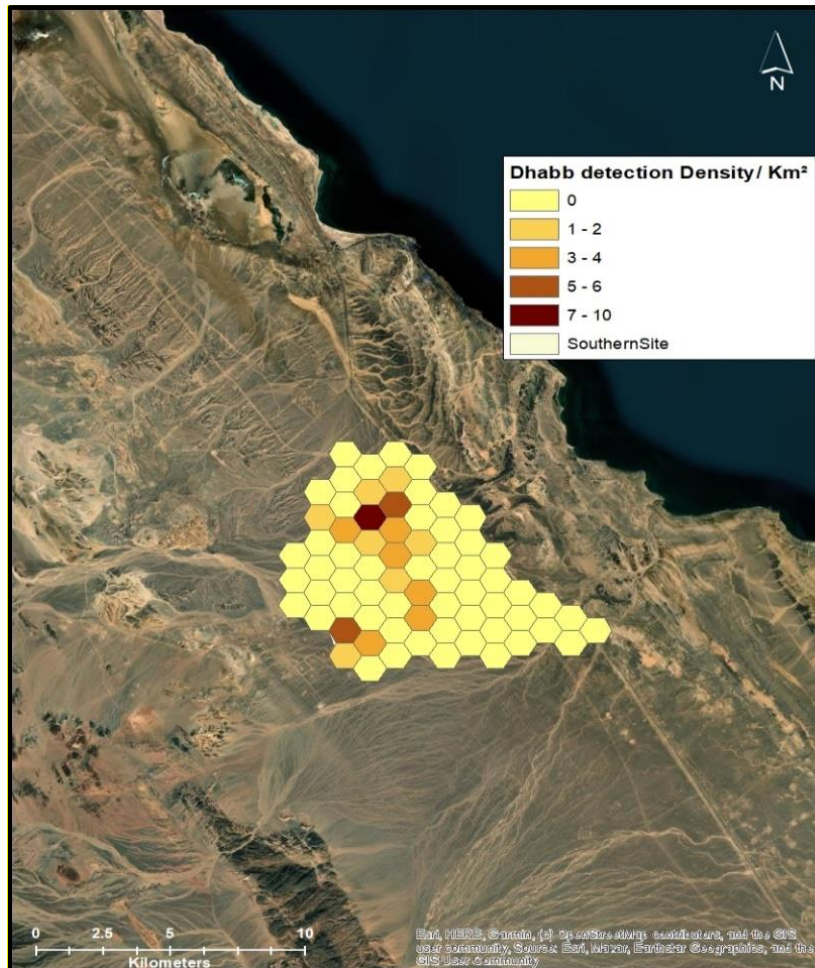
Table 37: Results of the Reptile Surveys

Common Name	Scientific Name	Red List Status
Spiny-Tailed Lizard	<i>Uromastix aegyptia</i>	Vulnerable
Steudner's Pigmy Gecko	<i>Tropicolotes steudneri</i>	Least concern LC
Red-spotted Lizard	<i>Mesalina rubropunctata</i>	Least concern LC
Elegant Gecko	<i>Stenodactylus sthenodactylus</i>	Least concern LC
Pallid Agama	<i>Trapelus pallidus</i>	Not Assessed

Bosc's Fringe-toed	<i>Acanthodactylus boskianus</i>	Least concern LC
Gecko sp.	-	-

Spiny-Tailed Lizard (Dhab Lizard) *Uromastyx aegyptia*

Surveyors registered 62 locations of both active and inactive burrows of this species which is an average of around 1.2 burrows per km². Spatial distribution of burrows was variable across the Aol, with the densest area of burrows being in the north-west as shown in the figures below.



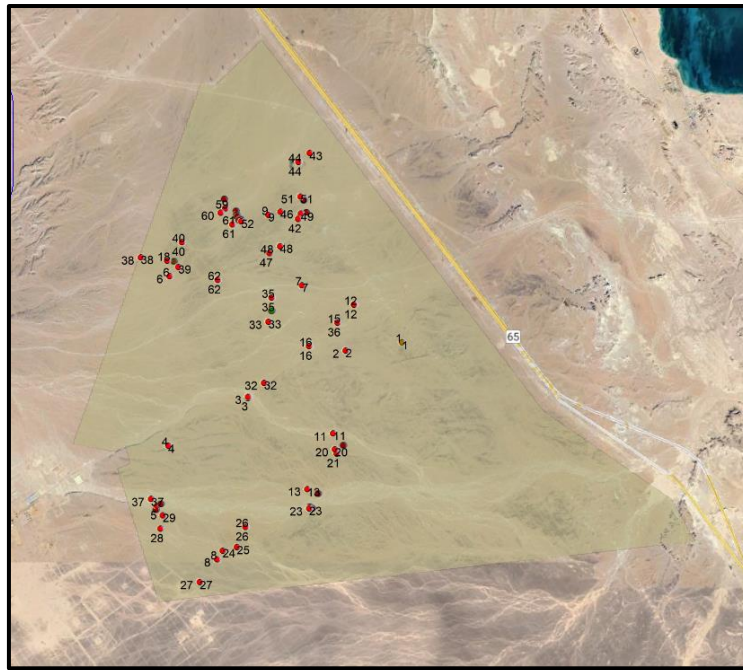


Figure 63: Spiny-Tailed (Dabb) Lizard Detection

7.5.5 Mammals (excluding bats)

Methods: Mammals

Surveys were undertaken by mammal specialists in 2023. The terrestrial mammals survey included a full walkover/drive of the Project AoI during which time any signs of mammals including scat, footprints, direct observations, burrows, or other signs was recorded in full. Where mammals of international or national conservation concern were recorded, they were mapped and their location recorded on to a GPS device. In addition, specific surveys were conducted for both large and small mammal species.

Large Mammals

Three survey methods were used for specifically surveying large mammals:

- Camera Trapping – camera traps were deployed in two sampling site for six days in order to photograph any medium or large mammals passing through these areas. Camera trap footage was reviewed, and species identified.
- Track Stations – in areas of the AoI where large mammal foraging was expected, track stations were prepared by smoothing a 3m² area of sand and baiting the area (with canned salmon or any bait with a strong odour). The track stations were prepared before dusk each night and fresh tracks were recorded each morning. Track stations were deployed in five sites and monitored for six days.
- Line Transects – observers walked 500m transect lines from several locations within the AoI in each direction (N, S, E and W). Observed species were recorded and where possible, photographed.

Small Mammals

In order to survey small terrestrial mammals, live trapping methods were used. Baited Sherman traps of differing sizes were installed randomly at ten locations across the Project AoI to cover all relevant habitat types, with a higher density of traps allocated to areas where small mammal activity has been previously recorded. Traps were regularly checked to ensure the safety and well-being of each animal. Captured individuals were identified to species level and relevant morphometric measurements were recorded. Mammals were then released into the site it was trapped.

Results: Mammals

Large Mammals

Only Red Fox (*Vulpes vulpes*) was recorded throughout the three surveying methods. Red Fox is an IUCN Least Concern Species. Results of these surveys are shown in Figure 64: Location of Red Fox recordings throughout the three survey methods.

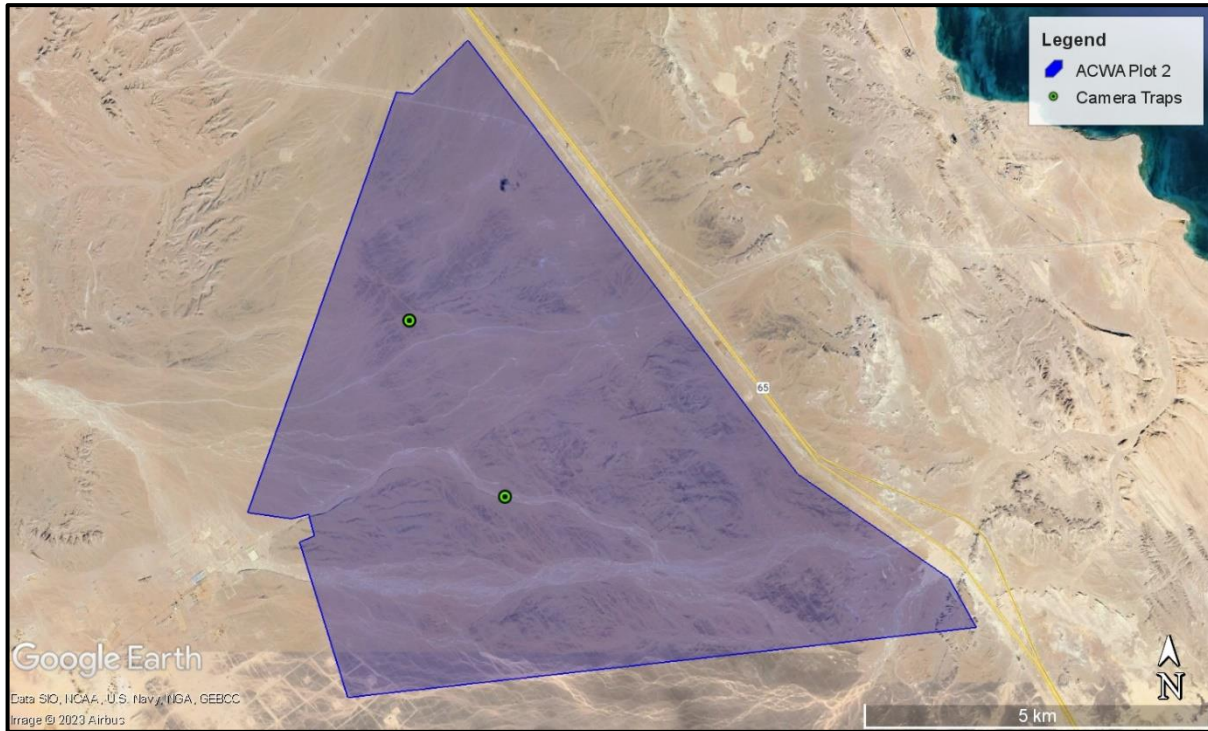


Figure 64: Location of Red Fox recordings throughout the three survey methods.

Small Mammals

Of the ten sampling sites, four returned positive records. One species of small mammal were recorded during the live trapping surveys: Lesser Egyptian Gerbil (*Gerbillus gerbillus*). This species is listed as IUCN Least Concern. Results of these surveys are shown in Figure 65 below.

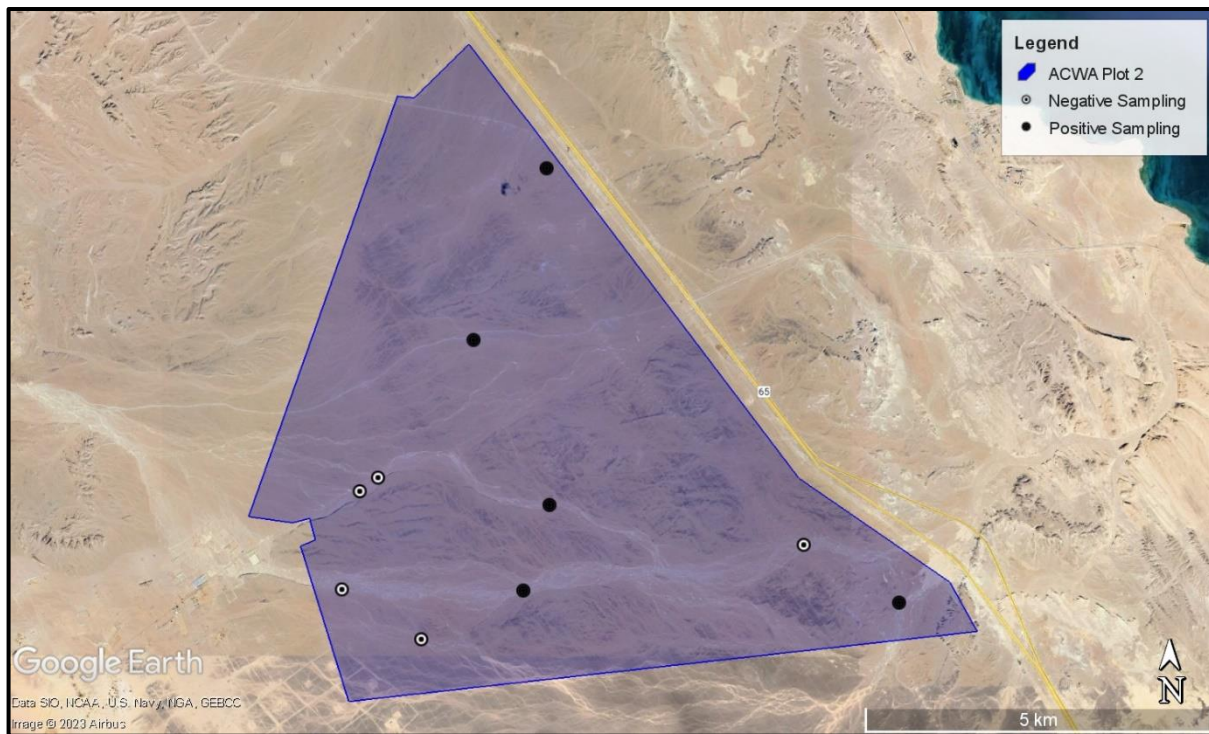


Figure 65: Location of Rodent Species Caught in Live Traps

7.5.6 Bats

Methods: Bats

Bat surveys consisted of Nocturnal Acoustic Survey along with a search for suitable roosting features within the Project Aol. Due to the size of the Project Aol it was considered that the use of static detectors would give robust data pertaining to the bat species present within the Aol, along with a reasonable estimation of the amount of flight activity.

Eight Wildlife Acoustic SM4BAT detectors were deployed at 24 ground locations (see Figure 65) a total of five times per location between 25th May 2023 and 20th November 2023 (to date data up to 25th October has been analysed). The survey protocol adapts methods protocols set out in guidelines published by NatureScot 2021 (formerly Scottish Natural Heritage) and Eurobats Publication 6, 2015. The detector locations were targeted at a number of WTG locations as well as at locations providing useful contextual information. At the time of deployment 18 locations were at known WTG locations, four were throughout the wider AOI to ensure coverage of the whole AOI was considered and two were at features of interest (a cave and the wadi dam). The detectors were programmed to start recording 30 minutes before sunset until 30 minutes after sunrise. Data was downloaded approximately once per month and batteries changed as necessary.

The total amount of recording nights completed to date, and corresponding size of data files collected are shown on the tables below.

Table 38: Recording Nights and Data

Static Location	May		June		July		August		September		October		November	
	# of Survey Nights	# of Files	# of Survey Nights	Number of Files	# of Survey Nights	# of Files	# of Survey Nights	# of Files	# of Survey Nights	# of Files	# of Survey Nights	# of Files	# of Survey Nights	# of Files
Whole Site	5	1869									-	-	-	-
1			5	704	5	2376	5	3558	5	0	-	-	-	-
2			5	3513	5	1992	5	3435	5	3174	-	-	-	-
3			5	771	5	2378	5	2714	5	3954	-	-	-	-
4			5	1870	5	1888	5	1294	5	1567	-	-	-	-
5			5	3925	5	2073	5	2873	5	4341	-	-	-	-
6	5	1543	5	4658	5	2686	5	2635	5	900	-	-	-	-
7			5	2288	5	8870	5	775	5	578	-	-	-	-
8			5	4635	5	5342	5	435	5	1323	-	-	-	-
9			5	512	5	2523	5	3533	5	782	-	-	-	-
10			5	1303	5	7081	5	4518	5	0	-	-	-	-
11	5	1869	5	3946	5	6036	5	5194	5	1663	-	-	-	-
12			5	1763	5	8411	5	3510	5	3292	-	-	-	-
13	5	1559	5	3867	5	4904	5	2196	5	906	-	-	-	-
14	5	1679	5	2951	5	6015	5	3734	5	1852	-	-	-	-
15	5	1008	5	3437	5	2582	5	2003	5	445	-	-	-	-
16			5	656	5	9292	5	1273	5	852	-	-	-	-
17			5	2200	5	876	5	686	5	4260	-	-	-	-
18	5	1027	5	4328	5	9424	5	6952	5	861	-	-	-	-
19			5	5339	5	2356	5	2659	5	272	-	-	-	-
20			6	3241	6	6211	6	589	6	5076	-	-	-	-
21			5	4616	5	8475	5	4488	5	2759	-	-	-	-
22	5	1149	5	4481	5	11923	5	4680	5	2929	-	-	-	-
23	5	358	5	5029	5	4813	5	3086	5	1097	-	-	-	-
24			5	13881	5	681	5	19181	5	10752	-	-	-	-

Results: Bats

According to the literature data on bats of Egypt, there are 21 species which may be within the project area.

The Project Aol consists of flat open desert with generally low suitability for bats due to the lack of suitable roosting features within the Aol and also lack of permanent waterbodies. There are no buildings or trees within the Aol nor are there bridges, culverts or wells which could support roosting bats.

No bat activity was recorded during the surveys to date. A bat most likely a Naked-Rumped Tomb Bat (*Taphozous nudiventris*) was recorded once at a nearby site showing the possible presence of bats in low numbers cannot be entirely ruled out based on the surveys to date.

Wave data recorded by “Song meter SM4” was explored by a special sound analysis software (Kaleidoscope 5.6.2) a file by file to determine the presence of bat calls in a spectrum of sound frequencies ranging from 10 to 120 KHz.

Bat activity can be determined by the recording time by the song meter and species by the frequency and speed cycles of the calls. The figure below shows a bat calls analysis technique.

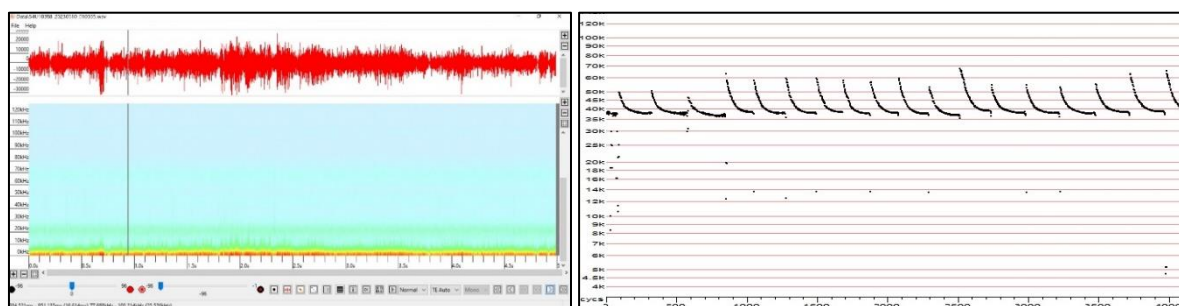


Figure 66: Bat Call Analysis technique (at left: frequency; at right: speed cycles of calls detected)

7.5.7 Invertebrates

Methods: Invertebrates

Invertebrate methodologies included pitfall trapping. Surveyors identified the species using key books, relevant scientific articles as well as consultation with external experts as appropriate.

Results: Invertebrates

No species of national or international conservation concern were recorded within the Project Aol and no species considered to be range-restricted, endemic or near-endemic were recorded. The invertebrate assemblage is considered typical for the area and the habitats present within the Aol and are of negligible sensitivity.

7.5.8 Avifauna

Note: this section presents an overview of the avifauna methodology and results. A detailed avifauna assessment report is presented in Annex I.

Methods: Avifauna

Bird surveys have been completed in order to quantify the impact of the project on key Avifauna species to subsequently inform final turbine layout, to develop additional mitigation (e.g. turbine shut down, habitat/species management plan) and to form the baseline for any future required supplementary surveys and operational monitoring. Survey information has also been used to inform a Collision Risk Model.

The following surveys have been undertaken:

- Spring Bird Surveys - 9th March to 20th May 2022 &
- Autumn Bird Surveys – 10th August to 10th November 2022
- Spring Bird Surveys – 20th February to 20th May 2023
- Autumn Bird Surveys - 10th August to 10th November 2023

Bird surveys have been undertaken involving Vantage Point (VP) surveys and, where necessary, specialist surveys. Whilst specific breeding bird surveys were not carried out across the site coverage during the majority of the year and over the whole site ensured that there is no risk of the presence of breeding birds of international conservation concern being missed during the surveys.

The protocols for surveys at VPs has been based on methodologies from the following documents:

- “Environmental Impact Assessment Guidelines and Monitoring Protocols for Wind Energy Development Projects along the RVRSF with a particular reference to wind energy in support of the conservation of Migratory Soaring Birds (MSBs)” (2013)
- “Strategic Environmental and Social Impact Assessment (ESIA) for an Area of 300 km² of potential wind farms at the Gulf of Suez (2013)”
- Strategic and Cumulative Environmental and Social Assessment Active Turbine Management Program for Wind Power Projects in the Gulf of Suez (2019)”

Additionally methodology developed by Scottish Natural Heritage “Survey Methods for Use in Assessing the Impacts of Onshore Wind farms on Bird Communities” (2005, and most recently updated in 2017) was used. However, where appropriate, the protocol has been adapted to be suitable for the location of the site and the additional risks of impacts the project may have on birds.

Wind farms present four main potential risks to birds:

- I. Direct habitat loss and disturbance through construction of wind farm infrastructure;
- II. Displacement (sometimes called indirect habitat loss) if birds avoid the wind farm and its surrounding area due to turbine construction and operation. Displacement may also include barrier effects in which birds are deterred from using normal routes to feeding or roosting grounds;
- III. Death through collision or interaction with turbine blades and other infrastructure (*i.e.* collision risk);
- IV. Interactions with transmission lines associated with wind energy projects which could result in mortality due to collision or electrocution.

For each of these three risks, detailed knowledge of bird distribution and flight activity is necessary in order to predict the potential effects of the wind farm on birds.

Vantage Point (VP) Survey

Vantage Point survey is designed to quantify the level of flight activity and the distribution of birds over the survey area. Its primary purpose is to provide input data for the Collision Risk Model (CRM), which is used to inform the Collision Risk Assessment (CRA) to predict likely mortalities from collision with operational turbines. Data can also be used to provide an overview of bird usage of the site to further inform an assessment of the likely impacts of habitat loss, disturbance, displacement and barrier impacts.

Surveyors

A team of suitably experienced ornithologists undertook the surveys and were able to identify all birds seen and heard within the Project AoI. During the surveys they used the following equipment:

- Field survey sheets;
- Weatherproof Clipboard;
- Binoculars (at least 8x magnification);
- Anemometer;
- First aid kits; and
- Digital camera

VP Selection

Turbine layouts were not finalized during the migration period therefore eighteen Vantage Points were selected for use during the surveys which aimed to cover the entire project area and the location of these points is shown in Figure 66. The selection of the VPs for a monitoring day the surveys attempted to minimize the potential of double counting birds by ensuring no overlap of VPs. For example, the VPs selected on Day 1 included VP1, VP3, OP5 and VP7, etc. instead of VP1, VP2, VP3, etc.

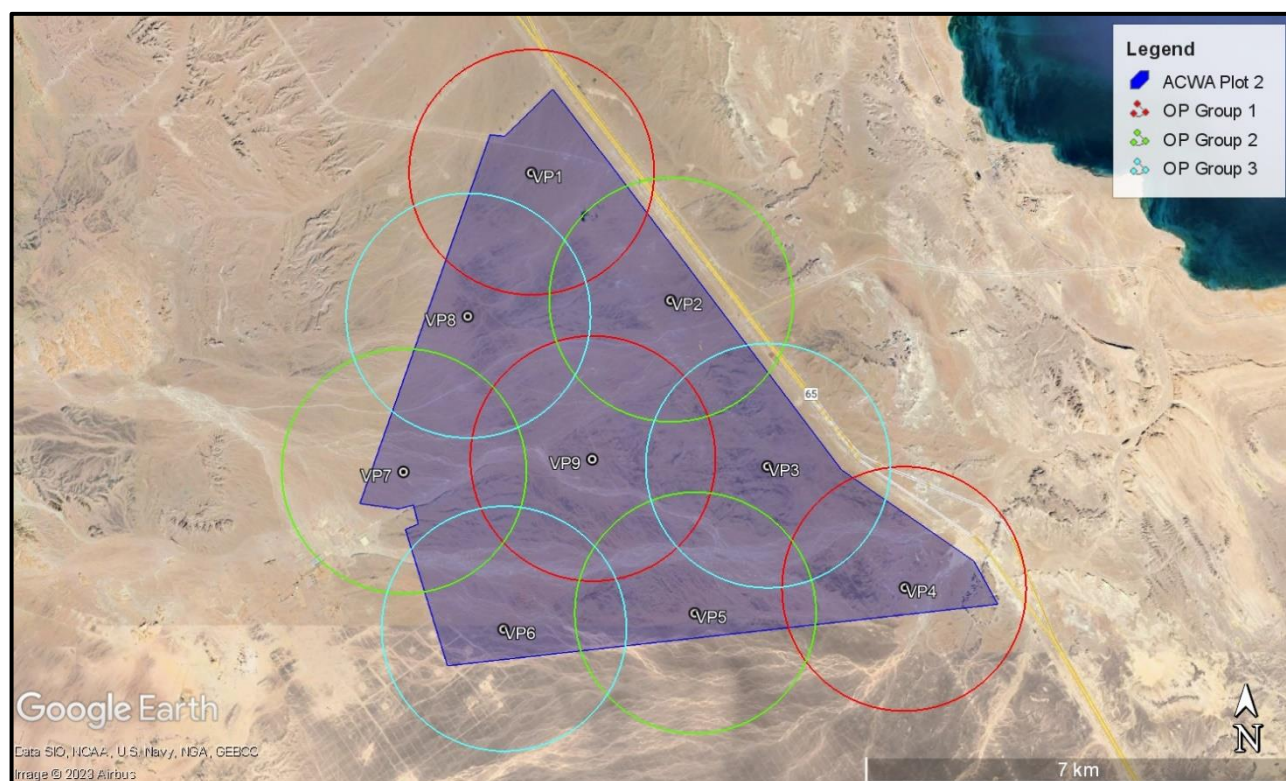


Figure 67: Location of Vantage Points

Previous survey methodology has required eight hours of observation time however for this site, the requirement for surveys was to start a minimum of one hour after sunrise and end one hour before sunset. This resulted in an average of ten hours survey time at each Vantage Point (VP). During Ramadan monitoring was undertaken for eight hours/day because of health and safety considerations for bird observers. The team started in alteration, with the first point starting monitoring 1 hour after sunrise then point two the following hour, and remaining VP observations starting hourly. Outside of Ramadan monitoring the VP ended 1 hour before sunset,

while in Ramadan it surveys ended 1.5 – 2 hours before sunset so that the surveyors had time to get back to the accommodation and prepare their meal to break their fast.

Nine VPs were covered per day with two observers at each VP to ensure full coverage. Due to the large scale of the site, a rotational system was implemented to provide targeted, temporal coverage. Each monitoring day was divided into morning and afternoon shifts, typically with a break between shifts. Breaks were staggered to ensure two surveyors were present at each VP so coverage was constant. The transportation of observers from the morning to the evening shift occurred during this break. Where significant bird activity was noted during a break of one observer, survey effort was resumed by both surveyors to ensure full data coverage.

The monitoring program provided survey coverage, in the form of a qualified backup team, at all times including public holidays (e.g. Eid) or unexpected events. Suspension of monitoring was only undertaken due to potential dangerous situations which could affect the health and safety of bird observers (e.g. sandstorms).

Target Species and Secondary Species

Target species were all Migratory Soaring Birds (largely made up of birds of prey but also including a range of waterbirds. These species represent the species of greatest sensitivity and/or conservation concern as well as likely impact from WTG.

Focal Bird Sampling

The area in view was scanned until a *Target Species* was detected at which point it is followed until it ceases flying or is lost from view.

The time the target bird was detected, and the flight duration were recorded and the route the bird followed was plotted in the field onto the maps. The bird's flight height is estimated at the time of detection and then at 15 second intervals thereafter.

Flight heights were recorded in height bands, *i.e.* below the rotor- swept area, the rotor-swept area and above the rotor-swept area, allowing for observer error. Height bands were updated during the two-year survey period to reflect changes in likely WTG specification. Height pads were as follows:

2022:

- 0 – 120m
- 120 – 150m
- 150 – 200m
- 200m+

2023:

- 0 – 120m
- 120 – 150m
- 150 – 200m
- 200 – 240m
- 240m+

Data Recording Methods

Data for *Target Species* was recorded on to survey forms and mapped onto field maps specific to each Vantage Point and the following information was recorded:

- The location of the VP used.
- Date of survey.
- Surveyor name.
- Start and End time of the VP session.
- Flight lines of target species
- Reference number of each flight line corresponding to that on the form.
- Species
- Age / sex (if known)
- Estimation of flight height
- Duration of at-risk flight

The data from the Vantage Point surveys has been collated on to seasonal Excel workbooks and the data used to inform the Collision Risk Model and subsequent assessment.

Features of Environmental Interest Survey

General

Migratory birds may be attracted to landscape features of interest including waterbodies or sources of food. As these features may be routinely used by migratory birds, long term risks could be elevated through the construction of the windfarm and therefore these constraints should be considered when assessing risks as part of the planning and consenting process.

Methods

Features of environmental interest were identified and included:

- Plot 2 dumpsite – this illegal dumpsite spread alongside the road to Wadi Dara is used for carcass disposal unofficially by livestock and poultry farms located within Wadi Dara. This feature has the potential to attract birds of prey and vultures throughout the year, and in particular during migration seasons, as birds stopover at this site for feeding/scavenging.
- Plot 2 Wadi Dara - poultry farms, the poultry processing facility, livestock farms, residences, landscaped vegetation and other features located in and around the community of Wadi Dara have the potential to attract migratory birds drawn to these landscape features for resting/roosting and/or feeding/scavenging. Wadi Dara is largely situated southwest of the Plot 2 boundary.

Throughout the Spring and Autumn 2023 survey period, each feature of environmental interest was surveyed for a period of two hours per day, which amounted to 89 survey visits with one day excluded for bad weather. All species of bird using these features were recorded.

Results: Avi-fauna

During each season the average number of hours of VP survey undertaken at each VP was:

- Spring 2022 – 185.3 hours per VP (1668 total hours)
- Autumn 2022 – 271.5 hours per VP (2443.5 total hours)
- Spring 2023 - 244.3 hours per VP (2199 total hours)
- Autumn 2023 – 274.2 hours per VP (2468 total hours)

Spring Migration Surveys

During the two-year survey period, 27 bird species were recorded during Vantage Point monitoring, including six species with elevated IUCN status. These were

- Steppe Eagle (IUCN EN)
- Egyptian Vulture (IUCN EN)
- Eastern Imperial Eagle (IUCN VU)
- Greater Spotted Eagle (IUCN VU)
- Sooty Falcon (IUCN VU)
- Pallid Harrier (IUCN NT)

Table 39: Results of Vantage Point Surveys provides a summary of Vantage Point Data for the surveys and includes details of relevant species conservation status, total number of individuals recorded, and total number of at-risk flights recorded.

All remaining species recorded during the surveys were classified as IUCN Least Concern (LC).

Table 39: Results of Vantage Point Surveys

Species	Scientific Name	IUCN Status	National Status	Spring 22		Spring 23		Autumn 22		Autumn 23	
				Total Number	At risk height	Total Number	At risk height	Total Number	At risk height	Total Number	At risk height
Levant Sparrowhawk	Accipiter brevipes	Least Concern	Passage migrant	16085	10085	8565	7454	40	40	1	1
Sparrowhawk	Accipiter nisus	Least Concern	Passage migrant	19	19	24	13	9	6	1	
Eastern Imperial Eagle	Aquila heliaca	Vulnerable	Passage migrant	30	30	14	6	0	0	0	0
Steppe Eagle	Aquila nipalensis	Endangered	Passage migrant	1267	1098	6859	2066	28	12	27	15
-	Aquila spp.	-	-	1621	1594	58	22	2	1	1	1
Steppe Buzzard	Buteo buteo vulpinus	Least Concern	Passage migrant	15276	14510	22645	10967	59	46	32	11
Long-legged Buzzard	Buteo rufinus	Least Concern	Passage migrant / winter visitor	179	175	53	32	3	2	1	1
-	Buteo spp.	-	-	34	12	333	62	197	158	0	0
White Stork	Ciconia ciconia	Least Concern	Passage migrant	172359	163749	221558	120959	203147	162216	211059	195794
Black Stork	Ciconia Nigra	Least Concern	Passage migrant	782	775	1108	778	430	284	73	60
Short-toed Eagle	Circaetus gallicus	Least Concern	Passage migrant / summer breeder	123	117	143	57	4	3	1	1
Marsh Harrier	Circus aeruginosus	Least Concern	Passage migrant	69	69	45	41	85	73	59	51
Pallid Harrier	Circus macrourus	Near Threatened	Passage migrant / winter visitor	16	16	1	0	11	10	11	9
Montagu's Harrier	Circus pygargus	Least Concern	Passage migrant	10	10	6	6	32	32	16	11
-	Circus spp.	-	-	2	2	9	7	32	27	16	14
Greater Spotted Eagle	Clanga clanga	Vulnerable	Passage migrant	21	21	6	1	0	0	0	0

Species	Scientific Name	IUCN Status	National Status	Spring 22		Spring 23		Autumn 22		Autumn 23	
				Total Number	At risk height	Total Number	At risk height	Total Number	At risk height	Total Number	At risk height
Lesser Spotted Eagle	<i>Clanga pomarina</i>	Least Concern	Passage migrant	67	65	200	89	1	0	2	1
Lanner Falcon	<i>Falco biarmicus</i>	Least Concern	Passage migrant	2	2	1	1	1	0	1	1
Sooty Falcon	<i>Falco concolor</i>	Vulnerable	Passage migrant / summer breeder	2	2	1	1	0	0	4	4
-	<i>Falco spp.</i>	-	-	10	8	6	4	9	6	4	2
Hobby	<i>Falco subbuteo</i>	Least Concern	Passage migrant	1	1	1	1	0	0	1	1
Kestrel	<i>Falco tinnunculus</i>	Least Concern	Passage migrant	91	91	97	85	35	23	17	9
Common Crane	<i>Grus grus</i>	Least Concern	Passage migrant	2	0	6747	1134	0	0	0	0
Griffon Vulture	<i>Gyps fulvus</i>	Least Concern	Passage migrant	0	2	2	1	0	0	0	0
Booted Eagle	<i>Hieraetus pennatus</i>	Least Concern	Passage migrant	55	54	69	37	17	10	17	7
Black Kite	<i>Milvus migrans</i>	Least Concern	Passage migrant	5444	4984	6064	3745	322	219	149	88
Egyptian Vulture	<i>Neophron percnopterus</i>	Endangered	Passage migrant	51	49	51	26	8	4	5	4
Osprey	<i>Pandion haliaetus</i>	Least Concern	Passage migrant	14	14	5	0	6	3	2	2
White Pelican	<i>Pelecanus onocrotalus</i>	Least Concern	Passage migrant	21114	20219	8590	5453	20141	15379	14375	12654
Honey Buzzard	<i>Pernis apivorus</i>	Least Concern	Passage migrant	6213	5089	21157	11360	6618	4652	8314	5432
Raptor Sp.	<i>Raptor spp.</i>	-	-	44	31	189	170	144	137	2	0
Lesser Kestrel	<i>Falco vespertinus</i>	Least Concern	Passage migrant	0	0	0	0	0	0	2	2

For all Migratory Soaring Birds (MSB) and target species, including unidentified species, the highest extrapolated passage rates were at VP12, with high rates also clustered in the central portion of the site (VPs 10,8,6,5 and 4). During Spring 2023, VP12 showed the highest amount of activity, by time, of all MSB and target species flocks, including unidentified species. The central areas of VP 10, 9 and 7 followed the next highest level of activity. VP3 in the northern section of site also showed high levels of activity

Flight Analysis

Detailed analysis of flights has been undertaken for Spring 2022 and 2023 (with surveys only just completed in Autumn 2023). Analysis of Autumn data has not been fully undertaken due to timing of receiving the data. Analysis of Spring seasons is shown below.

Flight Height

Summary of Notable Records from Vantage Point Survey and Incidental Surveys

The following section provides a summary of registrations of species of national or international conservation concern recorded during the Spring Migration Vantage Point Surveys.

- **Steppe Eagle (IUCN EN)** A total of 6,872 individual Steppe Eagle were recorded during the Spring 2023 surveys. The highest activity was recorded in VP6 and VP9 of Plot 2 and generally above 200m. A total of 747 individuals were recorded within the at-risk flight zone. During 2023 higher activity was recorded in the centre west of the with the highest level of activity above 200m
- **Egyptian Vulture (IUCN EN)** A total of 51 individual Egyptian Vulture were recorded with 38 within the at-risk flight zone. Birds spent over 50% of their time at low altitudes (0-120m). In 2023 the majority of flight activity was above 200m. No clear spatial patterns were identified.
- **Eastern Imperial Eagle (IUCN VU)** A total of 14 individuals were recorded, all within the at-risk flight zone. Imperial eagles spent a small proportion of time between 0-120m and over 200m heights compared to other height bands, although showed no clear spatial pattern in occurrence. During 2023 records were spread in low number across the site with the highest level of activity was above 200m.
- **Greater Spotted Eagle (IUCN VU)** A total of six individuals were recorded, all within the at-risk flight zone. Birds showed a slight preference for the south-east corner of the plot (VPS 3 and 4). No flights were recorded above 200m, with the majority below 150m. In 2023 Greater Spotted Eagle were recorded in small numbers although again showed a preference for the eastern side of the site.
- **Sooty Falcon (IUCN VU)** A single registration of a single bird in the Spring 2023 surveys.
- **Pallid Harrier (IUCN NT)** A single registration of a single bird in the Spring 2023 surveys.

Notable Records of Other Species

Notable records of LC species recorded during the Spring Migration period include:

- **White Stork** A total of 242,258 individuals were recorded with 218 birds within the at-risk flight zone. No clear spatial preference; although may spend a greater proportion of time flying at lower altitudes (0-120m) on the west side of the plot. During 2023 the highest activity was in the centre west of the site and a range of flight bands were used at these points. Around the rest of the site little activity was recorded below 150m.
- **Black Kite** A total of 6,214 individuals with 632 within the at-risk flight zone. 50% of their time below 120m heights. They were present at each VP with a relatively uniform distribution of passages. Very little time was spent in the highest height band. During 2023 the higher use of the site was in the central western part (VP 7 followed by 8 and 9). During this time Black Kite spent a similar proportion of time at each band meaning a far higher amount of time below 240m than above 240m but not specifically below 120m as in 2022.

- **Steppe Buzzard** A total of 22,645 individuals with 934 within the at-risk flight zone. Birds were recorded approximately equally between 0 and 200m, with less time spent at greater heights. There was no clear spatial pattern in the number of passages, or flight heights. In 2023 higher activity was recorded in the central west portions of site with the majority of activity above 150m.
- **European Honey Buzzard** A total of 21,1157 individuals with 342 within the at-risk flight zone. Birds did not show any clear spatial distribution of passages or flight heights, and time between height bands was relatively evenly split, with less time at highest altitudes. Activity in 2023 was highest on the western portion of site with VP's 14, 15 and 16 having the highest activity with the majority of activity **above 150m**.
- **Levant Sparrowhawk** A total of 8,585 individuals were observed within ten within the at-risk flight zone. Birds were observed at only 5 VPs; however, showed no clear preference for an area. While sample sizes of flight height records was low, over 75% of the time was spent at heights In 2022, birds were recorded in a small numbers again and across the site with no clear pattern of site or height use.
- **White Pelican** A total of 13,585 individuals with 75 within the at-risk flight zone. Birds are expected to pass through VP1, VP9 and VP4 in great numbers compared to the other locations observed. A large proportion of overall flight time was within 0-120m. A very small proportion of time was spent in excess of 200m. During 2023 there was a preference for the centre west of site and there was a good spread of height bands used.

Temporal Distribution

Plot 2 exhibited low migratory or avian movement during February to late March, when a sharp increase was recorded. Activity spiked throughout April, with one late spike of activity late May. Following this, activity steadily reduced. In both 2022 and 2023, White Stork was the most abundant species across this time period.

On average, the number of birds passing through Plot 2 spiked daily between 13:00 and 14:00 Activity broadly increased and decreased either side of this peak although higher activity was recorded between 09:00 and 10:00 and 17:00 and 18:00 which is likely based around activity of birds associated with roosting behaviour at the start and end of the day. This is in contrast to results from 2022 which showed there were two daily peaks in activity – one in the mid-morning and another in the early afternoon, which coincides with the pattern observed in other similar seasonal migration monitoring studies completed in the region.

Roosting Birds

Roosting Bird Species

The number of species roosting at Wadi Dara across both the spring and autumn survey periods were recorded and presented below:

Table 40: Showing the numbers of roosting birds across the Spring 2022 and 2023.

Spring 2022			Spring 2023		
Species	Month	Number	Species	Month	Number
Black Kite	Total	588	Black Kite	Total	248
	Mar	5		Mar	17
	Apr	518		Apr	218
	May	65		May	13
Black Stork	Total	137			
	Apr	85			
	May	52			
Egyptian Vulture	Total	6	Egyptian Vulture	Total	1
	Apr	6		Mar	1
Griffion Vulture	Total	1			
	Mar	1			
Honey Buzzard	Total	36			

Spring 2022			Spring 2023		
Species	Month	Number	Species	Month	Number
	Apr	19			
	May	17			
Kestrel	Total	2	Kestrel	Total	9
	Mar	1		Feb	1
	Apr	1		Apr	7
	-	-		May	1
Lesser Spotted Eagle	Total	2			
	Apr	2			
Long-legged Buzzard	Total	2			
	Apr	2			
Marsh Harrier	Total	4	Marsh Harrier	Total	3
	Apr	4		Apr	1
				May	2
Montagu's Harrier	-	-	Montagu's Harrier	Total	1
				May	1
Osprey	Total	1			
	Apr	1			
Raptor Species	Total	2			
	Mar	2			
Spotted Eagle	Total	1			
-	Apr	1			
Steppe Buzzard	Total	195	Steppe Buzzard	Total	10
	Mar	39		Mar	4
	Apr	125		Apr	6
	May	31			
Steppe Eagle	Total	9	Steppe Eagle	Total	53
				Feb	3
				Mar	50
	Apr	8			
	May	1			
Unidentified buzzard	Total	1			
	Mar	1			
Unidentified eagle	Total	1			
	Mar	1			
White Pelican	Total	1365	White Pelican	Total	782
	Mar	200			
	Apr	1165		Apr	682
				May	100
White Stork	Total	3752	White Stork	Total	9505
	Mar	12		Mar	9000
	Apr	3646		May	505
	May	94			
Aquila sp.			Aquila sp.	Total	5
				Apr	5
	Total	6105		Total	10618

Table 41: The numbers of roosting birds in Autumn 2022 and 2023

Autumn 2022			Autumn 2023		
Species	Month	Number	Species	Month	Number
Black Kite	Total	1	-	-	-
-	Sep	1	-	-	-
Common Kestrel	Total	2	-	-	-
-	Oct	2	-	-	-
Falcon Species	Total	1	-	-	-
-	Oct	1	-	-	-
Honey Buzzard	Total	2	Honey Buzzard	Total	29
				Sep	29
	Oct	2			
Marsh Harrier	Total	4	Marsh Harrier	Total	5
	Sep	2		Sep	1
	Oct	2		Oct	4
Montague's Harrier	Total	4			
	Sep	4			
Unidentified Harrier	Total	3			
	Sep	3			
White Pelican	Total	44			
	Oct	44			
White Stork	Total	136			
	Aug	120			
	Sep	15			
	Oct	1			
	Total	197		Total	34

Thirteen (13) species of soaring bird were recorded roosting on site during the survey periods 2022 and 2023 and this was a total of 6,105 birds in Spring 2022, 10,618 birds in Spring 2023 along with 197 birds in Autumn 2022 and 34 birds in Autumn 2023. This shows how the site is considerably more used for roosting in Spring than during Autumn.

White Stork dominated the use of the site for roosting during each autumn and this species accounted for 61.5% of birds recorded roosting during 2022 and 89.57% during 2023. White Pelican also used the site to roost in significant numbers with 22.4% and 7.4% of birds recorded roosting during 2022 and 2023 respectively. 53 individual Steppe Eagle were recorded roosting during Spring 2023 which is a significant amount for an Endangered species. Black Kite, Black Stork and Steppe Buzzard all had notable use during Spring 2022 although not significant. For all other species the use of the site for roosting is an incidental behavior of movement though the region rather than a key feature of the nature of the site. Roosting activity is generally spread across site although some notable areas of use are present at the north and center of site (see below locations of White Stork using both these locations and Steppe Eagle the central location).

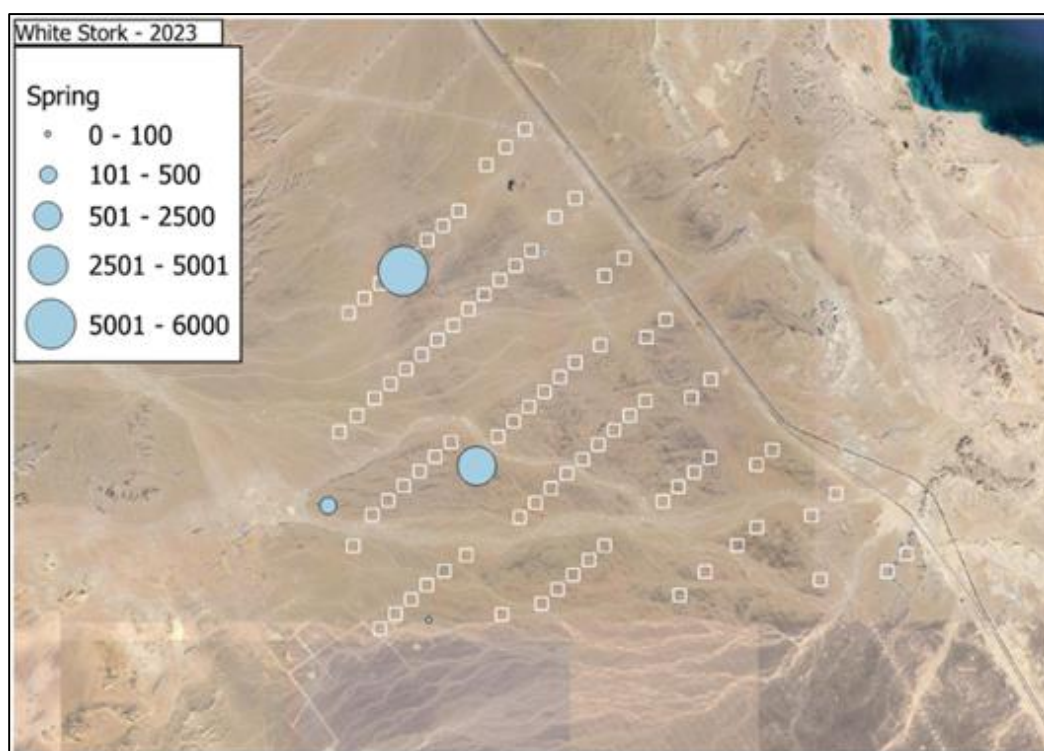


Figure 68: White Stork roosting locations

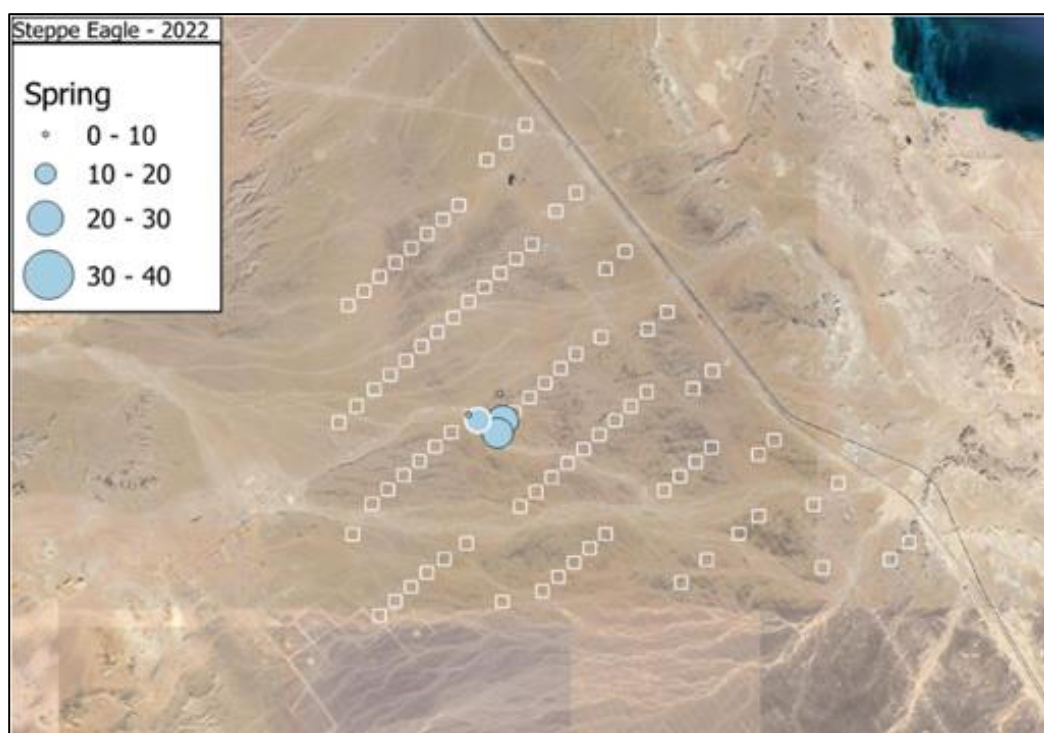


Figure 69: Steppe Eagle roosting locations

Features of Environmental Importance

Along with roosting surveys across the whole site surveys were undertaken during the day at the main feature of importance on site: the food waste sites. Thirteen species of MSBs and target species, excluding passerines, were recorded throughout the monitoring undertaken of the dump site (within the center of the project area). The most abundant species recorded at the location in 2022 was White Stork however none were seen in 2023 and this is likely to do with the lack of water at the nearby dam site. During 2023 4193 registrations of Steppe Eagle were noted with a peak count of 300 birds. Raptor use of the site is of great concern, given these species

are foraging on carcass remains disposed of at the site from poultry and livestock farms located at Wadi Dara (immediately south west of site).

However, it is important to note that since these surveys were undertaken the site is no longer used as a dump site with waste taken routinely elsewhere and no dumping (or associated use by raptors) noted later in the year.

Sensitive Receptors

A table is provided below which details the sensitivities of the receptors recorded within the Project Aol that may be impacted by the construction and operation of the proposed wind farm and will therefore be considered within the impact assessment.

Any species recorded during surveys, but which are not listed in the sensitive receptor table are considered to be of Low/lower value.

- Impacts on Low/Lower value species are expected to be minor-moderate significance; and
- Mitigation for higher value receptors will also alleviate impacts on these lower value receptors.

Therefore, these Low/lower value species have not been listed out in detail and the impact assessment section will not include assessments on these receptors.

Species identified as the PBFs include:

- Spiny-Tailed Lizard – this animal is present in high population across the Aol
- Migratory Birds – various birds are considered PBFs including the Steppe Eagle and Egyptian Vulture, Levant Sparrowhawk, Eastern Imperial Eagle, Steppe Eagle, Steppe Buzzard, White Stork, Black Stork, Greater Spotted Eagle, Common Crane, White Pelican and Honey Buzzard
- Natural Habitat – while no plant species present within the Aol was identified as being of on international nor national conservation concern, the general prerogative is to not heavily modify the local habitat through construction or operation works

7.6 Archaeology and Cultural Heritage

This section provides an assessment of baseline conditions within the Project site and surrounds in relation to archaeology and cultural heritage.

7.6.1 Baseline Assessment Methodology

The baseline assessment of the Project site was based on a literature review and a field survey, each of which is discussed below.

(i) Literature Review

Literature review included a comprehensive review of archives, publications, and studies on previous archaeological and cultural heritage work and surveys undertaken in the area, and which are available through desktop review as well as through the Red Sea Antiquities Inspection Office and Suez Antiquities Inspection Office. Such literature review included information available through the French Institute for Oriental Archaeology, French Institute in Cairo, and data published by the French mission working at in Sukhna city.

(ii) Field Survey

A field survey was undertaken by an archaeology and cultural heritage expert. The objective of the field survey was to ascertain the presence of any surface archaeological or cultural heritage remains within the Project site. The survey covered the entire Project site boundary. The monitoring equipment used were GPS devices, digital cameras and data loggers. The surface area was walked by the expert in order to inspect the entire ground surface. Based on the survey, should any sites of interest be discovered, the following actions are to be undertaken:

- Sketch plans and /or a photograph as appropriate
- GPS coordinates for the area
- Undertake an analysis to categorize the sites and archaeological features and making an assessment of their significance.

(iii) Stakeholder Consultation

The consultant to conduct meetings with relevant governmental entities to include: (i) Red Sea Antiquities Inspection Office; and (ii) Egyptian Antiquities Sector Office at the General Authority for Antiquities. The objective was to discuss the results and outcomes of the assessment, and identify any key issues of concern or additional requirements they might have.

7.6.2 Results

This section presents the results in accordance with the methodology discussed above. Based on the literature review, it is concluded that there are no registered archaeological sites within the Project area itself and the area adjacent to the Project area. The closest sites that are considered of great archaeological, historical and cultural heritage value are described in the table below and presented in the figure that follows.

Table 42: Nearest Archaeological Sites

Site	Description	Distance to Project
Wadi Jarf / Red sea coast	A harbour complex which was used regularly during the second half of the Old Kingdom and the Middle Kingdom (from 2550 to 1700 b.c.e.). It was used by the expeditions seeking turquoise and other products from south Sinai. Moreover, it's also known for its very famous wadi jarf papyrus which dates to the reign of king khufu and which describes the organization of labour under the supervision of their leader Merer who recorded the diary of the mission on a long papyrus sheet.	112 km to the north
Saint Anthony Monastery (Deir el Qidis Antun)	Saint Anthony's disciples founded the monastery between 361 and 36 (Starkey.2012:205)	131 km to the north
Saint Paul Monastery (Deir el Qidis Nulus):	The monastery is located in front of Mount el Galala. The caves in this area were used by Christian monks who used the limited resources available in the harsh desert for living, while the cave and chapel of Saint Paul in particular were considered the base for the current monastery (Starkey.2012: 207).	112 km to the north
Gebel El Zeit	The mountain itself is located within an Important Bird Area of the same name and located within the internationally recognized important corridor for soaring birds.	20 km
El Qusayr	A historical sit, city and port located on the Red Sea. The site dates back 5,000 years as a gathering place for Muslim pilgrims from Egypt and western Mediterranean region.	232 km



Figure 70: Locations of Archeological Sites in the GoS Area

In addition, the site survey undertaken indicated no evidence of any archaeological or cultural heritage resources within the Project site.

7.7 Air Quality and Noise

This section provides an assessment of baseline conditions within the Project site and surrounds in relation to air quality and noise.

7.7.1 Baseline Assessment Methodology

Assessment of baseline conditions was based on an onsite air quality program undertaken at the Project site. Additional details are discussed below.

(i) Selection of Parameters

Monitoring was undertaken for the following parameters: (i) gases to include Carbon monoxide (CO), Sulphur Dioxide (SO₂) and Nitrogen Dioxide (NO₂), (ii) Suspended Particulate Matter to include Total Suspended Particulate (TSP) and Respirable Particulates (i.e. Particulate Matter smaller than 10.0 (PM₁₀) and 2.5 microns (PM_{2.5}) in diameter); and (iii) Noise Pressure Levels (NPL). These parameters were selected based on the following rationale:

Such parameters are likely to be present within the Project site given its characteristic and attributes. Suspended particulate matter is expected given the barren nature of the site. On the other hand, pollutants (such SO₂, NO₂,) are expected onsite but rather at minimal concentrations as the site is relatively in a remote area; nevertheless, motor emissions particularly from vehicles passing casually through the site (or from the main road) could be a source of such pollutants. Finally, noise levels are expected from vehicular movement and to some extent from onsite and surrounding areas and activities.

Such parameters are likely to be affected mainly during the Project's construction and operational activities. All air pollutant parameters selected are expected to be slightly impacted and increase specifically during the Project's construction activities. Emissions from vehicles and machinery used onsite and their movement onsite will increase gaseous emissions, suspended particulate matter, as well as noise pressure levels.

The air quality parameters were measured for a period of 24 hours in 3 specific locations, complying with the provision of Annex 5 of the Egyptian Environmental Law 4/1994 and its amendments and the recommendations of the World Health Organization as well. The site-specific air quality measurements were conducted using standard ambient air quality monitoring instruments under the supervision of an experienced specialist.

(ii) Selection of Locations

To assess the air quality baseline conditions within the Project area, three (3) monitoring points were selected as shown in the figure below. Monitoring was undertaken for 24 hours at each point respectively. The coordinates for the monitoring points and location are presented in the table and figure that follows.

The below table shows the GPS coordinates of the ambient air measurement locations.

Table 43: Coordinates of Measurement Location for Gabal El Zeit Site

Measurement Locations	N coordinates	E coordinates
Point 1 (P4) Gebel El Zeit (Wadi Dara)	27° 59' 46.91"N	33°14'14.56"E
Point 2 (P5) Gebel El Zeit (Wadi Dara)	28° 1' 25.86"N	33°17'45.65"E
Point 3 (P6) Gebel El Zeit (Wadi Dara)	28° 3' 9.60"N	33°15'18.40"E

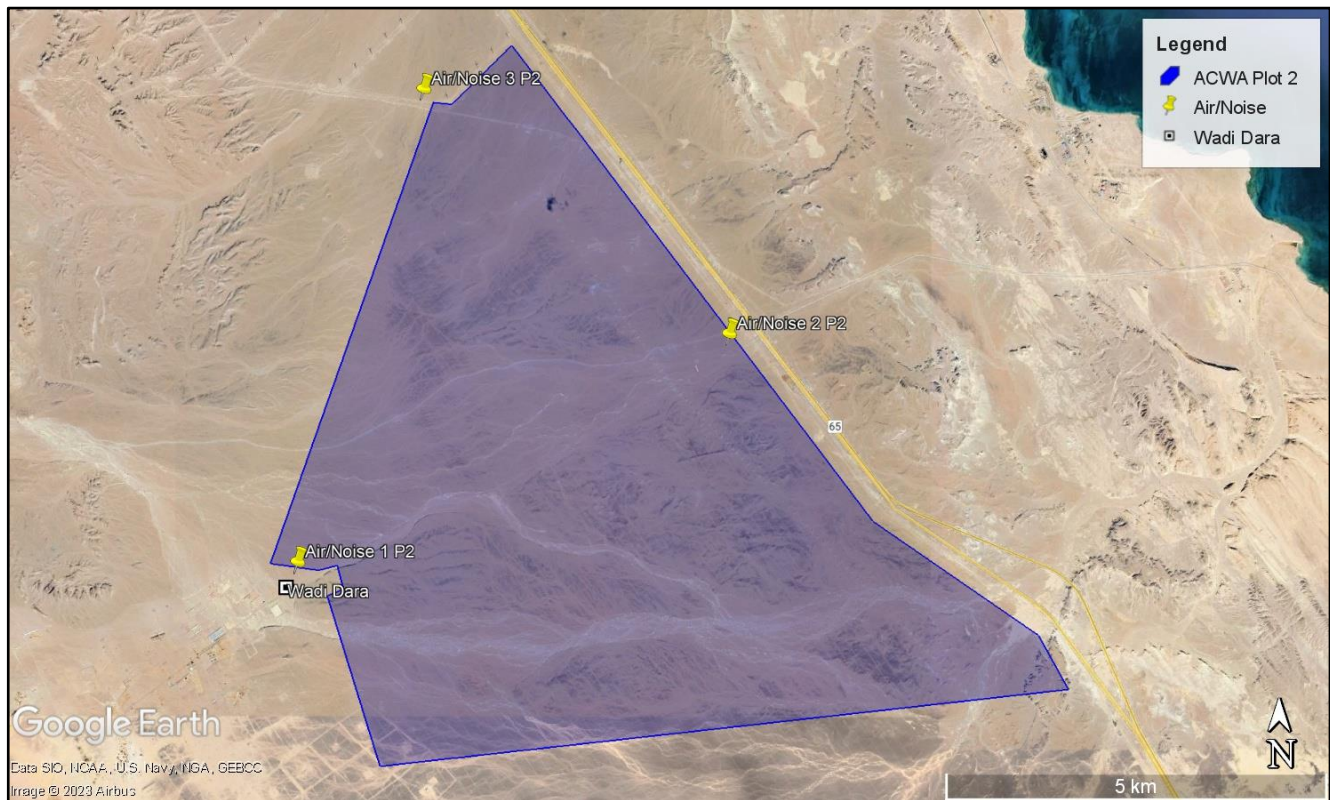


Figure 71: The coordinates and location of the 3 measurement locations

(iii) **Equipment**

Ambient Air Quality Monitoring equipment is an integrated system of which includes several analysers with data recording devices as follows:

- Ambient Particulate Matter TSP-PM2.5 And PM10 sampler
- Sulphur Dioxide SO2 Analyzer
- Nitrogen Oxides NO, NO2 & NOX Analyzer
- Carbon Monoxide CO Analyzer

The following devices have been used during the measurement activities of noise level:

- Integrated Sound Level Meters, Type I (precision grade), compliant with IEC 1672 Class 1 standard.
- Outdoor Weatherproof Microphone Kit

(iv) **Legislative Requirements**

With regards to air quality, the results of the measurements were compared to the national limits as set within Annex 5 of the Executive Regulation (D1095/2011) for ambient air quality. The table below identifies the corresponding applicable national ambient air quality permissible limits. The limits included for 'industrial' areas were used for comparison given the industrial nature of the site that includes petroleum activities and wind farms.

Table 44: Applicable National Ambient Air Quality Permissible Limits (Annex 5 of the Executive Regulation (D1095/2011) for ambient air quality)

Pollutant	Location	Maximum Limit ($\mu\text{g}/\text{m}^3$)			
		1 Hour	8 Hours	24 Hours	1 Year
Sulfur Dioxide (SO_2)	Urban	300	---	125	50
	Industrial	350	---	150	60
Carbon Monoxide (CO)	Urban	30 mg/m^3	10 mg/m^3	---	---
	Industrial	---	---	---	---
Nitrogen Dioxide (NO_2)	Urban	300	---	150	60
	Industrial	300	---	150	80
Total Suspended Particles (TSP)	Urban	---	---	230	125
	Industrial	---	---	230	125
Respirable Particulates (PM_{10})	Urban	---	---	150	70
	Industrial	---	---	150	70
Solid Particulates < 2.5 μm	Urban	---	---	80	50
	Industrial	---	---	80	50

With regards to noise, the results were compared to the national limits set in Annex 7 of the Executive Regulation (D710/2012) for the 'Day' and 'Night' intervals. The table below lists the different area classifications and their corresponding applicable permissible limits for noise. Similarly, the limits included for 'industrial' areas were used for comparison given the industrial nature of the site that includes petroleum activities and wind farms, which is set at 70dB(A) for both night and day.

Table 45: Applicable National Permissible Limits for Noise (Annex 7 of the Executive Regulation (D710/2012))

Type of Area	Permissible Limit for Noise Intensity [dB (A)]	
	Day (7 am to 10 pm)	Night (10 pm to 7 am)
Sensitive areas to noise	50	40
Residential suburb with low traffic and limited activities service	55	45
Residential areas in the city and have commercial activities	60	50
Residential areas are located on roads less than 12 m and have some workshops or commercial activities or administrative activities or recreational activities ... etc.	65	55
Residential areas located on roads equal or more than 12 m, or industrial zones with light industry and some other activities	70	60
Industrial areas (heavy industries)	70	70

In addition to the above, identified below are the limits as included within the IFC General EHS Guideline which are also considered applicable for this Project. Similar to rationale above, limits included for 'industrial' areas were used for comparison given the industrial nature of the site that includes petroleum activities and wind farms, which is set at 70dB(A) for both night and day.

Table 46: IFC and EU Limits for Noise and Air Quality

Parameter	(SO_2)	(PM_{10})	($\text{PM}_{2.5}$)	Noise
Maximum Permissible Limits IFC General ESH Guidelines	125 $\mu\text{g}/\text{m}^3$ (interim Target 1)	150 $\mu\text{g}/\text{m}^3$ (interim Target 1)	75 $\mu\text{g}/\text{m}^3$ (interim Target 1)	70 $\text{LA}_{\text{eq}}/\text{dB A}$
	50 $\mu\text{g}/\text{m}^3$ (interim Target 2)	100 $\mu\text{g}/\text{m}^3$ (interim Target 2)	50 $\mu\text{g}/\text{m}^3$ (interim Target 2)	
	20 $\mu\text{g}/\text{m}^3$ (guideline)	75 $\mu\text{g}/\text{m}^3$ (interim Target 3)	37.5 $\mu\text{g}/\text{m}^3$ (interim Target 3)	
		50 $\mu\text{g}/\text{m}^3$ (guideline)	25 $\mu\text{g}/\text{m}^3$ (guideline)	
EU Ambient standards	350 $\mu\text{g}/\text{m}^3$ (1 hour) 125 $\mu\text{g}/\text{m}^3$ (24 hours)	50 $\mu\text{g}/\text{m}^3$ (24 hours)	25 $\mu\text{g}/\text{m}^3$ (Stage 1) 20 $\mu\text{g}/\text{m}^3$ (Stage 2)	

7.7.2 Results

Air Quality

The table below presents the overall results for the air quality monitoring that was undertaken. As noted in the tables below, at all monitoring points and for all parameters monitored, the results are significantly lower than the maximum allowable ambient air levels indicated within the legal limits.

In general, there are two main factors affecting the concentration of a certain pollutant in the ambient air which is 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 are not limited to wind speed, wind direction, temperature, humidity, rainfall, atmospheric turbulence, solar radiation intensity and atmospheric pressure.

All recorded results as outlined in the tables verify compliance with the national restrictions. Most of the data recorded was significantly less than the maximum permissible limits set forth in these guidelines, which indicates that the ambient air quality in this area is within the guidelines of the gaseous pollutants in the ambient air.

There was no key source of pollutant emissions or activities throughout the monitoring period which could affect or impact air quality levels as presented in the table below.

Table 47: 24-hourly results ($\mu\text{g}/\text{m}^3$) for location (P1)

Parameter in $\mu\text{g}/\text{m}^3$		(CO)	(SO ₂)	(TSP)	(PM ₁₀)	NO _x
Concentrations ($\mu\text{g}/\text{m}^3$)	P1 (P4)	2.6	37.53	70.3	54.1	30.96
	P2 (P5)	2.82	41.36	75.9	57.2	33.86
	P3 (P6)	3.02	43.31	73.1	56.3	36.2
National Maximum Permissible Limits ($\mu\text{g}/\text{m}^3$)		-	150	230	150	-
International Maximum Permissible Limits ($\mu\text{g}/\text{m}^3$) – IFC General ESH Guidelines		-	125	-	150	-

Noise

The following tables present the overall results for the noise monitoring that were undertaken. As noted in the tables below, the results are within national limits during day and night-time. While there are potential noise emitters within the vicinity, such as the roadway adjacent to the project site and economic activities within Wadi Dara, no singular key source of noise emission or activity were noted during the monitoring period.

Table 48: Outcomes of Noise Monitoring Points

Maximum permissible noise level limits		
Point #	Day Time (7:00am-10:00pm)	Nighttime (10:00pm-7:00am)
P1 (P4)	57.43	56.44
P2 (P5)	62.50	58.17
P3 (P6)	60.67	58.86
National limits (LAeq/dBA)	70	60
IFC limits (LAeq/dBA)	70	60

7.8 Infrastructure and Utilities

This section provides an assessment of baseline conditions within the Project site and surrounds in relation to infrastructure and utilities.

7.8.1 Baseline Assessment Methodology

Assessment of baseline conditions was based on an onsite survey undertaken for the Project and surrounding areas as well as consultations with relevant entities that are managing such infrastructure and utility elements as applicable. Additional details are discussed below. There are various items characterizing infrastructure of the lands around the project site with some elements of the existing land use within the project boundary, for example: a dumpsite, which was designated as closed by may be in receipt of informal use (dumping) of wastes (particularly poultry wastes) from the nearby community); an abandoned seasonal residence, and an OHTL line that transects the Project site (from south to north). Other infrastructure elements are based in proximity of the Project site such as petroleum units, a substation, economic activities of the residents of Wadi Dara Village.

7.8.2 Existing Roads and Networks

The Cairo-Hurghada (Highway 65) runs adjacent to the Project site's eastern side. Stretching from the highway is an asphalt road leading through the Project site to the center of Wadi Dara Village. A gravel-dirt road also extends from the highway and through the Project site to the northern edge of Wadi Dara Village.

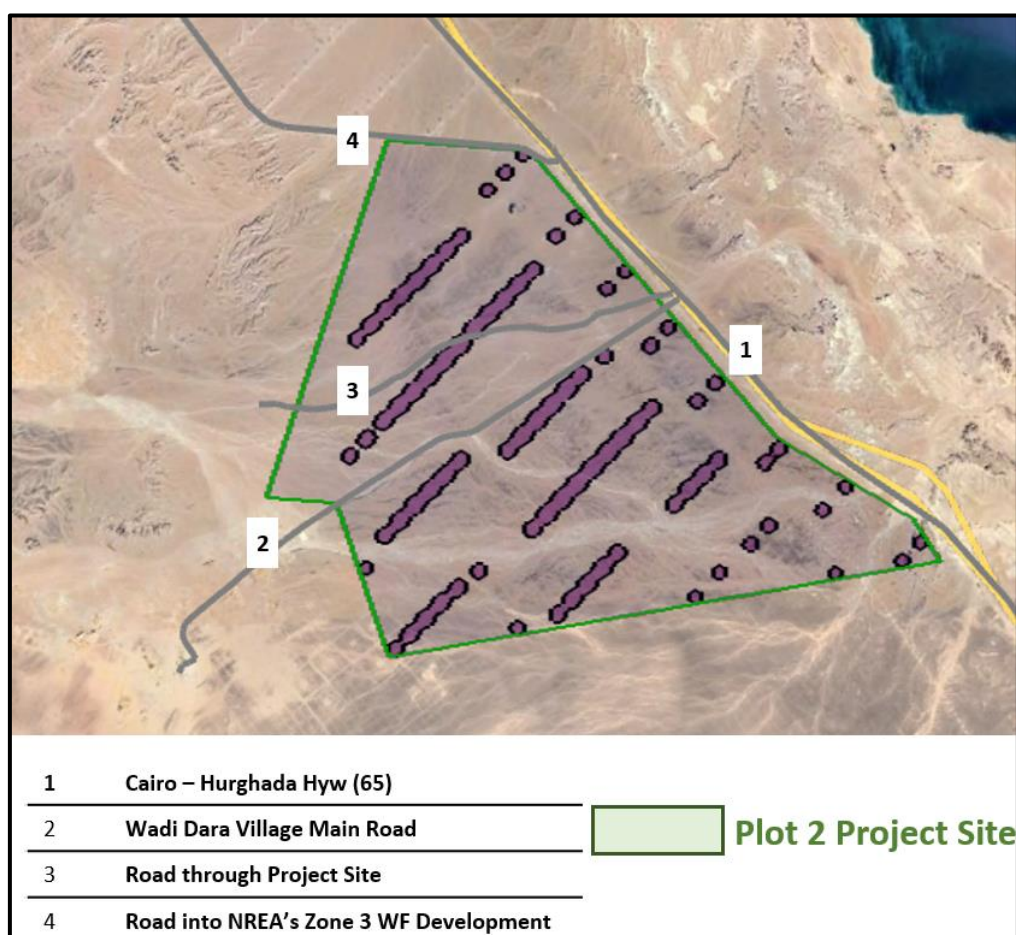


Figure 72: Vehicular Infrastructure

A service road, close to the site's northern corner, leads around the southern and eastern boundaries of a neighboring wind farms of Kreditanstalt fur Wiederaufbau Development Bank (KfW) and Fondo para la Internacionalizacion de la Empresa (FIEM) within the NREA Area's Zone 3.

7.8.3 Water Management

Wadi Dara Village is not connected to the National Water Network and is 11 km from the Kuraymat-Zaafarana-Gharib water feeding line. The village council buys drinking water from Ras Gharib, then, transports it using the village council's tank truck.



Figure 73: Desalination Plant

Groundwater is available and is utilized in irrigation through 15 wells. However, the high salinity of the ground water makes it detrimental for crops, farmers stated.

After water is collected in basin-shape reservoirs, it is then transferred to water treatment machines for desalination. With the completion of this process, groundwater can be used for irrigation.

Table 49: Coordinates of the Desalinization Plant

Location Activity	Latitude (N)	Longitude (E)
Desalination Plant	28.080108	33.256719

Consultations with Ras Ghareb Water Company informed the team that there are no existing or planned water connections to the Project area. Developments in such areas, in general, have to rely on water trucks and tankers from Ras Ghareb to deliver water requirements to the site while the drinking water is mostly bottled water.



Figure 74: Location of Desalinization Plant respective of the Plot 2

7.8.4 Waste Management (Solid Waste, Wastewater and Hazardous Waste)

The assessment is based on literature review as well as site visit undertaken for the Project site's location to identify waste management characteristics in and around the Project site.

Based on the site visit undertaken, within the Project site, litter is observable along the highway as well as the road leading into Wadi Dara Village (which also transects the Project site).



Figure 75: Decommissioned dumpsite located within Plot 2

Although it had been reported as having been decommissioned, the dumpsite located within the Plot 2 was still receiving recently discarded poultry carcasses and various other waste streams. It was observed that the waste included chicken carcasses and general wastes which seems to be discarded from the poultry farms that are located in Wadi Dara.

Regarding solid waste management, the Red Sea Governorate has only one controlled dumpsite for the disposal of solid waste - the Ras Gharib Public dumpsite, owned and operated by the Ras Ghareb City Council.



Figure 76: Ras Ghareb WWTP

There is no sewage nor sanitation network in the village. Wastewater is collected and disposed of at the Ras Ghareb Wastewater Treatment Plant (WWTP).

In addition, concerning waste recycling, there are facilities available for collecting and recycling various waste streams. One such facility is HEPCA, located in Hurghada, which specializes in recycling materials such as cardboard, plastic, metal, and glass. Another entity, Geocycle, operates a processing facility in Sokhna, where they recycle diverse waste streams, including both hazardous and non-hazardous materials.

There are currently two (2) approved hazardous waste disposal facilities in Alexandria and Helwan which are about 450 and 300 km respectively from site. The hazardous waste facilities are managed by the Nasiriya Hazardous Waste Treatment Centre (NHWTC) in Alexandria and in Arab Abu Saed the 2 facilities are privately owned and managed by First and EcoConServ Services.



Figure 77: Location of (informal) dumpsite and WWTP in relation to the Project Site

Table 50: Coordinates of Waste-Related Unites in relation to the Project Site

Location Activity	Latitude (N)	Longitude (E)
Rubbish disposal area	28.017592	33.202894
Wastewater treatment plant	28.135661	33.247981

7.8.5 Civil and Military Radars and Aviation Infrastructure

Based on a survey undertaken for the Project area and its surrounding, five (5) military posts were identified; none of which are in the immediate vicinity of the Project site. Additional details could be obtained regarding the radar systems nor civil aviation radars in the area. The military units are described as follows (in the table and graphic in order to illustrate their distance from the Project site):

- Army Unit 1 – an inactive military unit
- Army Unit 2 – an inactive military unit that was in the process of being demolished at the time of the field survey
- Army Unit 3 – an active military unit
- Army Unit 4 – an active military unit
- Army unit 5 – an active air defence unit



Figure 78: Location of Military Units respective of the Project Site

7.8.6 Radio, TV and Telecommunication Infrastructure

There are several communications towers in the vicinity of the Project site along the route of the Cairo-Hurghada Highway and the project's eastern boundary. In total, there are six (6) individual towers at three (3) locations as indicated in the figure below and accompanying table.



Figure 79: Locations of Communications Towers respective of the Project Site

Table 51: Coordinates of Communications Towers respective of the Project Site

Location Activity	Latitude (N)	Longitude (E)
Communication tower	28.121103	33.249242
Communication tower	28.019947	33.3068
Booster & Communication towers	27.984447	33.345492

The tower (C1) is the farthest from the Project site – over 7 km away, while the other two locations of towers are within 1 km from the Project boundary.

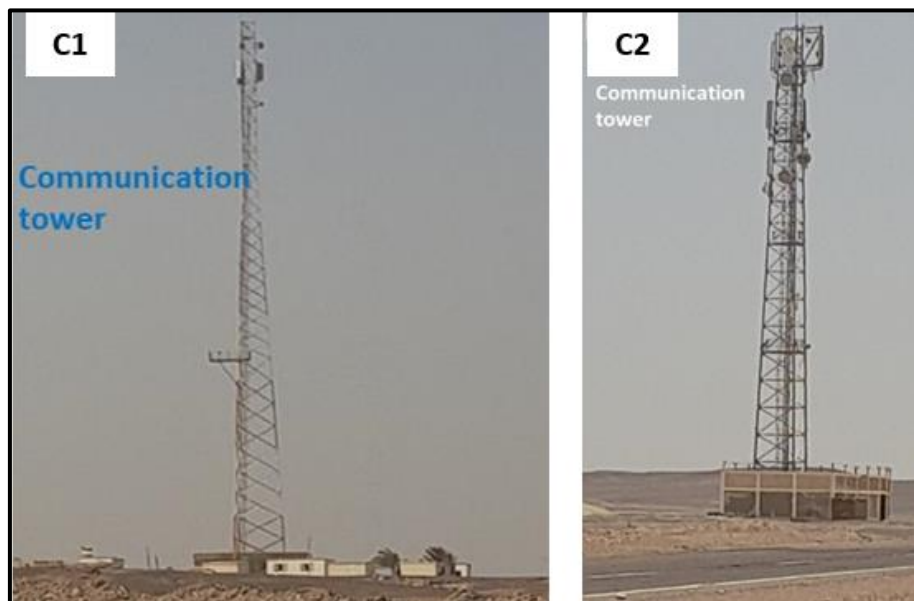


Figure 80: Communications Towers to the North and adjacent to the Project Site, respectively

The ESIA consultant established formal communication with the Radio and Television Union in Cairo on the matter of impacts of wind farm operations on communications' signals performance. In response, the Union indicated that they have studied the site and had little-to-no indications of negative impacts resulting from wind farm projects on radio and TV infrastructure in the area. The official letter is provided in Figure 80 below.



Figure 81: Telecommunications Towers Southeast of the Project Setroleum Facilities

Informed by consultations with the General Petroleum Company (GPC) in addition to the field survey of the Project area and its surroundings, petroleum units and excavation areas are features in the vicinity of the Project site, with the exception of one plot of levelled land (i.e. located in the Project Site).

The consultation held with GPC in Ras Gharib informed the team that there are exploratory wells near the Project site. A map of active sites was obtained (Figure 81). Coordination with GPC should take place prior to construction on aspects reflecting the topics of the Work Coordination Agreement between GPC and NREA (2005) included below.



Figure 82: Petroleum units of GPC in Proximity of Project Site

The Work Coordination Agreement between NREA and the GPC encompasses an area of 700km², in which wind farm developments are taking place (including the Project site – Plot 2). The Agreement includes several articles for the development projects to include:

- The General Petroleum Company has agreements for oil exploration and utilisation within concession areas located within the agreed area.
- Wind turbines are to be allocated in rows with a distance of 1km between each row and the next
- A distance of around 260m are to be respected between each wind turbine
- The tower height of the turbines should be around 100 m above ground
- The dimensions of the concrete foundation should be around 20m×20m and depth of 4m below ground
- Cables should be lain out next to the rows of turbines at a depth ranging from 1.5-2m and enclosed within special pipes with a diameter of around 15cm that connects to a substation that are to be constructed on an area of 500m×500m
- Within the same trench, communication cables are to be included that are to connect with a control room in the main administrative building
- The wind rows are to be serviced with internal roads with a width of 4m located adjacent to each row and these roads should be designed without an asphalt layer and should be able to withstand a load of 15ton/axle
- Other requirements are to include an administrative building, service buildings, accommodation facilities, etc.

General Petroleum Company has the right to undertake surveys, measurements or any other exploration activities along with any other company associated with it. The agreement identifies several provisions that should be met for any well drilling or survey activities some of which include: (i) ensure appropriate areas are available within the wind farms for installation of equipment and machinery to undertake required surveys; (ii) turn off turbines when required for security reasons or reduce noise impacts on survey results; (iii) provide the General Petroleum Company with final, detailed and accurate as built drawings for all infrastructure elements above and underground (e.g. cables, roads, etc.).

Table 52 below presents the location of the petroleum units within the Project's proximity. The map was based on satellite image review and verification as conducted during site visits.

For example, there is excavated and levelled land areas near the project site's boundary as well as operating oil sites indicated in Figure 83 above on the opposite side of Cairo-Hurghada Hwy and approximately 5 km from the Plot 2.



Figure 83: Petroleum Units in the vicinity of the Project site

Table 52: Coordinates of Petroleum Units

Location Activity	Latitude (N)	Longitude (E)
Gas compression station	28.131661	33.245547
GPC oil tanks	28.129064	33.249242
GUPCO oil tanks	28.125508	33.272486
Levelled area for construction	28.047119	33.250103
Levelled area for construction	28.044897	33.240706
Excavated and levelled area	28.055106	33.202894

7.8.7 High Voltage Power Line

An OHTL transects the Project Site and runs parallel to Cairo-Hurghada Hwy. To the north is a substation located within the Gebel Al Zeit Wind Farm (NREA Area – Zone 3).

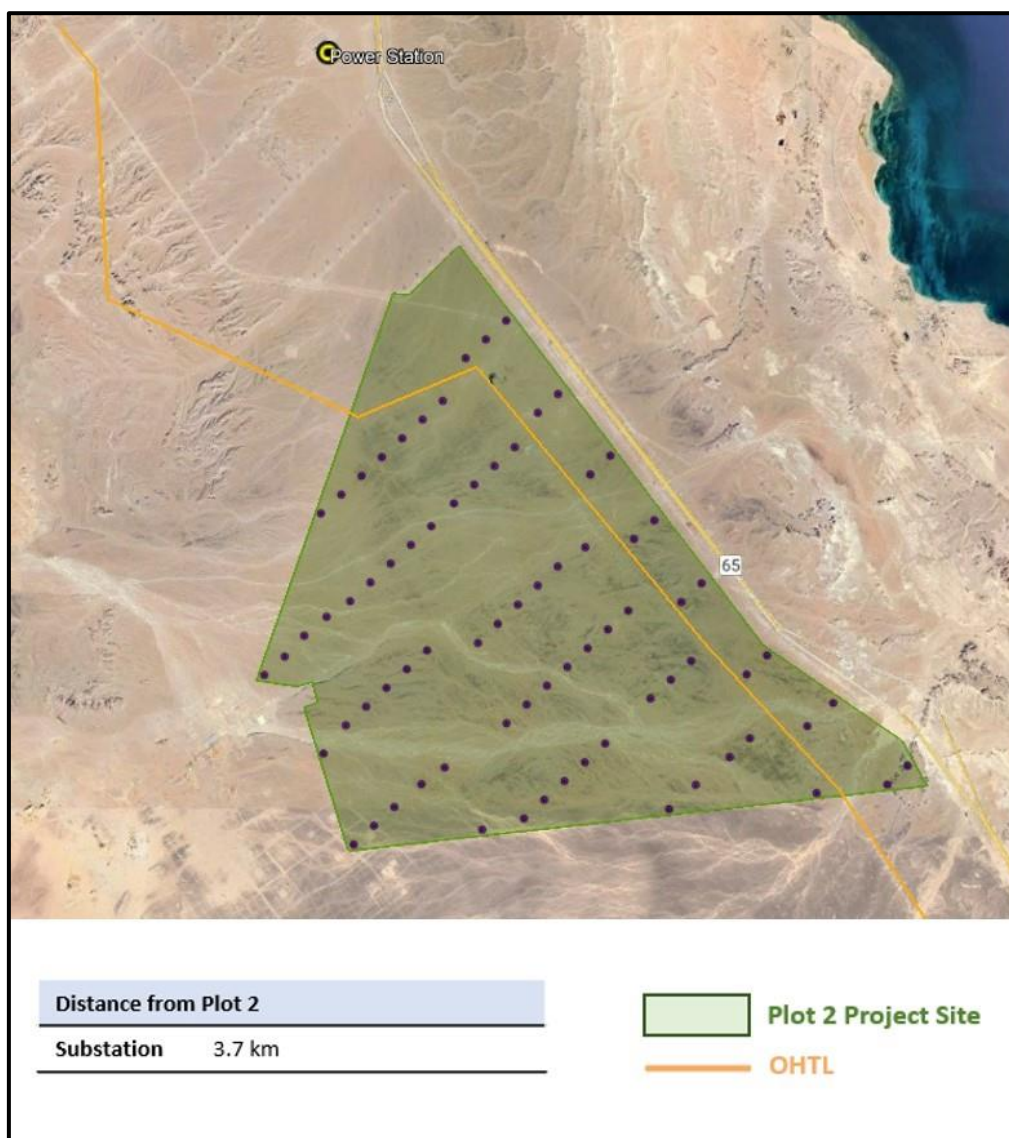


Figure 84: Power Substation and OHTL location respective of Project Site

Table 53: Coordinates of the Power Substation

Location Activity	Latitude (N)	Longitude (E)
Power station	28.087489	33.245672

7.8.8 Other Wind Farms

There are several operating and planned wind farms in the GoS. Specifically, the Project is located within a Strategic Area that has been allocated by the NREA for wind farm development projects – NREA Concessionary Area. This area has a target capacity of 3,000 MW Area has a total 600 km² with Plot 2 to occupy 50 km² of this area.

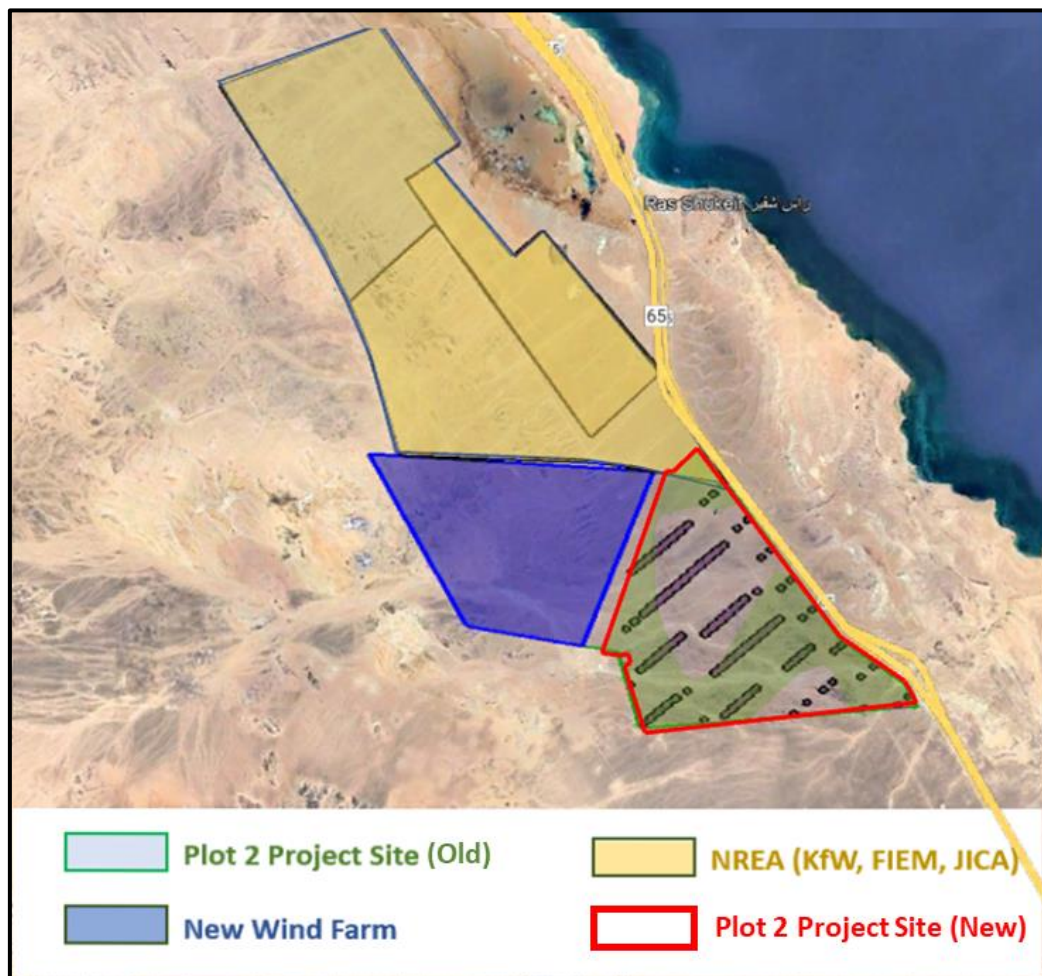


Figure 85: Adjacent and Nearby Planned and Operating Wind Farms

As described earlier, the NREA Concession Area is divided into three zones, only two of which are permissible for wind development. There are four other operating and planned wind farm projects illustrated in the Figure 84. Three of the four wind farms (Kreditanstalt für Wiederaufbau Development Bank (KfW), Japan International Cooperation Agency (JICA), Fondo para la Internacionalización de la Empresa (FIEM)) are located in the NREA Concession Area's Zone 3, which permits any wind farm installation that can provide technical avoidance and mitigation measures exemplary of the best practicable standard.

7.9 Public Health and Safety

This section provides an assessment of baseline conditions within the Project site and surrounds in relation to public health and safety.

As discussed earlier, the closest human settlement to the Project site, Wadi Dara Village, is located adjacent to the Project Site. The inhabitants of the village represent potential sensitive receptors.

In addition, as discussed within the land use ("Section 7.2."), the Project site entails receptors of physical or economical activities within close proximity. "Section 7.7" on noise and air quality determined that the baseline levels to be within national limits set for these parameters. Refer to "Section 8.11" on predicted impacts.

7.9.1 Socio-economics

This section provides an assessment of baseline conditions in relation to socio-economics.

7.9.2 Baseline Assessment Methodology

Socioeconomic conditions were assessed mainly through collection of secondary data on key socio-economic indicators of local communities as available – such as Central Agency for Public Mobilization and Statistics, Red Sea Governorate Information Centre and other. Such baseline was also verified through consultations with relevant stakeholders to include Red Sea Governorate official, Ras Gharib City Council officials and Wadi Darai Village.

7.9.3 Basic Demographic Characteristics

Administrative Division:

Egypt is divided into 27 Governorates. The Project site is located within the Red Sea Governorate that is bordered by the Red Sea Coast to the east and Beni Suef, Minya, Assyut, Sohag, Qena, Luxor and Aswan Governorates to the west, Suez Governorate to the North, and North Sudan to the south (refer to figure below). Red Sea Governorate's total area is around 120,000 km², forming 11.9% of the country's total area.

Administratively, the Red Sea Governorate is divided into 7 Cities (also known as Districts), each headed by a Local City Council. The capital of the Governorate is Hurghada that is located around 100km south of the Project site.

The Project site is located within the Ras Gharib City (or District) and therefore administratively is under the Ras Gharib City Council. The Ras Gharib District is further divided into Ras Gharib town as well as 2 rural (village) local units (Zaafarana and Wadi Dara). The closest community settlement to the Project site is Ras Gharib city (located 18km to the east).

Ras Gharib City is the second-largest city in the Red Sea Governorate, and the most important Egyptian city in terms of oil production.

As discussed earlier, the Project is located within a 300km² area that has been allocated by the GoE to NREA for development of wind farms. Within this, a land area of 50 km² has been allocated to the Developer by NREA for the development of this Project.



Figure 86: Administrative Borders of the Red Sea Governorate, Source: The official website of the Red Sea Governorate

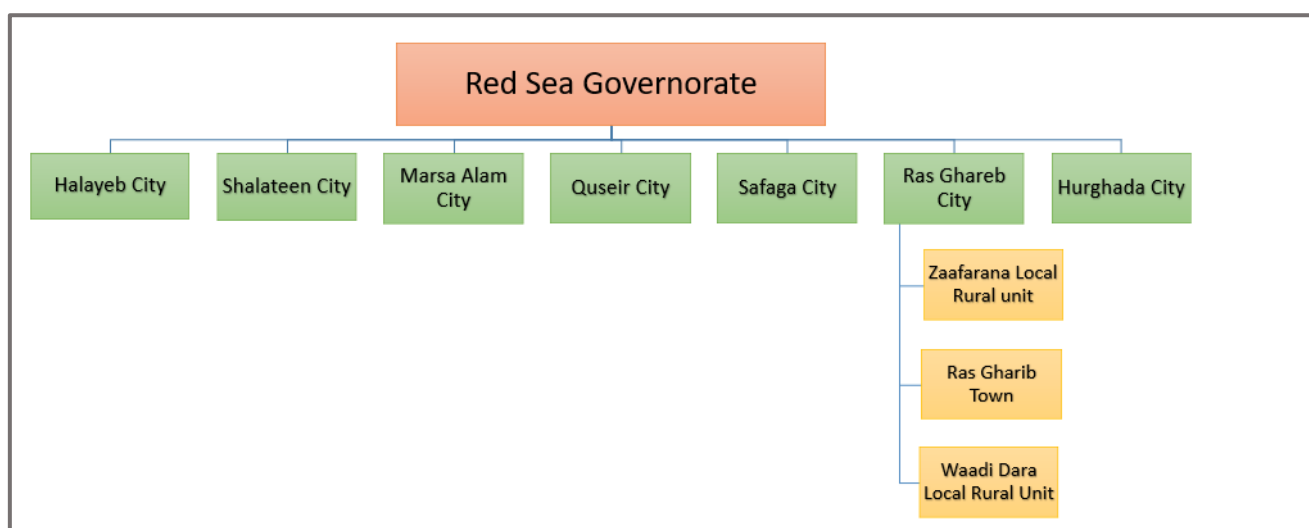


Figure 87: Administrative Division of Red Sea Governorate

Population Profile:

Based on information from the Statistical Yearbook 2022, the total population of the Red Sea Governorate was 396,000, which represents around 0.4% of the total national population. Further information about the population in the Project area is presented in the following table. As noted, the population of Ras Gharib in particular was estimated at around 68,020.

Table 54: Population (Red Sea Governorate Information Centre, 2022)

Area	Households	Population		Total Population
		Male	Female	
Red Sea Governorate	100,500	205,583	190,417	396,000
Ras Gharib	16,125	35,987	32,033	68,020
Hurghada	25,930	52,138	49,875	102,013
Safaga	18,500	37,444	36,136	73,580
Quseir	18,644	72,806	36,541	74,579
Marsa Alam	5,500	11,509	9,294	20,903
Shalateen	7,777	15,700	13,656	29,556
Halayeb	7,196	14,465	12,683	27,348

Ras Gharib represents 17% of the total population of the Red Sea Governorate, where the majority of population is located in Hurghada, due to the large-scale touristic activities in the city. However, services and population activities are concentrated in Ras Gharib City. The following figure shows the distribution of the population in the Red Sea Governorate according to each city.

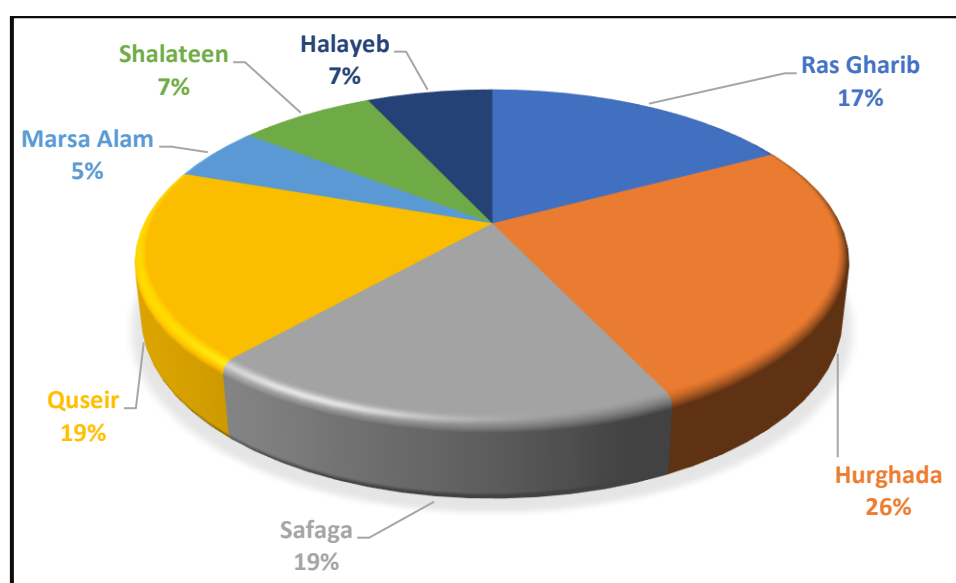


Figure 88: Distribution of Population Density According to Districts in the Red Sea Governorate

Bedouin communities in Ras Gharib are mostly unsettled, and live deep in the desert, away from the city and the villages. They currently settle permanently in Ras Gharib city, Zaafarana and Wadi Dara. Such Bedouin groups generally engage in traditional economical activities such as agriculture and animal husbandry and in addition, they are also employed in the development projects in the area (mainly the petroleum companies) either as guides, security guards, or contractors (more details in are provided throughout this section).

The demographic trend also includes migrant workers from neighbouring governorates. The predominant majority of these migrant workers work for oil companies located in the area, and a very small number work in farms in Wadi Dara village.

Age and Gender Distribution

Data from CAPMAS Statistical Yearbook 2020 indicate that the population in the Red Sea Governorate is predominantly young. Based on the outcomes of the 2020 population consensus, up to 79 % of the population of the Red Sea Governorate are under the age of 45. With respect to gender, statistical data indicates a male/female ratio in the Governorate (205,583: 190,417).

Rate of Natural Increase

The total population in the Red Sea Governorate has grown by 21.00/1000 (*Red Sea Governorate Information Centre, Statistical Yearbook of Red Sea Governorate, 2020-2022*). The growth rate in the governorate decreased from the previous rate in 2020, but despite this, the current growth rate is considered one of the highest rates during the past five years in terms of the rate of natural increase. However, it is considered one of the 10 lowest governorates in terms of birth rate.

The following table illustrates demographic trends in the Red Sea Governorate:

Table 55: Demographic Trends (Statistical Yearbook of Red Sea Governorate, 2019-2020)

Demographic Trends	Value
Average Household Size (persons)	3.8
Natural Growth Rate (per 1,000 persons)	25.30
Urban Population (% of total Egyptian population)	0.39
Birth Rate (Births per 1,000 persons)	28.70
Mortality Rate (Deaths per 1,000 persons)	4.10

Labour Profile

- CAPMAS statistical data indicates that the official unemployment rate decreased to 9.9% in the second quarter of 2018, marking the lowest rate in the past eight years. The job outlook has improved due to steadily accelerating economic growth, with Gross Domestic Product (GDP) growing by 5.4% year-on-year in the third quarter of the year 2017/2018 (January-March), according to data issued by the Ministry of Planning, Monitoring and Administrative Reform.
- This followed a growth of 5.2% and 5.3%, respectively, in the first and second quarters, and despite low household incomes and high inflation rates, more of the country's unemployed youth are being absorbed by the labour market, despite the low wages. Workforce research results for the second quarter (April - June) of 2018 in Egypt are provided in the table below.

Table 56: Workforce Research (CAPMAS, Workforce Research Results for the Second Quarter of 2018)

Workforce ⁵	Total No. of Employed Persons 26.161 Million		Total No. of Unemployed Persons 2.875 Million		Unemployment Rate 9.9%		Labour Force (by Occupation)		
	Males 80.8%	Females 19.2%	Males 53.1%	Females 46.9%	Males ⁶	Females ⁷	Agriculture	Industry	Service
29.036 Million	21.138 Million	5.023 Million	1.527 Million	1.348 Million	6.7%	21.2%	28.2%	24.7%	47.1%

⁵ Including the number of employed and unemployed persons.

⁶ Out of the total number of males (15 years of age and above) nationwide.

⁷ Out of the total number of females (15 years of age and above) nationwide.

- The table above shows that the service sector forms the biggest part of the employment sector in the Governorate which accounts for around 47% of the workforce. The agriculture sector constitutes around 28% of the total workforce, while the industry sector constitutes the lowest percentage of the working population, accounting for around 25%. In addition, the data shows that the rate of unemployment is higher amongst females compared to males.
- The following table shows data from the Directorate of Manpower in the Red Sea Governorate, excluding the informal sector. The Governorate's workforce—as a percentage of the local population is estimated at 34.61%.

Table 57: The Distribution of the Project Area's Population by Work Status & Sex - Red Sea Governorate (Directorate of Manpower in the Red Sea Governorate, 2018-2020)

Workforce	Total No. of Employed Persons 89.20 Thousand		Total No. of Unemployed Persons 25.7 Thousand		Unemployment Rate 21.7%	
	Males	Females	Males	Females	Males	Females
116.60 Thousand	77.5%	22.5%	59.8%	40.2%	17.6%	27.3%

- According to the Statistical Yearbook 2018 of the Red Sea Governorate, the service sector constitutes 60.3% of the Governorate's workforce. Hurghada City represents the largest proportion of employment, due to the presence of coastal touristic areas, followed by Safaga City.
- According to Ras Gharib City Council officials, the majority of the workforce can be divided into three main categories: Government/Public Sector, Oil and Gas (O&G) Petroleum Sector, and Fishing.
- There is also a percentage of waged workers. Agricultural activities are relatively minor, compared to petroleum-related activities. In addition, tourism-related activities are limited in Ras Gharib, even though some residents work in the tourism sector in other cities in the Governorate, such as Hurghada and Safaga.
- Based on discussions with City Council officials, it was indicated that there is a rise in the unemployment rate in Ras Gharib City due to the limited tourism in the Governorate during recent years, which increased the lack of employment opportunities.

Table 58: Labour Status of Ras Gharib & Zaafarana (CAPMAS Poverty Map, 2018)

Employment Information	Ras Gharib City	Zaafarana Village
Male Workforce (aged 15+) from Total Population	46%	57%
Female Workforce (aged 15+) from Total Population	25%	12%
% of Employed Adults (aged 24+) from the Total Workforce	57%	58%
Distribution of Workforce by Sector		
Self-Employed Males	49%	19%
Self-Employed Females	24%	33%
Male Workers in the Agricultural Sector	1.6%	37.2%
Female Workers in the Agricultural Sector	0.05%	84.2%
Workers in the Public Sector	57%	19%

Ras Gharib City attracts many migrant workers from neighbouring governorates, such as Beni Suef, Minya, Assiut, Sohag, Qena and Luxor. Workers also come from the Delta Governorates and Sinai, and the majority of them work for oil companies, while few of them work on poultry farms, as construction workers, and in agriculture in Wadi Dara village.

Economic Activities and Well Being

Economic activities in the city of Ras Gharib and its affiliated villages include oil and gas production, in addition to agricultural reclamation activities, poultry and livestock farms in the Wadi Dara region. According to a Ras Ghareb City Council representative, tourism is not a major economic activity in the city compared to other areas in the Red Sea Governorate.

Cultivated Lands: The area of cultivated lands in the Red Sea Governorate in 2012/2013 is almost 0.02% of the total nationwide cultivated lands. The Red Sea Governorate relies on rain and underground water in agriculture, which causes fluctuations in cultivated areas.

The division of land in Wadi Dar village (the village closest to the project site) includes lands allocated for agricultural reclamation projects. The number of existing farms at the time is approximately (50) farms. The status of these farms varies in terms of agricultural production and continuity in agriculture because the majority of them are still trying but facing obstacles with arable water due to the high salinity in groundwater in the area.

Fisheries: The Red Sea Governorate contributes to supplying fish, since the Governorate's coastline extends across 1,080 km and 240 km wide. The southern part of the Governorate is rich in fish resources.

The coastal area in Ras Gharib is not designated for fishing. There is no fishing port in Ras Gharib because the area is designated for oil exploration, therefore there is no scope for the fishing activities on the coast near the project site.

Livestock: 78.74% of the total number of livestock is butchered in state-owned slaughterhouses. The Red Sea Governorate has no livestock feed or poultry feed plants. Heifers account for 35% of cattle butchered in state-owned slaughterhouses.

According to the site visits and consultation activities that took place in the Wadi Dara area, there are some livestock and poultry breeding farms in Wadi Dara, some of which have begun production and others are still in the construction stage. In addition to 3 factories under construction to produce feed.

Industrial Activity: The total number of registered industrial firms is 53, operating in four industrial zones. The total number of workers in registered industrial firms is 4,340 workers (*Source: Red Sea Governorate Official Website, 2018*).

Social Services Profiles

Education

Education is one of the most important criteria for measuring the progress of people and their ability to advance and improve their standard of living. According to CAPMAS, September 2018 announced that Egypt's illiteracy rate dropped from 39.4% in 1996 to 29.7% in 2006, and then to 25.8% in 2017.

Ras Gharib City contains 18 schools covering the three basic stages of education (primary, preparatory and secondary), which include two experimental schools. Additionally, there are two secondary vocational training schools. According to Ras Gharib City Council officials, the main objective of the two secondary vocational training schools is to provide their students with the necessary basic skills that enable them to work in oil companies.

CAPMAS Poverty Map 2018 shows that 20.23% of males and 21.14% of females of Ras Gharib City received basic education. Likewise, the percentage of males and females who finalized their basic education in Zaafarana is approximately 19% and 15% respectively. The following table details the educational status of inhabitants of Ras Gharib and Zaafarana.

Table 59: Education Mapping of Ras Gharib & Zaafarana (CAPMAS Poverty Map, 2018)

Education Information	Ras Gharib City	Zaafarana Village
University Degree Holders/Males	19%	9%
University Degree Holders/Females	15%	0%
Male School Enrolment/Males (age: 6-18)	99.28%	72.2%
School Enrolment/Females (age: 6-18)	99.45%	74.3%
School Drop-outs/Males	0.21%	0%
School Drop-outs/Females	0.23%	0%

According to CAPMAS Poverty Map 2018, the illiteracy rate in Ras Gharib City is estimated at 20.4% for males and 16.1% for females, while the illiteracy rate in Zaafarana was 37.15% among males and 45% among females.

Table 60: Education Mapping of Ras Gharib City (The Statistical Yearbook, Ras Gharib City Information Centre, 2018)

Area	University Degrees		Above Intermediate Education		Intermediate Education		Less than Intermediate Education		Workers	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Ras Gharib	133	31	112	39	281	199	301	70	232	68

Health

Data from the Health Affairs Directorate in the Red Sea Governorate showed that the Governorate is free of the following diseases:

- Endemic diseases
- Infectious diseases
- Diseases related to water and air quality

The data indicated that non-communicable diseases include diabetes, and hypertension. Other common diseases include digestive system and cardiovascular diseases. Cancer is also increasing, and the most common cancers include breast, liver, bladder and lymph nodes. In addition, there are other communicable diseases to include diarrhoeal diseases (especially in children), cold and flu, fever and inflammations or infections of the ear, nose or throat, as well as skin rashes and infections.

The Red Sea Governorate suffers from a lack of specialized health services which are suitable for the middleclass. Furthermore, these services are concentrated in Hurghada City, and are absent in some other cities, such as Shalateen and Halayeb. The following tables show the health services available in the Governorate.

According to the statistics of the Directorate of Health Affairs (DHA) in Red Sea Governorate, there are 7 hospitals in Governorate with approximately 330 beds, they are government hospitals; one of them is a public and central hospital, in addition to 13 Private hospitals with 399 beds.

Table 61: Ministry of Health Hospitals & Other Entities in the Red Sea Governorate (The Statistical Yearbook, Red Sea Governorate Information Centre, 2018)

Item	Value
Hospitals Affiliated with the Ministry of Health	7
Hospitals of the General Authority for Health Insurance	0
Medical Treatment Institutions	0
Educational Hospitals	0

Item	Value
No. of Public & Central Hospitals	1
No. of Specialized Hospitals	1
Public Sector Hospitals (Including Military Hospitals)	4
Private Sector Hospitals	13
No. of Haemodialysis Centres Affiliated with the General Authority for Health Insurance	0
No. of Ambulance Vehicles	48

Ras Gharib City contains one central hospital, one ambulance station, and one civil defence unit, in addition to a limited number of private clinics and health centres. All health services are concentrated in Ras Ghareb City. The central hospital serves all the areas and villages administratively affiliated with Ras Gharib Local Government Unit (LGU). The hospital is equipped with an Emergency room section, and has outpatient clinics. There is an ambulance unit on Zaafarana--Ras Gharib Road north of Ras Ghareb city, near the Project site; these is the nearest ambulance unit to the project area.

Human resources is one of the main factors for the success and continuity of health services, and the absence of qualified medical staff affects the quality of services provided. The following table illustrates available human resources in the health sector in the Red Sea Governorate.

Table 62: Number & Categories of Health Sector Workers in the Red Sea Governorate (CAPMAS, Census of Population Activities of the Governorates, Arab Republic of Egypt, 2016)

Area	No. of Doctors		No. of Pharmacists		No. of Dentists		No. of Nursing Staff		No. of Assistants	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Red Sea Governorate	255	137	60	170	49	29	79	412	102	0

Infrastructure and Services

According to the data available in the statistical yearbook, Red Sea Governorate, a brief summary of the extent to which access of basic infrastructure services available in the Red Sea Governorate and to the project's area is given in the following tables.

Potable Water & Sanitation

Table 63: Access to potable water and sanitation in the Red Sea Governorate

Item	Unit	Value
Production of potable water	Thousand m ³ /Day	107.57
Consumption of potable water	Thousand m ³ /Day	81.96
Per capita water consumption	Liter. Day/ Person	249.24
Capacity of sanitation	Thousand m ³ /Day	16.57
Per capita sanitation capacity	Liter. Day/ Person	50.39

Source: Red Sea Governorate- Egypt Description by Information, 2020

- 18.00 thousand m³/ day is the total capacity of sanitary drainage treatment plants in the Red Sea Governorate in 2018/2020.
- 92.06 % is the actual capacity of total capacities of sanitary drainage treatment plants in Red Sea Governorate in 2018/2020.
- 76.19 % is the amount of potable water consumption to average produced water in the Red Sea Governorate in 2018/2020.

All houses and facilities in Ras Gharib are connected to water and sanitation services from the local network. There is a limited number of houses (10%) in the city are not connected to the sewage network. They rely on septic tanks that are drained periodically.

Electricity

Access to electricity in Upper Egypt Governorates is 99.0% (Egyptian Human Development Report 2020). Even squatter areas have access to electricity regardless of their legality.

The East Delta Company for Electricity serves governorates of (Damietta- Ismailia- Port Said – Suez- North Sinai- South Sinai- the Red Sea).

Table 64: Access to Electricity in Red Sea Governorate

Item	Unit	Value
Total electricity production	Million k.w.h yearly	730.00
Total electricity consumption	Million k.w.h yearly	621.90
Electricity consumption for lighting	Million k.w.h yearly	424.27
Electricity consumption for industrial utilization	Million k.w.h yearly	197.63
No. of subscribers in the electrical grid	Thousand subscribers	157.05
Per capita share of electricity used for lighting	k.w.h yearly/ Person	1290.21

Source: Red Sea Governorate- Egypt Description by Information, 2020

All houses and facilities in Ras Gharib are connected to electricity services from the local network.

Investment and Development

- There is large focus on investment in the Red Sea Governorate, and many fields of investment are available (touristic, industrial, services), which positively impact comprehensive development in the Governorate.
- The following table shows the fields of investment in the Red Sea Governorate and Ras Gharib City

Table 65: Fields of Investment in the Red Sea Governorate & Ras Gharib City (Red Sea Governorate Official Website, 2018)

Item	Red Sea Governorate	Ras Gharib
Mineral Production	The Red Sea is one of the important Egyptian governorates in the field of mineral production, as it contains deposits of most of metallic and non-metallic minerals, decoration stones and construction materials. The Red Sea Governorate stretches across the larger part of Eastern Desert, which forms one-fourth of Egypt's total area (about 250,000 km ²), and contains huge mineral resources.	There are several metal productions sites in Ras Gharib, including: - Gold in Abu-Marwat - Iron in Abu-Marwat - White sands in Dakhl Valley - Gypsum in the northwest of El-Dob Valley - Marble in Al-Shaikh Fadl Road and El-Dob Valley - Granite in Al-Shaikh Fadl Road
Fish Production	The Red Sea Governorate is an important region that can be utilized to increase fish production, as it has a 1,080 km-long coastline, with an average width of 240 km. There are various coral reef sites, with 3-5 square mile-area each. Different kinds of fish pass by these sites in certain seasons. Fish food is four times more abundant in the southern part of the Red Sea coast compared to the northern part.	There are several fish production sites in Ras Gharib: - Al-Mallaha fish farm which is located between Ras Gharib and Shoqair, with an area of 15,000 acres and a total annual production of more than 250 tons. - Suez Gulf fish farm with an area of 12,000 acres, and a total annual production of more than 400 tons. - Gamsha Gulf fish farm with an area of 9000 acres and total annual production of more than 350 tons.
Agricultural & Livestock Projects	Agriculture is a basic element in the regional comprehensive and integrated development in the Red Sea Governorate either through providing the food supply required for the development in the region or taking part in the	Suggested areas for agricultural investment in Ras Gharib include: Cultivation of 500,000 acres in Wadi Araba (to the south of Zaafarana), which can be irrigated by groundwater from El-Bowerat well.

Item	Red Sea Governorate	Ras Gharib
	attraction of new population from the crowded places over the Nile banks and confronting the expected increase in the population and consumption. The southern triangle (Shalateen, Halayeb, Abu-Ramad) is one of the most important places for the agricultural investment in addition to other cities in the Governorate.	- Cultivation of Gharib basin using groundwater in the area, as it is possible to extract 4,000 m³ of medium-salinity water per day, which can be used in irrigating citrus fruits and barley. - Cultivation of Wadi Dara village.
Touristic Investment	The General Tourist Planning of the Red Sea Governorate Red Sea Governorate contains a number of planned touristic zones.	- Zaafarana Sector - Gamsha Sector
	Available Elements for Supporting the Establishment of Touristic Projects in the Red Sea Governorate: ▪ A colourful, rocky mountain range extends along the Red Sea coast, providing a wonderful backdrop to the beach. The area is teeming with mines that had been exploited during ancient ages; mines that once rendered Egypt as one of the richest nations in ancient times, which were used to excavate gold, diamonds and valuable stones like Schist, white granite, etc. ▪ The beaches of the Red Sea coast are renowned for their clear blue waters, calm waves, and a paradise of colourful underwater coral reefs, which contains a multitude of rare and colourful fish. ▪ The yearlong moderate climates attract tourists both in summer and in winter to Red Sea Governorate resorts. ▪ The Governorate hosts various national parks, which contain a multitude of biological diversity. ▪ The Governorate contains valleys and archaeological, religious and curative sites. ▪ The Red Sea is also renowned for its black sands, which are used to cure rheumatoid and psoriasis.	
	Touristic Projects Proposed for Implementation in the Governorate: ▪ Touristic villages, hotels, motels and camps in Safaga, Qoseir and Marsa Alam, the southern triangle (Shalateen, Abu-Ramad & Halayeb), as well as Zaafarana. Project lands are allocated according to vacant areas. ▪ Cinemas, amusement parks and malls proposed to be established in Hurghada, Safaga, Qoseir & Marsa Alam. ▪ Fairs, aquariums, sports centres, golf courses, billiard halls and bowling alleys proposed to be implemented in Hurghada, Safaga, Qoseir, Marsa Alam & Zaafarana. ▪ Centers for providing diving equipment in Hurghada, Safaga, Qoseir & Marsa Alam. ▪ Tourist companies that provide safari trips in Hurghada, Safaga, Qoseir & Marsa Alam. ▪ Shipyards in Hurghada, Safaga, Qoseir & Marsa Alam. ▪ Internal shipping lines connecting the ports of Hurghada, Safaga & Marsa Alam with the ports of Al-Tour, Nuweiba, Taba & Sharm El-Sheikh, as well as Port Tawfik in Suez. Additionally, an international shipping line is proposed to connect the Governorate's ports with the ports the Red Sea and the Arabian Gulf. ▪ Establishing integrated projects for underwater imaging in Hurghada and Marsa Alam. ▪ An international conference centre in Hurghada. ▪ A hotel school in both Hurghada and Qoseir. ▪ Schools for teaching diving and swimming, drawing on graduate divers and specialized trainers in Hurghada, Safaga & Marsa Alam. ▪ Utilizing the islands in the construction of suitable projects in accordance with environmental laws. ▪ Small and medium industries for providing hotel equipment.	

8. ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

This Chapter provides an overview of the strategic environmental and economic impacts related to the Project development followed by an assessment of anticipated impacts resulting and or influenced by the Project throughout its phases (construction, operation and decommission) on Environmental and Social receptors and attributes.

8.1 Overview of Strategic Environmental and Economic Impacts

8.1.1 Governmental Vision for the Energy Sector

The GoE has taken steps to adopt an energy diversification strategy underscored by increased development of renewable energy and the implementation of energy efficiency, including assertive rehabilitation and maintenance programs in the power sector (IRENA, 2018).

To this extent, in 2013, the Arab Republic of Egypt (through the Supreme Council of Energy) had developed and adopted the Integrated Sustainable Energy Strategy (ISES) 2015 – 2035, which outlines the nation's roadmap to increase the contribution of renewable energy to 42% of the country's electricity mix by 2030.

To promote renewable energy sources and in order to open the way for the private sector to effectively participate in the implementation of renewable energy project, the Renewable Energy Law (Decree Law 203/2014) was issued. The law facilitates investors in developing renewable grid-connected electricity production through the BOO scheme as discussed earlier in "Section 1.1".

8.1.2 Energy Security

The topic of energy security Recently, most policy makers around the world are grappling with issues related to energy security, energy poverty, and an expected increase in future demand for all energy sources – and Egypt is no exception. Almost certainly, the most spoken words by policy makers and government bodies in Egypt in the last couple of years revolved around 'energy security'.

Through various strategies and visions, Egypt has emphasised on the importance of energy security. This includes for example the Egypt Sustainable Development Strategy, Egypt Vision 2030, in which the sustainable development targets include energy and in which Goal I specifically address security of supply to ensure the availability of reliable energy supplies to satisfy the future development needs of the country through adoption of a more diverse energy mix. Similarly, the ISES 2015 – 2035 addresses energy import dependence and diversification of electricity generation.

In line with the above, the Project in specific will contribute to increasing energy security by way of increasing the availability of a national and mostly import-independent energy resource. The estimated electricity generation from the Project is estimated at around 3,000 Gigawatt hours (GWh) per year on average; which will serve the annual electricity needs of around 1,000,000 local households.

The above has been calculated based on statistics obtained from Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS). The total household electricity consumption in Egypt for 2016 – 2017 (latest statistics available online) was 64,100 GWh (CAPMAS, 2018). In addition, in 2016 – 2017 the total number of household beneficiaries from the public electricity network was 23,383,521 Households (CAPMAS, 2017). Therefore, average electricity consumption per household per year can be assumed to be around 2,700 (kWh/household).

8.1.3 Environmental Benefits

The negative environmental impacts from generating electricity through conventional fossil fuel burning at thermal power plants are very well known. This most importantly includes air pollutant emissions such as ozone, Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂), Particulate Matter (PM), and other gases which are the cause of some serious environmental concerns such as smog, acid rain, health effects, and many others.

In addition, the burning of fossil fuels results in carbon dioxide emissions; a primary greenhouse gas emitted through human activities which contributes to global warming. The main human activity that emits CO₂ is the combustion of fossil fuels for electricity production and transportation. Concurrently, global climate change has become an issue of concern and so reducing greenhouse gas emissions have also emerged as primary issues to be addressed as the world searches for a sustainable energy future.

Generating electricity through wind power is rather pollution-free during operation. Compared with the current conventional way of producing electricity in Egypt through thermal power, the clean energy produced from renewable energy resources is expected to reduce consumption of fossil fuels, and is to aid in reducing GHG emissions, as well as air pollutant emissions. The Project is to displace around 1.4 million metric tons of CO₂ annually.

The above has been calculated based on statistics obtained from Egyptian CAPMAS. Carbon Dioxide (CO₂) emissions for 2016 – 2017 (latest statistic available) was 210 million tons, in which the electricity sector accounted for 43.3% of (i.e., around 91 million tons) (CAPMAS, 2019). In addition, the total electricity generated for 2016 – 2017 was around 190,000 GWh (CAPMAS, 2018). Therefore, CO₂ emissions (Tones) per kWh is around 479g per kWh.

In addition, there is an important benefit in relation to wind farm developments related to water conservation because unlike certain power generation methods, wind projects do not require significant amounts of water for cooling or steam generation. Conservation of water is particularly important in arid regions like Egypt, where water scarcity is a significant challenge.

8.2 Landscape and Visual

This section identifies the anticipated impacts on landscape and visual from the Project throughout its various phases. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

8.2.1 Potential Impacts during the Construction Phase

Site preparation activities which are to take place onsite by the EPC Contractor for installation of the wind turbines and the various Project components to include substation, transmission cables, access roads and internal road network, buildings, etc. are expected to include land clearing activities, levelling, excavation, grading, etc.

Construction activities would create a temporary negative effect on the visual quality of the site and its surroundings and may disturb the natural appearance of the desert terrain. The visual environment during the construction phase would include the presence of elements typical of a construction site such as equipment and machinery to include excavators, trucks, front end loaders, compactors and others.

As discussed in “Section 6”, Wadi Dara Village (less than 1 km from the boundary of the Project site) represents several sensitive visual receptors in the surrounding vicinity. While there are a number of structures (as indicated in Section 6.2 the majority represent commercial – agricultural establishments; Wadi Dara Village, overall, hosts about 4-5 families. Visual impacts will be observable from the main road leading into and from the Village.

The visual environment created during the construction period would be temporary, of a short-term duration, limited to the construction phase only. For the duration of construction, the visual impacts will of a negative nature and be noticeable, and therefore of a medium magnitude. As there are sensitive visual receptors that would be affected in the vicinity of the Project site, the receiving environment is determined to be of a medium sensitivity. Due to the proximity of SRs to the Project site, yet low number of full-time occupants, the lack of landscape features, such an impact is considered to be minor.

Mitigation Measures

The following identifies the mitigation measures to be applied by the EPC Contractor during the construction phase and which include:

- Ensure proper general housekeeping and personnel management measures are implemented which could include:
 - Ensure the construction site is left in an orderly state at the end of each work day.
 - To the greatest extent possible construction machinery, equipment, and vehicles that are not in use should be removed in a timely manner and kept in locations to reduce visual impacts to the area.
- Ensure proper storage, collection, and disposal of waste streams generated
- Implement restoration and rehabilitation measures to restore the site's visual quality through for example re-contouring the land and removing temporary structures (e.g. batching plant).

Following the implementation of these mitigation measures, the significance of the residual impact remains unchanged (minor significance), with a low magnitude of impact and medium sensitivity of the receiving environment.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by EPC Contractor during the construction phase:

- Inspections of the works should be carried out daily (or maximum – monthly) basis) as part of site inspections to maintain Project-site housekeeping to ensure the above measures are implemented.

8.2.2 Potential Impacts during the Operation Phase

Visual impacts associated with wind energy projects typically concern the turbines themselves (e.g. colour, height, and number of turbines) and impacts relating to their interaction with the character of the surrounding landscape and the visual receptor which might be present.

Turbines are tall structures (185 m for this Project) that can be seen from several kilometres away and impose a change on the landscape of the area where they are installed. However, visual impacts depend on several factors such as distance, size, visibility, landscape and geography, and the presence of potential sensitive visual receptors.

Nevertheless, visual impacts created from the development of the Project are not considered an issue of concern due to the following:

- The only potential sensitive receptors would be Wadi Dara located 0.9km from the Project. However, As explained earlier, Wadi Dara Village does not have a large permanent community with majority of population being workers and guards employed at the various poultry, livestock and agricultural farms within the settlement (mainly at a rotational basis). Based on this, aesthetical value for such a receptor loses some importance. Finally, based on consultations undertaken with Wadi Dara (refer to “Section 4” such impacts were explained but no issues were raised.

- Project area is considered a barren and desert area and in general is located within an industrial area with petroleum activities for which its aesthetical value loses some importance.
- There are several existing and under construction wind farm developments in the area as well as several electricity distribution and transmission lines so the addition of this Project will not be a significant impact to the visual and landscape characteristics of the area.
- Being visible is not necessarily the same as being intrusive. Aesthetic issues are by their nature highly subjective. For some viewers, a Wind Farm could be regarded as manmade structures with visual burdens while to others it represents a positive impact in the sense that they introduce a break in the otherwise dull and monotonous view.

In addition to the above, the rotating blades will be visible from vehicles passing across the Hurghada - Cairo Highway as well as the main road leading into Wadi Dara Village which also intersects the Project Site. The turbines can attract visual attention and potentially distract drivers passing along the highway.

Given all of the above, the potential impacts on landscape and visual are of a long-term duration throughout the Project operation phase. The impacts will be of a negative nature, and medium magnitude given that such elements of the Project will be visible. However, given the key visual receptors in the project route and its surroundings the receiving environment is considered of medium sensitivity. Given all of the above, such an impact is considered of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the Project Operator during the operation phase and which include:

- In coordination with the Traffic and Transport Authority, install clear and informative signage in Arabic and English language at Hurghada – Cairo Highway and on the road leaving the highway and into Wadi Dara Village to alert drivers of the wind farm ahead and provide guidance on safe driving practices.

Following the implementation of these mitigation measures, the significance of the residual impact remains unchanged (minor significance), with a low magnitude of impact and medium sensitivity of the receiving environment.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by Project Operator during the operation phase:

- Inspections on highway to ensure signage is installed.

8.3 Land Use

This section identifies the anticipated impacts on land use from the Project throughout its various phases. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

8.3.1 Potential Impacts during the Planning and Construction and Operation Phase

Wadi Dara

As noted within the baseline section, the Project site itself is completely empty of any structures with the exception of 1 receptor which was noted as a part-time residence or accommodation, however this structure is

for the Red Sea Governorate and have been abandoned and is not in use. Red Sea Governorate indicated that these are no longer required and have no objection on removal of these structures.

However, as explained earlier, NREA issued a formal letter dated 17 January 2023 to the Wadi Dara Cooperative Association explaining that the Wadi Dara encroaches on the allocated lands for NREA in accordance with the “Presidential Decree 116 for the year 2016” to be used for development of electrical energy.

The Wadi Dara Cooperative Association provided a letter acknowledging the above and indicating that an area of around 103 Fiddan (equivalent to 0.4km² – part of which is 0.1km² which the Project overlaps) is located within the NREA allocated area and that the Association has no objection on conceding this area to NREA given that an alternative land is being provided through the Red Sea Governorate. In addition, alternative lands have also already been provided by the Red Sea Governorate that are of similar area and of similar characteristics.

The site survey undertaken identified within this overlap area what seems to be abandoned early preparatory works from a long time ago undertaken by 4 private sector investors (such as levelling works, division of land, etc.). Wadi Dara Cooperative Association indicated that alternative lands have been provided for these investors of similar area and similar characteristics.

The ESIA consultant required additional details on the selling process as well as the contact details for these private sector investors from the Wadi Dara Association so that direct consultations can be undertaken. The Association indicated that two of the investors are no longer in Egypt and are in Canada while the two others they are no longer responding to any direct inquiries from the Association. Therefore, no further details could be obtained on this issue.

Informal Land Use

While the Project site is owned by NREA and will be utilised for the Development of the Project it is still a conventional understanding that Bedouin Groups have, in the past, utilized and the land under the Ghafra system, under which such land areas traditionally included the Project site. Therefore, the Developer should be aware of Al-Ghafra system, and other aspects of Bedouin culture. The Developer’s understanding of Bedouin culture plays a major role in regulating the relationship with the tribes in the region. Inappropriate management of such issues could result in potential conflicts with such groups.

Taking the above into account, should the above issues not be taken into account as part of the planning phase of the Project, it could result in impacts that are considered of long-term duration, of negative nature, and of medium magnitude and high sensitivity given that it could result in land use impacts and disputes with both Bedouin Groups and/or private sector investors in the area. Given all of the above, the impact is considered of moderate significance.

Mitigation Measures

The following identifies the key mitigation measures that should be considered by the Developer in relation to land use:

- Obtain formal no objection from the Red Sea Governorate on removal of the structures they have onsite.
- Formal consultations must take place through the Wadi Dara Association with these 4 investors to verify that they are aware of the alternative lands provided to them by the Association through the Red Sea Governorate.
- Establish coordination with the Bedouin Groups for inclusion and engagement in employment and procurement opportunities as part of the employment and procurement procedure.
- Implementation of SEP that includes specific references for engagement and coordination with Bedouin groups. Please refer to SEP for additional details.

- Community development programs for the benefit of the local community may be initiated, as elaborated in the Community Engagement Plan (CEP) and its relevant Corporate Social Responsibility (CSR) program, conducted by the Project's Community Liaison Officer (CLO) in consultation with a local development unit and community members to benefit community members.

Following the implementation of these mitigation measures, the significance of the residual impact is reduced to minor significance, with a low magnitude of impact and high sensitivity of the receiving environment.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the EPC Contractors during the construction phase and which include:

- Submission of formal letter from Red Sea Governorate
- Submission of final detailed design avoiding overlap area OR submission of proof of consultation with investors through Wadi Dara Association
- Monitoring the effectiveness of the grievance mechanism that allows the Bedouin community to raise concerns, provide feedback, and seek resolution for any perceived impacts or conflicts. Regularly review the mechanisms' accessibility, transparency, and responsiveness.
- Submission of employment and procurement procedure that includes references for Bedouin groups;
- Submission of proof of coordination and agreement with Bedouin groups as part of the SEP such as engagement records.

8.4 Geology, Hydrology and Hydrogeology

This section identifies the anticipated impacts on hydrology and hydrogeology from the Project throughout its various phases. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

8.4.1 Potential Impacts from Flood Risks on the Project Site

In general, it is important to investigate potential risks of local flood hazard from the wadi systems (as discussed previously under "Section 7.3.4.") during the rainy season and especially during flash flood events which in turn could affect the Project components. Such risks must be taken into consideration throughout the planning phase of the Project as they could inflict damage to the Project and its various components.

According to the hydrological study prepared for the Wind Project by EGEC (2023), the flood threat in the project area includes the following:

- For the 2-year and 5-year return periods, the flood hazard is predominantly low.
- For the 10-year return period, the flood hazard is mostly low outside the wadis, with some medium points inside the wadis.
- For the 20-year return period, the hazard remains mostly low outside the wadis, while varying between medium and low inside the wadis.
- The 50-year return period shows mostly low hazards outside the wadis, with medium to high hazards inside the wadis.
- For the 100-year return period, the hazard is mostly low outside the wadis, but ranges from high to very high inside the wadis. This pattern persists when considering climate change (Note: 100-year period

considering climate change).

- The 200-year return period indicates mostly low hazards outside the wadis, with high to very high hazards inside the wadis.

The assessment revealed that most flow paths exhibit minor water depths due to the wide wadi widths and steep slopes. To mitigate flood risks, the study recommends installing grouted riprap protection around each wind tower foundation to prevent scour and protect against direct precipitation. A minimum grading slope should be maintained around the towers to direct surface water flow towards the wadis, avoiding water accumulation near tower foundations. Also, two (2) Irish crossings are recommended at the intersection between internal asphalt roads and main streams to protect the internal roads from flash floods as shown in the Figure below.

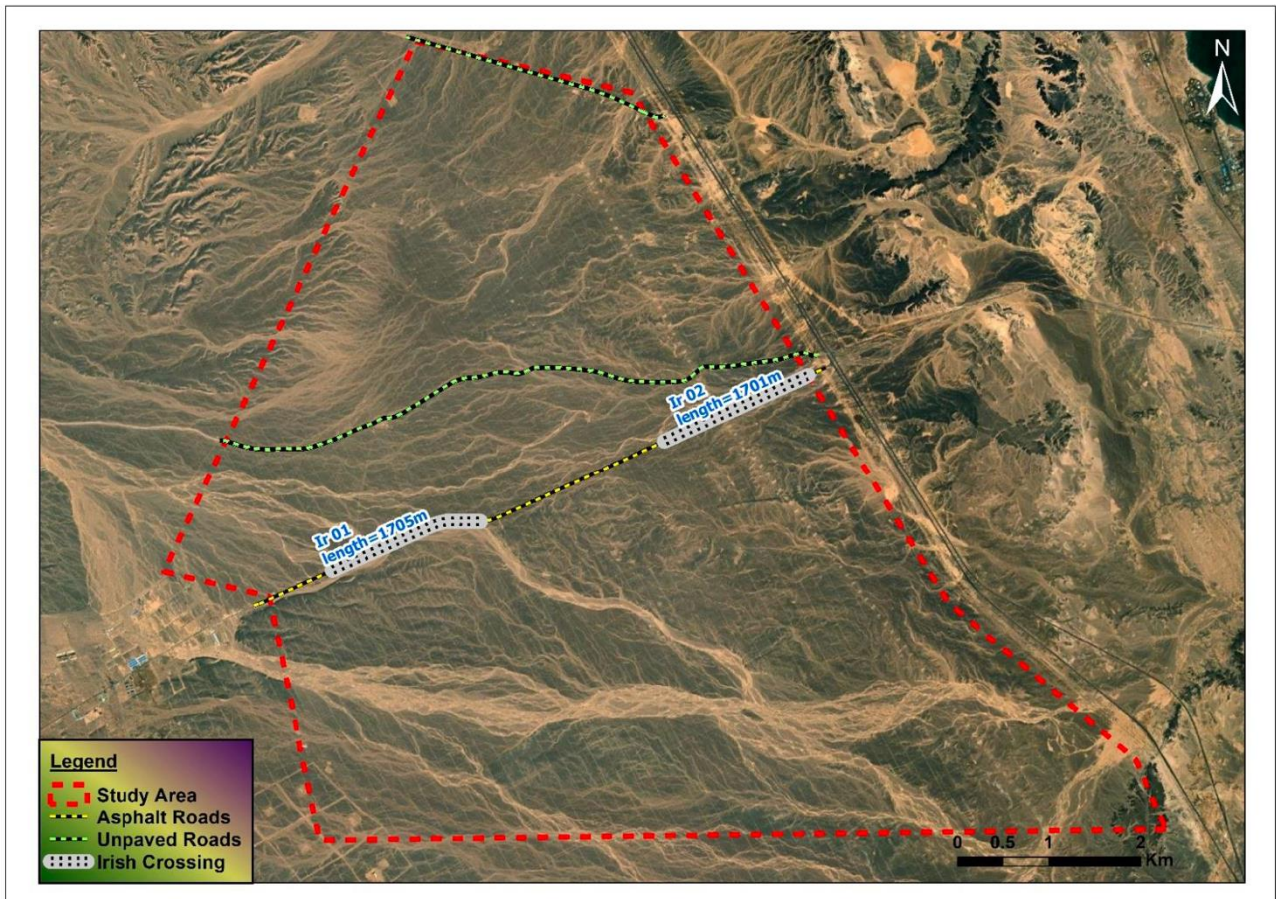


Figure 89: Proposed Irish Crossings Location

Nevertheless, should the above issues not be taken into account as part of the planning phase of the Project, it could result in impacts that are considered of long-term duration, of negative nature, and of medium magnitude and high sensitivity given that it could result in infrastructure damage as well as impacts on health and safety. Given all of the above, the impact is considered of moderate significance.

Mitigation Measures

Recommendations and protection measures recommended in the Hydrology Report to be implemented by EPC Contractor to prevent flooding.

Following the implementation of these mitigation measures, the significance of the residual impact is categorized as minor, with a low magnitude of impact and low sensitivity of the receiving environment.

8.4.2 Potential Impacts from Improper Management of Waste Streams during Construction and Operation

Solid waste is expected to be generated from construction and operational activities. Solid waste generated will likely include construction waste (such as debris) and municipal solid waste (during construction and operation such as cardboard, plastic, food waste, etc.). Municipal solid waste and construction waste generated will likely be collected and stored onsite and then disposed to the closest approved dumpsite (Ras Gharib Public Dumpsite) or, if possible, reused in the construction activities.

Given the generic nature of the impacts on soil and groundwater for both phases of the Project (construction and operation) those have been identified collectively throughout this section. Generally, this includes potential impacts from improper housekeeping practices (e.g. improper management of waste streams, improper storage of construction material and of hazardous material, etc.).

Improper housekeeping practices during construction and operation (such as illegal disposal of waste to land) could contaminate and pollute soil which in turn could pollute groundwater resources. This could also indirectly affect flora/fauna and the general health and safety of workers (from being exposed to such waste streams). Generally, such impacts can be adequately controlled through the implementation of general best practice housekeeping measures as highlighted throughout this section, and which are expected to be implemented by the EPC Contractor throughout construction phase and Project Operator during the operation phase.

The potential impacts from improper management of waste streams could be of a long-term duration throughout the construction and operation phase. Such impacts are negative in nature, and could be noticeable and are therefore of medium magnitude. However, they are considered of low sensitivity as they are generally controlled through the implementation of general best practice housekeeping measures. Given all of the above, such an impact is considered to be of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by all involved entities to include the EPC Contractor during the construction phase and the Project Operator during the operational phase unless stated otherwise:

- Removal of Dumpsite: Remove remnants of dumpsite and its contents from the Project site in order to avoid and / or eliminate the compounding effect that the existence of the dumpsite could have on biodiversity, including avi-fauna, visual and health and safety aspects of the Project site;
- Waste that is collected is to be sorted and stored according to its category into solid non-hazardous and hazardous wastes (including all potential categories of hazardous wastes, including electrical wastes). Hazardous wastes are to be collected by a licensed contractor through a contractual agreement and disposed of at the approved hazardous waste landfills. Solid non-hazardous wastes may be collected by the municipality according to an agreement with them or by a Waste Contractor.
- Coordinate with Ras Gharib City Council for the collection of solid waste from the site to the municipal approved dumpsite (the closest dumpsite being Ras Gharib Public Dumpsite) or for recycling (as discussed in further details below);
- Prohibit fly-dumping of any solid waste to the land;
- Distribute appropriate number of properly contained litter bins and containers properly marked as "Municipal Waste";
- Adhere to waste hierarchy principles with associated mitigation measures to include prevent, minimize, reuse, recycle, recover and dispose.
- EPC Contractor only - during construction, distribute a sufficient number of properly contained containers clearly marked as "Construction Waste" for the dumping and disposal of construction waste.

- EPC Contractor only – during construction, it is recommended that recycling measures are implanted. It is recommended that recycling is undertaken in the following approach: (i) separation and disposal of recyclables in a separate container (cardboard, paper, glass, metal, etc.); and (ii) separation and disposal of non-recyclable materials in a separate container (e.g. food waste). Each container must be clearly marked. In addition, EPC Contractor must seek ways to reduce construction waste by reusing materials (for example through recycling of concrete for road base coarse);
- Implement proper housekeeping practices on the construction site at all times; and
- Maintain records and manifests that indicate volume of waste generated onsite, collected by contractor, and disposed of at the landfill. The numbers within the records are to be consistent to ensure no illegal dumping at the site or other areas.

Following the implementation of the mitigation measures highlighted throughout this section, the residual significance can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by all involved entities to include the EPC Contractor during the construction phase and the Project Operator during the operational phase unless stated otherwise:

- Inspection of waste management practices onsite;
- Review of records and manifests for volume of waste generated to ensure consistency; and
- Regular environmental reporting on implementation of the waste management practices onsite.

(i) Wastewater Generation

Wastewater is mainly expected to include black water (sewage water from toilets and sanitation facilities), as well as grey water (from sinks, showers, etc.) generated from workers during the construction and operation phase. Wastewater quantities are expected to be minimal. It is expected that wastewater will be collected and stored in fully contained septic tanks and then collected and transported by transportation tankers to be disposed at the closest Wastewater Treatment Plant (WWTP) (being Ras Gharib WWTP). However, if inadequate disposal of wastewater occurs and is allowed to drain on land, this might contaminate the soil and possibly infiltrate to groundwater.

The potential impacts from inadequate disposal of wastewater could be of a long-term duration throughout the construction and operation phase. Such impacts are negative in nature and could be noticeable and are therefore of medium magnitude. Based on the geotechnical report for the Project, groundwater was not encountered at all boreholes during the geotechnical investigation and the soil within the Project site is typical of the soil characteristics found in the project area. Therefore, both are considered of low sensitivity on a local scale. With no mitigation measures, the overall environmental significance before mitigation is rated as minor.

Mitigation Measures

The following identifies the mitigation measures to be applied by all involved entities to include the EPC Contractor during the construction phase and the Project Operator during the operational phase unless stated otherwise:

- Coordinate with Ras Gharib Water Company to hire a private contractor for the collection of wastewater from the site to the closest WWTP (being Ras Gharib WWTP);

- Prohibit illegal disposal of wastewater to the land;
- Maintain records and manifests that indicate volume of wastewater generated onsite, collected by contractor, and disposed of at the WWTP. The numbers within the records are to be consistent to ensure no illegal discharge at the site or other areas;
- EPC Contractor only - ensure that constructed septic tanks during construction and those to be used during operation are well contained and impermeable to prevent leakage of wastewater into soil; and
- Ensure that septic tanks are emptied and collected by wastewater contractor at appropriate intervals to avoid overflowing.

Following the implementation of the mitigation measures highlighted throughout this section, the residual significance of the above impacts can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by all involved entities to include the EPC Contractor during the construction phase and the Project Operator during the operational phase unless stated otherwise:

- Inspection of wastewater management practices onsite;
- Review of records and manifests for volume of wastewater generated to ensure consistency; and
- Regular environmental reporting on implementation of the wastewater management practices discussed above.

(ii) Hazardous Waste Generation

Hazardous waste is expected to be generated throughout both the construction and operation phase and this could include consumed oil, chemicals, paint cans, etc. Hazardous waste generated will likely be collected and stored onsite and then disposed at the approved hazardous waste disposal facilities managed by the Hazardous Waste Management Project and supervised by the governorate and the EEAA.

With no mitigation measures in place, the potential impact from inadequate disposal of hazardous waste is assessed as of a long-term duration and irreversible. The impact will be of a negative nature, and has a medium magnitude. Based on the geotechnical report for the Project, groundwater was not encountered at all boreholes during the geotechnical investigation and the soil within the Project site is typical of the soil characteristics found in the project area. Therefore, both are considered of low sensitivity on a local scale. With no mitigation measures, the overall environmental significance before mitigation is rated as minor.

Mitigation Measures

The following identifies the mitigation measures to be applied by all involved entities to include the EPC Contractor during the construction phase and the Project Operator during the operational phase unless stated otherwise:

- Coordinate and hire a private contractor for the collection of hazardous waste from the site to the approved hazardous waste disposal facilities;
- Ensure that hazardous waste is disposed in a dedicated area that is enclosed; of hard surface; with proper signage and suitable containers as per hazardous waste classifications and that they are labelled for each type of hazardous waste.

- Ensure hazardous waste storage area is equipped with spill kit, fire extinguisher and anti-spillage trays and a hazardous waste inventory is available.
- Prohibit illegal disposal of hazardous waste to the land;
- Possibly contaminated water (e.g. runoff from paved areas) must be drained into appropriate facilities (such as sumps and pits). Contaminated drainage must be orderly disposed of as hazardous waste;
- Ensure that containers are emptied and collected by the contractor at appropriate intervals to prevent overflowing; and
- Maintain records and manifests that indicate volume of hazardous waste generated onsite, collected by contractor, and disposed of at the hazardous waste disposal facilities. The numbers within the records are to be consistent to ensure no illegal discharge at the site or other areas.

Following the implementation of the mitigation measures highlighted throughout this section, the residual significance of the above impacts can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by all involved entities to include the EPC Contractor during the construction phase and the Project Operator during the operational phase unless stated otherwise:

- Inspection of hazardous waste management practices onsite;
- Review of records and manifests for volume of hazardous waste generated to ensure consistency; and
- Regular environmental reporting on implementation of the hazardous waste management practices onsite.

(iii) Hazardous Material

The nature of construction and operational activities entail the use of various hazardous materials such as oil, chemicals, and fuel for the various equipment and machinery. Improper management of hazardous material entails a risk of leakage into the surrounding environment either from storage areas or throughout the use of equipment and machinery.

Should spills occur and with no mitigation measures in place, the potential impact is assessed as of a long-term duration and irreversible. The impact will be of a negative nature and has a medium magnitude. Considering the low sensitivity of the soil and groundwater quality on a local scale, the overall environmental significance before mitigation is rated as minor.

Mitigation Measures

The following identifies the mitigation measures to be applied by all involved entities to include the EPC Contractor during the construction phase and the Project Operator during the operational phase unless stated otherwise:

- Ensure that hazardous materials are stored in proper areas and in a location where they cannot reach the land in case of accidental spillage. This includes storage facilities that are of hard impermeable surface, flame-proof, accessible to authorized personnel only, locked when not in use, and prevents incompatible materials from coming in contact with one another;
- Maintain a register of all hazardous materials used and accompanying Material Safety Data Sheet (MSDS) must present at all times. Spilled material should be tracked and accounted for;

- Incorporate dripping pans at machinery, equipment, and areas that are prone to contamination by leakage of hazardous materials (such as oil, fuel, etc.);
- Regular maintenance of all equipment and machinery used onsite. Maintenance activities and other activities that pose a risk for hazardous material spillage (such as refuelling) must take place at a suitable location (hard surface) with appropriate measures for trapping spilled material;
- Ensure that a minimum of 1,000 liters of general-purpose spill absorbent is available at hazardous material storage facility. Appropriate absorbents include zeolite, clay, peat and other products manufactured for this purpose; and
- If spillage on soil occurs, spill must be immediately contained, cleaned-up, and contaminated soil disposed as hazardous waste.

Following the implementation of the mitigation measures highlighted throughout this section, the residual significance of the above impacts can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by all involved entities to include the EPC Contractor during the construction phase and the Project Operator during the operational phase unless stated otherwise:

- Inspection for storage of hazardous materials to include inspections for potential spillages or leakages; and
- Report any spills and the measures taken to minimize the impact and prevent from occurring again.

8.4.3 Potential Impacts from Erosion and Runoff during the Construction Phase

Site preparation activities which are to take place onsite by the EPC Contractor for installation of the various Project components to include wind turbines, substation, cables, etc. are expected to include land clearing activities, excavation, grading, etc.

The nature of construction activities discussed above could disturb soil, exposing it to increased erosion during rainfall events. If onsite erosion and runoff are not controlled, they can result in siltation of surface water. Generally, such impacts can be adequately controlled through the implementation of general best practice housekeeping measures as highlighted throughout this section, and which are expected to be implemented throughout construction phase.

The potential impacts from erosion and runoff are of short-term duration as it is limited to the construction phase. Such impacts are negative in nature, and could be noticeable and are therefore of medium magnitude. However, they are considered of low sensitivity as they are generally controlled through the implementation of general best practice housekeeping measures. Given all of the above, such an impact is considered to be of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by all involved entities to include the EPC Contractor during the construction phase:

- Avoid executing excavation works under severe weather conditions.
- Place clear markers indicating stockpiling area of excavated materials to restrict equipment and personnel movement, thus limiting the physical disturbance to land and soils in adjacent areas.
- Erect erosion control barriers around work site during site preparation and construction to prevent silt runoff where applicable.

- Return surfaces disturbed during construction to their original (or better) condition to the greatest extent possible.

Following the implementation of the mitigation measures highlighted throughout this section, the residual significance can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by all involved entities to include the EPC Contractor during the construction phase:

- Inspection for erosion and runoff control to include inspections for implementation of mitigation measures.

8.5 Biodiversity

This section identifies and assesses the anticipated impacts from Project activities on identified ecological receptors during the construction and operation phases. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

Impact assessment summary tables are relevant, however for some impacts the assessment is provided within the accompanying text and where impact significance is clear (e.g. similar impacts affecting multiple receptors), no table has been provided to avoid significant levels of repetition.

All mitigation measures contained in this section will be included in a Project specific construction Biodiversity Management Plan which will also include details of pre-clearance, pre-construction, and during-construction monitoring.

8.5.1 Potential Impacts during the Construction Phase

Habitat Loss, Fragmentation and Degradation

Site clearance and subsequent construction activities will result in the direct loss of areas of natural habitats over the full construction footprint of the Project including internal site roads, turbine bases, crane pads, substations, and permanent site structures (e.g. offices). Natural habitats are valued as being of Low Sensitivity as they are not listed as Priority Habitats. There is also likely to be temporary habitat loss and degradation of habitats as a result of temporary lay-down areas and other temporary facilities (e.g. worker accommodation) as well as cabling and communication routes.

Habitat loss has been discussed with respect to habitat and flora itself but not in regard to fauna. The list of terrestrial fauna present on site from surveys is presented below. All species are IUCN Least Concern other than Spiny-Tailed Lizard (Vulnerable) which has specific individual mitigation measures in place to ensure no harm comes to the species during works.

- Lesser Egyptian Gerbil (LC)
- Steudner's Pigmy Gecko (LC)
- Red-spotted Lizard (LC)
- Elegant Gecko (LC)
- Pallid Agama (LC)
- Bosc's Fringe-toed Lizard (LC)
- Spiny-Tailed Lizard (VU)

- Invertebrates (typical assemblage for region – all LC)

Habitat loss of terrestrial species can lead to a negative impact on overall population viability. In the situation here the impact is reduced due to the nature of the development meaning that habitat loss is spread in small areas over a wider project site. This means that connectivity is maintained through the area and no barriers to movement put in place or wide areas of specific interest will be lost. Given habitats are found through the area the small loss of habitat (1.5% of the project area) it is considered that there will be no impact on conservation status of these species.

Despite this there will be mitigation for all these species in the form of provision of alternate habitat due to the enhancement of around 2.0 km² using appropriate, native planting in suitable parts of the Project Area. This will ensure no loss the area available to use for these widespread species. Planting within these areas is being monitored and accordingly the success of habitat provision will be ensured. Details of habitat loss associated with infrastructure other than WTG bases cannot be fully assessed at this stage due to no confirmed infrastructure layout. It is assumed that habitat loss associated with access from the main road will be minimized by following existing vehicle access routes. Assumed areas for infrastructure are provided at this stage in order to best assess the project impact.

Any species recorded during surveys, but which are not listed in the sensitive receptor table are considered to be of Low/lower value.

- Impacts on Low/Lower value species are expected to be of low to moderate magnitude and are therefore not significant; and
- Mitigation for higher value receptors will also alleviate impacts on these lower value receptors.

Therefore, these Low/lower value species have not been listed out in detail and the impact assessment section will not include assessments on these receptors.

Species identified as Priority Biodiversity Features (PBFs) are also identified in the table below.

The potential impacts on habitat loss, fragmentation and degradation would be negative in nature yet short-term in duration. Such impacts would be medium in magnitude yet deemed irreversible. Considering the ecology of the site, the receiving environment is determined to be of medium sensitivity. Given the above, the impact is considered overall of minor significance.

Mitigation Measures

The following mitigation measures will be employed to reduce the significance of habitat loss, fragmentation, and degradation during the construction period. Mitigation measures are largely based on avoidance of impact through selection of the working areas to favour areas of degraded natural habitat or those areas where habitats have been modified. Where impacts cannot be avoided the following will be completed

- All site workers will undertake a Project induction before working on site. The induction will include a comprehensive biodiversity element where the baseline ecological value and sensitivity of the site will be discussed.
- Prior to construction works, working areas will be clearly demarked (using temporary fencing (e.g. orange netting attached to wooden posts)) so that site workers fully understand the working area. Encroachment into areas outside of agreed working areas will be prohibited and working areas will be subject to regular check by the EPC Ecologist to check enforcement of working areas.
- On completion of phased construction works the EPC Contractor will be responsible for habitat rehabilitation works in all areas that have been subject to temporary disturbance.
- Following construction an area of around 2.0 km² will be enhanced using appropriate, native planting in suitable parts of the Project Area, this will ensure that no net loss of habitat as a result of the works. Any

areas of additional planting will be monitored as part of the biodiversity monitoring program and any species which do not establish will be replaced.

Direct Impacts on Sensitive Receptors (Habitats and Flora) – Non-native Species and Introduced Flora

It is possible that non-native or introduced flora could be imported in to the AoI on vehicles or within any imported soil material. The impacts of non-native and introduced flora could have a moderate significant impact in absence of any mitigation as these species could become established and out-compete native flora.

Impacts associated with non-native, invasive or introduced flora could result in long-term negative impacts, irreversible (if allowed to become established) and moderately significant.

Impacts associated with non-native, invasive or introduced flora could result in long-term negative impacts, irreversible (if allowed to become established) and potentially significant.

Mitigation Measures

- Prior to construction works, working areas will be subject to a botanical walkover survey to identify areas of non-native or invasive species. Any specimens will be clearly marked, and the area avoided and if this is not possible the specimen will be removed and disposed of.
- Areas of soil in proximity to these species will be stored separately and not used further on the site. It will be collected from the site and disposed of or used as deep sub-soil fill (to reduce the chance of seed germinating).
- Areas of non-native or invasive species will be mapped and a programme of mechanical control will be completed over the construction period in order to remove these species from the AoI. Chemical control will be avoided however if necessary, will be used but in accordance with national and international guidelines as well as those applied by the Lenders (e.g specific risk assessment and Lender agreement prior to use).
- Soil imports to be taken from local quarries or borrow pits to avoid importing non-native and invasive species.
- Adequate wheel-washing facilities to be constructed at the entrance to the site (e.g. at the eastern end of the access road) and any wastewater will be disposed of correctly to prevent spread of undesirable species.
- Regular site walkover surveys throughout the construction period by a suitably qualified botanist to check to the presence and abundance of non-native or invasive species.

Direct Impacts on Sensitive Receptors (Vertebrates) - Site Clearance and Earthworks

As well as impacts to habitats it is near-certain that site preparation works and construction activities will negative impact sensitive ecological receptors (e.g. reptiles, mammals, breeding birds) as a result of direct mortality.

Egyptian Spiny Tailed Lizard (IUCN VU) are likely to be particularly exposed to impacts during construction as they are a diurnal species meaning they will be mobile while site works are active. Unmitigated impacts on Egyptian Spiny Tailed Lizard could potentially be medium-term and irreversible (e.g. loss of breeding habitat and mortality).

Mitigation Measures

A summary of mitigation measure to avoid and mitigate for direct impacts on sensitive vertebrate receptors is included below. These measures will be included (and expanded upon) in a Construction Biodiversity Management Plan/Biodiversity Action Plan.

- All site workers will undertake a Project induction before working on site. The induction will include a comprehensive biodiversity element where the baseline ecological value and sensitivity of the receptors within the Aol will be discussed.
- Prior to construction works, working areas will be clearly demarked (using temporary fencing (e.g. orange netting attached to wooden posts)) so that site workers fully understand the working area. Encroachment into areas outside of agreed working areas will be prohibited and working areas will be subject to regular check by the EPC Ecologist to check enforcement of working areas.
- Working areas should avoid trees / shrubs as these are likely, due to their sporadic distribution across the Aol to be of importance to breeding birds (e.g. passerines, raptors).
- A pre-construction walk-over survey will be undertaken of all working areas to check for the presence of ground nesting birds. Surveys will be completed by an appropriately qualified ecologist and surveys will be undertaken in the hours after sunrise (up to 10:00). The surveyors will aim to identify behaviour indicative of breeding activity (e.g. carrying food / nesting material / faecal sacs, presence of nests, eggs or chicks (both nidifugous and nidicolous).
- Where nests are found they will be recorded in full and their locations mapped, with the data transferred to Excel master sheets and Google Earth. Mapping will then be circulated to the project team along with details of a works exclusion zone. Exclusion zones will be dependent on the species of bird nesting along with its conservation status and be agreed with the qualified Project Ecologist.
- Mitigation during construction will include timing work to remove suitable nesting habitat outside of the most sensitive times of year for ground nesting species, and for all clearance work within this time period to be done under the supervision of an on-site ecologist.
- Pre-construction surveys for sensitive species (i.e. those qualifying Priority Biodiversity Features) of herpetofauna have taken place. The locations of known/active burrows used by Egyptian Spiny-tailed Lizard have been marked throughout the Project Area.
- Prior to the start of construction suitable sites for the release of relocated Egyptian Spiny-tailed Lizards will be identified and mapped. A suitable translocation receptor site must;
 - Be within 10 km of the Project site. Contain appropriate vegetation (both for food and cover).
 - Have suitable soil types to allow animals to dig and create new burrows.
 - Not already be close to carrying capacity for this species.
- Capture and movement of Spiny-tailed Lizards will only be completed as a last resort. All works will aim to be completed at least 50m from active burrows. Locations where burrows are present between 50 and 100m of construction will be monitored throughout the construction period and if significant negative impacts (i.e., abandonment of burrows or increased mortality) are observed the remaining burrows in closest proximity will be excavated and the animals translocated to holding areas in accordance with the below protocols for the duration of the construction window in that location.
- Detailed design for the final infrastructure layout will take into account the results of the pre-construction surveys and Project infrastructure will be sited to avoid the identified burrows. Where this is not possible, or where fresh burrows are identified at the commencement of clearance works, these burrows will be excavated by hand and the animals captured and translocated, details of this are provided below.

- Prior to work in an area containing Spiny-tailed Lizard burrows any remaining burrows within 50m of proposed works will be re-checked by the Ecologist using an endoscope and if empty dug out and destroyed. If any animal is found back in the working areas the burrow will be dug out carefully by hand and the animal captured and placed in a secure box before taking to a cool location ready for translocation to the receptor site. Once the lizard is removed from the burrow the hole will be collapsed and made unsuitable for future use.
- If areas suitable for translocation exist within the Project Area these will be prioritized as this minimizes the impacts of transporting animals away from the Project site.
- Studies have shown that soft releasing Spiny-tailed Lizards leads to a better survival rate than simply releasing the animals into a new site so any animal which is translocated will be soft-released into an individual mesh enclosure within an area of suitable habitat. The pen will measure at least 2m x 2m and be covered to provide shade and prevent attack from above. A “starter hole” will be dug using a 20cm auger to a depth of approximately 30cm to provide some initial shelter. Supplementary feeding will also be undertaken and after a period of seven days the enclosure will be removed to allow the lizards to move and forage naturally.
- After the relocation period, a report will be prepared which will include the following information:
 - Survey dates and timing of capture and release
 - Weather conditions during survey and relocation effort
 - Location of captured individuals
 - Number of captured individuals during each relocation effort
 - Number of juveniles, mature males and mature females
 - Release sites used for relocation of each effort
 - Number of males and females released at each site
 - Number of mortalities during relocation effort

Direct Impacts on Sensitive Receptors (Vertebrates) – Vehicle Collisions

Vehicle related collision is possible for all vertebrate species present within the Project’s Aol and this will result in direct mortality on receptors of low to high sensitivity. Any such impact would be negative, long-term and irreversible and would be of medium to high magnitude and therefore of minor to major significance (depending on the receptor killed).

Both small and large vertebrate species are at risk of vehicle collisions throughout construction. Species such as Egyptian Spiny Tailed Lizard are at higher risk of collision with vehicles and machinery as they are active in the day.

It is possible that carcasses on the road could attract scavenging animals, including birds of prey which in turn would increase their risk of collision with vehicles and machinery.

Mitigation Measures

- Speed limits of 20 kph will be enforced by the EPS Contractor

- Regular signage will be installed along the site access roads and internal roads informing all drivers of the speed limit
- A gated entrance will be staffed and any visitors or locals using the site roads will be informed of the speed limits and that there are regular checks of vehicle speeds
- A ban of driving at night will be enforced and if absolutely necessary the speed limit will be reduced to 15kph
- Ban against off-road driving at all times of the day
- Regular checks of the road for carcasses and if found these will be moved to at least 10m from the road to reduce the likelihood of hitting scavengers, including birds of prey.
- A incidental / chance find procedure will be included in the BMP so that all workers report any road collisions so that any such incident can be investigated in full.

Direct Impacts on Sensitive Receptors (Habitats, Vertebrates) – Poaching, Collection etc.

It is possible that site worker may poach or take plants and animals from the site, either for firewood or in the case of the Spiny-Tailed Lizard for food, trophy or to be sold. Species such as Red Fox could also face persecution.

Any of the identified receptor are potentially at risk from this long-term, irreversible negative impact. The likelihood of this occurring is possible and the magnitude of this impact ranges from Low to High magnitude depending on the receptor affected.

Mitigation Measures

- The Project will enforce strict controls on hunting, gathering, poaching and otherwise disturbing flora and fauna within the Project Aol. Any breaches of this ban will be strictly enforced, and any workers found in breach of this control measure will be subject to disciplinary procedures.
- The ban on hunting etc. will be included in the site induction along with discussions about the sanctions for breaches of this control measure.
- A chance find procedure will be implemented should any site worker find a wild animal, especially one that has become a nuisance (e.g scavenger in the works camp, presence of small mammals in worker accommodation, presence of snake or scorpion on the works site) and the EPC Ecologist will arrange for an appropriately qualified person to capture and relocate. Where scavengers have been identified within the works site additional housekeeping measures may be required.

Following mitigation, a low magnitude and not-significance would be expected.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Disturbance

The presence of site workers and machinery can result in disturbance related impacts to all terrestrial ecological receptors present within the Aol. These impacts are not certain, and the magnitude of such impacts will vary depending on the sensitivity of each receptor to disturbance. The significance of any such disturbance impacts is likely to range from minor to Moderate / Major, depending on the sensitivity of the affected receptor. The duration of impact will also likely vary from very short-term (e.g running away from a vehicle using the access road) to short to medium term in areas adjacent to construction areas or worker accommodation. It is likely that any disturbance impacts, irrespective of duration will be reversible once the disturbance event has passed.

The main features of interest within the AOI are the two known potential feeding locations at dumping areas. These have however stopped being used due to local government intervention and accordingly are no longer a

concern. Whilst this is the case monitoring will continue to ensure no illegal dumping takes place and the project will work with the local government if such a case arises to ensure tight control as well as clear any potential feeding materials.

Mitigation Measures

- Site wide induction to include information regarding disturbance of ecological receptors.
- Chance find procedure to report sightings of potentially sensitive receptor and investigation of any such sightings by the EPC Contractor in order that additional buffer areas can be agreed, where necessary.
- Continued monitoring of dump area to ensure no further use

Following mitigation, a low magnitude and not-significance would be expected.

Direct and Indirect Impacts on Sensitive Receptors (Protected Sites)

The proposed project is within Gebel El Zeit IBA Protected site. The site is designated for its migratory bird species (as well as non-breeding White-eyed Gull). The protected area is designated because of its use to soaring birds based on its topography and location as a staging area for birds to cross the Gulf of Suez or to continue up the eastern coast of Egypt. Whilst the proposed works will impact the land on site they will not directly impact the topographical reasons for the protected sites interest. Impacts on individual birds will be covered within other sections.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Reduced Air Quality / Dust

The habitat across the Aol is very sandy. It is likely that constructed related ground disturbance will likely increase the amount of dust in the air which in turn could result in negative impacts on plants and vertebrate receptors. In addition, air pollution from site vehicles from the concrete batching plant could also result in negative impacts on valued receptors. These impacts are possible, short-term and reversible and are considered to be of minor to moderate significance.

Mitigation Measures

- Where necessary tracks will be damped down to reduce the risk of dust. Damping down will also include areas adjacent to roads. These measures will be implemented where necessary.
- Vehicles will be properly maintained to reduce emissions.
- Emissions from the batching plant will be monitored in line with control plans to minimise air pollution

Direct Impacts on Sensitive Receptors (Vertebrates) – Noise

Noise as a result of construction can result in direct impacts on (vertebrates) due to acoustic masking, disturbance and displacement thereby reducing survivorship and reproductive success.

Any impacts are likely to be short- to medium term (for the duration of construction) and reversible. The magnitude of impact ranges from low to medium and is likely to be of not significant to moderate significance.

Mitigation Measures

- Vehicles will be properly maintained to noise emissions.
- Use of available technology and management practices with construction methodologies to reduce noise.

- Regular monitoring of noise levels within works compounds and works areas as far as possible and apply corrective measures as necessary.

Direct Impacts on Sensitive Receptors (Vertebrates) – Lighting

Lighting could impact foraging and commuting routes for bats.

Any impacts are likely to be short- to medium term (for the duration of construction) and reversible. The magnitude of impact is low and is likely to be of no/minor significance given the lack of bats present. Mitigation measures will help all nocturnal site use by other animals.

Mitigation Measures

- Limit the amount of lighting, especially within the wider AoI (e.g at turbine construction sites). This will be achieved by ensuring that night-time working is limited.
- Where lighting is required within worker compounds, site offices etc. ensure that any lighting is shielded and protected to reduce light-spill and glare. Low intensity lighting should also be used, where possible, to further reduce light spill.
- For external security lights PIR trigger units should be used and these should be timed to automatically switch off after five minutes.
- No lighting will be installed along the access roads.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Littering, Waste Management

Unmitigated it is possible that poor waste management could result in the proliferation of litter across the Project AoI including plastic containers, plastic bags and glass. This waste could result in negative impacts to sensitive receptors through ingestion or entanglement. Any such impact could be long-term and irreversible, and the significance of this impact would be minor to high depending on the receptor effected.

In addition poor management of other solid wastes, including food waste could result in the presence of pest species such as rats and mice, which could outcompete wild rodents and feral cats and dogs which could increase the risk of predation of wild rodents and other prey species.

Mitigation Measures

- A Waste Management Plan will be prepared by the EPC Contractor
- Waste Management will be included in the Site Induction so that all site workers understand their responsibilities to maintaining a clean and tidy site. Where possible all materials than can be recycled will be.
- Zero tolerance to littering on the works site and within the worker compound. This zero-tolerance approach should also be applied to smoking and workers must use appropriate smoking areas (supplied with ‘butt bins’) at all times, even when on construction sites. Litter must not be thrown out of vehicle windows when driving to and from or around the site.
- Daily inspections of working areas and worker compound should be completed, and corrective actions applied, where necessary.
- Additional mitigation measures for pest species, including feral cats and dogs are included below.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Pest Species

As discussed above it is possible that pest species become established within the Project as a result of increased littering or poor waste management as well as the propensity of certain species (e.g. rats, cats and dogs) to associate with human habitation.

An increase in pest species could result in long-term negative impacts on wild animals through direct and indirect competition for food resources, direct mortality through predation, and direct impacts as result of disturbance impacts. Such impacts could be reversible or irreversible, will be between low to high magnitude and as such significance will vary from minor to major depending on the receptor being affected.

Mitigation Measures

- Where pest species are identified the EPC Contractor / Ecologist will be notified and an appropriate course of action taken. For small mammal pest's live traps will be used, in order to reduce the risk of by-catch. Poison baits should be avoided, unless it can be certain that non-target species will be affected, and any such use should be in accordance with national and international best practice. If poison baits are to be used it must be certain that any poisoned animal cannot move out on to the wider Aol to reduce the risk of natural predators eating poisoned animals. Any chemical control of pest must only be undertaken in accordance with national and international guidelines as well as following Lender guidelines including risk assessment and prior agreement with the Lender.

8.5.2 Potential Impacts during the Operation Phase

Direct Impacts on Sensitive Receptors (Vertebrates and Birds) – Collision with Turbines

The Project Aol is on a major migration route for birds with large numbers of birds travelling through the area during both Spring and Autumn migration seasons.

This number of birds passing through Plot 2 indicates that the impact on migratory bird species will be a major significant if unmitigated.

The majority of collision recorded at active turbines is from large, soaring birds. However, there is potential for any lighting present to provide an attract for nocturnally migrating species, in particular passerines.

Notable use of the project site for stopover is noted for Steppe Eagle and White Stork. The roosting locations are within 2.5km of active turbines showing that displacement from roosts will be limited to around this distance ensuring that any displacement does not effect significant proportions of the IBA/KBA. Feeding locations that have been present in the wind farm area have ceased and this will also likely reduce those species stopping in the area so the impacts will be reduced.

Mitigation Measures

- It is recommended that Plot 2 operates an observer- or technology-led Shut Down on Demand during both Spring and Autumn bird migration periods (between late February – end May and between to early August -late November).
- Active Turbine Management Program (ATMP)

Bird Monitoring and Active Turbine Management Program (Shutdown On-Demand and Predictive Fixed Shutdown Programs

BMP & ATMP consultant(s) on behalf RCREEE will implement a robust and appropriate post-construction BMP, breeding and migratory birds during spring and autumn migration periods over the Project's duration at the SWE project south site (Plot 2) . The SOD program involves the shutdown of all or some WTG and/or Predictive Fixed Shutdown of all or some WTGs located at sensitive areas to birds in response to a potential bird collision risk. WTG shutdown is subject to certain criteria being met and ensures a high level of energy generation while

protecting biodiversity. Shutdowns are generally short term in nature. The program will be implemented by a Visual Observations (VOs) Approach and may be assisted by the combination of VOs with use of a Radar Systems (RSs) Approach Prior to the operational phase, specification for the implementation of BMP & SOD-Program under VOs and the combination of VOs with use of RSs, will be prepared building on the findings of the ESIA, CHA and CEA of the project. Detailed information will include identification of key species, key periods for monitoring, observation points, team composition, observation schedule, data collection observations, shutdown criteria, shutdown on-demand procedures and communication protocol, curtailment losses, risk management, standard data form, maps and data storage, data analysis, communication, required resources and equipment, breakdown of cost. The ATMP will include:

- Defining/delimiting key flight activity periods at the SWE project south site (Plot 2);
- Use of Radar and other high-tech monitoring technology if available;
- Drawing on bird monitoring data both historic and real time from RSs, VOs, bird behavioural variables, site-specific characteristics and weather data and other relevant data;
- Identifying high-risk areas and times; defining the groups of SWE's (Plot 2) WTGs by zones for the SOD-Program and achieve effective coverage throughout the SWE (plot 2);
- Adopting a reactive/responsive approach to mitigation but which will be informed and refined through a predictive approach;
- Determining strategically located vantage points for monitoring flight activity and to facilitate effective turbine shutdown; and
- Improving effective communication networks between bird observers as well as between bird observers and SWE's (Plot 2) wind turbine operators

Cumulative Effect Assessment (CEA)

The process has identified 13 species, which had an Overall Risk of Major or Moderate, and are considered priority bird VECs for the Projects. Some of these were already identified by the Lekela CEA and all within the IPH CEA. Whilst peak counts have been updated for two species there are no changes to risk status from the IPH document.

Cumulative Habitat Assessment (CHA)

Critical Habitat has been triggered for this project but there are a number of PBFs that will need to be safeguarded during the construction and operational phase to ensure no net loss of these features.

There are species of bird and reptile that are considered to be PBFs and mitigation and monitoring for these species will be included in a Biodiversity Management Plan.

Monitoring will need to be completed to ensure no net loss of PBFs during the operational phase.

Pre-clearance and pre-construction surveys, at appropriate times of the year, will need to be completed to establish presence/absence in proposed works areas and if mammals and reptiles are found to be present in these areas or considered likely to occur in these areas during construction, additional mitigation (e.g. limited translocation to a suitable receptor site) will be required.

It is considered that the Project has met the requirements as set out in IFC PS6 Paragraph 17 and the measures detailed above will be included in the management plan and BMP documents. These documents will also set out measures designed to achieve No Net Loss for those species defined as PBFs.

PS: CEA & CHA studies has been conducted and submitted with ESIA study

Direct and Indirect Impacts on Sensitive Receptors (Birds) – Collision with Turbines

Collision Risk Modelling Methodology

Whilst it is clear from the number of birds moving through the area that there is a risk of impact to migrating birds Collision Risk Modelling (CRM) is completed to further inform the magnitude (extent) of collision impacts on bird populations recorded flying within the proposed Wind Farm area. The collision risk model used in this assessment has been developed by Scottish Natural Heritage (SNH) and the British Wind Energy Association (BWEA) and has been accepted as representative of industry best practise⁸⁹¹⁰. In depth details of the model are given in the cited publications but a brief description is provided below.

The model runs as a two-stage process. Firstly, the risk is calculated assuming that flight patterns and behaviours are unaffected by the presence of the WTGs i.e. that no avoidance action is taken. This is essentially a mechanistic calculation, with the collision risk calculated as the product of (i) the probability of a bird flying through the rotor swept area, and (ii) the probability of a bird colliding if it does so. This probability is then multiplied by the estimated numbers of bird movements through the WTG rotors at the risk height (i.e. the height of the rotating rotor blades) in order to estimate the theoretical numbers at risk of collision if they take no avoiding action. Given the site is a clear migration corridor and the high majority of activity of birds through the area are associated with this activity Stage 1 has been completed using the method directly designed for migrating birds.

A bird is simplified in shape to a flying cross with length, wingspan, and speed, and always flying perpendicularly towards the rotor. A bird may be ‘gliding’ i.e. with the arms of the cross fixed, or ‘flapping’ i.e. with the arms of the cross flapping so as to occupy a space similar to that of a spinning top, with the length of the bird being the axis of spin. ‘Gliding’ flight has a marginally lower collision risk than ‘flapping’ flight – notably for passage at points level with the rotor hub, where the wings lie parallel with potentially colliding blades. However, the difference is rarely sufficient to warrant detailed consideration of different bird behaviours. As a ‘worst case’ scenario, all flight data entered into the collision risk model is set to ‘flapping’ flight.

The second stage of the collision risk model incorporates the probability that the birds, rather than flying blindly into the WTGs, will actually take a degree of avoiding action. The most recent SNH guidelines¹¹ advise that the default avoidance rates for all species is 98% with the exception of a small number of species. Golden Eagle is considered to have a moderately higher avoidance rate of 99%, based on the size and flight characteristics. Steppe Eagle is also considered to have the same avoidance rates. Common Kestrel and Lesser Kestrel are considered to have a relatively low avoidance rate of 95%. Recent published literature^{12 13 14} based on research at operational wind farms in the UK, Europe and the United States, indicates that the above approach is likely to be conservative and accordingly the figures presented are precautionary. Given the surveys have covered two years a range of collision risks over the two years has been gathered for each species. Tables below present figures for each of the four surveyed migration seasons and then provide two figures for annual collision risk:

- Peak annual collisions – this shows the highest collision risk for each species based on combined data (spring and autumn) from 2022 versus combined data from 2023.

⁸ Percival et al. (1999)

⁹ Band et al. (2005) Developing field and analytical methods to assess avian collision risk at wind farms. In De Lucas, M., Janss, G. and Ferrer, M., eds. Birds and Wind Power. www.quercus.pt

¹⁰ Scottish Natural Heritage (2014) <https://www.nature.scot/wind-farm-impacts-birds-flight-speeds-and-biometrics-collision-risk-modelling>

¹¹ Avoidance Rates for the onshore SNH Wind Farm Collision Risk Model: SNH (July 2017)

¹² Vasilakis, D. P., Whitfield, D. P., Schindler, S., Poirazidis, K. S., & Kati, V. (2016). Reconciling endangered species conservation with wind farm development: Cinereous vultures (*Aegypius monachus*) in south-eastern Europe. *Biological Conservation*, 196, 10–17

¹³ Whitfield, D. P. & M. Madders. (2006a). Deriving collision avoidance rates for Red Kites (*Milvus milvus*). Natural Research Information Note 3. Banchory, UK.

¹⁴ Whitfield, D. P.. (2009). Collision avoidance of golden eagles at wind farms under the ‘Band’ collision risk model. Report to Scottish Natural Heritage. Natural Research. Ltd. Banchory, UK

- Maximum annual collisions – this shows the highest collision risk for each species based on the sum of the highest spring season output (either 2022 or 2023) plus the highest autumn season output (either 2022 or 2023)

Once the avoidance rate is incorporated, the model then predicts the likely number of annual collisions of each particular species.

The number of predicted collisions (i.e. the extent) is then assessed against the total local, national or international populations as appropriate to ascertain the magnitude and hence significance of any impacts along with fatality thresholds for these priority species as appropriate.

Collision Risk Model Input Data

The Collision Risk Model requires data relating to the species of birds occurring at the proposed Project and data on the type and specification of the proposed WTGs.

Collision Risk Modelling (CRM) (and subsequent Collision Risk Assessment (CRA)) has been completed based on the 82 wind turbine layout as presented in this ESIA.

At the time of reporting, the proposed scheme is to construct and operate 82 turbines with a hub height of 110m and a rotor diameter of 175m, resulting in a tip height of 197.5. The rotation period is variable dependent upon wind speed and its rated speed used in the CRM was taken from comparable turbines. The blade pitch is also variable depending on wind speed, however the worst case of 90° was used in the CRM.

Parameters specific to the Project and survey include the area of the Project, the mean day length during the survey period and the number of day's activity over the length of the survey period. Bird Size and Flight Speed.

Bird Size and Flight Speed

The biometric data, including body size, wing length, as well as flight speed used in the collision risk model has been taken from various sources^{15 16 17 18} and was populated with correct data prior to running the CRM.

Bird Flight Activity and Flight Height

Data on bird flight activity through the proposed Project area and on the proportion of those birds flying at rotor height are taken from the field surveys completed by in-country ornithologists.

Data relating to birds flying above or below the blade swept area was not included in the collision risk analysis. This is considered appropriate given two years data has been used and worst case additions of the seasons to form annual totals.

The results of the CRM are shown on the table below, along with a cumulative prediction for combined winter and summer collisions.

Results of Collision Risk Assessment

The following table shows the results of the Collision Risk Model for soaring birds recorded flying through the wind farm.

¹⁵ Bird body size data from: The complete birds of the Western Palearctic Cramp (1998)

¹⁶ Flight speed data from: A dictionary of birds. Campbell and Lack (1985)

¹⁷ Bird Guide: Collins (2001)

¹⁸ Birds of the western palearctic / BTO fact sheets

Table 66: Collision Risk Model

Species	Common Name	Avoidance Rate	Number of seasonal collisions				Number of annual collisions	
			Spring 22	Spring 23	Autumn 22	Autumn 23	Peak annual collisions from 2022 or 2023	Maximum annual collisions combining 2022 and 2023
<i>Accipiter brevipes</i>	Levant Sparrowhawk	98%	20.22	11.34	0.00	0.00	20.22	20.22
<i>Accipiter nisus</i>	Sparrowhawk	98%	0.04	0.02	0.00	0.00	0.04	0.04
<i>Aquila fasciata</i>	Bonelli's Eagle	98%	-	-	-	-	0.00	0.00
<i>Aquila heliaca</i>	Eastern Imperial Eagle	99%	0.03	0.01	-	-	0.03	0.03
<i>Aquila nipalensis</i>	Steppe Eagle	99%	1.20	1.71	0.00	0.00	1.71	1.71
<i>Aquila spp.</i>	-	99%	1.74	0.02	0.00	0.00	1.74	1.74
<i>Buteo buteo vulpinus</i>	Steppe Buzzard	98%	26.23	15.04	0.00	0.00	26.24	26.24
<i>Buteo rufinus</i>	Long-legged Buzzard	98%	0.33	0.05	0.00	0.00	0.33	0.33
<i>Buteo spp.</i>	-	98%	0.02	0.09	0.01	-	0.09	0.09
<i>Ciconia ciconia</i>	White Stork	98%	291.61	163.39	8.04	9.71	299.65	301.32
<i>Ciconia Nigra</i>	Black Stork	98%	1.33	1.01	0.01	0.00	1.34	1.34
<i>Circaetus gallicus</i>	Short-toed Eagle	98%	0.25	0.09	0.00	0.00	0.25	0.25
<i>Circus aeruginosus</i>	Marsh Harrier	99%	0.07	0.03	0.00	0.00	0.08	0.08
<i>Circus macrourus</i>	Pallid Harrier	99%	0.02	-	0.00	0.00	0.02	0.02
<i>Circus pygargus</i>	Montagu's Harrier	99%	0.01	0.01	0.00	0.00	0.02	0.02
<i>Circus spp.</i>	-	99%	0.00	0.01	0.00	0.00	0.01	0.01
<i>Clanga clanga</i>	Greater Spotted Eagle	99%	0.02	0.00	-	-	0.02	0.02
<i>Clanga pomarina</i>	Lesser Spotted Eagle	99%	0.07	0.07	-	0.00	0.07	0.07
<i>Falco biarmicus</i>	Lanner Falcon	98%	0.00	0.00	-	0.00	0.00	0.00
<i>Falco concolor</i>	Sooty Falcon	98%	0.00	0.00	-	0.00	0.00	0.00
<i>Falco spp.</i>	-	98%	0.01	0.01	0.00	0.00	0.01	0.01
<i>Falco subbuteo</i>	Hobby	98%	0.00	0.00	-	0.00	0.00	0.00
<i>Falco tinnunculus</i>	Kestrel	95%	0.41	0.29	0.00	0.00	0.41	0.41
<i>Grus grus</i>	Common Crane	98%	-	1.63	-	-	1.63	1.63
<i>Gyps fulvus</i>	Griffon Vulture	98%	0.01	0.00	-	-	0.01	0.01

Hieraaetus pennatus	Booted Eagle	98%	0.10	0.05	0.00	0.00	0.10	0.10
Milvus migrans	Black Kite	99%	5.21	2.97	0.01	0.00	5.21	5.21
Neophron percnopterus	Egyptian Vulture	98%	0.11	0.04	0.00	0.00	0.11	0.11
Pandion haliaetus	Osprey	98%	0.03	-	0.00	0.00	0.03	0.03
Pelecanus crispus	Dalmatian pelican	98%	-	-	-	-	0.00	0.00
Pelecanus onocrotalus	White Pelican	98%	37.86	7.75	0.80	0.66	38.67	38.67
Pernis apivorus	Honey Buzzard	98%	10.06	17.03	0.26	0.30	17.33	17.33
Raptor spp.	Raptor Sp.	98%	0.06	0.24	0.01	-	0.24	0.25
Falco naumanni	Lesser Kestrel	95%	-	-	-	-	0.00	0.00
<i>Falco peregrinus</i>	Peregrine	98%	-	-	-	0.00	0.00	0.00
<i>Falco vespertinus</i>	Red-footed Falcon	98%	-	-	-	-	0.00	0.00

Collision Risk Assessment – Discussion

The above results show that the majority of species passing through are at a low risk of collision annually. Those species of conservation concern, or showing potentially high levels of collision, are discussed below.

Steppe Eagle

Steppe Eagle (IUCN EN) are predicted to have a cumulative mortality of 1.71 individuals per year. This would equate to between approximately 42.75 collisions during the operational lifetime of the Project (assuming 25 years of operation).

The global population of Steppe Eagle is declining and is currently estimated to be between 50,000 and 75,000 individuals and the population in central Asia has been estimated to be between at least 22,000 and 35,500 pairs. The area is a clearly important migration route for the species although presence is not expected at any other time of year.

During surveys raptors were attracted to carcasses during their passage through the area and this contributes to a higher collision risk for the species. With the cessation in carcass dumping due to local government intervention leading to few birds within the AoI, along natural avoidance behaviors, mortality will be lower than predicted

In absence of mitigation, collisions at the rates stated above would result in moderate/major negative impacts for this species over the lifespan of the Project however these impacts would be permanent and irreversible.

Egyptian Vulture

Egyptian Vulture (IUCN EN) are predicted to have a cumulative mortality of 0.11 individuals per year. This would equate to between approximately 2.75 collisions during the operational lifetime of the Project (assuming 25 years of operation).

The global population is currently estimated to be between 12400 and 36000 individuals however the low collision rate means that, in absence of mitigation, collisions at the rates stated above would result in low negative impacts for this species over the lifespan of the Project.

Other species of Conservation Concern

Greater Spotted Eagle (IUCN VU), Pallid Harrier (IUCN NT) and Eastern Imperial Eagle (IUCN VU) are currently estimated to have up to 0.03 collisions per year. Predicted mortality of Sooty Falcon (IUCN VU) is estimated at around 0.004 birds per year.

The low collision rates means that, in absence of mitigation, collisions at the rates stated above would result in negligible negative impacts for this species over the lifespan of the Project.

Least Concern species with notable collision risk

Levant Sparrowhawk (20.22 collisions per year), Steppe Buzzard (26.24), Honey Buzzard (17.33), White Stork (301.32) and White Pelican (38.67) all have collision per year of particular note. In the absence of mitigation these are high collision numbers. Whilst the species are Least Concern species and typically abundant the rates stated above would result in medium negative impacts for this species over the lifespan of the Project.

Black Stork (1.34), Common Crane (1.63), Black Kite (5.21) also have collisions per year requiring consideration, albeit at a different scale to the former species. The populations of these species are typically abundant, and the species are not of conservation concern. Accordingly mortality at this level is near-certain to not result in significant long-term impacts on any of these species at a population level.

Whilst most species use the site only incidentally for roosting when conditions require, birds have used some areas more regularly including the use by White Stork and Steppe Eagle at the centre and north of the site.

Other attractants (i.e. the food waste areas) are used for feeding during migration. Local government have acted to remove these resources and so it is considered that this will help to reduce the collision risk going forward.

Mitigation Measures

- Dumpsite located within the Project area must be completely removed prior to commencement of any construction activities as it acts as a source of attraction to birds onsite. In addition, it must be ensured that the Project site is not used for any waste disposal at any point during the construction and operation phase.
- Given the very high levels of migration activity and based on the outputs of the CRM as well as the results of the surveys completed to date upfront mitigation including led Shut Down on Demand is considered necessary as predicted mortality for all species is likely to result in moderate or major negative impacts.
- Shutdown on demand will take place ensuring the following principles are followed:
 - All of the turbines and a buffer area will be covered by constant observation.
 - The buffer will ensure that enough time is available for WTG to be shut down when birds approach
- Should shut down on demand be observer led:
 - Observers will work in pairs and in shifts to ensure a vigilant effort from observers.
 - Observers will communicate both with shut down operatives and other observers to ensure effective practices
- Shut down protocol will undertake discussion with other operatives in the region to discuss best practice for the location
- The Project AoI is flat or gently undulating and as such turbines will be more obvious to birds migrating over the site than within hilly terrain. In order to increase visibility of the turbines, and thus increase natural avoidance behaviour a single blade will be painted black from the tip to halfway up the blade. This measure will reduce motion blur and increase the visibility of the moving turbine to birds.
- Operational monitoring will be completed through the first 3 years of operation, with scope to continue depending upon results during the first three years, to monitor actual levels of mortality. Post construction fatality monitoring will be completed at all of the turbines and the programme of post construction monitoring will include carcass searching, searcher efficiency trials and carcass persistence trials. The results of the post-construction fatality monitoring will be used to inform a GenEst Analysis. Such effort will be in line with the Post-construction Bird and Bat Fatality Monitoring for Onshore Wind Energy Facilities in Emerging Market Countries – Good Practice Handbook and Decision Support Tool (2023)
- An adaptive management strategy will be developed, and additional mitigation will be undertaken if the results of the post-construction fatality monitoring indicate higher than predicted mortality, especially in relation to species of elevated conservation concern.
- A chance find procedure will be implemented and any carcasses seen by site workers will be reported to the Project Ecologist so that they can investigate. In addition, any prey species carcasses found on on-site (e.g. on roads) will be removed to reduce the likelihood of scavenging birds landing within the Project site.
- Species at risk of collision linked to lighting as an attractant are not considered to be a high risk (based on local records at active turbines) and accordingly no direct mitigation is required at this stage. This can be changed on the back of the results of mortality studies any notable impacts on night migrants are recorded.

Results from Adjacent Windfarm

Given the noted risk of collision impact for a range of species it has been considered important to gain an understanding of the likelihood of shutdown on demand being an effective tool. Whilst many wind farms have extremely different situations there is a local project within a comparable location, habitat and topographical situation that allow comparison of the effectiveness of shutdown compared to high bird movements and predicted collisions.

Results show that for species of known pre construction Collision Risk 210 collisions are predicted over the course of two spring seasons. The actual situation on the ground is that 5 individuals of these species have collided. This covers Steppe Eagle, White Stork, Black Stork and Honey Buzzard which are key features of the proposed site. It is certainly significant noting that only 2.4% of the predicted collisions for these species during Spring have happened. It is also worth noting that observer led shutdown on demand is likely to improve on a given site over time as well as regionally as more knowledge about the most effective methods come to light.

It is important to note that other collision have been noted at the comparison site with Honey Buzzard the most impacted species along with 1 or 2 Marsh Harrier, Montagu's Harrier, Sooty Falcon and Kestrel. There is no data available to compare the predicted collisions to these results however the collisions are not extensive for these species.

It is considered that with the likely reduction in birds due to removal of feeding opportunities as well as evidence from the nearby windfarm of the effectiveness of shut down in the region the number of mortalities will be significantly reduced from the predicted.

Accordingly following mitigation, residual impacts to migratory soaring birds are considered likely to be low.

Table 67: Results from Lekela Windfarm operational monitoring of avian collisions following the shut-down procedure

Species	Time	Mortality Per Year	
		Predicted	Actual Total
Steppe Eagle	Autumn 2021		0
	Spring 2022	4	1
	Autumn 2022		0
	Spring 2023	4	0
	Autumn 2023		0
Steppe Buzzard	Autumn 2021		0
	Spring 2022	37	0
	Autumn 2022		0
	Spring 2023	37	0
	Autumn 2023		0
White Stork	Autumn 2021		0
	Spring 2022	57	0
	Autumn 2022		0
	Spring 2023	57	0
	Autumn 2023		1
European Honey Buzzard	Autumn 2021		14
	Spring 2022		1
	Autumn 2022		11
	Spring 2023		0
	Autumn 2023		10
Black Kite	Autumn 2021		0
	Spring 2022	7	2
	Autumn 2022		0
	Spring 2023	7	2
	Autumn 2023		0
Montagu's Harrier	Autumn 2021		1
	Spring 2022		0

Species	Time	Mortality Per Year	
		Predicted	Actual Total
	Autumn 2022		0
	Spring 2023		0
	Autumn 2023		0
Marsh Harrier	Autumn 2021		2
	Spring 2022		0
	Autumn 2022		0
	Spring 2023		0
	Autumn 2023		1
Sooty Falcon	Autumn 2021		0
	Spring 2022		0
	Autumn 2022		1
	Spring 2023		0
	Autumn 2023		0
Common Kestrel	Autumn 2021		0
	Spring 2022		2
	Autumn 2022		1
	Spring 2023		0
	Autumn 2023		0

Direct and Indirect Impacts on Sensitive Receptors (Protected Sites)

The proposed project is within Gebel El Zeit IBA Protected site. The site is designated for its migratory bird species (as well as non-breeding White-eyed Gull). The protected area is designated because of its use to soaring birds based on its topography and location as a staging area for birds to cross the Gulf of Suez or to continue up the eastern coast of Egypt. Operation of WTG will not directly impact the topographical reasons for the protected sites interest. Impacts on individual birds are covered within other sections.

Direct Impacts on Sensitive Receptors (Bats) – Collision with Turbines

Bats are known to suffer negative impacts from wind turbines both through direct contact with turbine blades and resulting mortality. Certain species are known to be more negatively affected by turbine due to their flight heights and behaviours.

Data from the bat detectors has shown that no bats were recorded on site and with only one bat recorded, most likely a Naked Rumped Tomb Bat (*Taphozous nudiventris*), locally it is considered that the Aol does not support significant species (e.g those of elevated global / national conservation concern) nor will it support significant populations. The Aol does not support trees of sufficient size that could support roosting bats. In addition, there are also no settlements within the vicinity of the Aol. The habitats on the site are also sub-optimal for foraging bats and as a result and due to lack of roosting habitats it is considered that the site will not be of importance for migrating bats.

Evidence to support the likely lack of impact comes from a nearby windfarm which has performed operational monitoring of bats. Only two bat carcasses were found from Autumn 2019 to Autumn 2023 showing very low numbers of bats affected by the turbines (of which there are a similar amount at 125 turbines on one plot and 96 at another). The methodology for monitoring included daily surveys six days a week from 20 February until 20 May in Spring and 10 November onwards in Autumn. The search plot for each turbine was a 200 x 200m area around the turbine itself.

Surveys for bats have not been carried out at a time when the Wadi's are wet, and it is possible that there is an increase in acidity at this time. Given the low starting point it is not considered any increase would be significant however this will be adaptively monitored by post construction fatality monitoring to international best

practice. The use of methods in accordance with the Post-construction Bird and Bat Fatality Monitoring for Onshore Wind Energy Facilities in Emerging Market Countries – Good Practice Handbook and Decision Support Tool (2023) will ensure adaptive management is possible from the results of the monitoring.

Indirect Impacts on Sensitive Receptors (terrestrial mammals and breeding / resident birds) – Disturbance

During the operation of the wind farm disturbance impacts are likely to be very minor as the site will not be subject to regular activity other than occasional vehicle movements and maintenance operations around the site, including turbine locations. Egyptian Spiny-Tailed Lizard may suffer some minor impact to their daily foraging activities. Any such impact will have be very short-term (for the duration of the disturbance impact) and reversible and is likely to only result in impacts of low magnitude. The significance of operational disturbance is therefore considered to be minor, at worst.

Mitigation Measures

- Speed limits to be enforced.
- Sensitive species are to be included in the site induction for all operational staff where additional control measures will be discussed including allowing animals to move around the site, not chasing after them in vehicles or approaching them on foot and what to do if they observe breeding birds within their works areas.

Direct Impacts on Sensitive Receptors (Vertebrates) – Vehicle Collisions

Vehicle related collision are possible for all vertebrate species present within the Project's AoI and this will result in direct mortality on receptors of low to high sensitivity. Any such impact would be negative, long-term and irreversible and would be of medium to high magnitude and therefore of minor to major significance (depending on the receptor killed).

Species such as Egyptian Spiny-Tailed Lizard have a high risk of collision with vehicles due to their diurnal nature.

It is possible that carcasses on the road could attract scavenging animals, including birds of prey which in turn would increase their risk of collision with vehicles and machinery.

Mitigation Measures

- Speed limits of 20 kph will be enforced by the O&M Contractor
- Regular signage will be installed along the site access roads and internal roads informing all drivers of the speed limit.
- A gated entrance will be staffed and any visitors or locals using the site roads will be informed of the speed limits and that there are regular checks of vehicle speeds.
- A ban on driving at night will be enforced and if absolutely necessary the speed limit will be reduced to 15kph
- Ban against off-road driving at all times of the day, and if necessary, the works area will be subject to a walkover by the Project Ecologist.
- Regular checks of the road for carcasses and if found these will be moved to at least 10m from the road to reduce the likelihood of hitting scavengers, including birds of prey.
- A incidental / chance find procedure will be included in the BMP so that all workers report any road collisions so that any such incident can be investigated in full.

Direct Impacts on Sensitive Receptors (Vertebrates) – Lighting

Lighting could potentially result in negative impacts of a range of ecological receptors including those of high sensitivity such as Honey Badger, Caracal, Marbled Polecat and Goitered Gazelle. In addition lighting could impact foraging and commuting routes for bats.

Any impacts are likely to be short- to medium term and reversible. The magnitude of impact ranges from low to medium and is likely to be of minor to moderate significance.

Mitigation Measures

- Site-wide lighting is not being implemented so any lighting impacts during operation will be very limited. Night-time working is not anticipated and will certainly not be a regular occurrence.
- Where lighting is required within worker compounds, site offices etc. ensure that any lighting is shielded and protected to reduce light-spill and glare. Low intensity lighting should also be used, where possible, to further reduce light spill.
- For external security lights PIR trigger units should be used and these should be timed to automatically switch off after five minutes.
- No lighting will be installed along the access road from Kirkkiz.
- Turbines will not be lit and any aviation lights will be shielded to minimise visibility from ground level to reduce the attractiveness of lights to night flying insects which in turn could attract bats.
- Lighting above turbine doors will be PIR controlled and timed so that it switches off automatically after five minutes. Again, this measure will be implemented to reduce night-flying invertebrates in proximity to turbines.

Direct Impacts on Sensitive Receptors (Habitats and Flora) – Non-native Species and Introduced Flora

It is possible that non-native or introduced flora could be imported in to the AoI on vehicles or within any imported soil material. The impacts of non-native and introduced flora could potentially be significant in absence of any mitigation as these species could become established and out-compete native flora.

Impacts associated with non-native, invasive or introduced flora could result in long-term negative impacts, irreversible (if allowed to become established) and potentially significant.

Mitigation Measures

- Post-construction monitoring will be completed across the AoI to record the presence and distribution of non-native and invasive plant species and a program of mechanical control will be completed over during the operation period to remove these species from the AoI. Chemical control will be avoided however, if necessary, will be used but in accordance with national and international guidelines and will also be subject to risk assessment and approval from the Lenders. The program of control will continue until the species are absent from the Project AoI.
- A program of regular monitoring will be completed with surveys completed in Years 1, 2, 5, 10, 15 to survey for the presence of non-native and / or invasive species and relevant control of these species will be completed, where necessary.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Pest Species

It is possible that pest species become established within the Project as a result of increased littering or poor waste management as well as the propensity of certain species (e.g. rats, cats and dogs) to associate with human habitation.

An increase in pest species could result in long-term negative impacts on wild animals through direct and indirect competition for food resources, direct mortality through predation, and direct impacts as result of disturbance impacts. Such impacts could be reversible or irreversible, will be between low to high magnitude and as such significance will vary from minor to major depending on the receptor being affected.

Mitigation Measures

- Where pest species are identified, the O&M Contractor / Ecologist will be notified, and an appropriate course of action taken. For small mammal pest's live traps will be used, to reduce the risk of by-catch. Poison baits should be avoided, unless it can be certain that non-target species will be affected, and any such use should be in accordance with national and international best practice and will also be subject to risk assessment and approval from the Lenders. If poison baits are to be used it must be certain that any poisoned animal cannot move out on to the wider AoI to reduce the risk of natural predators eating poisoned animals.

Monitoring

Long term monitoring of the Project AoI will be completed as set out above and will include:

- Habitat and Flora monitoring within the AoI to measure the success of habitat rehabilitation work to reasonably demonstrate no net loss of Natural Habitat as well as to record the presence of invasive / non-native flora. Monitoring will be completed in Years 1, 2, 5, 10 and 15. Full site walkover surveys as well as quadrat surveys will be completed.
- Monitoring of mammal and herpetofauna assemblages across the AoI. Repeat of baseline surveys will be completed in Years 1, 2, 5, 10 and 15. Population densities recorded in Year 5 will be compared to baseline levels and if required additional work will be completed.
- Fatality Monitoring Program (FMP)

FMP consultant on behalf RCREEE will implement systematic fatality surveys (i.e. carcass searches) by trained experts have become the main means of monitoring collision victims and estimating collision rates at wind power plants worldwide. Through applying the suitable survey design to be implemented at the project site, it is the most reliable and accurate approach for determining the number of birds killed in a certain wind farm, for monitoring bird fatalities over time, for analysing the factors that cause variations in fatalities among turbines or analysing the effectiveness of measures designed to reduce collision risk.

When conducting systematic carcass searches experts walk along pre-defined transects 260x260 m² under each turbine (e.g. within a 260m radius around each turbine). All found carcasses (in this case a bird/bat or parts of a bird/bat) are recorded and carefully examined (any evidence of fatality, carcass complete or dismembered, type of injuries evident, scavenging evident, distance and direction to turbine etc.).

Estimates of fatality rates are biased in relation to searcher efficiency. Furthermore, other factors such as proportion of searched areas and carcass persistence should be taken into consideration when estimating fatality rates. When carcasses are located, observers will record species name, distance from the turbine tower, direction to the nearest turbine, and predation evidence or other observations. Carcasses will be then used in carcass persistence trails. Notes should be made of any tags, rings or transmitters that might be on such birds.

Besides, carcass search surveys will also be undertaken along associated Overhead Transmission Line (OHTL) during bird migration seasons. In general, the same approach on standardized carcass searches can be applied. Data collection and data analysis of the monitoring at OHTL will be coordinated at wind farms in the GoS.

- Barrier Effect Study

It is recommended that RCREEE undertake at the cumulative level for all wind farms within the GoS region a barrier effect study. The study should assess potential impacts of wind farms as disruptive barriers to the migration route at the cumulative level within the GoS region and identify any additional mitigation measures to be considered. This could include for example spacing/buffer requirements between wind farms. The study should take into account the Project and all surrounding wind farms and the variations in the turbine heights of such projects. The study should be undertaken once all wind farms have confirmed their turbine specifications – please refer to “Section 9” for full list of wind farm projects within the GoS region.

- All of the above monitoring requirements will be included within Construction and Operational Biodiversity Management Plans which will include KPIs against which the results of the monitoring will be assessed.

Potential Wider Conservation Benefits of the Project (compensation / off-setting)

Measures that could be considered as part of this wider compensation or off-setting package could include:

- Supporting monitoring and conservation at Batumi, Georgia (Levant Sparrowhawk, Pallid Harrier, Greater Spotted Eagle, Steppe Eagle, Booted Eagle)
- Wetland restoration and nest protection, Polesia (Black Stork, Greater Spotted Eagle and Common Crane)
- Retrofitting of power lines in Egypt (White Stork, Black Stork, Great White Pelican and Common Crane)
- Retrofitting of power lines in Portugal (Egyptian Vulture, White Stork, Black Stork, Booted Eagle, and Common Crane).
- Other possibilities include: Protected area expansion, Anti-poisoning campaign, Retrofitting Power lines (Africa); Captive breeding programmes, protecting breeding habitat (Europe)

Whilst the exact option has not yet been chosen it is important to consider that it would be a sensible time to discuss these options on a regional level considering other possible developments in the area and working with projects that can take packages from more than one site in a joined up approach.

8.6 Archaeology and Cultural Heritage

This section identifies the anticipated impacts on archaeology and cultural heritage from the Project throughout its various phases. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

It is important to note that there are no anticipated impacts during the operational phase of the Project.

8.6.1 Potential Impacts during the Construction Phase

Site preparation activities which are to take place onsite by the EPC Contractor for installation of the wind turbines and the various Project components to include substation, transmission cables, access roads and internal road network, buildings, etc. are expected to include land clearing activities, levelling, excavation, grading, etc.

Although such activities are limited to the relatively small individual footprints of these facilities and the actual area of disturbance is relatively minimal, if such activities are improperly managed, they could damage or disturb archaeological remains present on the surface of the Project site. However, the archaeological baseline assessment discussed earlier concludes that there are no archaeological sites or remains within the Project site. Therefore, there are no anticipated impacts from the Project on surface archaeological remains within the Project site.

In addition, there is a chance that throughout such construction activities, archaeological remains buried in the ground are discovered. Improper management (if such sites are discovered) could potentially disturb or damage such sites which could potentially be of importance. Such potential impacts are of a short-term duration as they are limited to the construction phase, and are irreversible as should sites be discovered then inappropriate management could result in disturbance and/or damage, in which such an impact would be of medium magnitude. The impacts will be of a negative nature and low sensitivity given that the likelihood of such impacts is considered low. Given all of the above, such an impact is considered to be of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the EPC Contractor during the construction phase and which include:

- As required by the, during excavation activities, SCA must be notified to check if they will provide any observers to oversee the process and ensure that no underground archaeological remains of importance are unearthed and/or disturbed.
- Throughout the construction phase, and as the case with any Project development that entails such construction activities, there is a chance that potential archaeological remains in the ground might be discovered. It is expected that appropriate measures for such chance find procedures are implemented. Those mainly require that construction activities be halted and the area fenced along with proper signage, while immediately notifying the Ministry of Tourism and Antiquities/Red Sea and Suez Antiquities Inspection Office. No additional work will be allowed before the Ministry/Inspection Office assesses the found potential archaeological site and grants a clearance to resume the work. Construction activities can continue at other parts of the site if no potential archaeological remains were found. If found, same procedures above apply.

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to not significant, with a low magnitude of impact and low sensitivity of the receiving environment.

Monitoring Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the Wind Farm EPC Contractors during the construction phase and which include:

- Submission of formal letter of communication with SCA; and
- For chance find procedure, inspection of actions taken in case of new discoveries, including fencing, limiting access to site, and contacting the Ministry of Tourism and Antiquities/ Red Sea and Suez Antiquities Inspection Office. Report should be prepared and submitted to the Ministry in such a case which details the above.

8.7 Air Quality and Noise

This section identifies the anticipated impacts on air quality and noise from the Project throughout its various phases. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

8.7.1 Potential Impacts during the Construction Phase

Site preparation activities which are to take place onsite by the EPC Contractor for installation of the wind turbines and the various Project components to include substation, transmission cables, access roads and internal road network, buildings, etc. are expected to include land clearing activities, levelling, excavation, grading, etc.

Although such activities are limited to the relatively small individual footprints of these facilities and the actual area of disturbance is relatively minimal. Nevertheless, such activities will likely result in an increased level of dust and particulate matter emissions, which in turn will directly and temporarily impact ambient air quality. If improperly managed, there is a risk of nuisance and health effects to construction workers onsite and to a lesser extent to the nearby surrounding receptors from windblown dust (such as nearby petroleum activities). In addition, construction activities will likely entail the use of vehicles, machinery and equipment (such as generators, compressors, etc.) which are expected to be a source of other pollutant emissions (such as SO₂, NO₂, etc.) which would also have minimal direct impacts on ambient air quality.

In addition, all the above activities will likely include the use of machinery and equipment such as generators, hammers, compressors, etc. and which are expected to be a source of noise and vibration generation within the Project site and its surroundings. If improperly managed, there is risk of nuisance and health affects to construction workers onsite and to a lesser extent to the nearby surrounding receptors (such as nearby petroleum activities).

However, it is important to note that there are no key receptors that are anticipated to be impacted from dust, noise and emission given that the closest receptor / community settlement to the Project site is Wadi Dara Village – adjacent to the Project site to the east.

The above impacts are anticipated to be temporary and of short-term nature as they are limited to the construction period only. Such impacts are of a negative nature, and will be noticeable and therefore of medium magnitude. However, the impacts will be dispersed and are reversible as air quality would revert back to baseline conditions after construction works is completed and thus the receiving environment is considered of low sensitivity. Given the above such an impact is considered of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the EPC Contractor during the construction phase:

- If dust or pollutant emissions were found to be excessive due to construction activities, the source of such emissions should be identified and adequate control measures must be implemented;
- Comply with the Occupational Safety and Health Administration (OSHA) requirements and the Egyptian Codes to ensure that for activities associated with high dust and noise levels, workers are equipped with proper Personal Protective Equipment (e.g. masks, eye goggles, breathing masks, ear muffs, etc.);
- Apply basic dust control and suppression measures which could include:
 - Regular watering of roads for dust suppression;
 - Proper planning of dust causing activities to take place simultaneously in order to reduce the dust incidents over the construction period.
 - Proper management of stockpiles and excavated material (e.g. watering, containment, covering, bundling).
 - Proper covering of trucks transporting aggregates and fine materials (e.g. through the use of tarpaulin).
 - Adhering to a speed limit of 15km/h for trucks on the construction site.

- Develop a regular inspection and scheduled maintenance program for vehicles, machinery, and equipment to be used throughout the construction phase for early detection of issue to avoid unnecessary pollutant and noise emissions.
- Based on inspections and visual monitoring undertaken, if noise levels were found to be excessive from construction activities, the source of such excessive noise levels should be identified and adequate control measures must be implemented; and
- Apply adequate general noise suppressing measures. This could include the use of well-maintained mufflers and noise suppressants for high noise generating equipment and machinery, developing a regular maintenance schedule of all vehicles, machinery, and equipment for early detection of issues to avoid unnecessary elevated noise level, etc.

Following the implementation of these mitigation measures, the significance of the residual impact is categorized as not significant, with a low magnitude of impact and low sensitivity of the receiving environment.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the EPC Contractor during the construction phase and which include:

- Dust and noise monitoring should be undertaken on a quarterly basis during the construction phase at key points where active construction activities are undertaken. The monitoring should include TSP, PM10 and PM2.5 and noise levels.
- Periodic inspections should be conducted at nearby sites (e.g. such as nearby petroleum activities) to determine whether harmful levels of dust and noise from construction activities exist; and
- Reporting of any excessive levels of pollutants/dust or noise and the measures taken to minimize the impact and prevent it from occurring again.

8.7.2 Potential Impacts during the Operation Phase

The main foreseen impacts during the operation phase are that related to the noise generated from the operating wind turbines and its potential impact on the health and safety of the nearby surrounding receptors. Given that such impacts are directly related to public health and safety, such impacts have been discussed in details in “Section 8.111 Public Health and Safety” along with other relevant impacts such as shadow flicker.

8.8 Infrastructure and Utilities

This section identifies the anticipated impacts on infrastructure and utilities from the Project throughout its various phases. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

8.8.1 Potential Impacts on Road Networks during the Planning and Construction Phase

Wind turbines are manufactured in factories and transported to the installation site where they are assembled. Wind turbine components have big dimensions and weight and their transport poses a challenge to the existing roads and infrastructure.

Components for wind energy projects are usually transported by sea from the manufacturing country to the country of installation and are then loaded in existing ports to trucks which manoeuvre their way through existing roads to the installation site.

Given the increasing size, weight, and length of components of the wind turbines, proper transportation and logistical solutions could be required for managing the heavy-load long-haul requirements. If improperly planned and managed, the trucks hauling the various heavy Project components may damage the existing roads, highways and bridges, utility lines (e.g. electricity lines), and could also be a public safety concern for other vehicles on the road.

The table below provides a summary of the peak maximum daily number of vehicles based on the initial route study conducted for the Project. Related to the size and categories of equipment paired with the size of vehicles fit to transport the equipment that are expected to access the site during the course of the construction period, the below tables, instead, condense the illustration of comparable added traffic into a single day. *However, it is important to note that the figure is based on peak numbers assuming all peak traffic requirements occur on the same day. In reality, actual peak numbers are likely to be much lower given that peak number of workers and peak delivery of materials is not expected to be on the same day nor week.*

Table 68: Summary of Peak Vehicles by category of components

Traffic Source (Delivery of Components)	Maximum Number of Vehicles
Rotor and Nacelle Components	138
Blade Components	207
Tower Tops	345
WTG Accessories (Ventilation hoods, converters, transformers, platforms)	345
WTG Accessories (Lifting spreader for Blades, Nacelle)	77

As noted in the table below, with regards to the Sokhna-Hurghada Highway, the Project-related traffic is considered sizable taking into the existing traffic condition and highway capacity as, in the scenario below, for comparison purposes, transportation of all equipment for the 69 turbines were transported in a single day – equating to 3.6 times the capacity of the existing highway.

Table 69: Project and Existing Traffic

Traffic Source from Project	Max Number of Vehicles / Day	Equivalent Vehicles	Equivalent Vehicles / Hour	Project Traffic / Hour	Highway Capacity / hour
Rotor and Nacelle Components	138	19,044	793.50	12,904.67	3,500
Blade Components	207	42,849	1,785.38		
Tower Tops	345	119,025	4,959.38		
WTG Accessories (Ventilation hoods, converters, transformers, platforms)	345	119,025	4,959.38		
WTG Accessories (Lifting spreader for Blades, Nacelle)	77	5,929	247.04		
	1,112	305,872	12,744.67		

Other than highway capacity, there several obstacles en route from the Adabiya port, which is 250 km by road away from the Project site, requiring minor civil works to be performed to ensure safety and ease of escort of the equipment. The obstacles include select instances of temporarily removing concrete barriers at the port exit and to access a detour route, if necessary.

In addition to the above, there is also a key impact in relation to road and networks. As noted within “Section 7.8.2” earlier, the main road that leads to Wadi Dara runs within the Project site. Inappropriate construction activities could damage or disturb this road network which in turn could disrupt local community transportation requirements into /out of Wadi Dara. This could include for example, heavy machinery blocking the road, heavy load damaging the road itself rendering it unusable, etc.

Taking all of the above into account, the anticipated impacts on road networks are considered of short-term duration during the Project construction phase. Such impacts are of a negative nature, and if such impacts are improperly managed, then they are expected to be of high magnitude and medium sensitivity. Given the above impact is considered of moderate significance.

Mitigation Measures

It is recommended that EPC Contractor develop a Traffic and Transport Plan before commencement of any transportation activities to ensure that the transportation process is properly and adequately managed and does not pose a risk of damage to the existing roads, highways, overpasses whilst ensuring public safety. The Plan must analyse and study the entire route for transportation of the Project components from the port till the Project site. The assessment must take into account worst case scenarios for transportation of Project components for blade lengths, tower sections, etc. The study must investigate any constraints which need to be considered along the highways leading to the Project site such as bridges, overhead utility cables, slants in roads, etc. and identify accommodations which need to be taken into account (bypasses, adjustments to roads, etc.)

The Plan must take into account the following:

- The Plan must be developed in accordance with relevant local traffic and transportation legislations related to traffic loads and weights, dimensions, speed limits, etc.
- The plan must consider, to the extent possible, the proper planning of generated trips of trucks to ensure they are spread over the course of a work day and hours of day, and which also take into account peak and non-peak commute hours on the highway;
- As part of the Plan, the EPC Contractor must establish coordination with relevant entity to take into account any specific requirements that should be considered and ensure they are aware of the transportation requirements and details related to the Project.
- The plan must include detailed and site-specific measures to ensure no impacts on the Wadi Dara road or its usage by local communities. This should include for example, (i) daily monitoring to ensure no blockage of the road by an project related equipment or machinery, (ii) daily monitoring to ensure no project related damage to the road and should this happen immediate repair and maintenance activities should be undertaken, (iii) immediately respond to any local community related grievances on the road as part of the SEP and its grievance mechanism and (iv) other as appropriate.

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to minor, with a medium magnitude and sensitivity of the receiving environment.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the EPC Contractor during the construction phase and which include:

- Submission of Traffic and Transport Plan with proof of coordination with the authorities discussed above for works required as part of the Study.
- Submission of proof of coordination with relevant entities

8.8.2 Potential Impacts on Civil and Military Aviation during the Planning and Construction Phase

Any tall structure could impact aircraft safety if located near airports or known flight paths. In addition, such structures could potentially interfere with certain electromagnetic transmissions associated with air transport, for example primary radar and secondary surveillance radar. Wind turbines have the potential to impact the surveillance systems used to detect and identify aircraft approaching, overlying or leaving Egyptian airspace and for which a Recognized Air Picture (RAP) is produced.

Inappropriate management of planning activities and site locations (e.g. siting of turbines) and construction activities (e.g. excavations) could disturb such aviation practices.

Such issues are generally managed through appropriate setback distances (if applicable) and in addition, regulatory authorities generally include requirements for wind farm developments related to visibility of turbines to include navigational lights and blade paintings

Nevertheless, if such issues are improperly managed and not taken into account as part of the planning phase, they could affect aircraft safety. Therefore, such impacts are considered of long-term duration, of negative nature, and of low magnitude given impact is related to inappropriate management of activities, however given its importance it is considered if high sensitivity. Given all of the above, the impact is considered of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the Developer during the planning phase and which include:

- Establish coordination with NREA to ensure that the clearance that has been provided by the Ministry of Defence for the area includes in particular approvals from civil and military aviation entities. In addition, based on the that adhere to any specific navigational safety requirements (e.g. navigational lights, blade paintings, etc.)

Following the implementation of these mitigation measures, the significance of the residual impact remains unchanged.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the Developer during the construction phase and which include:

- Submission of formal non-objection letters from relevant entities

8.8.3 Potential Impacts on the Petroleum Facilities during Construction

The nearest locations of petroleum activity are located just outside of Ras Sukahir approximately 8.4 km from the Project site. While it's relatively distant from the proposed wind farm as well as the existing Coordination Agreement between NREA and General Petroleum Company, there are specific requirements to be considered for the detailed design of the Project.

Taking all of the above into account, the anticipated impacts are considered of short-term duration during the Project construction phase. Such impacts are of a negative nature, and if such impacts are improperly managed, then they are expected to be of medium magnitude and medium sensitivity due its distance from the Project site. Given the above impact is considered of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the Developer during the planning phase:

- Establish coordination via NREA with the GPC's head office in Cairo to discuss and determine any specific requirements to be taken into account for the detailed design of the Project as well as coordination agreement requirement during the construction and operation phase (e.g. avoidance of such areas, buffer distances to be considered, etc.). This is to take place no less than six (6) months prior to construction activities.

Following the implementation of these mitigation measures, the significance of the residual impact remains unchanged

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the Developer during the planning phase and which include:

- Submission of proof of coordination with relevant entities

8.8.4 Potential Impacts on Water Resources during Construction and Operation

It is expected that the Project throughout the construction and operation phase will require water for potable usage (drinking, showering, etc.) and non-potable usage (e.g. cleaning of machinery and vehicles).

The Project is expected to require around 70,000 m³ throughout the construction phase (for a total duration of 24 months) –. This will include around 46,560 m³ for construction requirements (concrete works, minimize dust, cleaning of requirements, etc.) as well as 22,050 m³ as potable water requirements (drinking, washing, etc.).

Similarly, during the operation phase, water will mainly be required for potable use of onsite staff at the Wind farm. Nevertheless, such requirements are expected to be minimal and insignificant.

As discussed earlier, based on consultations with Ras Gharib Water Company there are no existing or planned water connections to the Project area. Water will be supplied through water trucks and tankers from Ras Gharib and stored onsite through water tanks.

Based on the above it is clear that the water requirements for the Project during construction and operation are unlikely to entail any constraints on the existing users. However, the involved entities are required to coordinate with Ras Gharib Water Company to secure water requirements for the Project most likely through tankers.

Taking all of the above into account, the anticipated impacts on the local water resources and utilities are considered of short-term duration during the Project construction phase and of long-term duration during the operation phase. Such impacts are of a negative nature, and are expected to be of low magnitude and of low sensitivity given the temporary nature of such impacts during construction and minimal water requirements of the Project during operation. To this extent, the impact is considered not significant.

Additional Requirements

The following identifies additional requirements to be applied by the EPC Contractor during the construction phase and Project Operator during the operation phase respectively and which include:

- Coordinate with the Ras Gharib Water Company to sector the water requirements of the Project.

With the implementation of the additional requirement, the significance of the impact remains unchanged and is expected to be not significant.

8.8.5 Potential Impacts on Waste Utilities during Construction and Operation

The Project is expected to generate the following waste streams during the construction and operation phases:

- Wastewater during construction and operation to include black water (sewage water from toilets and sanitation facilities) and grey water (from sinks, showers, etc.) and industrial effluents (e.g. batching plants onsite). Wastewater during the construction phase from the Project can be assumed by taking into account an 80% wastewater generation factor for potable water requirements which will amount to around 20,000m³ throughout the construction phase. Wastewater generated from the Wind Farm during operation is expected to be minimal and insignificant. Wastewater will be stored onsite though enclosed septic tanks and collected by tankers from the Project to the closest WWTP.

- Solid waste during construction and operation from the Wind Farm will include construction waste (mainly during construction to include dirt, rocks, debris, etc.) as well as general municipal waste (such as food, paper, glass, bottles, plastic, etc.). Solid waste quantities generated are not expected to be significant and are likely to be easily handled by closest landfill facility.
- Solid waste quantities expected are around 1.25-2.5 tonnes daily for construction waste on average, while municipal waste is expected to be around 937.5 kg per day at peak taking into account the daily per capita waste generation factor in Egypt ($1.25\text{kg/capita/day}^{19}$) and number of 750 workers. During operation, this is only likely to include municipal waste at around 25kg per day for 20 workers.
- Hazardous waste during construction and operation from the Wind Farm will include routine waste generated from such activities to include spent oil, lubricants, paint cans, solvents, etc. Hazardous waste quantities generated are not expected to be significant and are likely to be easily handled by closest authorized facility.
- Hazardous waste quantities are expected to be around 20.09 kg per day only.

Taking all of the above into account, the anticipated impacts on waste utilities are considered of short-term duration during the Project construction phase and of long-term duration during the operation phase. Such impacts are of a negative nature, and are expected to be of low magnitude and of low sensitivity given the relatively minimal quantities generated and easy of management by relevant authorities. Given the above impact is considered not significant.

Additional Requirements

The following identifies the additional requirements to be applied by the EPC Contractor during the construction phase and Project Operator during the operation phase respectively and which include:

- Dumpsite located within the Project area must be completely removed prior to commencement of any construction activities. In addition, it must be ensured that the Project site is not used for any waste disposal at any point during the construction and operation phase.
- Coordinate with the Ras Gharib Water Company and obtain list of authorized contractors for collection of wastewaters from the site to the Ras Gharib WWTP.
- Coordinate with the Ras Gharib City Council to hire a competent private contractor for the collection of solid waste from the site to the Ras Gharib Public Dumpsite.
- Coordinate with Environmental Management at Ras Gharib City Council to obtain list of authorized contractors for collection of hazardous waste from the site to the closest approved facility for final disposal.

With the implementation of the additional requirements, the significance of the impact remains unchanged and is expected to be not significant

8.8.6 Potential Impacts on Telecommunication and Television & Radio Links during the Planning and Construction Phase

Wind turbines during the construction and operation phase could impact telecommunication, TV and Radio infrastructure. For example, construction activities could damage/disturb underground communication cables (if present within the area), while rotating turbines during operation could disrupt Line of Sight (LoS) connections between telecommunication transmission towers.

¹⁹ [A smart framework for municipal solid waste collection management: A case study in Greater Cairo Region - ScienceDirect](#)

Such issues are generally managed through appropriate setback distances (if applicable) from such infrastructure elements. Nevertheless, if such issues are improperly managed and not taken into account as part of the planning phase, they could affect such elements. Therefore, such impacts are considered of long-term duration, of negative nature, and of low magnitude given impact is related to inappropriate management of activities, however given its importance it is considered if high sensitivity. Given all of the above, the impact is considered of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the Developer during the planning phase and which include:

- Establish coordination via NREA with NTRC to provide information on the at least six (6) months prior to the commencement of construction (to include location and specifications of turbines in specific) and include any specific requirements to be considered as part of the detailed design to include setback distances if required for telecommunication, infrastructure (e.g. from LoS connections)

Following the implementation of these mitigation measures, the significance of the residual impact remains unchanged.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the Developer during the planning phase and which include:

- Submission of formal non-objection letter from NTRC.

8.8.7 Potential Impacts on Nearby Wind Farms

As noted earlier, there are several operating and planned wind farm development Projects within the GoS area. Within the Project area, there is another existing and operational wind farms known as the JICA, KfW, Spain and Scatec Wind farms (“Section 7.8.9”) bordering the Project site.

Inappropriate management of planning activities (e.g. siting of turbines and proper buffer distance) could affect such nearby wind farms.

Taking all of the above into account, the anticipated impacts are considered of long-term duration during the operation phase. Such impacts are of a negative nature, and if such impacts are improperly managed, then they are expected to be of medium magnitude and medium sensitivity due to their distance from the Project site. Given the above impact is considered of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the Developer / EPC Contractor during the planning phase:

- Further follow/communication with NREA to ensure if buffer distance of the Project from other nearby wind farm projects is considered sufficient and appropriate from a technical perspective

Following the implementation of these mitigation measures, the significance of the residual impact remains unchanged.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the Developer / EPC Contractor during the planning phase and which include:

- Submission of proof of coordination with relevant entities.

8.9 Occupational Health and Safety and Worker Accommodation

This section identifies the anticipated impacts from the Project throughout its various phases on occupational health and safety. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

This section presents the assessment of potential impacts on occupational health and safety collectively during the construction and operation phase for the wind farm, given that they are similar in nature during both phases.

Throughout the construction and operation phase there will be generic occupational health and safety risks to workers, as working onsite increases the risk of injury or death due to accidents. The following risks are generally associated with wind farm development projects:

- Slips and falls;
- Working at heights;
- Working with powered and hand-held tools;
- Struck-by objects;
- Moving machineries;
- Working in confined spaces and excavations;
- Exposure to chemicals, hazardous or flammable materials;
- Working in sunny conditions and high temperatures;
- Exposure to electric shocks and burns when touching live components;
- OHS risks from work with nearby operations to include in specific the oil rigs and petroleum storage facilities

Such impacts are considered of short-term duration during the construction phase and of long-term duration throughout the Project operation phase, of a negative nature, and are expected to be of medium magnitude and high sensitivity as in extreme cases they could entail permanent impacts (e.g. permanent disability). Nevertheless, such impacts are generally controlled through the implementation of general best practice. Given the above such an impact is considered of moderate significance.

Mitigation Measures

Occupational Health and Safety

It is expected that the EPC Contractor will prepare an Occupational Health and Safety Plan (OHSP) regarding the Project's construction, installation and commissioning works as well as the general construction site operations. In addition, the Project Operator is expected to develop an OHSP tailored to the Project's operation phase.

The objective of the OHSP is to ensure the health and safety of all personnel in order to concur and maintain a smooth and proper progress of work at the site and prevent accident which may injure personnel or damage property of the EPC Contractor and all involved sub-contractors, as well as the Project Operator.

The OHSP for the construction and operation phase should be Project and site specific and must take into account the national requirements mainly the Law 4/1994 and Law 12/2003 on Labour and Workforce Safety and Book V on Occupational Safety and Health (OSH) and Ministerial Decree 211/2003. In addition, it must also be compliant with the IFC PS2, EBRD PR 2 and World Bank's ESS 2 (Labour and Working Conditions) which

recognize the importance of avoiding or mitigating adverse health and safety impacts on workers and require the development of a project-specific health and safety plan that is in accordance with Good International Industry Practice (GIIP).

In general, the OHSP should address the following components:

- Identify roles and responsibilities of the personnel involved within the Project to include the EHS manager, construction manager, supervisor, and other subcontractors' responsibilities;
- Identify in details information in relation to formulation of safety committees, communication protocols, first aid personnel and facilities, first aid training programs, occupational health and safety culture, quality system, reporting requirements, competence and job safety training, safety inspections, recruitment procedures, safety audits, risk assessment, etc.;
- Risk assessment, method statement, and job safety analysis procedure;
- permit to work procedure;
- Lock Out Tag Out Procedure;
- Identification of measures to be implemented onsite that ensure hazard elimination or substitution, followed by engineering control requirements.
- Identify in details the hazards which may be associated with various activities to take place and the various measures to be implemented to reduce such risks including the requirements for Personal Protective Equipment (PPE). This includes for example hand tools, access equipment, lifting equipment, mobile working equipment, etc.; and
- Establish training requirements for workers to comply with health and safety procedures and protective equipment.
- Include specific procedures and protocols related to COVID-19 risk to include but not limited to: (i) complying with the World Health Organization (WHO) requirements as well as local Ministry of Health requirements at that time; (ii) identification of requirements for daily temperature checks, provision of relevant PPE equipment (sanitizers, facemask, etc.) and undertaking COVID-19 testing at accredited institutions; (iii) undertake regular sanitization and disinfection arrangements of shared facilities; (iv) identification of requirements for self-isolation in case of suspected COVID-19 symptoms or direct contact with a person with a confirmed COVID-19 infection; (v) continues training and education on COVID-19 issues such as symptoms, procedures to be implemented, etc.
- Include specific procedures and protocols related to venomous species onsite to include but not limited to undertaking awareness sessions on potential presence of key species, measures to be undertaken in case they are found, ensuring medical resources are available to handle incident.
- Incident and investigation procedure.

The EPC Contractor and Project Operator are expected to adopt and implement the provisions of the OHSP throughout the Project construction and operation phase.

Emergency Preparedness and Response

The EPC Contract and Project Operator are also expected to prepare and implement an Emergency Preparedness and Response Plan for the Project construction and operation phase.

The objective is to establish a series of organizational, operational and preventive measures in the event of an emergency that are adapted to the circumstance of such situations, which in turn will ensure the safety of workers and property within the specific Project site. The plan should take into account the following:

- Inclusion of requirements for an emergency responder team that includes at a minimum first aiders and firefighters that receive appropriate and certified training
- Inclusion of requirements to undertake emergency drills in coordination with external emergency response services if required (e.g. civil defence, nearest hospital, etc.)
- Identify in detail of emergency procedures to be implemented to include first actions, alerting emergency contacts, site evacuation, communicating with external emergency services
- Identification in details of emergency control measures to include but not limited to: (i) fire (including fit for purpose firefighting equipment and PPE given potential electrical fires), (ii) personnel accidents, (iii) spillage, (iv) sandstorms, (v) heat strokes, (v) war conflicts/security deterioration and other.
- Consider real time emergency communication using radios
- Identification of location of assembly points onsite
- Identification of emergency signs to be implemented onsite
- Identify roles and responsibilities for implementation of plan to include establishment of an emergency committee and assigning roles to an emergency manager

Worker Grievance Mechanism

The EPC Contract and Project Operator are also expected to prepare and implement a worker grievance mechanism for the Project construction and operation phase. The objective is to ensure a robust and comprehensive procedure to capture, document, resolve and close out any worker complaint, whether classified as grievances or not. The plan should take into account the following:

- Identification of a step-by-step process and guideline to ensure that every complaint/grievance made by workers are registered, documented and fully addressed
- The overall outline/structure of the grievance mechanism will be as follows:
 - Workers will be allowed to lodge grievances through various platforms and channels to include grievance boxes distributed onsite, telephone, face to face meetings with responsible personnel, workers representatives and unions. Contact details for all such channels will be identified and provided in detail.
 - Anonymous lodging of grievances will be allowed.
 - All grievances will be recorded and a case handler will be assigned and who will be determined at a later stage.
 - All grievances will be handled in the shortest possible period. The first approach will be to inform the worker within the first 24 hours after receiving the grievance. The worker will be informed within 7 working days on whether or not the grievance proceeds and what the next steps will be.
 - Once a resolution has been agreed or a decision made, the case handler will monitor the implementation of the response.

- After the implementation of an agreed resolution has been verified the grievance close-out will take place. It will entail reaching a unanimous agreement, clearly communicated to avoid misunderstandings.
- A close-out report will be prepared with evidence to support closure (e.g. photos).

Worker Accommodation

It is not clear at this point whether there will be any onsite accommodation for workers. Nevertheless, should the EPC Contractor opt for onsite accommodation unit for workers, it must conform to the national requirements. In addition, it should also confirm to international best practice requirements – this includes mainly the “Workers’ accommodation: process and standards” (EBRD/IFC Guidance Note, 2009). The document provides guidance notes on general living facilities, room facilities, medical facilities, management of accommodation units, etc.

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to minor.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the EPC Contractor and Project Operator during the construction and operation phase:

- Inspection to ensure the implementation of the provisions of the Occupational Health and Safety Plan and assess compliance with its requirements;
- Regular Reporting on the health and safety performance onsite in addition to reporting of any accidents, incidents and/or emergencies and the measures undertaken in such cases to control the situation and prevent it from occurring again; and
- If applicable, inspection on workers accommodation to ensure its compliance with the requirements of “Instructions for Prevention of Health Nuisances from Workers Accommodation No. (1) For the year 2013” and “Workers’ accommodation: process and standards” (EBRD/IFC Guidance Note, 2009).
- Submission of an Emergency Preparedness and Response plan
- Submission of a Worker Grievance Mechanism.

8.10 Human Rights and Supply Chain

Inappropriate management of the workforce during both the construction and operation phase could entail several human right risks and violations by employing entities such as the EPC Contractor and Project Operator. In addition, the engagement of suppliers will present potential risks related to labour and working conditions. These risks include but not limited to occupational health and safety risks (assessed in Section 8.9 above), forced labour, child labour, confiscation of passports of foreign workers, unsuitable working hours, provision of inadequate accommodation facilities (assessed in Section 8.9 above) and lack of access to grievance mechanism (assessed in Section 8.9 above) and impact on the environment relating to pollution of water supplies, soil and air.

This assessment is based on the outcome of the following studies:

- An initial human rights assessment conducted by for a nearby wind farm in GoS, which is relevant and applicable to this project.

- A follow-up assessment of the health, safety, and working conditions for Envision (WTG Supplier) and its suppliers, building on findings from a 2022 assessment for ACWA wind farms in other countries. These assessments complied with local labour laws in China, ILO conventions ratified by China, and the requirements of the EBRD and Equator Principles. ACWA Power has confirmed that the same suppliers will be used for the SWE 1.1 GW Wind Project.

Human Rights

An initial Human Rights Assessment (HRA) was carried out by Eco Consult for a nearby wind farm (RSWE Wind Farm) in the GoS area to assess the potential human rights risks at a national and project level. The assessment was carried out in accordance with the Equator Principles and the UN Guiding Principles on Business and Human Rights. The assessment involved a review of existing literature and labour legislation to understand the national human rights context. Also, potential human rights risks were identified and benchmarked against international standards such as the International Bill of Human Rights and the eight ILO Core Labour Standards.

The identified risks were categorized based on potential impacts on various human rights categories and affected groups. The risk level was categorized as low, medium, or high, based on an evaluation of the scope, scale, ability to remedy, and likelihood of causing harm. Each risk was assessed with two values: "national-level," which evaluated the general risk in Egypt's context, and "with mitigation," which considered the risk within the project's scope, assuming the implementation of the appropriate mitigation measures outlined below. The assessment is pertinent and applicable to this project due to the similar location, scope, and the groups affected (receptors).

A summary of the potential risks, along with the proposed mitigation and management measures are provided in the Table below. The assessment concluded that with the application of the relevant mitigation and management measures listed below, a detailed human rights risk assessment is not deemed necessary.

Without mitigation measures and based on the assessment in the Table below, the risks are expected to be of medium magnitude. The sensitivity of the receptors is considered high, therefore, the risks related to human rights are considered of moderate significance.

Mitigation Measures

Following implementing the mitigation measures listed in the Table below, the significance of the residual impact can be reduced to minor.

Table 70: Initial Human Rights Assessment and Mitigation Measures

Risks	Level of Risk (Before Mitigation)	Group Impacted	Mitigation measures	Level of Risk (After Mitigation)	Reference Plan
Child labour: ILO standards prohibit hazardous work for all persons under 18 years. While Egyptian law has some protections for workers under the age of 18, illegal and hazardous child labour remains widespread.	National level - Medium	Workers (children)	The Labour and Working Conditions Management Plan should explicitly prohibit the recruitment of children under the age of 18 in illegal and hazardous work. However, if children between the ages of 15-18 are to be employed at any stage throughout the construction or operation stages, the following should apply: An official letter with the approval of their parents or guardian should be provided. Young workers must provide valid identification that presents proof of age at the recruitment stage. Driver licenses are not admissible as proof of age. Minor workers are not allowed to work onsite and are only allowed to work in the Project's worker camp. They are not to be employed in any kind of work which by its nature is likely to harm their health and safety or expose them to risks and hazards. Hazardous jobs include but not limited to the following: Operating or supervising machines, apparatus, and equipment of substantial power Operating vehicles of any kind Exposure to petroleum products and/or hazardous materials of any kind Lifting, moving, or pushing heavy materials Work performed at heights Any underground works Other activities which entail exposure to dangerous or hazardous equipment, materials, or activities Other activities similar in nature to the above	Low	Labour & Working Conditions Management Plan

Risks	Level of Risk (Before Mitigation)	Group Impacted	Mitigation measures	Level of Risk (After Mitigation)	Reference Plan
			In accordance with the Labour law, young workers shall not work for more than six hours a day, during which one or more break periods totalling not less than one hour shall be granted for meals and rest. They shall not be made to work overtime hours or required to come to work on weekends and official holidays. They shall not be made to work between 7:00 pm and 7:00 am.		
Right to Work / termination: Loss of income from termination impacts both the worker and their family's well-being. Workers should not be terminated without a valid reason connected to their conduct or performance. While there are established procedures and limitations to termination in Egyptian law, they are commonly circumvented.	National level - Medium	Workers	The Labour and Working Conditions Management Plan should explicitly prohibit wrongful termination. The employment of a worker shall not be terminated unless there is a valid reason for such termination connected to the capacity or the conduct of the worker. In accordance with the Labour law, the following reasons shall not be considered as legitimate and adequate justifications for termination: Colour, sex, social status, family obligations, pregnancy, religion, or political view. The worker's affiliation to a union organization, or his participation in a union activity within the context of the limits set by the laws. Exercising the quality of workers' representative, fanner exercise of that quality, or seeking to represent the workers. Submitting a complaint, filing an action against the employer, or joining in that, in protest against violating the laws, regulations, or labour contracts. Laying garnishment with the employer on the worker's	Low	Labour & Working Conditions Management Plan

Risks	Level of Risk (Before Mitigation)	Group Impacted	Mitigation measures	Level of Risk (After Mitigation)	Reference Plan
			dues. The worker's use of his/her rights to the leaves. The employment of a worker shall not be terminated for reasons related to the workers' conduct or performance before they are provided an opportunity to defend themselves against the allegations made. A worker who considers that his employment has been unjustifiably terminated shall be entitled to appeal against that termination to an impartial body, such as a court, labour tribunal, arbitration committee or arbitrator. If a worker's employment is terminated without justification, the worker shall be entitled, in accordance with national law to compensation that is not less than the wage of two months of the comprehensive wage for each year of service, to be determined by a judicial committee.		
Fair Wages: Workers should receive equal remuneration for work of equal value. Remuneration should provide for a decent standard of living and covering basic needs. While Egypt has an established minimum wage, currency	National level - Medium	Workers Local Community	Wages will be based on a clear and established salary scale that is applied without discrimination and takes into account the local market and will be fair and should meet the basic needs to maintain a safe and decent standard of living. Wages must be established based on qualifications and competencies, professional experience, job responsibilities, and wages at equivalent positions.	Low	Labour & Working Conditions Management Plan

Risks	Level of Risk (Before Mitigation)	Group Impacted	Mitigation measures	Level of Risk (After Mitigation)	Reference Plan
devaluation and inflation has outpaced increases in the minimum wage.			Remuneration for work of equal value should be provided for female and male workers. Wages should not be below the nationally established minimum wage.		
Working Hours: While Egyptian law allows for a 6-day 48-hour work week, ILO recommends a standard 40-hour work week to provide for an adequate work-life balance and allow workers to have sufficient rest and leisure time. Overtime should be compensated above the standard rate and should not exceed 10-hours a day six days a week.	National level - Medium	Workers	According to the Labour law, working hours should be set to a maximum of 8 hours a day for 6 days including at least one hour break every 4 hours. Overtime is allowed with appropriate need, but in all cases, working hours should not exceed 10 per day. Workers should have a 24-hour period of rest after 6 days of work. All workers will be notified of their schedule for the weekly day rest, working hours, break periods and any changes introduced to such a schedule.	Low	Labour & Working Conditions Management Plan
Discrimination: All individuals should be treated equally regardless of class, race, colour, religion, gender, age, political or other beliefs, national or social origin, disability, civil	National level - Medium	Workers	The local recruitment process will be conducted in an inclusive and diverse manner, which means job opportunities will be open to all community members regardless of their class, race, colour, gender, age, disability, civil status etc. Recruitment will be based on competency and skill.	Low	Labour & Working Conditions Management Plan

Risks	Level of Risk (Before Mitigation)	Group Impacted	Mitigation measures	Level of Risk (After Mitigation)	Reference Plan
status, family background etc.			Efforts and resources will be allocated to make sure that women are also fairly targeted and recruited and are provided opportunities for learning skills to participate equally as men. Gender inclusive advertising will be identified, in consultation with female stakeholders (such as women's groups and CBOs) and will be utilized in the announcement of job opportunities. Candidate selection (recruitment) will be conducted by a mixed-sex panel (comprising of at least two people). Candidate promotion selection will always be carried out by a gender diverse and balanced panel (more than one person and never by a single-sex panel). It will be prohibited to terminate the contract of a female worker during her maternity leave.		
Right to Social Insurance: With the high prevalence of informal work in Egypt, a contractor or third party may hire workers informally which leaves workers largely unprotected and unable to contribute to and access their rights.	National level - Medium	Workers	All workers on site will be provided with a contract. Each worker will be provided with a signed copy of the contract and another copy will be retained with the HR Manager. Each employee will be provided with a copy of the contract and Code of Conduct as well as Gender Based Violence and Harassment (GBVH) Code of Conduct and will be required to sign it. The signed copy will be retained with the HR Manager. At recruitment stage and before signature, contracts and codes of conduct have to be verbally explained to	Low	Labour and Working Conditions Management Plan

Risks	Level of Risk (Before Mitigation)	Group Impacted	Mitigation measures	Level of Risk (After Mitigation)	Reference Plan
			workers in a language that they understand – to ensure that illiterate workers are fully informed of their rights and responsibilities. Workers should be entitled to annual and sick leaves as well as any other social benefits as stipulated in the Labour law. These will be included in the worker's contract.		
Right to Organize and Join Unions Worker should have the right to organize, including the ability to form and join unions and bargain collectively.	National level - Medium	Workers	The Labour and Working Conditions Management Plan should explicitly state that workers have the right to organize and form and join unions and collectively bargain. Discrimination against workers who join unions or support organizing efforts should be explicitly prohibited.	Low	Labour and Working Conditions Management Plan
Forced Labour and/or Human Trafficking: Egypt has a 2010 anti-trafficking and a 2016 anti-smuggling law and continues to make efforts to eliminate forced labour and trafficking, but incidents continue to be reported.	National level - Medium	Workers Local Community (other individuals under forced labour)	The Labour and Working Conditions Management Plan should explicitly prohibit forced labour and human trafficking. Confiscation of employees' passports should be explicitly prohibited.	Low	Labour and Working Conditions Management Plan
Occupational health and safety: Companies should	National level - Medium	Workers	An Occupation Health and Safety Plan (OHSP) that is project and site specific will be developed that ensures the health and safety of all personnel and prevents	Low	Occupational Health and Safety Plan

Risks	Level of Risk (Before Mitigation)	Group Impacted	Mitigation measures	Level of Risk (After Mitigation)	Reference Plan
provide and actively promote safe and healthy work conditions for workers.			accidents which may injure personnel or damage property. A Worker Influx Plan should be developed and to take into account: i) medical examination program for workers; ii) procedures to maintain hygienic conditions onsite, iii) code of conduct for workers; iv) induction training and awareness requirements for risk diseases.		Worker Influx Plan
Rights of Women: Workers are entitled to a safe workplace free from sexual harassment. While men can also be targeted, the vast majority of Egyptian women report having been sexually harassed in their lifetime.	National level - Medium	Workers	Female workers should explicitly be subject to the same protections as male workers, including legal contracts, fair wages, reasonable working hours, occupational health and safety measures, and non-discrimination. The Worker Grievance Mechanism will prohibit gender-based violence and harassment in the workplace and will outline that a suitably trained male and female person is designated to process grievances in which male / female workers might feel uncomfortable discussing with a person of the opposite sex. The grievance mechanism also includes a procedure to deal with GBVH grievances. Female sanitary, toilet facilities, and prayer rooms will be kept separate from men. All such facilities will have lockable doors with adequate numbers provided. Separate changing rooms and cabinets will be provided for men and women both of which have locking mechanisms. In case of hotel and apartments, separate sleeping rooms for men and women will be provided in shared accommodations Means of securing bedroom doors	Low	Labour & Working Conditions Management Plan Worker Accommodation Management Plan

Risks	Level of Risk (Before Mitigation)	Group Impacted	Mitigation measures	Level of Risk (After Mitigation)	Reference Plan
			from inside and out will be provided. Finally, female sanitary and toilet facilities will be kept separate from men. Men and women will be provided with separate sleeping rooms/ dormitories. In addition, female sanitary and toilet facilities will be kept separate from men All workers will be required to read and sign a Worker Code of Conduct which will be explained verbally. The code of conduct prohibits the following and which is subject to disciplinary action: (i) harassment, gender-based violence and abuse of any kind will not be tolerated; (ii) discrimination based on personal characteristics is prohibited to include but not limited to gender, race, nationality, ethnic, social and indigenous origin, religion or belief, disability, age, or sexual orientation. In the case body searches are required for security reasons, those will be gender sensitive (i.e. body searches on female workers / employees /visitors should be undertaken by female security officers and vice versa).		
Rights of migrant workers should be respected. Migrant workers should not be discriminated or denied labour rights. Egypt is not a	National level - Medium	Workers	The project should ensure that migrant workers employment is in conformity with Egyptian laws and regulations, to ensure workers are not vulnerable to exploitation for fear of deportation or arrest. Migrant workers should explicitly be subject to the same protections as non-migrant workers, including legal	Low	Labour & Working Conditions Management Plan Worker Accommodation

Risks	Level of Risk (Before Mitigation)	Group Impacted	Mitigation measures	Level of Risk (After Mitigation)	Reference Plan
signatory to the Migrant Workers Convention, 1975.			contracts, fair wages, reasonable working hours, occupational health and safety measures, and non-discrimination. Migrant workers should have access to fair and reasonable complaint mechanisms for rights violations. In the case of a dispute, the migrant worker should have the right to present his case to a competent body without fear of retribution. In the case of expulsion of a migrant worker of their family, the cost shall not be borne by them. Migrant workers should have access to their personal and travel documents including passports at all times. If provided, accommodations for migrant workers should provide adequate personal space and standard of living.		Management Plan
Rights of local community groups	National level - Medium	Local Community	The Project is expected at a minimum to provide job opportunities for local communities. This, to some extent, could contribute to enhancing their socio-economic conditions. While the ESIA notes that there are no economic activities relating to Bedouin Groups within the Project site, the area is under their “Ghafra System” and therefore it is recommended that a Community Integration Plan for employment and procurement opportunities for local communities and Bedouin groups is developed. The Stakeholder Grievance Mechanism included within the Stakeholder Engagement Plan (SEP) allows local	Low	Community Integration Plan / (Referred to as Social Responsibility Program in this ESIA report)

Risks	Level of Risk (Before Mitigation)	Group Impacted	Mitigation measures	Level of Risk (After Mitigation)	Reference Plan
			communities (including Bedouin groups) to lodge grievances. Note: The above mitigation measures are also relevant and applicable to this project. The consultations and land use survey conducted for the SWE 1.1 GW Wind Project confirm that the project area is not used by the Bedouins or the local community for any activities such as grazing or farming. The Ghafra system, which divides the area among Bedouin families, is respected and does not involve formal claims to the land.		

Supply Chain

As stated above, the engagement of suppliers will present potential risks related to labour and working conditions. ACWA Power has requested Envision (WTG supplier) to carry out a supplier's risk assessment for all their Tier 1 and 2 suppliers involved in four (4) wind farms in Azerbaijan and Uzbekistan in 2022. The assessment was carried out to ensure the projects comply with EBRD PR1 and PR2 requirements.

Between March and April 2024, SGS conducted follow-up assessments of the health, safety, and working conditions for Envision and its suppliers, building on the findings from the previous assessment carried out in 2022. These assessments were conducted in compliance with local labour laws, ILO conventions ratified by the People's Republic of China (PRC), and the requirements of the EBRD requirements, as well as the Equator Principles. As stated in the report, the results of these assessments are applicable to other ACWA Power projects that adhere to the same standards and legal requirements. Also, ACWA Power has confirmed the same suppliers will be used for the SWE 1.1 GW Wind Project. The follow-up assessment evaluated 36 suppliers at various intervals, including initial assessments (1 to 3 months after the previous assessment), half-year, annual, and final reviews ²⁰(SGS, 2024).

During the previous assessment (2022), all findings were classified into five (5) compliance levels (Zero-Tolerance, Major Non-Compliance, Minor Non-Compliance, Observation, Not Available). The compliance levels were determined based on five (5) criteria (legal aspect, production interruption, potential loss, reputation, checklist). The severity of the finding decreases from "Zero Tolerance", to "Major Non-Compliance" to "Minor Non-Compliance" to "Observation" (SGS, 2024).

The main objectives of the HS and Working Condition Follow-up Assessment were to track, evaluate, and report the status of rectifications conducted by the manufacturers. All findings in the follow-up assessments were classified into 3 levels (Open, Ongoing, Closed). The follow-up assessment showed that all 348 findings including all major non-compliances were closed out for all 36 suppliers throughout the different phases of the assessment (initial, half year, year and final). The outcome of the follow-up assessment and action plan for each supplier is provided in the HS & Working Condition follow up report.

In order to ensure human rights protections is maintained across the supply chain, the follow up assessment includes continuous monitoring of labour-related systems and changes in the workforce of different suppliers. The key checkpoints identified during these assessments include (SGS, 2024):

- The number of third-party workers is no more than 10% of the employee population
- The overtime hours of employees in the company do not exceed 36 hours per month, which complies with regulations
- The employees in the company do not work for 7 consecutive days
- The overtime salary provided by the company meets the requirements of national laws and regulations
- Other: Findings that have been closed, but have been changed for a special reason, but at the same time do not involve non-compliance. Such cases will be monitored on an ongoing basis and explained in the assessment note

Given the resolution of all findings by Envision and their suppliers and the continuous monitoring process, the impacts are considered to be of minor significance. Although the magnitude of these impacts is low, the receptors are considered to be of high sensitivity.

²⁰ SGS, HS & Working Condition Follow-Up Report. 2024.

Mitigation Measures

Project Company to align with the measures and management plans already developed for similar wind projects to avoid duplication of efforts and ensure consistent application of best practices across all projects using the same suppliers.

EPC contractor to comply with ACWA Powers' procurement and supply chain requirements. This includes implementing all mitigation and management plans developed for the management of suppliers, such as Supply Chain Management Plan, and adhering to monitoring requirements of suppliers. The EPC contractor should ensure any change in suppliers should be assessed to confirm compliance with ACWA Power and EBRD requirements.

The EPC Contractor and Project Operator are required to develop and implement a Human Resources (HR) procedure for workers that should be guided by the Local Labour Law as well as the IFC PS 2 / EBRD PR 2 and ILO Fundamental Labour Conventions covering the following in particular:

- Implementing the mitigation and management measures listed in Table 70 above for human rights risks.
- Providing reasonable working conditions and terms of employment to include but not limited to contract management, working hours, salaries/wages, annual and medical leaves, bereavement leaves, accommodation, etc.
- Recognizing workers' rights to form and to join workers' organizations and to bargain collectively
- Prohibition of child labour within the workforce
- Overall management of young workers within the labour force
- Prohibition of forced labour
- Non-discrimination throughout the entire work cycle in all its forms
- Providing equal opportunities for all throughout procurement and employment opportunities including women groups
- Overall management of daily workers, migrant workers and third-party workers

Following the implementation of these mitigation measures, the significance of the supply chain impacts remains minor.

Monitoring and Reporting Requirements

For supply chain, ACWA Power and Project Company to align with the monitoring requirements already developed for similar wind projects using the same suppliers.

The following identifies the monitoring and reporting requirements that must be adhered to by the EPC Contractor and Project Operator:

- Undertake monthly inspections during construction and quarterly during operation against the developed HR procedure
- Submission of HR inspection report that identifies any corrective measures undertaken

8.11 Public Health and Safety

This section identifies and assesses the anticipated impacts from the Project activities on public health and safety during the various phases to include planning and construction phase and operation phase. For each

impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

8.11.1 Potential Impacts from Noise during Operation

Wind turbines produce noise during operation from mechanical and aerodynamic sources. Mechanical noises are mainly limited from the machinery in the nacelle of the turbine (gearbox, generator, auxiliary equipment, etc.) while aerodynamic noise is generated from the movement of air around the turbine blades and tower.

Propagation of the sound from a turbine is primarily a function of distance, but it can also be affected by the placement of the turbine, surrounding terrain, and atmospheric conditions. In addition, noise levels depend greatly on the level of operation of the turbines (percentage of rated power). Nevertheless, in some cases, background/ambient sound already exceeds the sound produced by any wind turbine (e.g. high wind speeds, surrounding activities, etc.). In this case, the sound from the wind turbine blends into the background sound, simply becoming part of the present soundscape without the notice of residences.

As required by the IFC EHS Guideline for Wind Energy, the following is noted in relation to noise assessment for wind farms:

- Receptors should be chosen according to their environmental sensitivity (human, livestock, or wildlife).
- Preliminary modelling should be carried out to determine whether more detailed investigation is warranted. The preliminary modelling can be as simple as assuming hemispherical propagation (i.e., the radiation of sound, in all directions, from a source point). Preliminary modelling should focus on sensitive receptors within 2,000 meters (m) of any of the turbines in a wind energy facility.
- If the preliminary model suggests that turbine noise at all sensitive receptors is likely to be below an LA90 of 35 decibels (dB) (A) at a wind speed of 10 meters/second (m/s) at 10 m height during day and night times, then this preliminary modelling is likely to be sufficient to assess noise impact; otherwise, it is recommended that more detailed modelling be carried out, which may include background ambient noise measurements.

The IFC EHS Guideline for Wind Energy is based on the on “the Assessment and Rating of Noise from Wind Farms” (ETSU-R-97). ETSU can be regarded as relevant guidance on good practice, it contains a methodology for generating noise limits for a wind turbine and wind farms. ETSU-R-97 is referenced by the United Kingdom (UK) Government as a best practice guide for UK Legislation. The assessment procedure of ETSU-R-97 consists of the following steps for the screening assessment:

- Determine a study area;
- Identify potentially affected properties;
- Predict noise levels from all turbines (existing and proposed) and determine a noise contour boundary of 35dB(A);
- Identify if any noise sensitive receptors are within this boundary.

Taking the above requirements into account, a screening assessment was undertaken for the Project based on the following:

- Noise prediction calculations using SoundPLAN 8.2 software according to the International Organization for Standardization (ISO) 9613 ‘Acoustics – Attenuation of Sound During Propagation Outdoors’ (International Organization for Standardization -ISO, 1996). ISO 9613 specifies an engineering method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources
- ISO 9613-2 calculates predicted noise levels with the major assumption that the sources are located upwind

from the Noise Sensitive Receiver locations (NSR) as this is the worst-case scenario. Therefore, directivity and attenuation due to metrological factors such as wind speed and wind direction upwind from a source are not taken into account

- Screening was based on a worst-case noise scenario (W10 = 10m/s) as required by the guidelines.

Table 71: Turbine and Noise Specifications

Manufacturer	Envision
Model type	EN182 7.8 MW
Rated Power	8,000 kW
Rotor Diameter	171 m
Hub Height	110 m
Number of Turbines	82
Maximum Sound Power Level	110.1 dB(A)
Sound Power Level Uncertainty	± 2 dB(A)

- To ensure a comprehensive analysis, the uncertainty value of the Envision layout (+2) was incorporated into the assessment to account for a maximum worst-case scenario.
- Determining the extent of the 35 dB(A) contour boundary emitted from the wind turbine generators (WTG)
- Determining if there are any noise sensitive receptors within the calculated contour boundary;
- Model calculation and parameter setting to include the following:

Table 72: Model Calculation and Parameter Setting

Model Parameter	Parameter Setting / Standard
Calculation Standard	(ISO) 9613 'Acoustics – Attenuation of Sound during Propagation Outdoors – Part 2: General Calculation Method' (ISO, 1996) Application as per IOA GPG
Wind Speed	10 m/s
Ground Absorption Coefficient	0.5
Receiver Height	10 m
Meteorological Data	Humidity 70% Air Pressure 1013.3 mbar T = 25°C
Atmospheric Attenuation Coefficients (dB / km)	63Hz 125Hz 250Hz 500Hz 1kHz 2kHz 4kHz 8kHz 0.1 0.3 1.1 2.8 5.0 9.0 22.9 76.6

The study is based on the following information:

- General arrangement and layout drawings of the wind farm, including topography.
- Wind turbine supplier data (vendor noise data) as provided by the Developer
- Noise Sensitive Receiver locations (NSR) as identified earlier – Wadi Dara Village. Review of identified receptors indicate that the nearest NSR is Wadi Dara Village located adjacent to the Project site. As discussed within the land use section (refer to "Section 7.2") several economic and land use activities take place within the village related to agriculture and livestock rearing.

A noise contour map for the worst-case noise scenario has been calculated and is presented in the figure below. The map shows both contour lines and noise propagation level areas or 'zones'. The significance of the noise contour map is to allow for an overview of noise levels over a geographic area and therefore allows a quick basic analysis of the noise propagation for identification of the specific NSR.

Table 73: Noise Contour Map Setup Specification

Parameter Description	Noise Map Parameter
Wind Speed (W10)	10 m/s
WTG Operation	Worst Case – All WTGs operating
Mapping Grid Resolution	25 x 25 m

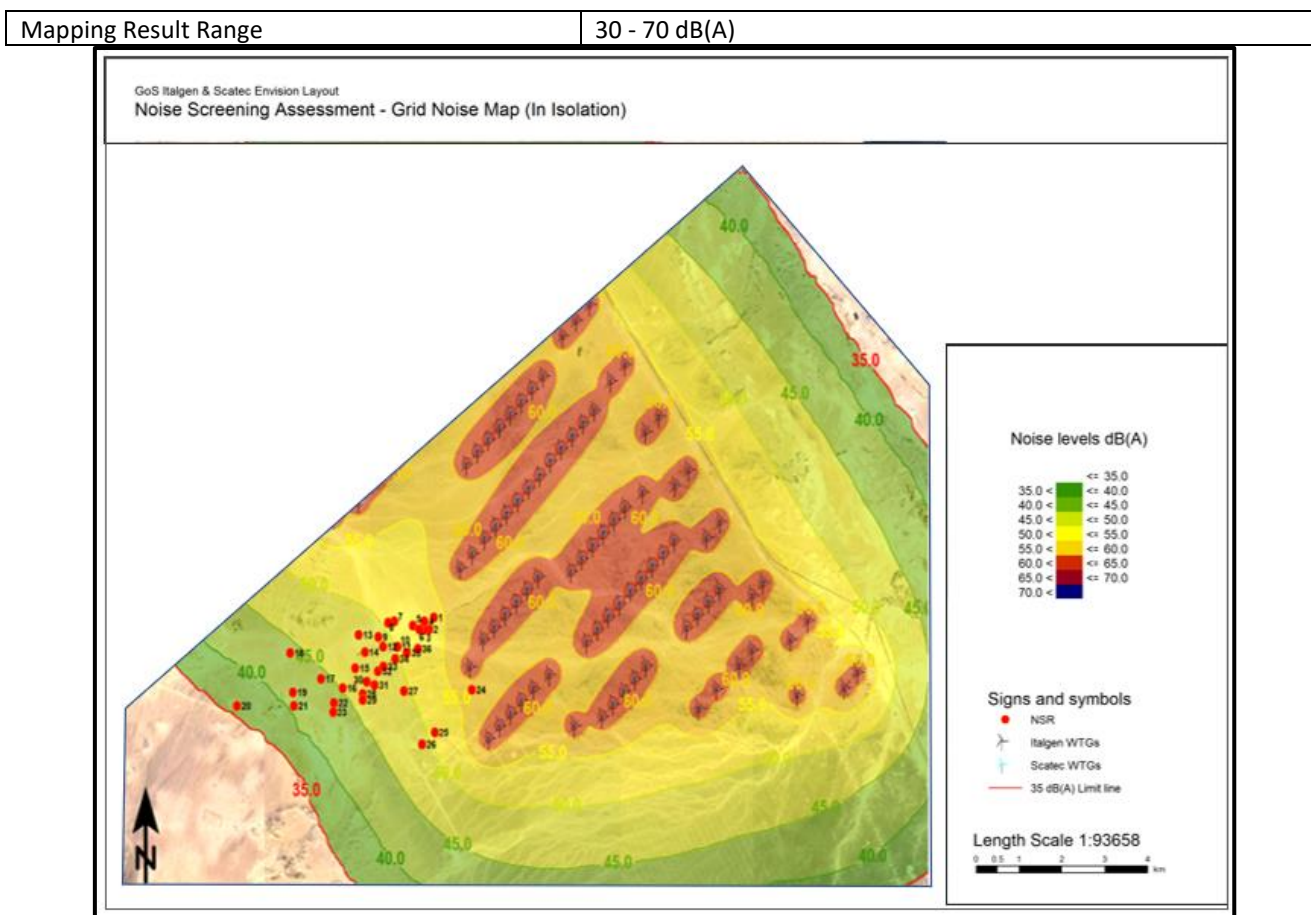


Figure 90: Noise Screening Assessment Results – Grid Noise Map (In Isolation)

Taking the above into account, the preliminary modelling indicates that the level of noise at Wadi Dara village is not outside of the 35dBA limit. Therefore, in accordance with the IFC requirements, a detailed noise modelling and assessment is required including establishing background noise over a series of 10-minute intervals. The detailed noise modelling is included below.

Detailed Noise Modelling

An assessment was undertaken to assess the potential noise impact from the proposed SWE Wind Farm Project (Plot 2) focussing on the NSRs in the immediate surrounding areas where residential areas are located within Wadi Dara Village (a total of 35 NSRs have been identified).

A baseline noise survey was conducted at two noise measurement sites located in the vicinity of the NSRs, adjacent to the wind farm development from 27th January 2024 to 10th February 2024. The purpose of the survey was to measure background noise levels across a range of wind speeds. The IOA GPG states that the '*study area for background noise surveys (and noise assessment) should, as a minimum, be the area within which noise levels from the proposed, consented and existing wind turbine(s) may exceed 35 dB LA90 at up to 10 m/s wind speed*'.

Considering the above, the selected noise monitoring sites were positioned to the west of the wind farm site, strategically placed within the region where the majority of NSRs are situated and can be considered representative of the other NSRs located within the same area. The survey methodology used is summarised in the table below.

Table 74: Summary of Noise Survey Methodology

Parameters	LAeq and LA90
Equipment	Type 1 Sound Level Meter (SLM) Field Calibrator Wind shield Heavy Duty Tripod
Reference method	ISO 1996-1:2003 ²¹
No. locations	2
Measurement interval	10 minutes
Duration (per location)	15 days
Data Points	NML 1: 2016 NML 2: 2016
Dates covered	27 th January 2024 to 10 th February 2024
Calibration drift over measurement period	0 dB

The locations of the NSRs and monitoring sites are shown in the following Figure, with their coordinates provided in the accompanying table.

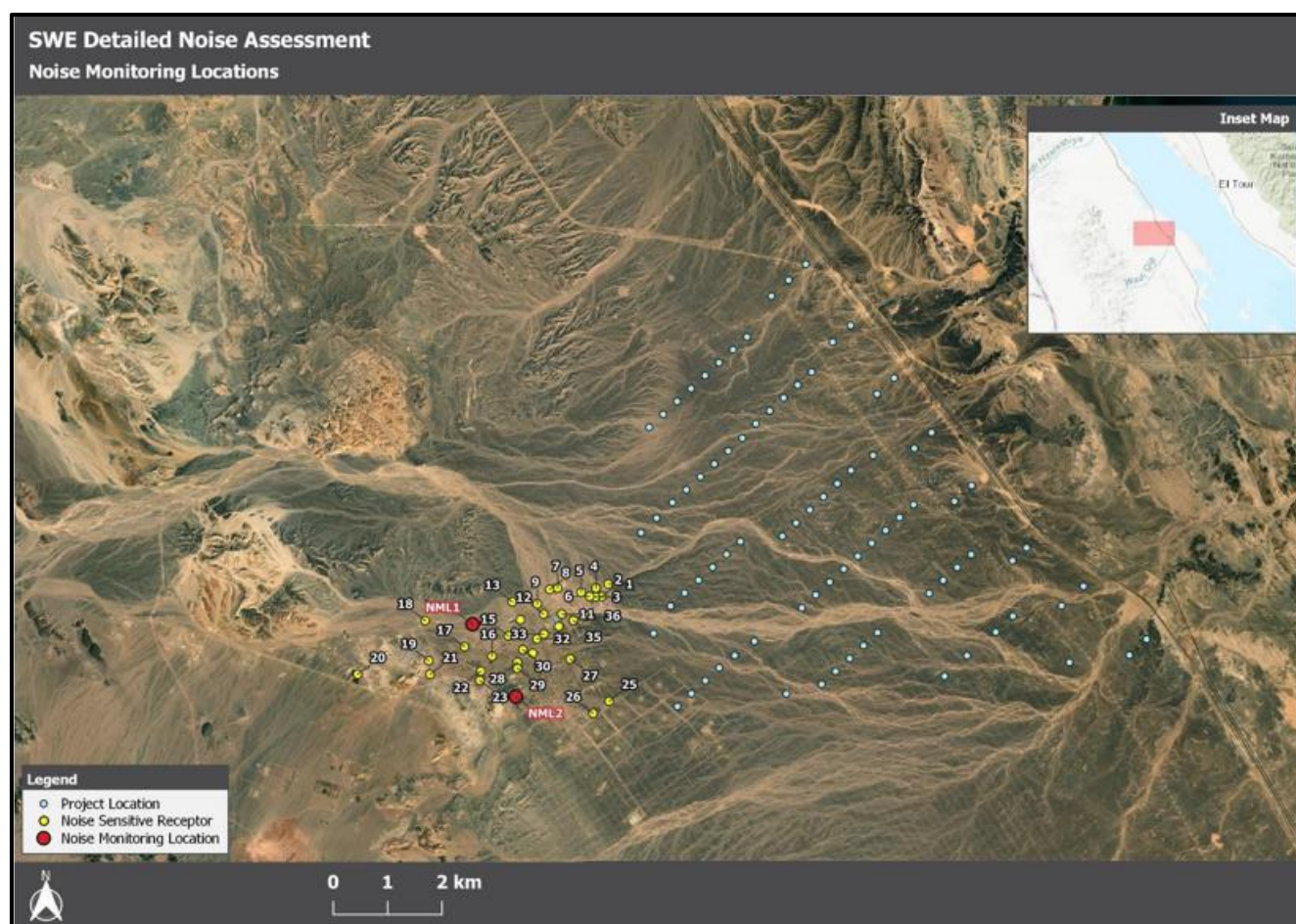


Figure 91: Location of NSRs and Noise Monitoring Sites

²¹ "International Organization for Standardisation (ISO) 1996-1: 2003 'Description and Measurement of Environmental Noise'," 1996.

Table 75: Coordinates of NSRs and Noise Monitoring Sites

NSR	UTM Coordinates (Zone 36)	
	mE	mN
NSR1	523397	3096856
NSR2	523279	3096627
NSR3	523162	3096619
NSR4	523172	3096781
NSR5	522900	3096702
NSR1	523055	3096628
NSR2	522467	3096781
NSR3	522320	3096757
NSR4	522093	3096490
NSR5	522542	3096304
NSR6	522542	3096304
NSR7	522207	3096304
NSR8	521633	3096530
NSR9	521782	3096199
NSR10	521557	3095902
NSR11	521259	3095529
NSR12	520753	3095702
NSR13	520030	3096184
NSR14	520094	3095446
NSR15	518786	3095195
NSR16	520120	3095195
NSR17	521054	3095253
NSR18	521035	3095080
NSR19	524285	3095499
NSR20	523414	3094699
NSR21	523118	3094477
NSR22	522698	3095475
NSR23	521726	3095417
NSR25	521827	3095647
NSR26	522008	3095582
NSR27	522088	3095846
NSR28	522215	3095936
NSR29	522487	3096077
NSR30	522757	3096184
NSR31	523017	3096269
NSR32	523397	3096856
NSR33	523279	3096627
NSR34	523162	3096619
NSR35	523172	3096781
NSR36	522900	3096702
Noise Monitoring Location 1	520901	3096119
Noise monitoring Location 2	521699	3094785

Noise limits were derived from the baseline data and noise predictions were calculated with SoundPLAN 9.0 software according to ISO 9613-2 with input parameters and limitations stipulated as per IOA GPG. Wind speed data were recorded from a met mast located in the vicinity of the proposed wind farm site. The data from all instruments on the mast is captured on a 10-minute averaging period by a data logger. The stored data are then downloaded to cover the requisite monitoring period.

The detailed noise assessment was originally conducted for Goldwind turbines as detailed in Table below. However, the wind turbine model has changed to Envision. According to the noise expert, this change in wind turbine number and model will not affect the outcome of the assessment based on the following:

- The revised layout has a reduced number of WTGs decreasing from 82 to 69 turbines.
- The revised layout does not position any wind turbine closer to a sensitive receptor than the original layout.
- The overall density of the wind farm layout remains approximately the same.
- The specifications of the WTGs have not changed.

Table 76: Wind Turbine Generator Specifications (Original and Current Layouts)

Item	Specification (Original)	Specification (Current)
Manufacturer	Goldwind (GWH182-7.5 MW)	Envision
Number of Turbines	82	69
Rated Power	7,500 kW/ 7.5 MW	8.0 MW
Rotor Diameter	182 m	171 m
Hub Height	100 m	100 m

The assessment focused on the worst-case noise level scenario, involving all WTGs including existing WTGs, operating at maximum sound power output (10 m/s). The assessment also considers the cumulative effects of existing and operating wind farms in the area (discussed in Section 7.8.9) and shown in the Figure below.



Figure 92: Existing and Proposed Wind Farms

The noise limits used for the assessment are summarised in the Table below, which are based on IOA Good Practice to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise.

Table 77: Summary of ETSU-R-97 Noise Limits

Assessment Period	Limits
Daytime	35 dB(A) or 5 dB above prevailing background, whichever is greater.
Night-time	43 dB(A) or 5 dB above prevailing background, whichever is greater.

Using the methodology laid out in ETSU-R-97, the daytime and night-time background noise level at NM1 and NM2 was calculated and is presented in the Figures below.

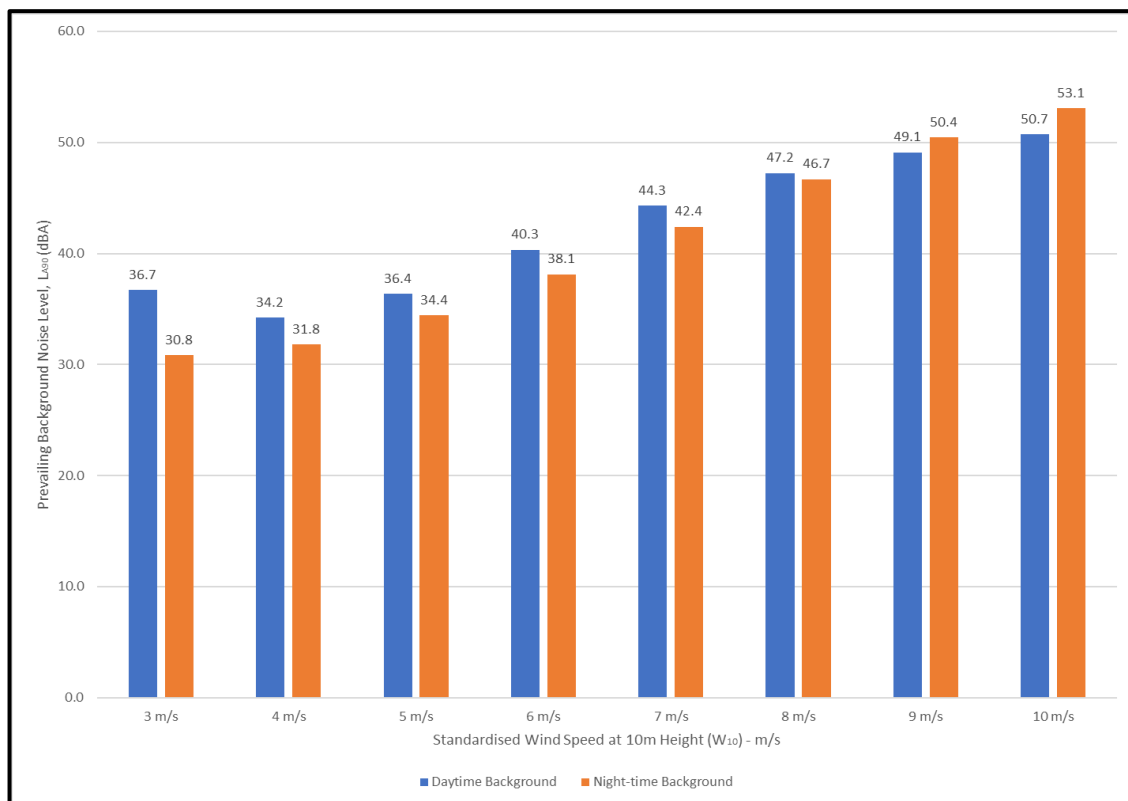
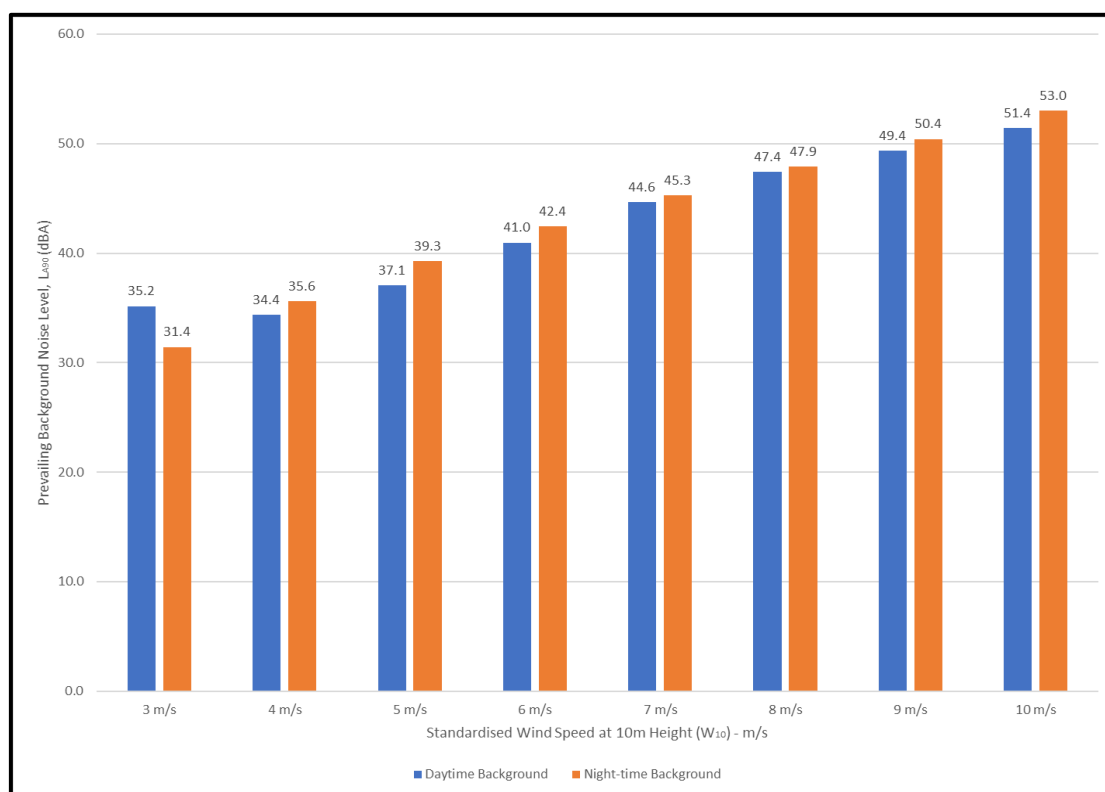


Figure 93: Prevailing Background Noise Level according to standardized wind speed W10 at NM1

Figure 94: Prevailing Background Noise Level according to standardized wind speed W₁₀ at NM2

Determination of Assessment Noise Limits

For the daytime and night-time period, the limit is based on the background noise level +5 dB. The proposed assessment noise limits are set out in the table below.

Table 78: Proposed Noise Limits for WTG Noise Assessment

Location / Area	Standardised Wind Speed at 10 m Height, m/s			
	ETSU-R-97 Noise Limits, LA90 dB for the worst-case, 10 m/s			
	Daytime Background LA90 dB(A)	Daytime Limit LA90 dB(A) (i.e. background + 5 dB(A))	Night-time Background LA90 dB(A)	Night-time Limit LA90 dB(A)
NML1	50.7	55.7	53.1	58.1
NML2	51.4	56.4	53.0	58.0

Although the two wind speed data sets are similar, to remain conservative, the lowest derived daytime and night-time noise limit from the two monitoring locations is applied for all NSRS. This means that the daytime noise limit is 55.7 dB(A), and the night-time noise limit is 58 dB(A).

Tables 14 and 15 below show the assessments for daytime and night-time periods for wind speed W₁₀ of 10 m/s, the worst-case scenario respectively. For a conservative approach, the predicted noise contribution from the WTGs includes the cumulative noise levels from all WTGs in the surrounding area.

Table 79: Noise Impact Assessment for Day-time Periods, $W_{10} = 10$ m/s

Noise Sensitive Receptor	Predicted Noise Contribution	Total Noise (Contribution + Background)	ETSU-R-97 Day-time Limit (background for 10 m/s + 5 dB)	Maximum Exceedance Value
	dB LA90	dB LA90	dB LA90	dB
NSR1	52.6	54.8	55.7	0
NSR2	51.9	54.4	55.7	0
NSR3	51.4	54.1	55.7	0
NSR4	51.5	54.1	55.7	0
NSR5	50.3	53.5	55.7	0
NSR6	50.9	53.8	55.7	0
NSR7	48.8	52.9	55.7	0
NSR8	48.2	52.6	55.7	0
NSR9	47.3	52.3	55.7	0
NSR10	48.7	52.8	55.7	0
NSR11	48.7	52.8	55.7	0
NSR12	47.5	52.4	55.7	0
NSR13	45.9	51.9	55.7	0
NSR14	46.1	52.0	55.7	0
NSR15	45.2	51.8	55.7	0
NSR16	44.1	51.6	55.7	0
NSR17	42.9	51.4	55.7	0
NSR18	41.5	51.2	55.7	0
NSR19	41.1	51.2	55.7	0
NSR20	37.8	50.9	55.7	0
NSR21	40.9	51.1	55.7	0
NSR22	43.3	51.4	55.7	0
NSR23	43.1	51.4	55.7	0
NSR25	50.0	53.4	55.7	0
NSR26	48.4	52.7	55.7	0
NSR27	48.5	52.7	55.7	0
NSR28	45.3	51.8	55.7	0
NSR29	45.2	51.8	55.7	0
NSR30	45.8	51.9	55.7	0
NSR31	46.3	52.0	55.7	0
NSR32	46.8	52.2	55.7	0
NSR33	47.3	52.3	55.7	0
NSR34	48.3	52.7	55.7	0
NSR35	49.4	53.1	55.7	0
NSR36	50.5	53.6	55.7	0

Table 80: Noise Impact Assessment for Nighttime Period, $W_{10} = 10$ m/s

Noise Sensitive Receptor	Predicted Noise Contribution	Total Noise (Contribution + Background)	ETSU-R-97 Day-time Limit (background for 10 m/s + 5 dB)	Maximum Exceedance Value
	dB LA90	dB LA90	dB LA90	dB
NSR1	52.6	55.8	58	0
NSR2	51.9	55.5	58	0
NSR3	51.4	55.3	58	0
NSR4	51.5	55.3	58	0
NSR5	50.3	54.9	58	0
NSR6	50.9	55.1	58	0
NSR7	48.8	54.4	58	0
NSR8	48.2	54.2	58	0
NSR9	47.3	54.0	58	0
NSR10	48.7	54.4	58	0
NSR11	48.7	54.4	58	0
NSR12	47.5	54.1	58	0
NSR13	45.9	53.8	58	0
NSR14	46.1	53.8	58	0
NSR15	45.2	53.7	58	0
NSR16	44.1	53.5	58	0
NSR17	42.9	53.4	58	0
NSR18	41.5	53.3	58	0
NSR19	41.1	53.3	58	0
NSR20	37.8	53.1	58	0
NSR21	40.9	53.3	58	0
NSR22	43.3	53.4	58	0
NSR23	43.1	53.4	58	0
NSR25	50.0	54.8	58	0
NSR26	48.4	54.3	58	0
NSR27	48.5	54.3	58	0
NSR28	45.3	53.7	58	0
NSR29	45.2	53.7	58	0
NSR30	45.8	53.8	58	0
NSR31	46.3	53.8	58	0
NSR32	46.8	53.9	58	0
NSR33	47.3	54.0	58	0
NSR34	48.3	54.3	58	0
NSR35	49.4	54.6	58	0
NSR36	50.5	54.9	58	0

Based on the above results, the cumulative noise levels were predicted to be below the ETSU-R-97 derived limit during daytime or night-time at any of the NSRs. Therefore, no mitigation or curtailment for noise is required for the Project.

Based on the above, significance of the residual impact is determined as not significant, with a low magnitude of impact and low sensitivity of the receiving environment.

Monitoring and Reporting Requirements

As there are no significant negative impacts predicted from the wind farm, mitigation is limited to further monitoring to confirm that there are no negative noise impacts once the wind farm is operational.

Upon completion of the construction of the wind farm, during the commissioning period a detailed long-term EPC contractor to carry out verification noise monitoring programme. The monitoring programme should be carefully designed with specific planning of equipment, measurement locations and periods.

8.11.2 Potential Impacts from Shadow Flicker from Wind Turbines during Operation

Shadow flicker occurs when the sun passes behind the wind turbine and casts a shadow several hundred meters away from the turbine's location. As the rotor blades rotate, shadows pass over the same point causing an effect known as 'shadow flicker'. Shadow flicker only occurs under specific environmental conditions which must also align for flicker to occur which include position and height of the sun, wind speed, direction, cloudiness, and position of the turbine to a sensitive receptor.

Excessive shadow flicker can be a source of nuisance and could create a disturbing indoor environment to the occupants of those buildings especially when casted through windows of buildings that directly face the turbine with no obstructions in sight (trees, hills, etc.).

A companion guide to Planning Policy Statement 22 (PPS22) (2004) and BERR (2007) indicates that shadow flicker is typically limited to occurring within approximately 10 rotor diameters of a wind turbine; at distances beyond 10 rotor diameters shadow flicker effects are essentially undetectable. Beyond this distance, the shadow is diffused such that the variation in light levels is not likely to be sufficient to cause annoyance. This is also acknowledged in the Queensland Wind Farm Planning Guidelines, which state that the first step in performing a shadow flicker assessment is to determine the extent of shadows from turbines and suggest a distance equivalent to 265 maximum blade chords (the thickest part of the blade) as an appropriate limit. This limit corresponds to around 800 m to 1,325 m for modern wind turbines, which typically have maximum blade chord lengths of 3 m to 5 m (AECOM, 2016). The maximum shadow flicker expected are likely to occur within 1,800m radius.

The IFC EHS Guideline for Wind Energy states that where there are nearby receptors, commercially available software can be used to model shadow flicker in order to identify the distance to which potential shadow flicker effects may extend.

Wadi Dara Village's proximity to the Project site indicates the potential for exceedance levels of shadow flicker to be of potential concern.

Shadow Flicker Modelling

A shadow flicker assessment was undertaken for the SWE Wind Farm Project (Plot 2) using WindPRO 3.6. The modelling was carried out in accordance with the assessment criteria of the German guideline for shadow flicker. The modelling considered 82 Goldwind turbines. As stated above in the noise assessment (operation phase), the change in turbine model and layout will not affect the outcome of the assessment,

The German guidelines refer the following limit of the shadow and is set by two factors:

- The angle of the Sun over the horizon must be at least 3 degrees; and,

- The blade of the WTG must cover at least 20% of the Sun.

The limits of shadow impact for a neighbour to a wind farm according to the guidelines are:

- A maximum of 30 hours per year of astronomical maximum shadow (considered worst case); and,
- A maximum of 30 minutes per day of astronomical maximum shadow (considered worst case).

If one of these thresholds is exceeded, mitigation measures should be devised in the form of curtailment strategies which would not allow for shadow flicker to occur – i.e., not operate certain WTGs at times and conditions when shadow flicker would occur.

Shadow flickering effects are only considered for domestic dwellings with one or more windows / openings that face in the direction of the WTGs / Wind Farm in question. Areas which are not used for human occupancy are not considered in this assessment (i.e., garages and storage areas).

The following calculations and assumptions were used for WindPRO calculations:

- Calculations only when more than 20% of the sun is covered by the blade.
- Minimum sun height over the horizon of influence: 3o.
- Day step for calculation: 1 day.
- Time step for calculation: 1 minute.
- Before calculating the flicker values, the software performs a Zone of Visual Influence (ZVI) calculation to exclude the wind turbine generators (WTGs) that are not visible from a given location.
- A WTG will be visible if it is visible from any part of the receiver window.
- The ZVI calculation is based on the following assumptions:
 - Height contours are used.
 - Eye height: 1.5 m.
 - Grid Resolution: 10.0 m.
- The calculated times are “worst-case” given by the following assumptions:
 - The sun is shining continuously during the day, from sunrise to sunset.
 - The rotor plane is always perpendicular to the line from the WTG to the sun; and,
 - The WTG is always operating.

The following summarised the results of the shadow flicker assessment:

- The results of the prediction calculations showed that under worst-case conditions, shadow flicker occurs at 3 of the 35 assessed sensitive receptors (results are presented in the Table and Figures below). These SRs are predicted to experience exceedances of the guideline level of 30 hours per year. These exceedances were 6 hours and 30 mins at SR1 and SR6, and 7 hours and 1 minute at SR3
- The results assume that the 3 affected properties have direct window orientation to the WTGs. In addition, the results also assume that there will be direct occupancy during the days/hours within which shadow flicker occurs. In the case the above conditions are not met no impacts are anticipated.

Table 81: Assessment of Shadow Flicker for 'Hours per Year' and 'Minutes per Day' Limitations

Receiver ID	UTM Easting	UTM Northing	Astronomical maximum possible shadow flickering [HH:MM per year]	Limit – Hours per Year	Astronomical maximum possible shadow flickering [Minutes per day]	Limit – Minutes per day	Shadow Flicker Exceedance
SR1	523055	3096628	36:30	30	00:28	30	Yes
SR3	522320	3096757	37:01	30	00:29	30	Yes
SR6	522542	3096304	36:30	30	00:25	30	Yes



Figure 95: Shadow Flicker Map for Worst-Case Scenario (hours per annum)



Figure 96: Shadow Flicker Map for Worst-Case Scenario (mins per day)

Based on the results of the assessment above, the impact is considered of long-term duration throughout the Project operation phase, of a negative nature, and is expected to be of medium magnitude and receptors of high sensitivity. Therefore, without mitigation measures, the impact is considered of moderate significance.

Mitigation Measures

In terms of shadow flicker management, the following is required:

- Develop and implement a stakeholder grievance mechanism as part of the SEP.
- As part of the SEP and prior to the operation phase, the Project Company will be required to undertake direct consultations with the residents of the 3 sensitive receptors identified and explain in detail the shadow flicker impacts and the results and outcomes of the assessment that indicated exceedance of allowable limits. In addition, the Project Company should also explain the stakeholder grievance mechanism.
- In the case that the residents do submit grievances related to shadow flicker (based on the assumptions identified above (i.e. window orientation and occupancy)), the ACWA Power and Project Company should consider measures to eliminate such impacts could include installation of window blinds, installation of vegetative buffers, any other barriers around the property as applicable. This should be done in agreement and consultation with the residents of the property.
- A second scenario, based on real-case statistics can be undertaken if required. This will assess the effect raised by the inclusion of more local conditions, e.g., average daily sunshine hours and wind conditions. It is expected that with this analysis no exceedances will occur.

Following the implementation of these mitigation measures, the significance of the residual impact is reduced to minor, with a low magnitude and high sensitivity of receptors.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the Project Company:

- Records of consultations with the 3 sensitive receptors and ensure grievance mechanism is explained (prior to operation)
- Records of grievances and close out actions

8.11.3 Potential Impacts from Trespassing of Unauthorised Personnel

Such impact is mainly related to public access of unauthorized personnel to the various Project components. Such access could result in safety issues such as unauthorized climbing of the turbine, safety hazards from substations (electric shock, thermal burn hazards, exposure to chemicals and hazardous materials, etc.), unauthorized climbing of the transmission tower and others.

Such impacts are considered of long-term duration throughout the Project operation phase, of a negative nature, and are expected to be of medium magnitude and high sensitivity given that it entails potential public safety concerns which in extreme cases they could entail permanent impacts (e.g. death or permanent disability). Given the above such an impact is considered of moderate significance.

Mitigation Measures

The following presents the mitigation measures that are to be implemented by the Project Operator during the operation phase of the Project and which include:

- A Security Risk Assessment should be developed for the Wind Farm Project and which takes into account the following:
 - Each turbine to be fitted with locked doors to prevent unauthorized access to the turbines;
 - Substation area to be completely fenced with concrete walls to prevent unauthorized access;
 - Onsite guards within the entire Project site at all times to ensure the safety and security of the Project as well as preventing unauthorized access to any of the Project components. However, it must be ensured that all onsite guards are adequately trained to deal with unauthorized trespassing incidents.
 - Post informative signs on the turbines and substation about public safety hazards and emergency contact information. Signs, especially warnings need to be pictorial as well as written to ensure they are understood by those unable to read

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to minor, with a low magnitude of impact and high sensitivity of receptors.

Monitoring and Reporting Requirements

The following presents the mitigation measures that are to be implemented by the Project Operator during the operation phase of the Project and which include:

- Submission of Security Risk Assessment

8.11.4 Potential Impacts from Worker Influx during Construction

During construction the Project a relatively significant number of workers will be expected onsite (around 750 workers) for duration of approximately 24 months. However, as discussed earlier, at this point it is still unclear

how many of these workers will be expatriates, Egyptians and/or from local communities and it is still unclear where accommodation of these works will take place.

Nevertheless, the influx of workforce to the area could result in certain community health, safety and security impacts which are discussed below.

Risk of Diseases

Influx of workers may introduce new reservoirs of diseases such as vector-related diseases, water-borne diseases, etc. In addition, there is also a risk of spreading communicable diseases, included sexually transmitted ones. The risk of catching or exchanging communicable diseases (e.g., Virus B, Virus C, and HIV/AIDS) and the lack of awareness on transmission disease can represent a high risk to workers and community health and safety. This could also include in particular risk from COVID-19.

Inappropriate Code of Conduct

Other risks from worker influx include inappropriate code of conduct by workers towards local communities which might result in hostilities and resentment. Such inappropriate conduct could include also disrespecting the traditional culture and social norms of the area and local communities.

Increase in Social Vices

Population influx could result in an increase of social vices including alcoholism, drug abuse, and other. , sexual exploitation and harassment (SEAH), particularly in relation to vulnerable groups identified (Section 4.4.)

Such impacts are considered of short-term duration during the construction phase, of a negative nature, and are expected to be of medium magnitude and medium sensitivity. Given the above such an impact is considered of minor significance.

Mitigation Measures

The EPC Contractor is expected to prepare a worker influx plan to be implemented for the construction phase of the Project. The plan must take into account the following:

- Medical examination program. All workers must be subject to a preliminary medical examination before commencement of any job tasks in accordance with local applicable requirements. In addition, routine medical examination for workers (bi-annually) must be undertaken. Such medical examinations must be undertaken at certified centres. Copies of medical examination results of all workers must be retained onsite.
- Details and procedures for ensuring and maintaining hygienic conditions onsite at all times specifically related to toilet and washing facilities, eating areas, etc.
- Development of a code of conduct for workers which takes into account appropriate behaviour by workers at all times, religious customs, traditional cultures and social norms in the area. In addition, it must include specifically requirements for social vices including gender-based violence, sexual harassment, alcoholism, drug abuse, etc.
- Induction training and awareness raising sessions on risks associated to the most common contagious diseases (e.g. influenza virus), communicable diseases, general measures for hygiene, code of conduct expected to be implemented and other as appropriate.
- COVID-19 procedures to be implemented onsite for the workforce (e.g. masks, disinfectants, etc.)

Following the implementation of these mitigation measures, the significance of the residual impact remains unchanged.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the EPC Contractor:

- Submission of the Worker Influx Plan

8.11.5 Potential Impacts from Security Personnel

Inappropriate management of security issues and incidents by security personnel towards local communities could result in resentment, distrust and escalation of events. Such impacts are considered of short-term duration during the construction phase and long-term duration during the Project operation phase, of a negative nature, and are expected to be of medium magnitude and medium sensitivity. Given the above such an impact is considered of minor significance.

Mitigation Measures

The EPC Contractor and Project Operator are expected to prepare a Security Management Plan to be implemented for the construction and operation phase of the Project.

The plan must identify appropriate measures for hiring, rules of conduct, training, equipping, and monitoring of security personnel to control and manage such issues. The plan must adhere to: (i) IFC PS 4 (Community Health, Safety and Security); and (ii) EBRD PR 2 (Labour and Working Conditions), all of which identify requirements for security personnel. This includes in specific requirements to ensure security personnel are guided by the Voluntary Principles on Security and Human Rights in terms of hiring, rules of conduct, training, equipping and monitoring of such personnel. They also require reasonable inquiries that those providing security measures are not implicated in past abuses, will ensure they are trained adequately in the use of force (and firearms if applicable) and appropriate conduct towards the workers and the local community. Force should only be used when strictly necessary, and to an extent proportional to the threat.

Following the implementation of these mitigation measures, the significance of the residual impact remains unchanged.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the EPC Contractor and Project Operator:

- Submission of the Security Management Plan

8.11.6 Potential Impacts from Blade and Tower Glint of Wind Turbines during Operation

Blade or tower glint occurs when the sun strikes a rotor blade or the tower at a particular orientation. This can impact a community, as the reflection of sunlight off the rotor blade may be angled toward nearby residences.

However, as discussed previously, there are no key sensitive receptors located within the surrounding area of the wind farm which could potentially be impacted by blade and tower glint. In addition, according to the IFC EHS Guidelines on Wind Energy (IFC, 2007), blade glint is a temporary phenomenon for new turbines only, and typically disappears when blades have been soiled after a few months of operation.

Taking all of the above into account, such impacts are considered of short-term duration as they will occur only temporary throughout the operation phase of the Project and of a negative nature. However, given that there are no sensitive receptors located within the surrounding areas and the only temporary occurrence (if occurring at all) such an impact is considered of low magnitude and low sensitivity. Given the above, such an impact is considered of not significant.

Mitigation Measures

The following presents the mitigation measures that are to be implemented by the Project Operator during the operation phase of the Project and which include:

- Consideration should be given to the use of non-reflective finishes to ensure potential impacts are not significant.

Following the implementation of these mitigation measures, the significance of the residual impact remains unchanged.

Monitoring and Reporting Requirements

The following presents the mitigation measures that are to be implemented by the Project Operator during the construction phase of the Project and which include:

- Inspections and visual monitoring to ensure that non-reflective finishes have been used.

8.11.7 Potential Impacts from Blade/Ice Throws from Turbines during Operation

There are potential impacts from blade throws and ice throws from the wind turbines, where if such incidents occur, they could affect the public safety of nearby receptors.

According to the IFC EHS Guidelines on Wind Energy (IFC, 2015), a failure in the rotor blade can result in the 'throwing' of a rotor blade – however the overall risk of such an event is extremely low. In addition, if ice accretion occurs in blades, which can happen in certain weather conditions in cold climates, then pieces of ice can be thrown from the rotor during operation, or dropped if the turbine is idling. Ice throws are considered irrelevant given that in general the area does not experience any snow events.

The IFC EHS Guidelines on Wind Energy (IFC, 2015) states a setback distance should be applied between turbines and populated locations. The minimum setback distance is 1.5 x turbine height (**which is equivalent to around 300m**), although modelling suggests that the theoretical blade throw distance can vary with the size, shape, weight, and speed of the blades, and the height of the turbine.

Based on the current design and turbine specifications, there are no receptors within such a distance. Although there is a receptor (refer to "Section 7.2") located close to a turbine but it is still not within this distance (located 400m from nearest turbine. In addition, as noted within this section, this is an abandoned structure that will be demolished and is no longer in use by the Red Sea Governorate.

Taking all of the above into account, such impacts are considered of long-term duration as they will occur throughout the operation phase of the Project and of a negative nature. However, given that there are no sensitive receptors located within the surrounding areas and given that the risk is extremely low such an impact is considered of low magnitude and low sensitivity. Given the above, such an impact is considered of not significant.

Taking the above into account, there are no applicable mitigation or monitoring measures to be considered but additional requirements.

Mitigation Measures

Even though there are no receptors within the setback distance, the following measures will be implemented as part of the Project SEP:

- Awareness and sensitization programs will be carried out for residents in Wadi Dara as part of the SEP.
- Regular patrols will be carried out to discourage loitering near wind turbines.

Should the turbine specification or turbine layout change, ensure a setback distance of .5 x turbine height is maintained from the Waid Dara receptors.

8.12 Socio-economics

This Section identifies the potential impacts in relation to socio-economic during the various Project phases. For each impact, a set of mitigation measures and monitoring requirements are identified.

Given the generic nature of the impacts on socio-economic development for both phases of the Wind Farm Project (construction and operation) those have been identified collectively throughout this section.

During the construction and operation phases of the Wind Farm, the Project is expected to create the following job opportunities:

- Around 750 job opportunities at peak during the construction phase for a duration of approximately 24 months. This will mainly include skilled job opportunities (to include engineers, technicians, consultants, surveyors, etc.) and unskilled job opportunities (mainly labourers but will also include a number of security personnel).
- Around 20 job opportunities during the operation phase for a duration of 25 years. This will include skilled job opportunities (such as engineers, technicians, administrative employees, etc.) and unskilled job opportunities (such as security personnel, drivers, etc.).

However, the contractors and operators have not been selected at this stage, and therefore there are no details available on the number of job opportunities targeted to local communities, type of jobs, duration, etc. In addition to the above, the local communities could also be engaged in procurement opportunities along different segments of the value chain such as local contractors, local supply of equipment and machinery, cleaning services, etc.

Taking the above into account, the Developer is committed to ensuring that priority for job opportunities and procurement activities where relevant are targeted to the local communities. The above could also entail other indirect positive benefits to the local community from increase in demand for local services, supplies, and businesses. This could include for example possible engagements for supplies and service providers (accommodation services, food, etc.). Such demands could improve the existing local economic activities and impact certain sectors, such as wholesale/retail trade.

Taking all of the above into account, this to some extent could contribute to enhancing the living environment for its inhabitants. The creation of job and procurement opportunities in specific is of crucial importance. However, it is understood that the socio-economic development of the area is not hinged on a single project but rather on implementing collective and coordinated actions, including other development projects and investment within the area.

Nevertheless, proper planning and local community engagement from the start is crucial to understand issues and opportunities which in turn would enable the Project build true sustainable links which will bring maximum benefits to the local communities. Given the above, such impacts are anticipated to be positive.

Recommendations and Required Action

As the impacts discussed are mainly positive, no mitigation measures have been identified. This section provides recommendations which aim to enhance such positive impacts anticipated from the Project throughout the construction and operation phases to the greatest extent possible.

- Local Recruitment Procedure: the EPC Contractor under supervision from the Developer should develop a Local Recruitment Procedure that must identify the number of job opportunities targeted for local communities to include skilled and unskilled workers, including Bedouin groups. Such job opportunities shall

also take into account employment of local communities in the area around the project to include fresh graduate engineers, technicians, labourers, etc. In addition, the procedure must include details on how job opportunities will be announced as well as a selection process that is fair and transparent and provides equal opportunities for all including females. The Procedure should investigate the potential for implementation through a joint collaboration between the Developer/EPC Contractors and the other wind farm developers in the area. Prioritising employment from the community is considered a key issue and this should be reflected in the EPC Contract and subsequent subcontracts.

- Local Procurement Procedure: the EPC Contractor under supervision from the Developer should develop a Local Procurement Procedure that must identify the procurement opportunities targeted for local communities (including Bedouin groups) to include for example local subcontractors, local supplies and services, cleaning services, etc. In addition, the procedure must include details on how procurement opportunities will be announced as well as a selection process that is fair and transparent and provides equal opportunities for all. The Procedure should investigate the potential for implementation through a joint collaboration between the Developer/EPC Contractors and the other wind farm developers in the area. Prioritising procurement opportunities from the community is considered a key issue and this should be reflected in the EPC Contract and subsequent subcontracts.
- Social Responsibility Program: it is recommended that the Developer implement a social responsibility program which aims to benefit the local communities to the greatest extent possible. In this case, a structured approach must be developed which must identify priority development projects which could benefit local communities (e.g. based on a needs assessment if available). Based on that the social responsibility program can prioritise projects for local communities based on available budget, vision, timeline for implementation and other factors.

8.13 Summary of Anticipated Impacts

The tables below present a summary of the anticipated impacts during the planning and construction and operation phase of the Project. The information in the tables includes:

- Key and generic environmental attributes (e.g. air quality, noise);
- Impact (textual description);
- Nature of impact (negative or positive);
- Duration (long-term or short-term);
- Reversibility (reversible or irreversible);
- Magnitude (high, medium, or low);
- Sensitivity (high, medium, or low);
- Significance (major, moderate, minor, or not significant);
- Management action – generally management actions describe whether an impact can be mitigated or not. Management actions include: (i) mitigation measures; (ii) compensation measures; (iii) additional requirements which must be implemented at a later stage and which could be required by a governmental entity; (iv) for positive impacts recommendations have been provided which aim to enhance the impact; and
- Residual significance after management actions is implemented (major, moderate, minor, or not significant)

Table 82: Summary of Anticipated Impacts during Planning and Construction

Attribute / Issue	Likely Impact – Planning and Construction Phase	Impact Assessment								
		Nature	Duration		Reversibility	Magnitude	Sensitivity	Significance	Management Action	Residual Significance
Landscape and Visual	Visual and landscape impacts due to presence of elements typical of a construction site such as equipment and machinery from the angle of Wadi Dara Village and Highway 65 (running along the Project site's eastern border).	Negative	Short Term	–	Reversible	Medium	Medium	Minor	Mitigation Available	Minor
Land Use	Project could conflict the formal assigned land uses set by the various governmental entities; for example, such as the allocation (by NREA) and its subsequent retraction of land to WDCALR to allocate for the purposes of wind farm development in the NREA Concessionary Area of land (by NREA) to WDCALR	Negative	Long Term	–	Reversible	Medium	High	Moderate	Mitigation Available (Hydrological Report)	Minor
	There are several land uses onsite which if improperly managed could result in potential conflicts and disputes. This includes the Ghafra system of the Bedouin groups, nearby petroleum facilities ²² , and the local organization – the Wadi Dara Cooperative Association, which has allocated/es land in the area to private-sector investors.	Negative	Long Term	–	Reversible	Medium	High	Moderate	Mitigation Available	Minor
Geology, Hydrology and hydrogeology	Potential for flood risks on the Project area.	Negative	Long Term	–	Irreversible	Medium	High	Minor	Mitigation Available	Minor
	Risk of soil and groundwater contamination during the various construction activities from improper housekeeping activities, spillage of hazardous material, random discharge of waste and wastewater.	Negative	Long Term	–	Could be irreversible	Medium	Low	Minor	Mitigation available	Not Significant

²² Coordination with General Petroleum Company should be sought prior to construction activities.

Attribute / Issue	Likely Impact – Planning and Construction Phase	Impact Assessment								
		Nature	Duration	Reversibility	Magnitude	Sensitivity	Significance	Management Action	Residual Significance	
	Potential Impacts from erosion and runoff	Negative	Short Term	– Could be irreversible	Medium	Low	Minor	Mitigation available	Not Significant	
Biodiversity	Improper management of construction activities could disturb/damage habitats and fauna	Negative	Short Term	– Could be irreversible	Medium	Medium	Moderate	Mitigation available	Not Significant	
	Habitat loss, fragmentation and degradation	Negative	Short Term	– Could be irreversible	Medium	Medium	Moderate	Mitigation available	Not Significant	
	Direct impacts on flora and habitats if non-native species are introduced	Negative	Long-term	Could be irreversible	Medium	Medium	Moderate	Mitigation available	Minor	
	Egyptian Spiny Tailed Lizard and their exposure to impacts in the Project’s AoI	Negative	Short Term	– Could be irreversible	Medium	High	Moderate	Mitigation available	Minor	
	Vehicular collisions with animals	Negative	Long-term	Could be irreversible	Medium – high	Medium	Minor ²³	Mitigation available	Minor	
	Noise impacts on wildlife	Negative	Short / Long-term	Reversible	Low-Medium	Low – Medium	Minor	Mitigation available	Minor	
	Air Quality (dust) impacts on wildlife	Negative	Short term	Reversible	Low	Low	Minor - Moderate	Mitigation available	Minor -	
	Lighting impacts on wildlife	Negative	Short / Medium	Reversible	Low	Low	Minor	Mitigation available	Minor	
	Introduction of Pests, Littering and Waste management	Negative	Long-term	Could be irreversible	Medium	High	Minor - High	Mitigation available	Moderate	
	Disturbance due to vehicular traffic	Negative	Medium-term	Reversible	Medium-High	Low	Minor	Mitigation available	Minor	
	Poaching of wildlife in the Site	Negative	Long-term	Could be irreversible	Low-to-high ²⁴	Medium	Moderate	Mitigation available	Moderate	
	Active Dabb Lizard burrows are located throughout the site. Reconnaissance of Dabb Lizard burros and submission of survey to be	Negative	Short Term	– Could be irreversible	Medium	Medium	Moderate	Mitigation available		

²³ depending on the receptor(s) killed²⁴ depending on receptor affected

Attribute / Issue	Likely Impact – Planning and Construction Phase	Impact Assessment							
		Nature	Duration	Reversibility	Magnitude	Sensitivity	Significance	Management Action	Residual Significance
	submitted as well as construction considerations (placement of turbines) if relocation of these animals is not permissible.								
Avi-Fauna (including above considerations in Biodiversity)	Improper management of construction activities could disturb breeding birds and damage relevant habitats	Negative	Short Term	– Could be irreversible	Low	Medium	Minor	Mitigation Available	Not Significant
Bats (including above considerations in Biodiversity)	Improper management of construction activities could damage habitats and disturb species.	Negative	Long Term	– Could be irreversible	Low	Low	Not Significant	No Mitigation Required	Not Significant
Archaeology	Improper management of construction activities could disturb/damage archaeological remains which could be buried in the ground (if any).	Negative	Short Term	– Could be irreversible	Medium	Low	Minor	Mitigation Available	Not Significant
Air Quality and Noise	Construction activities will likely result in an increased level of dust, particulate matter and pollutant emissions which in turn will directly impact ambient air quality.	Negative	Short Term	- Reversible	Medium	Low	Minor	Mitigation Available	Not Significant
	Possible noise emissions to the environment from the construction activities which will likely include the use of machinery and equipment such as generators, hammers, and compressors and other activities	Negative	Short Term	- Reversible	Medium	Low	Minor	Mitigation Available	Not Significant
Infrastructure and Utilities	Road Networks – if transportation activities of the various project components to the site are not properly managed beforehand, they could entail risk of damage to the existing roads and could be of public safety concerns to other users on the road. In addition, if planning activities are not well managed it could damage/disturb existing onsite road networks.	Negative	Short Term	- Reversible	High	Medium	Moderate	Mitigation Available	Minor
	Civil and Military Aviation – Improper planning and site selection of the Project could impact	Negative	Long Term	– Reversible	Low	High	Minor	Mitigation Available	Minor

Attribute / Issue	Likely Impact – Planning and Construction Phase	Impact Assessment							
		Nature	Duration	Reversibility	Magnitude	Sensitivity	Significance	Management Action	Residual Significance
	aircraft safety and/or could potentially interfere with certain electromagnetic transmissions associated with air transport								
	Petroleum Facilities – if planning activities are not well managed onsite it could damage/disturb existing the infrastructure of such facilities	Negative	Short Term	– Reversible	Medium	Medium	Minor	Mitigation Available	Minor
	Water Resources – water requirements of the Project could entail constraints on the existing resources and users.	Negative	Short Term	- Reversible	Low	Low	Not significant	Additional Requirements	Not Significant
	Waste Utilities – it is important to ensure that existing utilities would be able to handle the amount of waste, wastewater and hazardous generated from the Project during the construction phase.	Negative	Short Term	- Reversible	Low	Low	Not significant	Additional Requirements	Not Significant
	Telecommunication, and TV & Radio Links – Improper planning and site selection of the Project could potentially interfere with certain electromagnetic transmissions associated with telecommunications, and radio/television systems in the area.	Negative	Long- Term	Reversible	Low	High	Minor	Additional Requirements	Minor
	Potential impact on nearby wind farms: Inappropriate management of planning activities (e.g. siting of turbines and proper buffer distance) could affect such nearby wind farms	Negative	Long- Term	Could be Irreversible	Medium	Medium	Minor	Mitigation Available	Minor
Occupational Health and Safety	There will be some generic risks to workers health and safety from working on construction sites, as it increases the risk of injury or death due to accidents.	Negative	Short Term	– Could be Irreversible	Medium	High	Moderate	Mitigation Available	Minor
Public Health and Safety	Public access of unauthorized personnel to the various Project components (turbines, substation) could result in various public safety hazards.	Negative	Long term	– Could be Irreversible	Medium	High	Moderate	Mitigation Available	Minor

Attribute / Issue	Likely Impact – Planning and Construction Phase	Impact Assessment							
		Nature	Duration	Reversibility	Magnitude	Sensitivity	Significance	Management Action	Residual Significance
	Worker influx could result in certain community health, safety and security impacts to include risk of diseases, inappropriate code of conduct by workers towards locals, increase in social vices, etc.	Negative	Short Term	Reversible	Medium	Medium	Minor	Mitigation Available	Minor
	Inappropriate conduct of security personnel towards local communities could result in resentment, distrust and escalation of events	Negative	Short Term / Long- Term	Reversible	Medium	Medium	Minor	Mitigation Available	Minor
Human Rights	Inappropriate management of the workforce could entail several human right risks and violations.	Negative	Short Term	Reversible	Medium	High	Moderate	Mitigation Available	Minor
Supply chain	Engagement of suppliers will present potential risks related to labour and working conditions.	Negative	Long-term	Reversible	Low	High	Minor	Mitigation Available	Minor
Socio-economic	The Project is expected at a minimum to provide job opportunities for local communities. This, to some extent, could contribute to enhancing the living environment for its inhabitants, elevate their standards of living, and bring social and economic prosperity to local communities.	Positive	Not applicable.						

Table 83: Summary of Anticipated Impacts during Operation

Attribute / Issue	Likely Impact – Operation Phase	Impact Assessment							
		Nature	Duration	Reversibility	Magnitude	Sensitivity	Significance	Management Action	Residual Significance
Landscape and Visual	Visual impacts concern the turbines themselves (e.g. colour, height, and number of turbines) relating to their interaction with the character of the surrounding landscape.	Could be both Negative or Positive	Long Term	– Reversible	Medium	Medium	Minor	Mitigation available	Minor
Geology, Hydrology and Hydrogeology	Risk of soil and groundwater contamination during the various operational activities from improper housekeeping activities, spillage of hazardous material, random discharge of waste and wastewater.	Negative	Long Term	– Could be irreversible	Medium	Low	Minor	Mitigation available	Not significant
Biodiversity	Improper management of operation activities could disturb/damage habitats and fauna.	Negative	Long Term	– Could be irreversible	Medium	Low	Minor	Mitigation Available	Not Significant
Avi-Fauna (Birds)	Wind turbines are associated with impacts on birds from risks of strikes and collision on both migratory and resident soaring birds. Such impacts depend on several factors but could affect the population levels of certain species especially those with international/national critical conservation status.	Negative	Long Term	– Could be irreversible	Low – High	Medium	Moderate	Mitigation Available	Not Significant
	Due to its location within the Gebel El Zeit IBA, and the entailed potential impact on migrating birds, a long-term biodiversity monitoring and evaluation program is to be integrated into the client's management program .	Negative	Long-term	– Could be irreversible	Low – High	Medium	Moderate	Mitigation Available	Not Significant

Attribute / Issue	Likely Impact – Operation Phase	Impact Assessment								
		Nature	Duration	Reversibility	Magnitude	Sensitivity	Significance	Management Action	Residual Significance	
Bats	The potential impacts from the Project during operation are mainly related to risk of bat strikes and collisions with rotors of the operating wind turbines.	Negative	Long Term	– Could be irreversible	Medium	Low	Minor	Mitigation Available / Additional Studies	Not Significant	
Infrastructure and Utilities	Water Resources – water requirements of the Project could entail constraints on the existing resources and users.	Negative	Long Term	- Reversible	Low	Low	Not significant	Additional Requirements	Not Significant	
	Waste Utilities – it is important to ensure that existing utilities would be able to handle the amount of waste, wastewater and hazardous generated from the Project during the construction phase.	Negative	Long Term	– Reversible	Low	Low	Not significant	Additional Requirements	Not Significant	
Occupational Health and Safety	There will be some risks to workers health and safety during the operation and maintenance activities of the Project.	Negative	Long Term	– Could be irreversible	Medium	High	Moderate	Mitigation Available	Minor	
Public Health and Safety	Public access of unauthorized personnel to the various Project components (turbines, substation) could result in various public safety hazards.	Negative	Long term	– Could be Irreversible	Medium	High	Moderate	Mitigation Available	Minor	
	Inappropriate conduct of security personnel towards local communities could result in resentment, distrust and escalation of events	Negative	Short-term	Reversible	Medium	Medium	Minor	Mitigation Available	Minor	
	Blade or tower glint can impact sensitive receptors as the reflection of sunlight off the rotor blade may be angled toward nearby receptors.	Negative	Short Term	– Reversible	Low	Low	Not Significant	Mitigation Available	Not Significant	

Attribute / Issue	Likely Impact – Operation Phase	Impact Assessment								
		Nature	Duration	Reversibility	Magnitude	Sensitivity	Significance	Management Action	Residual Significance	
	Failure in rotor blade can result in the ‘throwing’ of the blade. Although overall risk of such events is extremely low, it could affect the public safety of nearby receptors.	Negative	Long term	– Could be Irreversible	Low	Low	Not Significant	Additional Requirements	Not Significant	
	Potential exposure to risks by local receptors in Wadi Dara Village due to noise	Negative	Long term	– Reversible	Low	Low	Not Significant	Mitigation not required. Only verification monitoring during commissioning.	Not Significant	
	to risks by local receptors in Wadi Dara Village due to shadow flicker	Negative	Long term	– Reversible	Medium	High	Moderate	Mitigation Available	Minor	
Human Rights	Inappropriate management of the workforce could entail several human right risks and violations.	Negative	Long Term	– Reversible	Medium	High	Moderate	Mitigation Available	Minor	
Socio-economic Development	The Project is expected at a minimum to provide job opportunities for local communities. This, to some extent, could contribute to enhancing the living environment for its inhabitants, elevate their standards of living, and bring social and economic prosperity to local communities.	Positive	Not applicable							

9. ASSESSMENT OF CUMULATIVE IMPACT

As discussed earlier, the “NREA Concessionary Area” was zoned according to the weight of the expected environmental impact among competing environmental interests: renewable energy development and conservation. The area starts about 20 km in the south of Ras Gharib and reaching up to the Gulf of Zayt (about 60 km in the North of Hurghada). The wind power target capacity for the area is between 2,000 – 3,000 MW by 2026/2027.

The following environmental surveys were carried out for the “NREA concession area”:

- Reconnaissance survey to assess the present land use in the area
- A survey on the fauna (others than avifauna) and flora
- An autumn and spring monitoring of bird migration and bird habitat
- A geological survey

The assessments evaluated the possibility of environmental impacts brought on by the development and operation of wind farm development in the NREA Concession Area. The results of the assessments affirmed that, overall, environmental and social impacts would be negligible due to the remoteness of the area, lack of residences and native ecosystems. However, concerning risks posed to migrating avi-fauna, they were determined to be significant.

This section provides an assessment of cumulative impacts mainly based on the outcomes of the NREA’s Feasibility Study for Large Wind Farm Development in the Gulf of El Zeit (2008).

The table below provides the key outcomes of the Strategic ESIA for each attribute, key outcomes of the project-specific ESIA and key additional requirements to be considered.

Table 84: Assessment of Cumulative Impacts

E&S Attributes	Outcomes of Strategic ESIA	Additional Requirements in Strategic ESIA
Landscape and Visual	No concerns reported as the landscape is sparse (desert plains) of sensitive receptors as well as ecological elements.	No additional requirements to be considered
Landscape and Use	Area is mostly desert landscape (compacted gravel or rocky) and not ecologically sensitive. Very little deterioration expected.	Site-specific mitigation and housekeeping procedures.
Geology, Hydrology, Hydrogeology	Negligible impacts on groundwater and surface water. A minimum distance of 150 m from wind turbines to existing groundwater wells of the Ras Shukheir water supply is required. Within the NREA Concession area, there are plans to construct service buildings, such as store, control and apartment buildings, of which will be connected to the existing water pipeline and equipped with an appropriate waste water treatment system (e.g. septic tank with underground seepage and regular sludge collection).	Turbines should be installed at a distance of 150m from existing groundwater wells of Ras Shukheir water supply.

E&S Attributes	Outcomes of Strategic ESIA	Additional Requirements in Strategic ESIA
Biodiversity	No serious impacts on biodiversity anticipated. The landscape is sparse in vegetation. Animals that were recorded are not included in the Red List of Threatened Species, both internationally or nationally.	Site-specific mitigation and monitoring requirement.
Birds (avi-fauna)	As the NREA area is located next to an registered Important Bird Area (IBA), the Gabal el Zayt IBA area, and near or partially in a major flyway area of migrating birds, impacts of wind power utilisation on migrating birds were likely to be significant. The disturbance on the flyway against the heavy wind during spring were determined to be critical.	Regarding Zone 2, in which the Project area is defined, wind farm installation is subject to further ornithological study in order to commence.
Archaeology and Cultural Heritage	None reported	Precautionary Principle to be applied and coordination with the Ministry of Antiquities
Air Quality and Noise	Some additional dust will occur locally during construction works; however, it is not anticipated to be critical due to the absence of population or wildlife, that would otherwise be affected. Similarly for noise, the closest sensitive receptors reported are in Wadi Dara. The noise emissions from wind turbines were significantly below 30 Decibel. Based on the detailed noise assessment carried out for SWE Wind Farm Plot 2, no cumulative noise exceedances of the ETSU-R-97 derived limit were predicted during daytime or night-time at any of the NSRs	Site-specific mitigation and monitoring requirement.
Infrastructure and Utilities	Water supply: Wind farms' water requirement not to affect the overall water supply in the region Transport: Wind power development is not anticipated to cause traffic bottlenecks in the greater area	Domestic waste water originating from the construction yard facilities or permanently constructed service buildings shall undergo simplified treatment (septic tank) and infiltrated to the sandy underground for further natural treatment. Site-specific mitigation (waste gathering and proper disposal) and monitoring requirement. A co-operation with the Rhas Gharib waste collection system is recommended.

E&S Attributes	Outcomes of Strategic ESIA	Additional Requirements in Strategic ESIA
		The wind park internal grid shall be made by underground cables. Any wind park, which would be erected on the NREA area, shall be connected to a substation to be built by EEHC/ETC. The interconnections shall be either by underground cable or built according to accepted bird protection guidelines
Occupational Health and Safety	General risks associated to persons involved in construction, operation and decommissioning of wind farms.	Adhering to international standards of health and safety guidelines.
Socio-economics	Few people reside in the immediate surrounding of the NREA area, who may be affected by wind power development. Windpark construction will create employment.	No additional requirements to be considered

10. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

10.1 Institutional Framework and Procedure Arrangements for ESMP Implementation

Generally, two main pillars govern the successful implementation of any Environmental and Social Management Plan (ESMP) as well as the Environmental, Social, Health and Safety Management System (ESHS-MS) for the project that will be developed at a later stage (as discussed in further details in below). These pillars include:

- Proper identification of roles and responsibilities for the entities involved; and
- Effective control of the process.

All management practices are interlinked, and this section describes how these two pillar criteria could be fulfilled, which in turn helps ensure that the overall objectives are met.

Staffing Requirements

Defining roles and responsibilities of the involved entities identifies where and when each entity should be engaged, their degree of involvement, and the tasks expected of the entity. This in turn eliminates any overlap of jurisdiction or authority and ensures proper communication and effective management of ESMP and ESHS-MS components.

The table below identifies the staffing requirements that are expected for the Project. This should be expanded further in the Environment, Health, and safety (EHS) Manual that is required as part of the ESHS-MS (as discussed in further details below). This should include an organisational structure that identifies the lines of authority and roles and responsibilities of all involved entities.

Table 85: Roles and Responsibilities of Entities Involved in ESMP

Project Role	Entity	Responsibilities	Staffing Requirements
Project Owner and Developer	SWE	▪ Selection of EPC Contractor and Project Operator; ▪ Implement mitigation and monitoring requirements as applicable for such entity as detailed in the ESMP; and ▪ Ensure overall compliance of EPC Contractor and Project Operator with the requirements of the ESMP and ESHS MS.	Appoint competent HSSE Manager or as part of Third-Party Employer representative (e.g. Owner's Engineer) Appoint a Community Liaison Officer (CLO)
EPC Contractor	TBD	▪ Appoint a competent HSE team. ▪ Implement mitigation and monitoring requirements as detailed in the ESMP and ESHS MS requirements;	For Project nature and duration, this is expected to include at a minimum full-time and onsite HSE Manager and one HSE officer is to be deployed for 50 workers.
Project Operator	NOMAC	▪ Appoint a competent HSE team. ▪ Implement mitigation and monitoring requirements as detailed in the ESMP and ESHS MS requirements;	For Project nature and duration, this is expected to include HSE Manager (which is required to be full-time onsite at all times).
EEAA	Granting environmental clearance to the Project	▪ Undertake compliance monitoring	N/A
IESC	TBD	▪ Monitoring on Developer and EPC Contractor to ensure compliance with IFI E&S requirements.	N/A

OE	TBD	Support Developer in implantation of mitigation and monitoring requirements and compliance of EPC Contractor with E&S requirements	Appoint competent HSSE Manager

Training and Awareness

An EHS training plan must be developed and maintained onsite which identifies the type of training that is required for each worker onsite. The plan will ensure that each worker is competent in relation to the tasks to be performed. In addition, signed attendance sheets and training material must be maintained onsite at all times. This should be completed by the EPC Contractor and Project Operator as applicable.

Training should include the following as applicable and as highlighted in the table that follows.

- Basic visitor HSE induction training
- Worker HSE induction training for all workers onsite to include for example EPC Contractor and subcontractor crew
- Emergency response training for all workers onsite to include for example EPC Contractor and subcontractor crew
- Specialized training: there are other specific training requirements that must be adhered to and which are related to specific topics as applicable. This includes for example specific training for Occupational Health and Safety (OHS) issues such as working at height, electrical works, etc.
- Tool Box Talks (TBT): regular TBT meetings must be undertaken with for example EPC Contractors respective crews and subcontractor crew. Topics and frequency are developed and distributed regularly.

Table 86: Training Elements

Training	EPC Contractor	Project Operator
Basic visitor HSE induction training	✓	✓
Worker HSE induction training	✓	✓
Emergency response training	✓	✓
Specialized training	✓	✓
Tool Box Talks (TBT)	✓	✓

Inspection and Monitoring

EHS inspection and monitoring must be undertaken to ensure compliance of involved entities with the mitigation and monitoring requirements as detailed in the ESMP and ESHS-MS requirements. This should be completed by the Developer, EPC Contractor, and Project Operator as applicable.

Inspection and monitoring should include the following as applicable and as highlighted in the table that follows.

- Daily HSE inspection and monitoring at the site and preparation of a daily observation report stating therein the corrective measures on observed safety deficiencies, unsafe acts and conditions.
- Weekly site inspections to be carried out using the weekly site inspection checklists template based on requirements of the ESMP and EHSS-MS
- HSE Audits to be undertaken by Developer on EPC Contractor to ensure compliance with ESMP requirement and EHSS-MS. HSE audits should be undertaken monthly during the construction phase and quarterly during the operation phase

Table 87: Inspection and Monitoring Elements

Inspection and Monitoring	Developer	EPC Contractor	Project Operator
Daily HSE Inspection and Monitoring		✓	
Weekly Site Inspections		✓	✓
HSE Audits	✓		

Meetings

Regular EHS meeting must be undertaken to discuss EHS performance onsite, outstanding issues, key issues of concern and other as applicable. Signed attendance sheets and Minutes of Meeting (MoM) must be maintained onsite at all times. This should be completed by the Developer, EPC Contractor, and Project Operator as applicable.

Meetings should include the following as applicable and as highlighted in the table that follows.

- Weekly HSE meetings
- Monthly HSE meeting
- Quarterly management HSE reviews

Table 88: Required Meetings

Meetings	Developer	EPC Contractor	Project Operator
Weekly HSE Meetings		✓	✓
Monthly HSE Meeting	✓	✓	✓
Quarterly Management HSE reviews	✓	✓	✓

Reporting

HSE reporting will be required to summarize the following:

- Progress in implementing the ESMP and EHSS MS plans as required
- Findings of the monitoring programs, with emphasis on any breaches of the control standards, action levels or standards of general site management
- Outstanding incident report forms
- Relevant changes or possible changes in legislation, regulations and international practices
- Reporting on Key Performance Indicators (KPI).
- Grievances
- Security incidents

Reporting should be submitted to the Developer as applicable by the relevant entities as identified below.

Table 89: Reports

Reporting	EPC Contractor	Project Operator
Reporting	Monthly	Monthly

10.2 Environmental, Health, Safety and Social Management System (EHSS-MS)

The ESIA is considered a key document in assessing and managing environmental and social risks related to the Project. The key output of the ESIA is the ESMP which aims to provide high level mitigations and requirements for managing the environmental and social risks anticipated from the Project.

Throughout the Project's construction and operation phase an Environmental, Health, Safety and Social Management System (EHSS-MS) must be implemented by all relevant parties (i.e. Developer, EPC Contractor and Project Operator). The EHSS-MS must be project and site specific and must build on and take into account the requirements of the ESMP. The development and implementation of an EHSS-MS is considered a key requirement under IFC PS1, in addition the EHSS-MS must also be in line with the IFC PSs.

Summarised below is the overall framework, structure and key requirements for the EHSS-MS for the key entities involved in the Project.

Developer

- HSE Manual that should include: (i) HSE Policy; (ii) Human Resources Policy and Procedures; (iii) HSE Organisational Structure and Responsibilities; and (iv) HSE Training, Monitoring and Reporting Plan
- Stakeholder Engagement Plan;
- Community Grievance Mechanism
- Active Turbine Management Plan (ATMP)
- Social Responsibility Program

EPC Contractor

- HSE Manual (in line with Developer) that should include: (i) HSE Policy; (ii) Human Resources Policy and Procedures; (iii) HSE Organizational Structure and Responsibilities; (iv) HSE Training, Monitoring and Reporting Plan
- Water Management Plan
- Waste Management Plan
- Air Quality and Noise Management Plan
- Traffic and Transport Management Plan
- Occupational Health and Safety Plan
- Emergency Preparedness and Response Plan
- Security Management Plan
- Chance Find Procedures
- Worker Grievance Mechanism
- Employment and Procurement Management Plan
- Worker Influx and Accommodation Plan
- Labour and Working Conditions Management Plan

Project Operator

- HSE Manual (in line with Developer) that should include: (i) HSE Policy; (ii) Human Resources Policy and Procedures; (iii) HSE Organizational Structure and Responsibilities; (iv) HSE Training, Monitoring and Reporting Plan
- Water Management Plan
- Waste Management Plan
- Occupational Health and Safety Plan
- Emergency Preparedness and Response Plan
- Security Management Plan
- Employment and Procurement Management Plan
- Labour and Working Conditions Management Plan

10.3 Compilation of Environmental and Social Management Plan (ESMP)

The tables below present the ESMP for the: (i) planning and construction, and (ii) operation phase respectively and which include the following:

- The environmental attribute (e.g. air quality) that is likely to be impacted;
- A summary of the potential impact and/or likely issue;
- The identified management measures that aim to eliminate and/or reduce the potential impact to acceptable levels. Management measures include mitigation actions, further requirements, additional studies, etc.;
- Monitoring actions to ensure that the identified mitigation measures are implemented. Monitoring actions include: inspections, review of reports/plans, reporting, etc.;
- The frequency for implementing the monitoring actions, which include: once, continuously throughout the construction/operation period (depending on the mitigation measure identified this could include daily, weekly, or monthly), or upon occurrence of a certain issue;
- Parameters and location of monitoring actions as identified and applicable; and
- Responsible entity for implementing the mitigation measures and monitoring actions identified.

Table 90: ESMP for the Planning and Construction Phase

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
Landscape and Visual	Visual and landscape impacts due to presence of elements typical of a construction site such as equipment and machinery.	Ensure proper general housekeeping and personnel management measures are implemented which could include: (i) ensure the construction site is left in an orderly state at the end of each work day; (ii) to the greatest extent possible construction machinery, equipment, and vehicles that are not in use should be removed in a timely manner and kept in locations to reduce visual impacts to the area. (iii) Ensure proper storage, collection, and disposal of waste streams generated as discussed in detail in "Section 8.4.27".	Mitigation	Visual inspections	At construction active areas	Daily / Weekly	EPC Contractor
Land Use	There are purportedly potential informal land uses onsite which if improperly managed could result in potential conflicts and disputes. This includes the Ghafra system of the Bedouin groups and existing petroleum facilities within the area.	(i) Establish coordination with the Bedouin Groups for inclusion and engagement in employment and procurement opportunities. (ii) Implementation of SEP that includes specific references for engagement and coordination with Bedouin groups. Please refer to SEP for additional details.	Additional requirement	Submit agreement with Bedouin groups	Not applicable	Once before commencement of construction	Developer
	Formal land uses include the allocation of land (shared with the proposed project site) under the WDCALR to its members	Cede said land back to NREA in exchange for alternate lands.	Additional requirement	Submit agreement with WDCALR	Not applicable	Before Commencement of Construction	Developer

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
	There is a dumpsite located within the Project site that continues to receive discarded wastes from nearby agricultural and livestock activities.	Optimal option – complete removal of the dumpsite and coordination with Wadi Dara Village to ensure local enterprises are aware that the dumpsite has been decommissioned and that its use as a dumpsite can no longer take place.	Mitigation		Construction active areas, maintain site security measures	Before commencement of construction	Developer
Geology, Hydrology and hydrogeology	Solid waste management	Coordinate with Ras Gharib City Council for the collection of solid waste from the site to the municipal approved dumpsite (the closest dumpsite being Ras Gharib Public Dumpsite)	Mitigation	Submit contract	Not applicable	Once before commencement of construction	EPC Contractor
		Prohibit fly-dumping of any solid waste to the land	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Commitment to adherence to the waste hierarchy principle	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Distribute appropriate number of properly contained litter bins and containers properly marked as "Municipal Waste"	Mitigation	Visual inspections	At construction active areas	Once before commencement of construction	
		Distribute a sufficient number of properly contained containers clearly marked as "Construction Waste" for the dumping and disposal of construction waste	Mitigation	Visual inspections	At construction active areas	Once before commencement of construction	
		Implement proper housekeeping practices on the construction site at all times	Mitigation	Visual inspections	At construction active areas	Daily / weekly	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
		Complete removal of the dumpsite within the Project site to safeguard human, operational and conservation prerogatives	Mitigation	Excavation	Site specific – the location of the dumpsite	Once	
		Maintain records and manifests that indicate volume of waste generated onsite, collected by contractor, and disposed of at the landfill	Mitigation	Submit manifests	Not applicable	Throughout construction period	
	Wastewater management	Coordinate with Ras Gharib Water Company to hire a private contractor for the collection of wastewater from the site to the closest WWTP	Mitigation	Submit contract	Not applicable	Once before commencement of construction	EPC Contractor
		Prohibit illegal disposal of wastewater to the land	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Ensure that constructed septic tanks during construction and those to be used during operation are well contained and impermeable to prevent leakage of wastewater into soil	Mitigation	Visual inspections	At applicable area	Once before commencement of construction	
		Ensure that septic tanks are emptied and collected by wastewater contractor at appropriate intervals to avoid overflowing	Mitigation	Visual inspection	At applicable area	Daily/weekly	
		Maintain records and manifests that indicate volume of wastewater generated onsite, collected by contractor, and disposed of at the WWTP	Mitigation	Submit manifests	Not applicable	Throughout construction period	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
	Hazardous Waste Management	Hire approved private contractor for the collection of hazardous waste from the site to the approved hazardous waste disposal facilities	Mitigation	Submit contract	Not applicable	Once before commencement of construction	EPC Contractor
		Ensure that hazardous waste is disposed in a dedicated area that is enclosed, of hard surface, with proper signage and suitable containers as per hazardous waste classifications and that they are labelled for each type of hazardous waste	Mitigation	Visual inspections	At applicable area	Once before commencement of construction	
		Ensure hazardous waste storage area is equipped with spill kit, fire extinguisher and anti-spillage trays and a hazardous waste inventory is available	Mitigation	Visual inspections	At applicable area	Daily / weekly	
		Prohibit illegal disposal of hazardous waste to the land	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Possibly contaminated water (e.g. runoff from paved areas) must be drained into appropriate facilities (such as sumps and pits). Contaminated drainage must be orderly disposed of as hazardous waste	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Ensure that containers are emptied and collected by the contractor at appropriate intervals to prevent overflowing	Mitigation	Visual inspections	At construction active areas	Daily / weekly	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
	Hazardous material management	Maintain records and manifests that indicate volume of hazardous waste generated onsite, collected by contractor, and disposed of at the hazardous waste disposal facilities	Mitigation	Submit manifests	Not applicable	Throughout construction period	EPC Contractor
		Ensure that hazardous materials are stored in an area that is of hard impermeable surface, flame-proof, accessible to authorized personnel only, locked when not in use, and prevents incompatible materials from coming in contact with one another, and includes secondary containment systems	Mitigation	Visual inspections	At applicable area	Once before commencement of construction	
		Maintain a register of all hazardous materials used and accompanying MSDS must present at all times. Spilled material should be tracked and accounted for	Mitigation	Visual inspections	At applicable area	Daily / weekly	
		Incorporate dripping pans at machinery, equipment, and areas that are prone to contamination by leakage of hazardous materials (such as oil, fuel, etc.)	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Maintenance activities and other activities that pose a risk for hazardous material spillage (such as refuelling) must take place at a suitable location (hard surface) with appropriate measures for trapping spilled material	Mitigation	Visual inspections	At construction active areas	Daily / weekly	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
		Ensure that a minimum of 1,000 liters of general-purpose spill absorbent is available at hazardous material storage facility.	Mitigation	Visual inspections	At applicable area	Daily / weekly	
		If spillage on soil occurs, spill must be immediately contained, cleaned-up, and contaminated soil disposed as hazardous waste	Mitigation	Visual inspection	At applicable area	Upon occurrence	
	Erosion and runoff management	Avoid executing excavation works under aggressive weather conditions	Mitigation	Visual inspections	At construction active areas	Upon occurrence	EPC Contractor
		Place clear markers indicating stockpiling area of excavated materials to restrict equipment and personnel movement, thus limiting the physical disturbance to land and soils in adjacent areas	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Erect erosion control barriers around work site during site preparation and construction to prevent silt runoff where applicable such as silt fences, gravel bas berms, fiber rolls, and other.	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Return surfaces disturbed during construction to their original (or better) condition to the greatest extent possible	Mitigation	Visual inspections	At construction active areas	Upon occurrence	
	Biodiversity	Implement Biodiversity Management Plan (BMP) which is provided as a standalone document.	Mitigation	Refer to BMP	At applicable area	Refer to BMP	EPC Contractor

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
	Construction activities would disturb existing habitats (flora and fauna). In addition, other impacts could be from improper management of the site (e.g. improper conduct and housekeeping practices).	Undertake a detailed Egyptian Dabb Lizard survey through a biodiversity expert. The survey should focus on all construction activities areas and in particular the Wadi systems where such a species is likely to be located. Should burrows and/or records of this species be identified, relocation activities should be undertaken to nearby similar habitats.	Additional Survey	Submission of report	Prior to construction	Once; before construction	EPC Contractor
		Implement proper housekeeping practices on the construction site at all times	Mitigation	Visual inspections	At construction active areas	Daily / weekly	EPC Contractor
Birds (avi-fauna)	Construction activities could disturb existing habitats of birds breeding and/or nesting within the Project site.	Implement proper housekeeping practices on the construction site at all times	Mitigation	Visual inspections	At construction active areas	Daily / weekly	EPC Contractor
		Submit reporting of procedures and mitigation measures sufficient to achieve No Net Loss (NNL) or even Net Gain (NG) status in accordance with Performance Standards (PS6-IFC/WBG) and Requirements (PR6-EBRD).	Mitigation, Additional Study and Requirement	Submission of Report	Prior to construction	Once – prior to construction	EPC Contractor
		Regarding Zone 2 of the NREA Concession Area, in which the Project area is defined, submission of an Ornithological Study prior and in order to commence construction	Additional Survey / Study and Requirement	Submission of Report	Prior to construction	Once – prior to construction	EPC Contractor
		Removal of dumpsite and / or excavate to cover dumpsites existing contents fully	Additional Precautionary Action	Excavation / Landscaping	At dumpsite located within the Project Area	Prior / during construction	Contractor

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
		Develop a protocol to swiftly report and dispose of any dead or injured wildlife or animals recorded onsite.	Mitigation	Submission of report	Prior to construction	Prior to construction	EPC Contractor
Archaeology and Cultural Heritage	Improper management of construction activities could disturb/damage archaeological remains which could be buried in the ground (if any).	As required by the SCA, during excavation activities, SCA must be notified to check if they will provide any observers to oversee the process and ensure that no underground archaeological remains of importance are unearthed and/or disturbed	Mitigation	Submission of evidence of communication with SCA	Not applicable	Prior to construction	EPC Contractor
		If potential archaeological remains in the ground are discovered, appropriate measures for such chance find procedures are implemented. Those mainly require that construction activities be halted and the area fenced along with proper signage, while immediately notifying the Ministry of Tourism and Antiquities/Red Sea and Suez Antiquities Inspection Office. No additional work will be allowed before the Ministry/Inspection Office assesses the found potential archaeological site and grants a clearance to resume the work. Construction activities can continue at other parts of the site if no potential archaeological remains were found. If found, same procedures above apply	Mitigation	Visual inspections and submittal of chance find report	At applicable area	Upon occurrence	EPC Contractor

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
Air Quality and Noise	Construction activities will likely result in an increased level of dust, particulate matter and pollutant emissions as well as noise which in turn will directly impact ambient air quality and noise levels.	If dust or pollutant emissions were found to be excessive due to construction activities, the source of such emissions should be identified and adequate control measures must be implemented (as identified below)	Mitigation	Visual inspections	At construction active areas and other receptors to include nearby petroleum activities and internal road networks	Upon occurrence	EPC Contractor
		Comply with the Occupational Safety and Health Administration (OSHA) requirements and the Egyptian Codes to ensure that for activities associated with high dust and noise levels, workers are equipped with proper Personal Protective Equipment	Mitigation	Visual inspections	At construction active areas	Daily / weekly	
		Apply basic dust control and suppression measures which could include: (i) regular watering of roads for dust suppression; (ii) proper planning of dust causing activities to take place simultaneously in order to reduce the dust incidents over the construction period; (iii) proper management of stockpiles and excavated material (e.g. watering, containment, covering, bundling); (iv) proper covering of trucks transporting aggregates and fine materials (e.g. through the use of tarpaulin); and (v) adhering to a speed limit of 15km/h for trucks on the construction site.	Mitigation	Visual inspections	At construction active areas	Daily / weekly	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
		Develop a regular inspection and scheduled maintenance program for vehicles, machinery, and equipment to be used throughout the construction phase for early detection of issue to avoid unnecessary pollutant and noise emissions	Mitigation	Submission of maintenance program	Not applicable	Monthly	
		If noise levels were found to be excessive from construction activities, the source of such excessive noise levels should be identified and adequate control measures must be implemented	Mitigation	Visual inspections	At construction active areas and other receptors to include petroleum storage facilities	Upon occurrence	
		Apply adequate general noise suppressing measures. This could include the use of well-maintained mufflers and noise suppressants for high noise generating equipment and machinery, developing a regular maintenance schedule of all vehicles, machinery, and equipment for early detection of issues to avoid unnecessary elevated noise level, etc.	Mitigation	Visual inspections	At construction active areas	Daily / weekly	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
Infrastructure and Utilities	Traffic and transport management	Develop a Traffic and Transport Plan to ensure transportation process of turbine components does not pose a risk of damage to the existing roads, highways, overpasses whilst ensuring public safety. The Plan must analyse and study the entire route for transportation of the Project components from the port till the Project site. The study must investigate any constraints which need to be considered along the highways leading to the Project site such as bridges, overhead utility cables, slants in roads, etc. and identify accommodations which need to be taken into account.	Additional study	Submission of Traffic and Transport Plan and approval from local authorities	Not applicable	Once before commencement of construction	EPC Contractor
	Civil and Military Aviation	Establish coordination with the relevant entity to provide information on the Project (to include location and specifications of turbines in specific) and include any specific requirements to be considered as part of the detailed design to include setback distances if required (e.g. from radar systems if applicable) and navigational safety requirements (e.g. navigational lights, blade paintings, etc.)	Additional requirement	Submit of formal non-objection letter (or similar) with relevant entity	Not applicable	Once before commencement of construction	Developer

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
	Improper planning and design of project could affect petroleum facilities	Establish coordination via NREA with the General Petroleum Company's head office in Cairo to discuss and determine any specific requirements to be taken into account for the detailed design of the Project as well as coordination agreement requirement during the construction and operation phase (e.g. avoidance of such areas, buffer distances to be considered, etc.)	Additional requirement	Coordination activities are initiated no less than six (6) months prior to construction. Submit formal communication letter (or similar) with relevant entity	Not applicable	Once before commencement of construction	Developer
	Water resources management	Coordinate with the Ras Ghareb Water Company to sector the water requirements of the Project	Additional requirement	Submit formal communication letter (or similar) with Ras Ghareb Water Company	Not applicable	Once before commencement of construction	EPC Contractor
	Waste utilities	Undertake the following: (i) coordinate with the Ras Ghareb Water Company and obtain list of authorized contractors for collection of wastewater from the site; (ii) coordinate with the Ras Gharib City Council to hire a competent private contractor for the collection of solid waste from the site; and (iii) obtain list of authorized contractors for collection of hazardous waste from the site	Additional requirement	Submit formal communication letter with relevant entities	Not applicable	Once before commencement of construction	EPC Contractor

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
	Telecommunication and TV/Radio management	Establish coordination via NREA/EETC with relevant entity and other applicable local agencies to provide information on the Project (to include location and specifications of turbines in specific) and include any specific requirements to be considered as part of the detailed design to include setback distances if required for telecommunication, radio and TV infrastructure (e.g. from LoS connections)	Additional requirement	Coordination activities are initiated no less than six (6) months prior to construction. Submit formal communication letter with relevant entities	Not applicable	Once before commencement of construction	Developer
	Nearby Wind Farms	Further follow/communication with NREA to ensure if buffer distance of the Project from other nearby wind farm projects is considered sufficient and appropriate from a technical perspective	Mitigation	Submit formal communication letter with relevant entities	Not applicable	Once before commencement of construction	Developer
Occupational Health and Safety	There will be some generic risks to workers health and safety from working on construction sites, as it increases the risk of injury or death due to accidents.	Develop and submit an Occupational Health and Safety Plan (OHSP) that is project and site specific to ensure the health and safety of all personnel in order to concur and maintain a smooth and proper progress of work at the site and prevent accident which may injure personnel or damage property.	Additional study	Submit OHSP plan	Not applicable	Once before commencement of construction	EPC Contractor
		Develop and submit an Emergency preparedness and Response Plan that is project and site specific and account for all potential emergency situations onsite to ensure the health and safety of all personnel and property onsite.	Additional study	Submit EPRP	Not applicable	Once before commencement of construction	EPC Contractor

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
Human Rights	Inappropriate management of the workforce during both the construction and operation phase could entail several human right risks and violations by employing entities such as the EPC Contractor and Project Operator. This could include but not limited to engaging child workers, confiscation of passports of foreign workers, unsuitable working hours, and other.	(i) Providing reasonable working conditions and terms of employment to include but not limited to contract management, working hours, salaries/wages, annual and medical leaves, bereavement leaves, accommodation, etc. (ix) Recognizing workers' rights to form and to join workers' organizations and to bargain collectively (x) Prohibition of child labour within the workforce (xi) Overall management of young workers within the labour force (xii) Prohibition of forced labour (xiii) Non-discrimination throughout the entire work cycle in all its forms (xiv) Providing equal opportunities for all throughout procurement and employment opportunities including women groups (xv) Overall management of daily workers, migrant workers and third-party workers (xvi) All mitigation measures listed in Table 70	Mitigation	(i) Undertake monthly inspections during construction and quarterly during operation against the developed HR procedure (ii) Submission of HR inspection report that identifies any corrective measures undertaken	At applicable area	Monthly	EPC Contractor

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
Supply Chain	OHS risks, forced labour, child labour, confiscation of passports of foreign workers, unsuitable working hours, provision of inadequate accommodation facilities and lack of access to grievance mechanism and impact on the environment relating to pollution of water supplies, soil and air.	Human Resource Procedure Management Plan Project Company to align with the measures and management plans already developed for similar wind projects to avoid duplication of efforts and ensure consistent application of best practices across all projects using the same suppliers. (ii) EPC contractor to comply with ACWA Powers' procurement and supply chain requirements. This includes implementing all mitigation and management plans developed for the management of suppliers, such as Supply Chain Management Plan, and adhering to monitoring requirements of suppliers. The EPC contractor should ensure any change in suppliers should be assessed to confirm compliance with ACWA Power and EBRD requirements.	Mitigation and monitoring	In line with ACWA Power procurement and supply chain requirements. Align with measures and management plans already developed for similar wind projects using the same suppliers.			ACWA Power/ Project Company to align with the monitoring requirements already developed for similar wind projects using the same suppliers and ensure EPC compliance.

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
Public health and safety	Relatively large worker influx could result in H&S issues such as risk of diseases, inappropriate code of conduct, social vices, etc.	Submit a worker influx plan which takes into account the following: (i) medical examination program for workers; (ii) procedures to maintain hygienic conditions onsite; (iii) code of conduct for workers; (iv) induction training and awareness requirements for risk of diseases, etc; (v) consider impacts from workers migration into nearby communities including pressure on rental accommodations and infrastructures	Additional study	Submit worker influx plan	Not applicable	Once before commencement of construction	EPC Contractor
	Inappropriate management of security issues and incidents by security personnel towards local communities could result in resentment, distrust and escalation of events	Prepare a Security Management Plan that identifies appropriate measures for hiring, rules of conduct, training, equipping, and monitoring of security personnel to control and manage such issues	Additional study	Submit security management plan	Not applicable	Once before commencement of construction	EPC Contractor

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
Socio-economics	The Project is expected at a minimum to provide job opportunities for local communities. This, to some extent, could contribute to enhancing the living environment for its inhabitants, elevate their standards of living, and bring social and economic prosperity	Local Recruitment Procedure: the procedure must identify the number of job opportunities targeted for local communities to include skilled and unskilled workers. Such job opportunities shall also take into account employment of local communities in the area around the project to include fresh graduate engineers, technicians, labourers, etc. In addition, the procedure must include details on how job opportunities will be announced as well as a selection process that is fair and transparent and provides equal opportunities for all including females. Local Procurement Procedure: the procedure must identify the procurement opportunities targeted for local communities to include for example local subcontractors, local supplies and services, cleaning services, etc. In addition, the procedure must include details on how procurement opportunities will be announced as well as a selection process that is fair and transparent and provides equal opportunities for all.	Recommendation	Regular reporting on outcomes of Program implementation	Not applicable	Continuous	Project Developer/EPC Contractors

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
		Social Responsibility Program: it is recommended that the Developer implement a social responsibility program which aims to benefit the local communities to the greatest extent possible. In this case, a structured approach must be developed which must identify priority development projects which could benefit local communities (e.g. based on a needs assessment if available). Based on that the social responsibility program can prioritise projects for local communities based on available budget, company vision, timeline for implementation as well as other factors.					

Table 91: ESMP for the Operation Phase

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
Geology, Hydrology and hydrogeology	Solid waste management	Coordinate with Ras Gharib City Council for the collection of solid waste from the site to the municipal approved dumpsite (the closest dumpsite being Ras Gharib Public Dumpsite)	Mitigation	Submit contract	Not applicable	Once before commencement of operation	Project Operator

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
		Prohibit fly-dumping of any solid waste to the land	Mitigation	Visual inspections	At operational active areas	Daily / weekly	
		Distribute appropriate number of properly contained litter bins and containers properly marked as "Municipal Waste"	Mitigation	Visual inspections	At operational active areas	Once before commencement of operation	
		Implement proper housekeeping practices onsite at all times	Mitigation	Visual inspections	At operational active areas	Daily / weekly	
		Maintain records and manifests that indicate volume of waste generated onsite, collected by contractor, and disposed of at the landfill	Mitigation	Submit manifests	Not applicable	Throughout operational period	
	Wastewater management	Coordinate with Ras Gharib Water Company to hire a private contractor for the collection of wastewater from the site to the closest WWTP	Mitigation	Submit contract	Not applicable	Once before commencement of operation	Project Operator
		Prohibit illegal disposal of wastewater to the land	Mitigation	Visual inspections	At operational active areas	Daily / weekly	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
		Ensure that septic tanks are emptied and collected by wastewater contractor at appropriate intervals to avoid overflowing	Mitigation	Visual inspection	At applicable area	Daily/weekly	
		Maintain records and manifests that indicate volume of wastewater generated onsite, collected by contractor, and disposed of at the WWTP	Mitigation	Submit manifests	Not applicable	Throughout operational period	
	Hazardous waste management	Hire approved private contractor for the collection of hazardous waste from the site to the approved hazardous waste disposal facilities	Mitigation	Submit contract	Not applicable	Once before commencement of operation	Project Operator
		Ensure that hazardous waste is disposed in a dedicated area that is enclosed, of hard surface, with proper signage and suitable containers as per hazardous waste classifications and that they are labelled for each type of hazardous waste	Mitigation	Visual inspections	At applicable area	Once before commencement of operation	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
		Ensure hazardous waste storage area is equipped with spill kit, fire extinguisher and anti-spillage trays and a hazardous waste inventory is available	Mitigation	Visual inspections	At applicable area	Daily / weekly	
		Prohibit illegal disposal of hazardous waste to the land	Mitigation	Visual inspections	At operational active areas	Daily / weekly	
		Possibly contaminated water (e.g. runoff from paved areas) must be drained into appropriate facilities (such as sumps and pits). Contaminated drainage must be orderly disposed of as hazardous waste	Mitigation	Visual inspections	At operational active areas	Daily / weekly	
		Ensure that containers are emptied and collected by the contractor at appropriate intervals to prevent overflowing	Mitigation	Visual inspections	At operational active areas	Daily / weekly	
		Maintain records and manifests that indicate volume of hazardous waste generated onsite, collected by contractor, and disposed of at the hazardous waste disposal facilities	Mitigation	Submit manifests	Not applicable	Throughout operational period	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
	Hazardous material management	Ensure that hazardous materials are stored in an area that is of hard impermeable surface, flame-proof, accessible to authorized personnel only, locked when not in use, and prevents incompatible materials from coming in contact with one another	Mitigation	Visual inspections	At applicable area	Once before commencement of operation	Project Operator
		Maintain a register of all hazardous materials used and accompanying MSDS must present at all times. Spilled material should be tracked and accounted for	Mitigation	Visual inspections	At applicable area	Daily / weekly	
		Incorporate dripping pans at machinery, equipment, and areas that are prone to contamination by leakage of hazardous materials (such as oil, fuel, etc.)	Mitigation	Visual inspections	At operational active areas	Daily / weekly	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
		Maintenance activities and other activities that pose a risk for hazardous material spillage (such as refuelling) must take place at a suitable location (hard surface) with appropriate measures for trapping spilled material	Mitigation	Visual inspections	At operational active areas	Daily / weekly	
		Ensure that a minimum of 1,000 litters of general-purpose spill absorbent is available at hazardous material storage facility.	Mitigation	Visual inspections	At applicable area	Daily / weekly	
		If spillage on soil occurs, spill must be immediately contained, cleaned-up, and contaminated soil disposed as hazardous waste	Mitigation	Visual inspection	At applicable area	Upon occurrence	
Biodiversity	Improper management of the site could disturb existing habitats (e.g. improper conduct and housekeeping practices).	Implement proper management measures to prevent damage to the biodiversity of the site.	Mitigation	Inspection	At applicable area	Continuous	Project Operator
Birds (avi-fauna)		Avi-Fauna Monitoring and On-Demand Turbine Shutdown	Mitigation	Submission of report	At operational active areas	Continuous	Consultant
		Avi-Fauna Carcass Search during Operation	Additional requirement	Submission of report	At operational active areas	Continuous	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
	Wind turbines are associated with impacts on birds from risks of strikes and collision on both migratory soaring birds and resident soaring birds in the area. Generally, such impacts depend on several factors but could affect the population levels of certain species especially those with international/national critical conservation status.	Carcass Search Surveys	Additional requirement	Submission of report	At operational active areas	Continuous	
Bats	The potential impacts from the Project during operation are mainly related to risk of bat strikes and collisions with rotors of the operating wind turbines.	Undertake at height bat acoustic surveys for one (1) year during first or second year of operations. Such acoustic surveys will be done at the met masts and should be undertaken by a third-party entity with experience in bat assessments and studies.	Mitigation	Submission of report	At operational active areas	Once during operation	Project Operator
		Carcass Search Surveys	Mitigation	Submission of report	At operational active areas	Continuous	Consultant
Infrastructure and Utilities	Water resources management	Coordinate with the Ras Gharib Water Company to sector the water requirements of the Project.	Additional requirement	Submit formal communication letter (or similar) with Ras Gharib Water Company	Not applicable	Once before commencement of construction	Project Operator

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
	Waste utilities	Undertake the following: (i) coordinate with the Ras Gharib Water Company and obtain list of authorized contractors for collection of wastewater from the site; (ii) coordinate with the Ras Gharib City Council to hire a competent private contractor for the collection of solid waste from the site; and (iii) obtain list of authorized contractors for collection of hazardous waste from the site	Additional requirement	Submit formal communication letter with relevant entities	Not applicable	Once before commencement of construction	Project Operator
Occupational Health and Safety	There will be some generic risks to workers health and safety from working on construction sites, as it increases the risk of injury or death due to accidents.	Develop and submit an Occupational Health and Safety Plan (OHSP) that is project and site specific to ensure the health and safety of all personnel in order to concur and maintain a smooth and proper progress of work at the site and prevent accident which may injure personnel or damage property.	Additional study	Submit OHSP plan	Not applicable	Once before commencement of operation	Project Operator

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
Human Rights	Inappropriate management of the workforce during the construction phase could entail several human right risks and violations by employing entities such as the EPC Contractor and Project Operator. This could include but not limited to engaging child workers, confiscation of passports of foreign workers, unsuitable working hours, and other.	Providing reasonable working conditions and terms of employment to include but not limited to contract management, working hours, salaries/wages, annual and medical leaves, bereavement leaves, accommodation, etc.	Mitigation	Submit HR inspection report identifying corrective measures undertaken	Not applicable	Monthly	Project Operator
		Recognizing workers' rights to form and to join workers' organizations and to bargain collectively	Mitigation	Submit HR inspection report that identifies any corrective measures undertaken	Not applicable	Monthly	
		Prohibition of child labour within the workforce	Mitigation	Submit HR inspection report that identifies any corrective measures undertaken	Not applicable	Monthly	
		Overall management of young workers within the labour force	Mitigation	Submit HR inspection report that identifies any corrective measures undertaken	Not applicable	Monthly	
		Prohibition of forced labour	Mitigation	Submit HR inspection report that identifies any corrective measures undertaken	Not applicable	Monthly	

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
		Non-discrimination throughout the entire work cycle in all its forms	Mitigation	Submit HR inspection report that identifies any corrective measures undertaken	Not applicable	Monthly	
		Providing equal opportunities for all throughout procurement and employment opportunities including women groups	Mitigation	Submit HR inspection report that identifies any corrective measures undertaken	Not applicable	Monthly	
		Overall management of daily workers, migrant workers and third-party workers	Mitigation	Submit HR inspection report that identifies any corrective measures undertaken	Not applicable	Monthly	
		Mitigation measures listed in Table 70 'Initial Human Rights Risk Assessment and Mitigation Measures'	Mitigation	In line with Labour & Working Conditions Management Plan, Occupational Health and Safety Plan,	Not applicable	In line with Labour & Working Conditions Management Plan, Occupational Health and Safety Plan	Project Operator

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
Public Health and Safety	Public access of unauthorized personnel to the various Project components.	A Security Risk Assessment should be developed for the Wind Farm Project and which takes into account the following: (i) each turbine to be fitted with locked doors to prevent unauthorized access to the turbines; (ii) substation area to be completely fenced with concrete walls to prevent unauthorized access; (iii) onsite guards; (iv) post informative signs on the turbines and substation about public safety hazards and emergency contact information, and other as applicable.	Additional study	Submit Security Risk Assessment	Not applicable	Once before commencement of operation	Project Operator
	Inappropriate management of security issues and incidents by security personnel towards local communities could result in resentment, distrust and escalation of events	Prepare a Security Management Plan that identifies appropriate measures for hiring, rules of conduct, training, equipping, and monitoring of security personnel to control and manage such issues	Additional study	Submit security management plan	Not applicable	Once before commencement of operation	Project Operator

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
	Blade or tower glint can impact nearby receptors in the area	Consideration should be given to the use of non-reflective finishes to ensure potential impacts are not significant	Mitigation	Visual inspection	Turbines	Once before commencement of operation	Project Operator
	Noise impacts from the operation of wind turbines (also considers cumulative impacts from nearby wind farm)	As there are no significant negative impacts predicted from the wind farm, mitigation is limited to further monitoring to confirm that there are no negative noise impacts once the wind farm is operational. Upon completion of the construction of the wind farm, during the commissioning period a detailed long-term verification noise monitoring program should be implemented. The monitoring program should be carefully designed with specific planning of equipment, measurement locations and periods	Monitoring	Long-term verification noise monitoring	NSRs and monitoring locations (in line with detailed noise modelling study)	During commissioning period	Project Company/ EPC Contractor

	Shadow flicker impacts	Undertake consultations with the residents of the 3 sensitive receptors identified and explain in detail the shadow flicker impacts and the results and outcomes of the assessment that indicated exceedance of allowable limits. In addition, the Project Company should also explain the stakeholder grievance mechanism. In the case that the residents do submit grievances related to shadow flicker (based on the assumptions identified above (i.e. window orientation and occupancy), the ACWA Power and Project Company should consider measures to eliminate such impacts could include installation of window blinds, installation of vegetative buffers, any other barriers around the property as applicable. This should	Mitigation	Consultations and grievance mechanism as part of SEP	Grievances	Prior operation to	Project operator

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
		be done in agreement and consultation with the residents of the property. A second scenario, based on real-case statistics can be undertaken if required. This will assess the effect raised by the inclusion of more local conditions, e.g., average daily sunshine hours and wind conditions. It is expected that with this analysis no exceedances will occur.					

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
Socio-economics	The Project is expected at a minimum to provide job opportunities for local communities. This, to some extent, could contribute to enhancing the living environment for its inhabitants, elevate their standards of living, and bring social and economic prosperity	Local Recruitment Procedure: the procedure must identify the number of job opportunities targeted for local communities to include skilled and unskilled workers. Such job opportunities shall also take into account employment of local communities in the area around the project to include fresh graduate engineers, technicians, labourers, etc. In addition, the procedure must include details on how job opportunities will be announced as well as a selection process that is fair and transparent and provides equal opportunities for all including females.	Recommendation	Regular reporting on outcomes of Program implementation	Not applicable	Continuous	Project Developer/ Operator

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
		Local Procurement Procedure: the procedure must identify the procurement opportunities targeted for local communities to include for example local subcontractors, local supplies and services, cleaning services, etc. In addition, the procedure must include details on how procurement opportunities will be announced as well as a selection process that is fair and transparent and provides equal opportunities for all.					

Environmental Attribute	Potential Impact	Management Action (mitigations, additional requirements, additional studies, compensation measures, etc.)	Type of Action	Monitoring Action	Parameters to be monitored / location	Frequency	Responsible Entity
		Social Responsibility Program: it is recommended that the Developer implement a social responsibility program which aims to benefit the local communities to the greatest extent possible. In this case, a structured approach must be developed which must identify priority development projects which could benefit local communities (e.g. based on a needs assessment if available). Based on that the social responsibility program can prioritise projects for local communities based on available budget, company vision, timeline for implementation as well as other factors.					

11. ASSESSMENT OF ASSOCIATED FACILITIES

11.1 Introduction

As discussed in “Section 2.3.3”, a standalone section will be included within the ESIA for associated facilities. This section presents an overall description of the associated facilities for the Project along with an E&S assessment. As discussed previously under “Section 2.3.3”, the main associated facility for the Project includes the OHTL.

11.2 Project Description

The OHTL is considered a key component of the Project as it will supply the electricity produced by the windfarm to the national grid. Without the OHTL, the windfarm project cannot be developed and the key strategic national level positive impacts discussed in “Section (iii)6.3.1 ” would not be realized as well.

As stated earlier, EETC (i.e. the off-taker) will be fully responsible for planning, developing, constructing, commissioning and operating the OHTL. In September 2024, EETC provided preliminary design information for the associated facilities.

The proposed OHTL is approximately 47 km long and will be a double circuit line (i.e. 2 lines running next to each other) designed to connect the wind farm to the national grid.



Figure 97: Location of OHTL Route

The following describes the main OHTL (Project) components. This has been based on current available information provided by the EETC.

11.2.1 OHTL Components

The following describes the main OHTL components. This has been based on currently available information provided by EETC.

(i) Transmission Towers

The main component of the OHTL is the transmission towers. The transmission tower will be a three (3) phase steel beam Double-Circuit Transmission Towers (DCT), which will transport the electricity from the substation located within the windfarm to the High Voltage National Grid. The typical structure of the DCT tower is presented in the figure below. The figure to the left is the actual tower that EETC will utilize for the project, while the figure to the right is a schematic to explain the key components.

Each transmission tower will consist of the following:

- Foundations: each tower will be fixed and bolted to the ground through reinforced concrete foundations. The exact area for each foundation is expected to be around 20m×20m and will be confirmed as part of the detailed design;
- Steel structure: the foundations will support the steel structure that will carry the conductors, cross-arms and shield wire;
- Cross-Arms: each tower will have six (6) steel beam cross arms (three (3) on each side) which connects the conductors (discussed below) with the towers (refer to figure below).
- Conductors: the conductor is the line used to carry electrical energy from one tower to the next until its connection with the High Voltage National Grid. There will be six (6) conductors, three (3) on each side of the tower that will through the cross-arms (refer to figure below). The conductor will be a 500 kV line; and
- Shield Wire (also known as earth wire): positioned above the phase conductors, the shield wire is grounded at each tower to facilitate the safe and rapid dissipation of voltage surges caused by technical issues or external factors (e.g. lightning).

The tower will have a height of around 67m. In addition, there will be one (1) tower approximately every 500m. Therefore, a total of 188 towers are expected since it will be a double circuit line (*i.e. 2 lines running next to each other*).

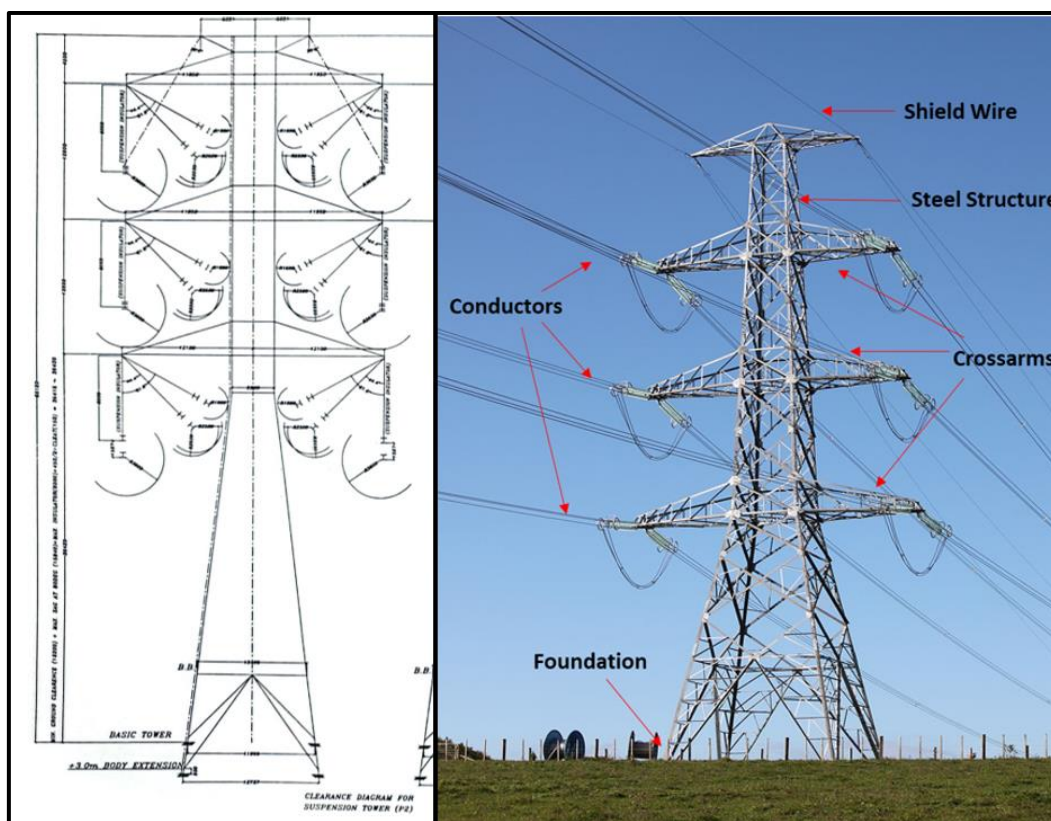


Figure 98: Typical Structural Components of DCT Towers

(ii) Infrastructure Elements

The only infrastructure requirements for the Project will be access roads, which might be required in areas where the towers are inaccessible based on existing site conditions. Such access roads are required for access of construction vehicles and machinery during construction and for maintenance activities during operation. The layout of the access roads will be determined at a later stage as part of the detailed design to be prepared by the OHTL Contractor and once areas with no access are identified.

11.2.2 Right of Way for the OHTL

Electricity transmission and distribution projects require Rights-of-Way (RoW) to protect the system from windfall, contact with trees, branches, utilities, buildings, and other potential hazards that may result in damage to the system, or power failures, as well as public health and safety concerns. RoW are also utilized to access, service, and inspect transmission and distribution systems.

The IFC EHS Guidelines for Electric Power Transmission and Distribution (2007), states that the RoW width for transmission lines ranges from 15 to 100m depending on voltage and proximity to other RoW, but typical range is between 15 and 30m.

Within the local requirements, EETC will take into account the requirements of the Electricity Law 87/2015, which provides requirements for safe distance between the conductors and the neighbouring lands and buildings and other receptors. Based on the law, the requirements of the RoW distances applicable for the 220kV OHTL is 25m horizontal distance from each side. Any successive buildings, structures or other receptors to be built shall take into account this safety distance/ RoW.

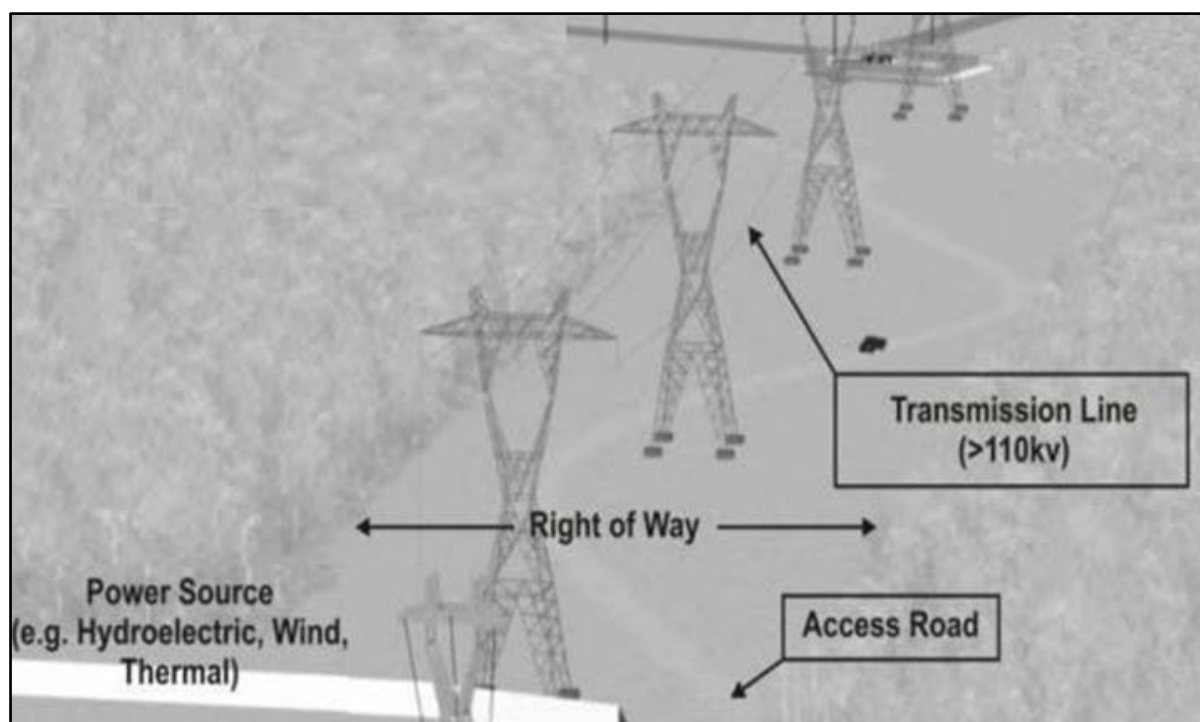


Figure 99: Right of Way and Access Road for OHTL (IFC, 2007)

11.2.3 Overview of Project Phases

This section presents the likely activities to take place during the Project development and which will include three (3) distinct phases: (i) construction, (ii) operation and (iii) decommissioning each of which is summarised below.

Planning & Construction Phase

Typical activities during the construction phase for the OHTL include the following:

- Transportation of various Project components to the Project site. The components are expected to be transported by road to the Project area;
- Site preparation activities for the tower foundations. Such activities are limited to the individual footprint of the towers and therefore the actual area of disturbance is small. Nevertheless, such activities could include land clearing activities, excavations, and levelling;
- Installation of components such as the DCT towers, cross-arms, and conductors;
- Stringing to install the conductor wires and the ground wire which is typically undertaken through using sufficient pulling force on one end and tension capabilities on the other;
- In addition to the erection of each DCT, there is additional construction work (which could include excavations, land clearing activities, etc.) for the road network if required to provide access of equipment and machinery onsite.

Throughout the construction phase, the Project will require skilled labour (such as engineers, technicians, surveyors, etc.) and unskilled labour. It is likely that the OHTL Contractor will have his own team to cover such employment opportunities.

Operation Phase

The OHTL is expected to remain operational throughout the operation period of the windfarm – which is set for 25 years. The operational phase will be mainly limited to maintenance and repair activities for the OHTL when needed. These could also include some routine maintenance activities (based on a set schedule) as well as maintenance in case of failure of any of the Project components. Maintenance activities are generally undertaken by a dedicated team of technicians from EETC and do not normally require any permanent staff to be onsite. The EETC Team would undertake required technical activities during any given day and leave the site.

Decommissioning Phase

Decommissioning activities will depend on the windfarm. As discussed earlier, the windfarm is expected to remain operational for 25 years after which the Project could be decommissioned. Decommissioning activities will include disassembly of the towers for final disposal. However, most of these materials are salvageable (i.e. recyclable).

11.2.4 Workforce

Throughout the construction phase, the Project will require skilled labour (such as engineers, technicians, surveyors, etc.) and unskilled labour. Therefore, the OHTL will create some limited job opportunities for skilled labour (such as engineers, technicians, surveyors, etc.) and un-skilled labour (mainly labourers) during the construction phase and through the OHTL Contractor.

During operation, maintenance activities are generally undertaken by a dedicated team of technicians from EETC and do not normally require any permanent staff to be onsite. The EETC Team would undertake required technical activities during any given day and leave the site.

11.3 E&S Assessment Approach and Methodology

In general, the E&S assessment approach for the associated facilities followed the same methodology and approach for that of windfarm as discussed earlier under “Section 3”. Please refer to the section for additional details.

11.4 Analysis of Alternatives

11.4.1 EETC Routing Process

It is important reiterate that the OHTL development process is entirely under EETC’s responsibility, with no influence or authority from the Developer over this process. This includes the process of OHTL routing, siting, planning, construction, operation and maintenance.

This section provides details on the route selection process that was followed for the proposed OHTL, to the greatest extent possible, based on information obtained from EETC through the Developer. EETC indicated that the route selection process was based on:

- A route survey and analysis undertaken for the area;
- Technical requirements included within the EETC “Network and Grid Stability Study for the GoS Region”.

Due to the overlap and similarity in nature of the route selection process for Plot 1 and Plot 2 OHTLs, this section discusses both projects jointly.

EETC initially required that both Plot 1 and Plot 2 OHTLs connect to the 220kV network. However, based on further investigations, it was indicated that there is no capacity on the existing 220kV network in the GoS area to connect both plots. Therefore, EETC decided to connect Plot 1 on the 220kV network and connect Plot 2 on the 500kV network. Additional details on each required connection are provided below.

- Plot 1 220kV connection requires a ring interconnection. This means that the electricity produced from Plot 1 must be connected to two (2) different substations to mitigate any risk of either line being disrupted due to any reason, therefore ensuring continuous supply of electricity. Therefore, it was decided to connect Plot 1 to the two nearest 220kV substations with available capacity and which are presented as SS1 and SS2 in the figure below. This includes an OHTL with a distance of 17 km to SS1 and a distance of 46km to SS2 – a total length combined of 63km.

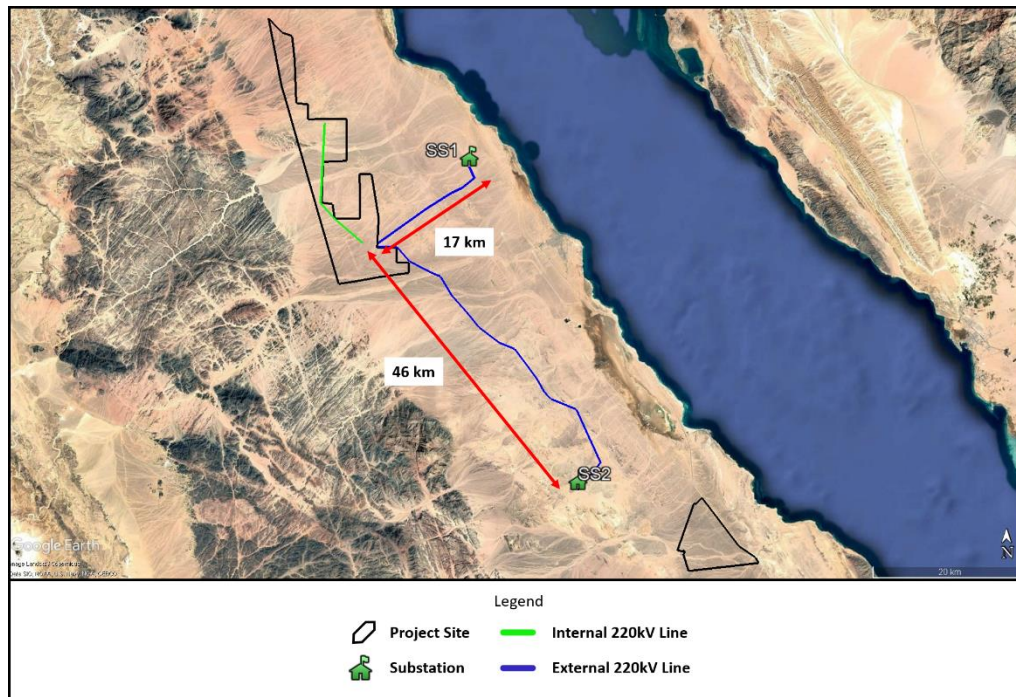


Figure 100: Plot 1 OHTL Ring Interconnections

Another option investigated by the 'E&S Team' was to connect Plot 2 to the 220kV network to determine if it would result in shorter OHTLs. In this case, the same concept above would be required (i.e. ring interconnection) and with the two closest 220kV substations with available capacity being SS1 and SS2. In this case the OHTL distance would be slightly longer as it would require a 15km OHTL to SS2 and 53 km to SS1 – a total combined length of 68 km.

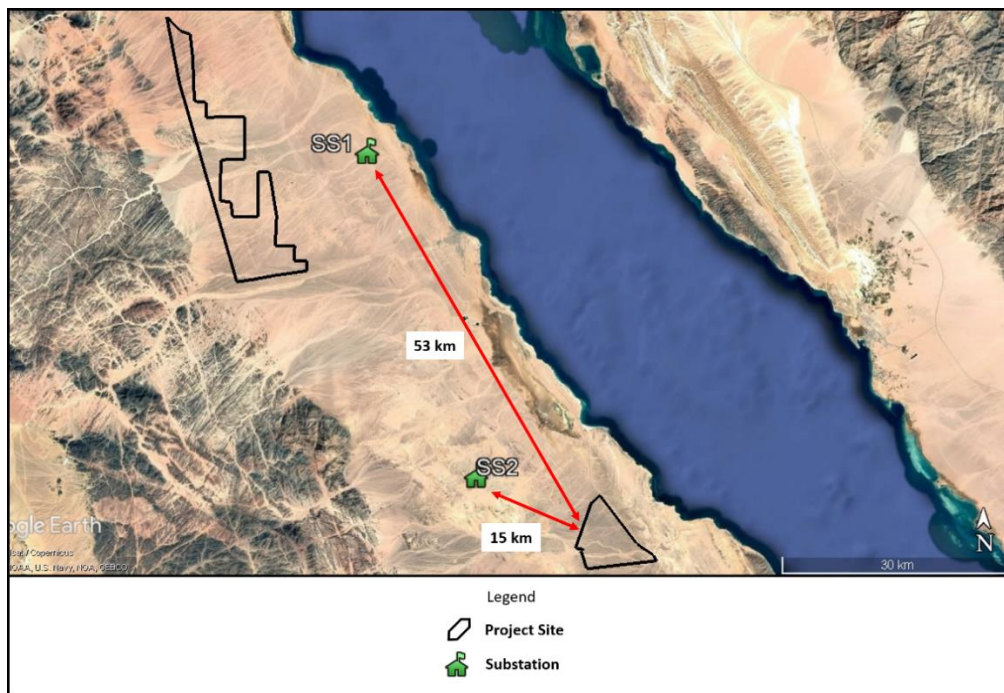


Figure 101: Plot 2 OHTLs Hypothetical 220 kV Connections

- The key factors considered by EETC for the Plot 1 OHTL route were as follows:
 1. For the eastern line, the shortest possible route was selected to SS1 that runs parallel to an existing road and then aligns with another high voltage OHTL as noted in the figure below.

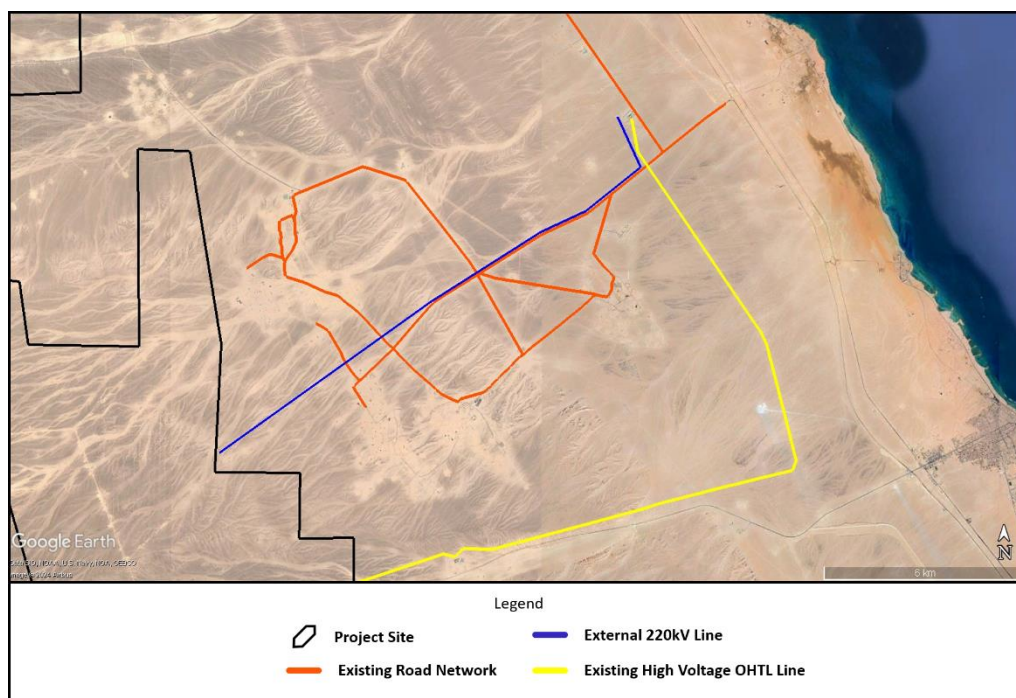


Figure 102: Plot 1 Eastern OHTL and Existing Infrastructure Elements

2. For the southern line, the route was selected to be aligned with an existing high voltage OHTL (presented in yellow) to the extent possible as noted in the figure below. The alignment is for a total distance of 12km (around 30% of its total distance). However, deviation had to be taken into account at a key area as presented below, due to an existing and operating wind farm. There was no availability for routing within such area for the proposed OHTL due to existing turbine constraints. After the deviation, the proposed OHTL was aligned with another MV OHTL for a distance of 5km (presented in pink). In the final

stretch, the OHTL aligns with the proposed Plot 2 500kV line for a distance of around 7km (presented in red).

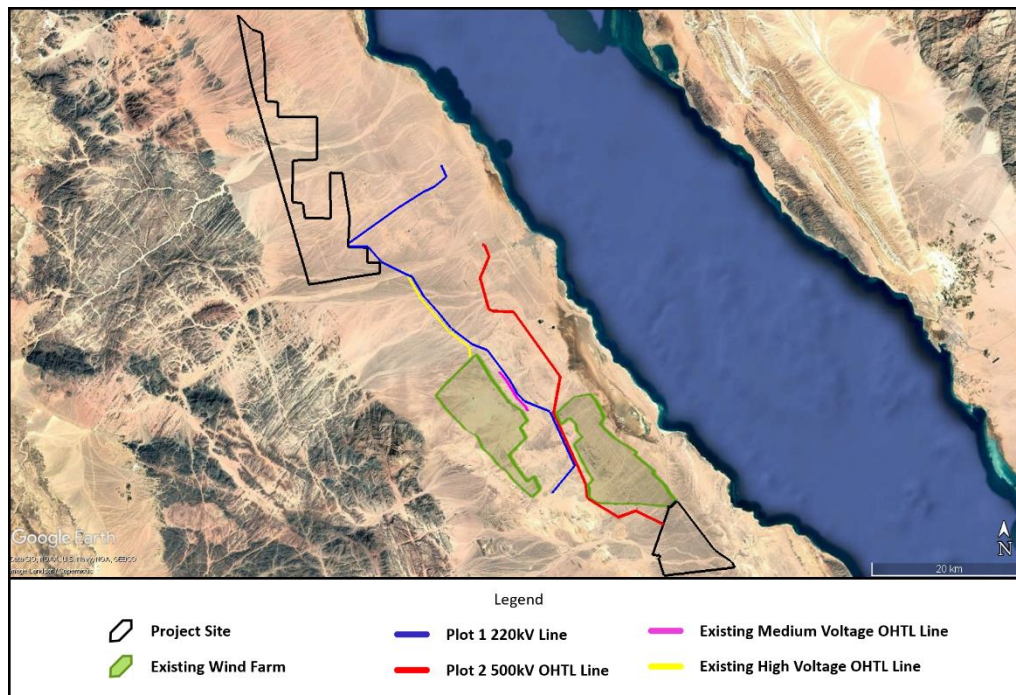


Figure 103: Plot 1 Southern OHTL and Existing Infrastructure

- As noted earlier, with the connection of Plot 1 OHTL to the 220kV network, there is no further capacity within the GoS 220kV network for further connections. Therefore, EETC decided that Plot 2 will need to connect on the 500kV network. The closest connection point available is 49km from Plot 2 as noted in the figure below.

An option investigated by the 'E&S Team' was connecting Plot 1 to this point to reduce the OHTL transmission length, given that Plot 1 is located 17km from this point. However, based on information provided by the Developer from EETC it was indicated that this will not be possible due to strategic reasons. EETC intends to construct within Plot 2 a substation with excessive capacity to possibly allow future planned wind farm development projects near Plot 2 area to connect to this substation for evacuation on the 500kV network; instead of building dedicated 500kV transmission lines for each project in the future

- The key factors considered by EETC for the Plot 2 route selection were as follows:
 - The initial and last stretch of the proposed OHTL follows an existing high voltage OHTL (presented in yellow) for a total distance of 26km (53% of the total OHTL length).
 - The proposed OHTL could not run parallel to the exiting OHTL within other areas noted below area given that in such locations it runs within an existing and operating windfarm. Therefore, the OHTL had to bypass the existing wind farm within those areas. There was no availability for routing within such area for the proposed OHTL due to existing turbine constraints. Within this deviation area, the proposed line was aligned with the Plot 1 220kV line for a distance of 7km.

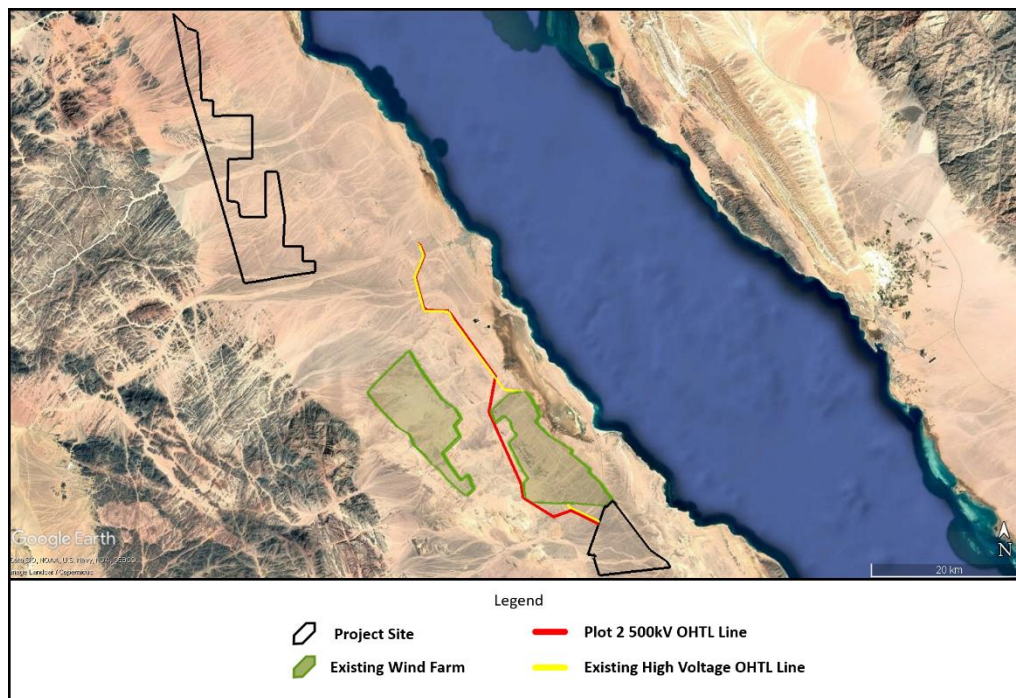


Figure 104: Plot 2 OHTL and Existing Infrastructure

- In terms of future evacuation plans for the GoS region, the following is noted by EETC:
 1. There will be no further 220KV lines constructed within the GoS region due to full capacity of the 220kv network
 2. Construction of Plot 2 substation and OHTL 500kv line is a strategic requirement as it planned to allow other future planned development projects to connect on this substation and evacuate electricity into the 500kv network.
 3. There is potentially new 500kv lines that will be constructed within the GoS area for other future projects in the region, however no details are available at this stage on their routes and locations.

11.4.2 OHTLs and IBAs

Further to the above, consultations were undertaken by the Developer and EETC, with the Developer requesting that the OHTL route for Plot 2 in particular be modified to avoid the Gebel al Zeit Important Bird Area (IBA) to the greatest extent possible. As noted in the figure below, Plot 2 OHTL mainly runs inside the IBA. In addition, the request was also submitted for Plot 1 OHTL although it runs for a small distance within the IBA (a distance of around 7km and just on the edge of the IBA).

EETC provided a formal letter (presented below) stating that after a site visit undertaken on 11 September 2024 this will not be possible due to the following:

- It is a key requirement to EETC that the proposed OHTL routes run parallel to any existing high voltage OHTLs. As noted within “Section 11.4.1” earlier, the majority of the proposed Plot 2 OHTL runs next to an existing 220KV line for a total distance of 26km (representing more than 50% of the total OHTL length).
- Shifting the lines to the areas outside of the IBA entails running within high level mountainous and hilly areas making it technically difficult to implement.

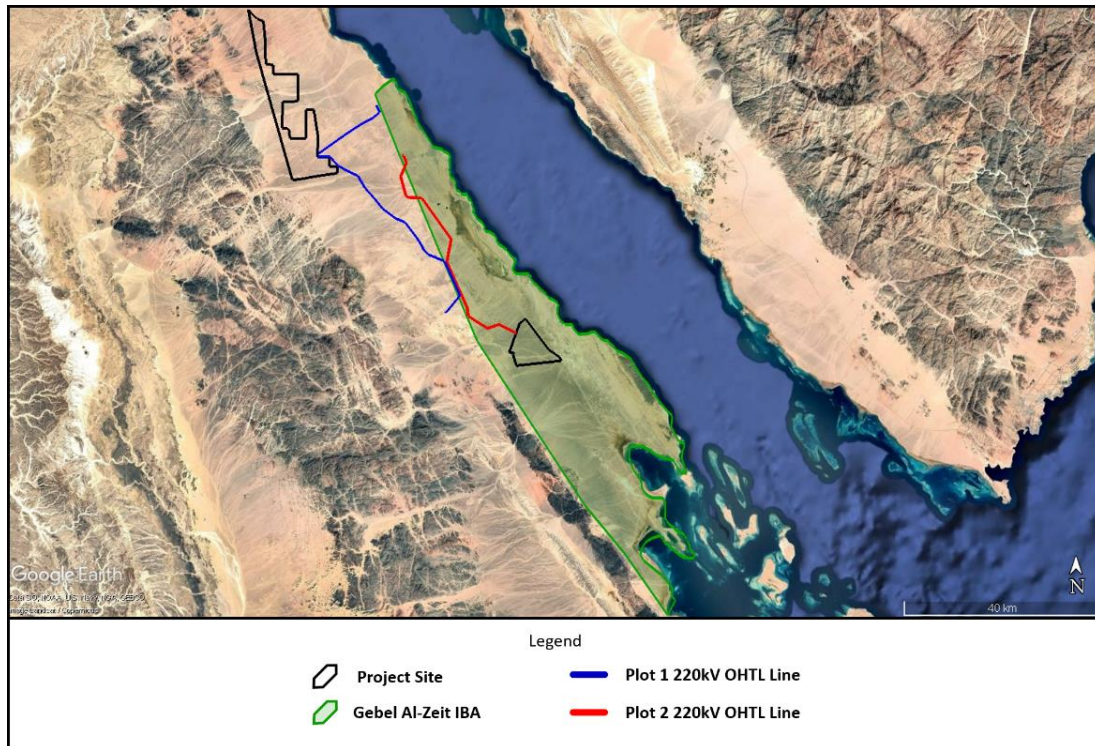


Figure 105: Plot 1 and 2 OHTLs and IBAs

EGYPTIAN ELECTRICITY TRANSMISSION
COMPANY (EETC)
Chairman
Tel.: 22618579 Fax: 22616486

الشركة المصرية لنقل الكهرباء
رئيس مجلس الإدارة
ت. ٢٢٦١٨٥٧٩ فاكس ٢٢٦١٦٤٨٦

الموضوع / خطوط ربط محطات ترقيع القدرة من مشروع ١١٠٠ ميجا وات
(رياح السويس الطاقة) بمحطات S4 & KFW6

المسيد المهندس / رئيس مجلس إدارة شركة أكوا باور
SODIC EDNC - بوابة ٩ مبنى ٥ - الدور الثالث - التجمع الخامس - القاهرة الجديدة - ت / ٠١٠٠١٩٠٠٨٩٠

تحية طيبة ... وبعد

بالإشارة إلى الموضوع عاليه ٠٠٠ وإلى البريد الإلكتروني الوارد من سيادتكم بتاريخ ٢٠٢٤/٩/٨ والمتضمن أنه تلاحظ تداخل أجزاء من مسار الخطوط جهد ٥٠٠ ك.ف بالأراضي الواقعة بالمحمية المصنفة بالأكثر أهمية للطيور المهاجرة وطلب تحريك المسار في الأجزاء المتداخلة حوالي ٣٠٠ متر في اتجاه الغرب لتجنب المنطقة الواقعة في مسار هجرة الطيور (مرفق)

تشرف بأن نرفق لسيادتكم طيه محضر المعاينة على الطبيعة بتاريخ ٢٠٢٤/٩/١١ لمسارات الخطوط المذكورة عاليه والمتضمن أنه تعذر تعديل مسار فتح الخط الكهربائي رأس غارب / S4 جهد ٥٠٠ ك.ف (د/خ) على م ٠٠م أكوا(١) حيث أن جزء من المسار يمر بجوار الخط الكهربائي جبل الزيت / رأس غارب جهد ٢٢٠ ك.ف من الجهة الشرقية بمسافة ٥٠ متر تقريباً (حسب اشغاطات البيئة) كما يمر جزء منه على حدود منطقة تباب مرتفعة وفي حالة ترحيل المسار لمسافة ٣٠٠ متر غرباً سيمر بمنطقة جبال وتباب مرتفعة المناسب مما يصعب التنفيذ وزيادة التكلفة وأما بالنسبة للخط الكهربائي المقترح أكوا(٢) / KFW6 جهد ٢٢٠ ك.ف فإن جزء من المسار يمر موازاً للمسار المقترح لفتح الخط الكهربائي المشار إليه بعاليه ويمر على حدود منطقة تباب مرتفعة وفي حالة ترحيل المسار لمسافة ٣٠٠ متر غرباً خارج حدود المحمية سيمر المسار بمنطقة تباب مرتفعة مما يصعب التنفيذ وزيادة التكلفة .

وتفضلوا بقبول فائق الاحترام،،،

رئيس مجلس الإدارة
والعضو المنتدب
٢٠٢٤/٩/١٩
مهندسة / منى رزق إبراهيم

مرفقات
- صورة بريد إلكتروني
- صورة محضر

Figure 106: Formal Letter from EETC for OHTL to avoid IBA

11.4.3 OHTLs and Other E&S Constraints

As part of the design process, the Developer has considered other potential E&S constraints for the proposed OHTLs to the extent possible. Such constraints were investigated as part of the E&S assessment presented in “Section 11.5” below. As noted, no key constraints were identified such as archaeological sites, land uses, etc and none were identified.

However, at the OHTL siting process, the Developer did account for some other E&S constraints – particularly within areas where the Developer can influence the design (i.e. the internal OHTL network as presented in Figure 97 earlier). As noted within “Section 7.5” earlier, the water dams are likely to present a source of attraction for birds and therefore a 2km setback distance was required. Two (2) water dams are located within the Plot 1 and a 3.8km setback has been considered from the first dam and a 1.8km setback has been considered for the second dam. Nevertheless, specific mitigations for this have been considered and are included within “Section 11.5.3Error! Reference source not found.”. Within plot 2 no water dams were noted.

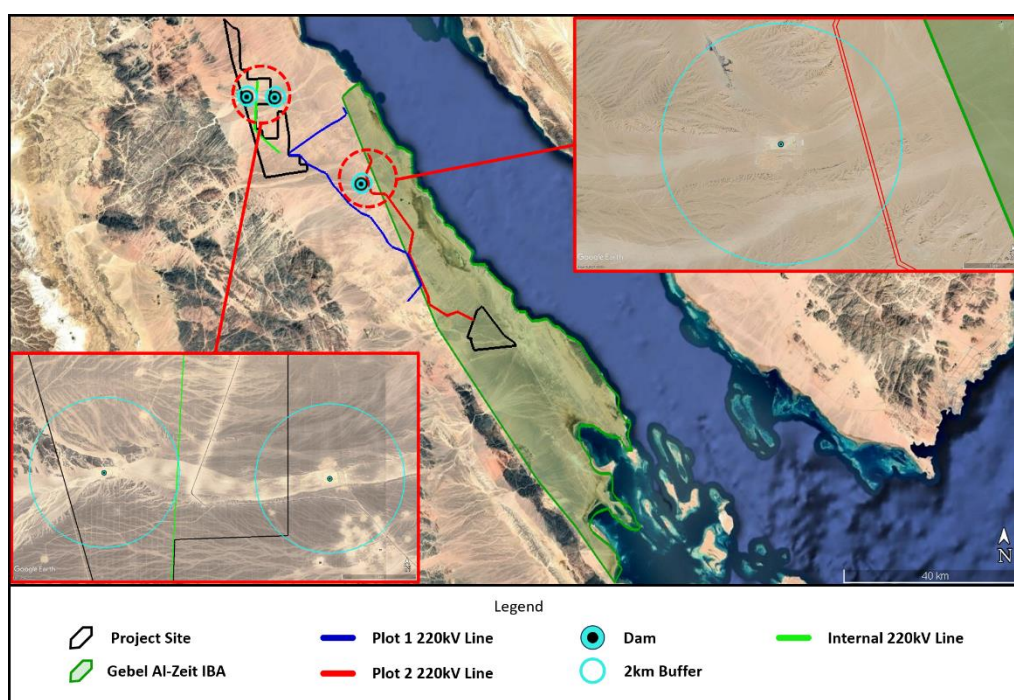


Figure 107: Dams and OHTLs

However, as noted above, for Plot 2 OHTL, there is another dam that is located along the OHTL route and around 1km from the line. However, similar to the reasons provided in “Section 11.4.2”, EETC stated that it is a key requirement that the proposed OHTL routes run parallel to any existing high voltage OHTLs – and within this section it does run and is aligned with an existing high voltage line as presented in Figure 104 earlier. Nevertheless, specific mitigations for this have been considered and are included within “Section 11.5.3”.

In addition to the below, in stretches where the OHTL runs parallel to a pre-existing OHTL, the towers of the new line will be placed in an alternating pattern with those of the existing line, rather than directly opposite each other (i.e. staggered design). This in turn, will increase visibility and reduce the probability of collisions²⁵.

²⁵ [Staggered towers on parallel transmission lines: a new mitigation measure to reduce collisions of birds, especially bustards | Namibian Journal of Environment \(nje.org.na\)](#)

11.5 Existing Physical, Biological and Social Environment

11.5.1 Landscape and Visual

The OHTL routes pass through undeveloped barren desert plains represented with pebbles, gravels, and small angular stones. In addition, the majority of the OHTL routes are within flat areas however there are parts that are considered hilly lands which may rise to 10m or more very shallow passages, representing drainage lines that cross the site from west to east with a slight slope.

The typical route for the OHTL is presented in the figure below.



Figure 108: Typical Landscape of OHTL Route

11.5.2 Land Use

A detailed land use survey was undertaken along the OHTL routes, including a 200 m buffer zone on both sides of the lines. The survey aimed to document and understand any informal land use activities, such as physical structures (houses, settlements, etc.) or economic activities (grazing, agriculture, etc.).

The area in general is uninhabited and vacant, with no indication or evidence of any physical or economic land use activities along the OHTL routes and the 200 m buffer zone. Only 1 uninhabited and abandoned guard house was noted (most likely could be for previous petroleum activities in the area). The table and figure below present the location of this structure. The red line in the figure below is the Plot 2 OHTL while the green line is the Plot 1 OHTL.

Table 92: Land Use along the OHTL Route and 200 m Buffer Zone

ID	Latitude	Longitude	Notes
5	28.07813	33.14765	Old uninhabited guardroom

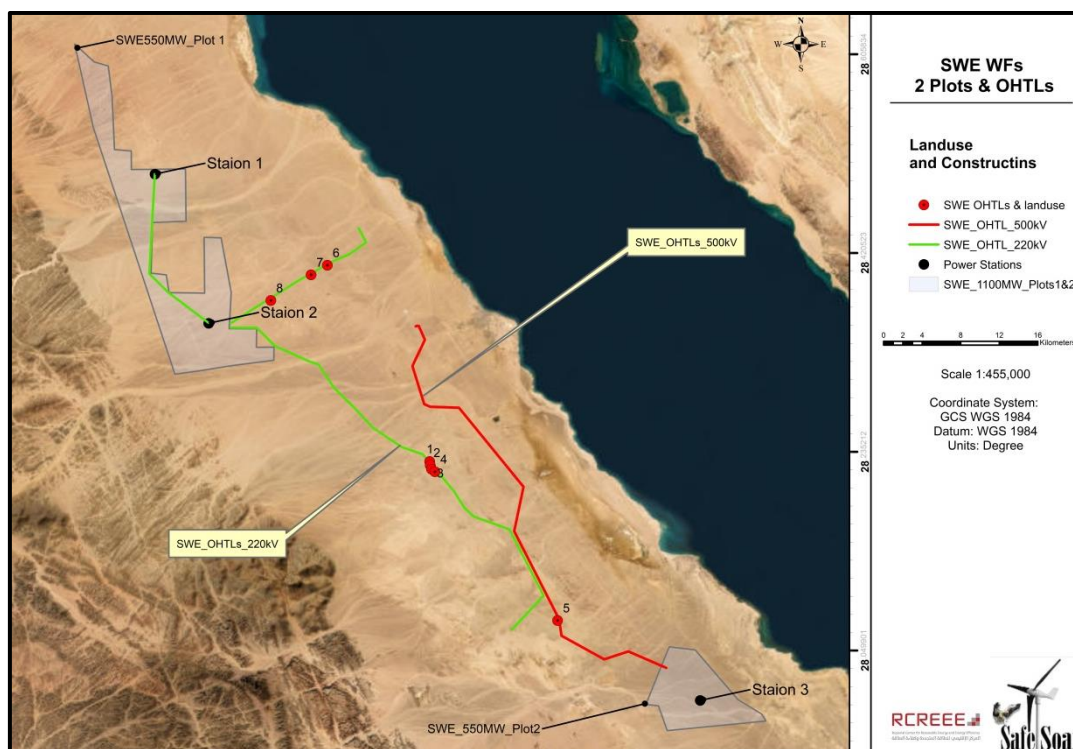


Figure 109: Land Use Map



Figure 110: Abandoned Guardroom

Apart from that, several infrastructure elements (e.g. highway, other OHTLs, etc.) were noted and those are discussed in detail in “Section 11.5.5Error! Reference source not found.” below.

In addition, all the lands within which the OHTL runs in are government-owned, with different government jurisdictions over the areas where the project is located, divided between the Red Sea Governorate and the Ministries of Electricity, Petroleum, and Transportation.

Inappropriate siting of Project components could result in land use impacts related to physical displacement and/or economical displacement or similar. Nevertheless, no such impacts are anticipated from the Project due to the following:

- The OHTL routes and 200 m buffer runs within areas that are uninhabited and vacant with no physical or economical land use activities. Therefore, physical and economical displacement impacts are considered irrelevant; and
- The Project site is under governmental ownership. Therefore, no land acquisition or compensation process is required.

11.5.3 **Biodiversity**

A. Baseline Assessment Methodology

Baseline studies were informed by literature reviews and an initial desktop analysis using information from the Plot 1 and Plot 2 Wind Farm ESIA's and other windfarms in the area including Blade. Masdar Infinity Power and Amunet Wind Farm.

A standardized sampling method was applied over the whole study region from 18-30th August 2024, allocating 31 sampling points along the proposed OHTL length, maintaining at least 1 km as a minimum distance between sample sites to achieve regional comprehensive coverage and avoid double sampling in the vicinity of each site to maintain sample independence (refer to figure below).

Assessment methods have been implemented at each sampling point to survey and assess the terrestrial flora and fauna of the project area including mammals (volant and non-volant; large, medium and small), herpetofauna (reptiles and amphibians), and invertebrate faunal species.

A combination of different survey methods have been used, such as walk transects, drive transects as well as active searching methods, to obtain the required data about existing habitats, fauna and flora of the study area. The presence of the faunal species were confirmed by direct observation or other associated signs such as tracks, dens and droppings. Photographic documentation for habitats, species and their signs were obtained when possible and particular attention was given to habitats that potentially support species of conservation interest, such as protected and threatened species, if they exist.

Further details of sampling for each particular taxa are detailed below.

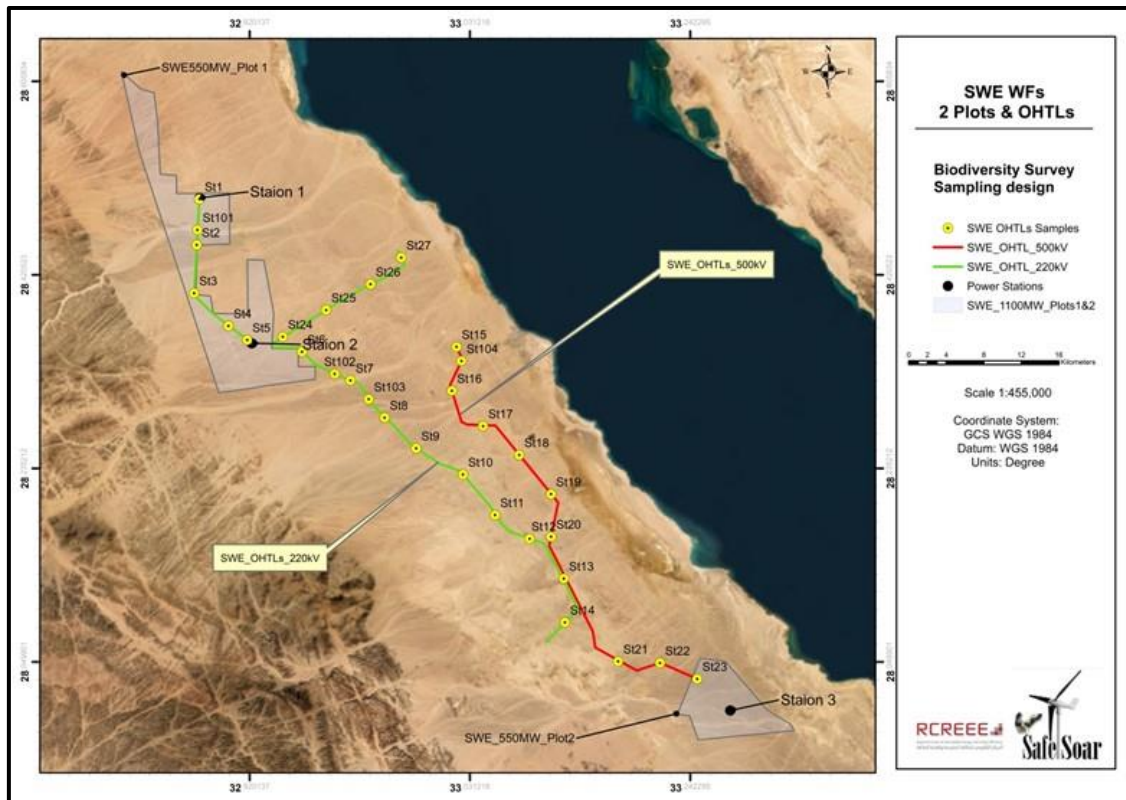


Figure 111: OHTLs and Sampling Points

Habitat and Floral Survey

The habitat and floral surveys followed the same methodology as used to survey the Plot 2 Project site as a whole, using quadrats from the specified sampling point. Further details of this methodology can be viewed in Section 7.5.37.5.3.

Mammal Survey

Large, medium-sized and small mammals were surveyed adopting different methods including active search, and line transects from each of the sampling points.

- Line transects: transects in many areas of the project site of over 200m long, one in each cardinal direction (E, W, S. & N.) were conducted to provide detailed assessment of fauna species. Observed species were recorded and photographed when possible.
- Active search: during the active search, within 100 m in both directions around the OHTL and along the path, carried out. Animal signs such as markings, urine, faces, dens, tracks, trails, carcasses, remains of preys or even direct observation of mammals were recorded and documented, when present.

Herpetofauna Survey

A GIS-based survey design was prepared which took into account the length of the OHTL and the hydrology of the landscape to allocate 31 sampling stations. From this, square-shaped line transects were undertaken across the landscape with a distance of 200 m per transect. Line transects were evenly distributed across all the habitats and landscapes along the proposed OHTL.

The square-shape design of the transect aims to increase the detectability of Egyptian Spiny-tailed Lizard (*Uromastix aegyptia*) and their burrows. This survey design aimed to reveal the spatial distribution, and

abundance of reptiles and amphibians, with a particular focus on large and medium sized, as well as Egyptian Spiny-tailed Lizard in the study area.

Avifauna

During the survey effort for flora and fauna, incidental bird species were recorded but there have been no specific avifauna surveys for the proposed OHTL, which would have assessed numbers of migratory bird species (MSBs) moving through the relevant area. Instead, a holistic approach has been undertaken, using data from other local wind farm studies to understand areas of high bird movement and risk as well as look at actual impacts at current OHTLs to determine predicted numbers of MSB collisions per year / over the lifetime of the Project.

This available data on actual bird deaths along existing OHTLs is more valuable than surveys within the area that MSBs pass through as it provides real data from similar and close by projects and will provide a more accurate result. Three assessments have been undertaken:

- Number of deaths per year: using bird collision data from wind farms in the immediate vicinity of the proposed project to extrapolate how many individual birds are predicted to collide with the OHTL each year. This has been done by taking the average of number of fatalities for each species per km over several seasons (with data from 2018-2024) at eight wind farms: FIEM, Gabal EL Zayt, JICA, KFW, LEKELA, NREA, RGWE and Zaafarana. Data from these projects has been extrapolated to predict how many birds will collide with the proposed OHTL per km of line, per year. This has been done for Plot 1, Plot 2 and for both plots combined. As part of the extrapolation it has been assumed that no bird diverters are currently in place (it is known to be the case that at least 5 of the lines have no diverters and the exact use of diverters along the full length of the other lines is unknown). The number of recorded fatalities at each OHTL was multiplied up using the results of OHTL studies using GenEst at Lakela and RGWE. Whilst this data was not available for all projects a standardized approach for scaling up the number of recorded carcasses was used to ensure that searcher efficiency, effort and prey removal were considered.
- Number of deaths with and without diverters: data has been used from background data studies showing the typical impact of addition of diverters to decrease bird collision and understand what the impact would be reduced to in this project with bird diverters used.
- Compounded and cumulative risk assessment: using bird collision data from local wind farms with OHTLs along similar lines to assess which areas of the OHTL are at the highest risk of MSB collisions, a cumulative risk assessment was undertaken by RCREEE and Safe Soar. This assessment takes into account five indicators (parameters):

Topography

Points	Criteria
1	Flat surface
2	Area with small elevations
3	Area with higher elevations and hills
4	Area with hills and different successive elevations

The cumulative effect resulting from the convergence of other OHTLs

Points	Criteria
1	Distance between different OHTLs > 1000 m
2	Distance between different OHTLs 500-1000 m
3	Distance between different OHTLs 250-500 m
4	Distance between different OHTLs 50-250 m

When calculating the risk level for the cumulative effect of converging OHTLs, the differences in the pylon elevations are taken into account. If two converging lines have different elevations, this increases the risk level by one point.

The cumulative effect resulting from the convergence of OHTLs with Wind Turbines

Points	Criteria
1	Distance between OHTL and Wind Turbines > 2000 m
2	Distance between OHTL and Wind Turbines 1000-2000 m
3	Distance between OHTL and Wind Turbines 500-1000 m
4	Distance between OHTL and Wind Turbines 100-500 m

Distance from any attraction (Sea –Sabkha - Hills or Mountainous areas)

Points	Criteria
1	Distance from attraction site >10 km
2	Distance from attraction site 6-10 km
3	Distance from attraction site 3-6 km
4	Distance from attraction site 0-3 km

Bird Density (This indicator is assessed in segments of 2.5 km)

Points	Criteria
1	0-1000 Bird / 2.5 km
2	1001-5000 Bird / 2.5 km
3	5001-10000 Bird / 2.5 km
4	≥10000 Bird / 2.5 km

Each indicator was assessed in segments of around 2.5 km

B. Results

An initial desktop review was completed as described in the methods. These wind projects did not record any Priority Biodiversity Features (PBFs) other than MSBs and the Egyptian Spiny Tailed Lizard (Baseline Audit Report of Project Blade, ESIA Amunet Wind Farm, ESIA Masdar Infinity Power).

Habitats

Critical habitat has been triggered for Gebel El Zeit IBA, and a number of species have been considered PBFs.

Floral Survey

During the OHTL survey effort, the 31 sampling sites were surveyed as described in the methodology sections. Except for the main drainage channels or wadis, the study area is sparsely vegetated. The floral community across the survey area comprised of about 19 species only with six species dominating and no species of conservation concern or endemic species recorded.

Some wadis in the area, such as Wadi Hawashiya and Wadi Um Yosr, have better vegetation cover than elsewhere in the Project area. The collective vegetation cover for the study area was 2.357 % while the minimum value of 0.00 % in 10 samples, to a maximum of 1.37 % and an average of 0.09. Species richness was also exhibiting a similar trend.

Dam

The main feature of interest within the area is the dam which is used by roosting birds during spring as well as feeding birds during spring seasons where water is present. Further information of this dam can be viewed in Section 7.5.8 of the *Plot 1 ESIA Final*.

Mammal Survey

Arabian Red Fox (*Vulpes vulpes*) was the only mammal species was observed during the OHTL surveys. Many burrows and tracks belonging to smaller rodents mostly belong to Lesser Egyptian Gerbil (*Gerbillus gerbillus*) and Cairo Spiny Mouse (*Acomys caherinus*)(figure below). These small rodent species are typical species of the Gulf of Suez coastal ecosystem and are commonly encountered and all are IUCN Least Concern.

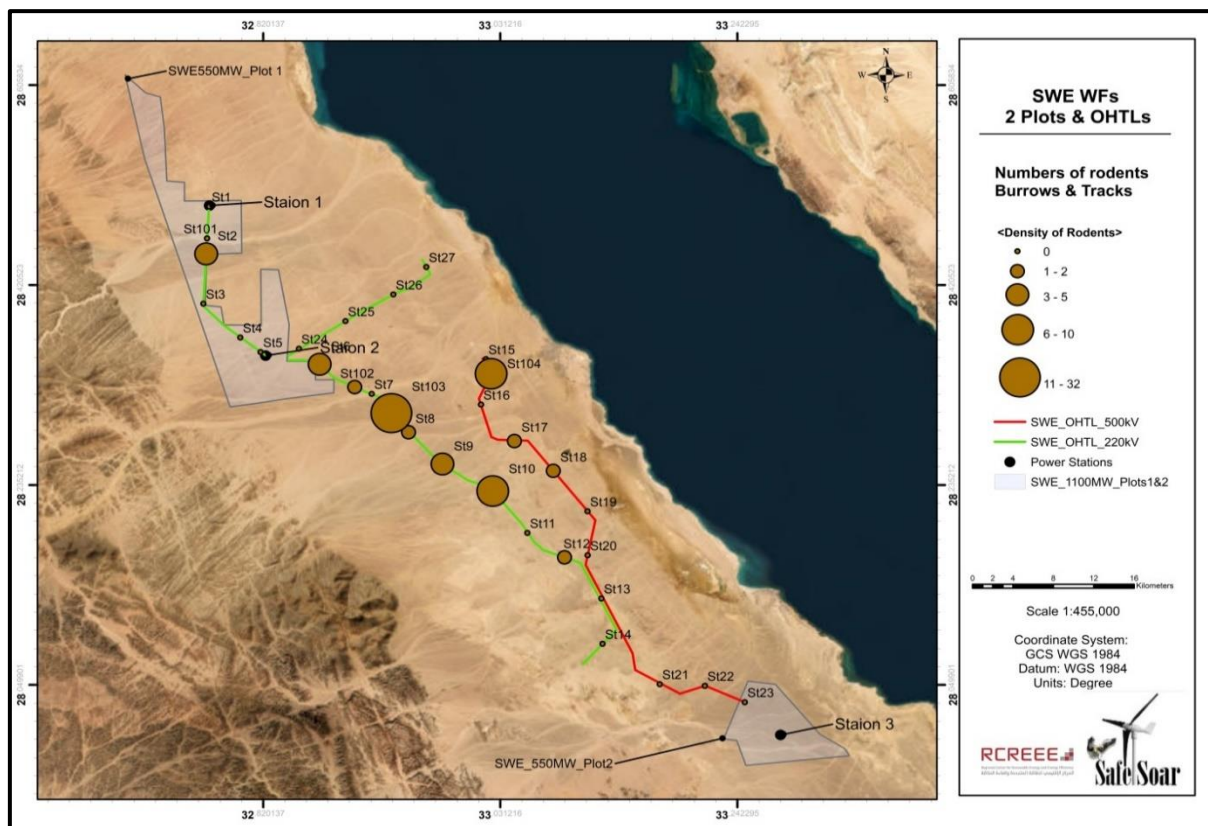


Figure 112: Rodent burrows within the project area

Herptofauna

During the OHTL survey effort, eight reptile species were recorded, including six lizards and two snakes: Spiny-tailed Lizard (*Uromastix aegyptia*); Red-spotted Lizard (*Mesalina rubropunctata*); Bosc's Lizard (*Acanthodactylus boskianus*) and Pale Agama (*Trapelus pallida*); Horned Viper (*Cerastes cerastes*) and Saharan Sand Snake (*Psammophis aegyptius*). Two other nocturnal lizards almost certainly occur in the study area but have not been recorded and these are Elegant Gecko (*Stenodactylus sthenodactylus*) and the Pigmy Gecko (*Tropiocolotes steudneri*). These two species are known to occur in the area due to previous survey efforts within Plot 1 and Plot 2 of the proposed turbine locations (*Plot 1 Final ESIA*).

The Spiny-tailed Lizard is the only reptile species that is on the IUCN Red List (regarded as Vulnerable) with all the others of Least Concern (IUCN 2024). Specific survey effort for Spiny-tailed Lizard resulted in detecting 19 active and inactive burrows across the survey area, however there were no burrows recorded within the Plot 2 OHTL (refer to figure below).

The large wadis running east to west in the south of the study site are mainly void of burrows or other presence signs and this is probably because lizards seek higher grounds for burrows to avoid potential flooding in Wadis.

Overall, Spiny-tailed Lizard is a Vulnerable species (IUCN Red List, 2024), which is exhibiting high presence in the site. According to the IUCN Red List assessment there has been a suspected population decline of over 30% over the past 15 years (3 generations), and this is expected to continue.

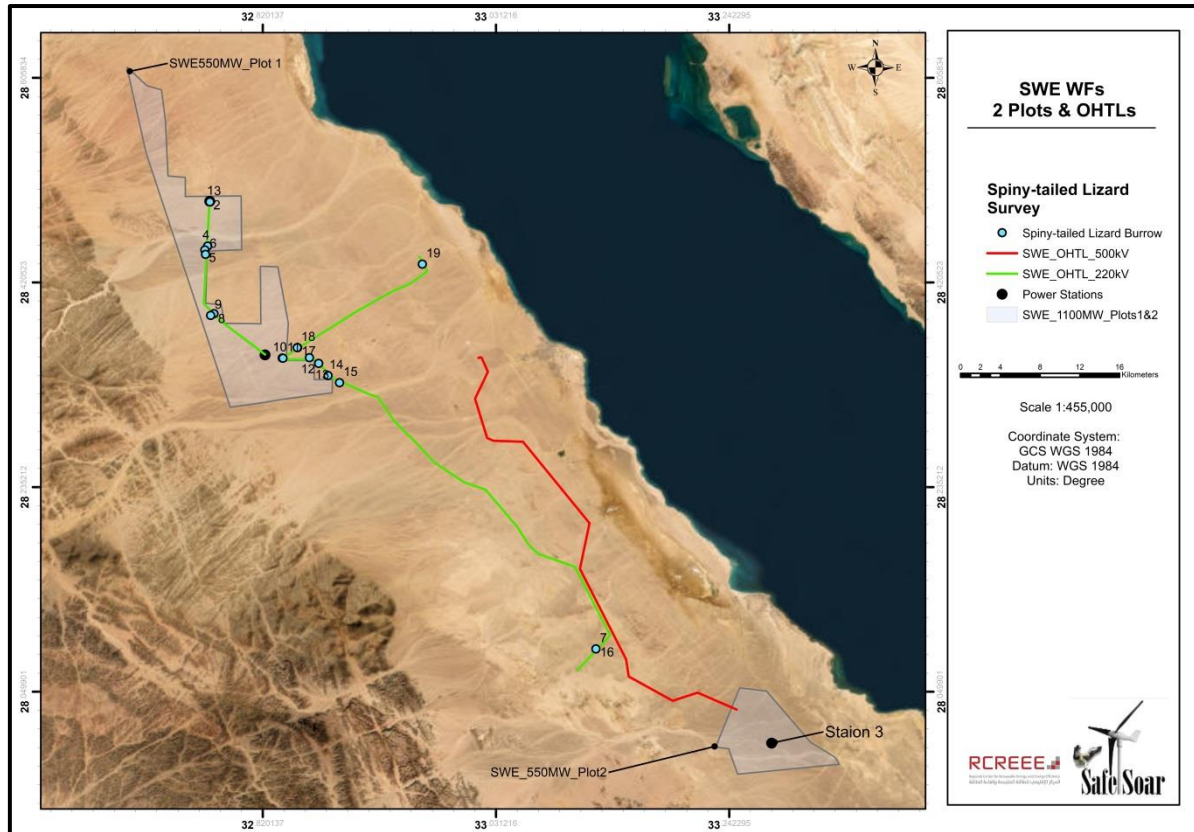


Figure 113: Spiny Tailed Lizard burrows within the project area

Avifauna

No specific bird surveys have been completed for the proposed OHTL. During the OHTL field visits and whilst driving along the routes of the OHTLs way, incidental records of birds were documented. These records involved seven individuals of a Sandgrouse sp. (*Pteroclididae* sp), one Willow Warbler (*Phylloscopus trochilus*) and one Brown-Necked Raven (*Corvus ruficollis*).

As noted earlier under “Section A – Baseline Survey Methodology”, for avifauna impacts in particular, a holistic approach has been undertaken, using data from other local wind farm studies to understand areas of high bird movement and risk as well as look at actual impacts at current OHTLs to determine predicted numbers of MSB collisions per year / over the lifetime of the Project. This is discussed in further details below under “Section 11.6.4”.

11.5.4 Archaeology and Cultural Heritage

Based on the site survey undertaken, no archaeology and cultural heritage sites were identified or recorded along the OHTL routes as well as the 200 m buffer area.

11.5.5 Infrastructure and Utilities

The following infrastructure elements were identified along the OHTL routes and within the 200 m buffer zone on both sides of the lines based on site survey as well as secondary review.

Existing and Planned OHTLs

An existing OHTL runs parallel to the proposed OHTLs, as shown in the figure below (in blue). The distance between the existing and proposed OHTLs vary along the alignment.

Existing Road Networks

As shown in the figure below, the OHTL will also intersect with existing highways and roads such as the Ras Ghareb-Minya highway (presented in yellow).

Planned Windfarms

There are planned windfarms within the surrounding areas. The Plot 2 OHTL will intersect with one (1) planned windfarm; the NIAT Wind Farm, as shown in the figure below.

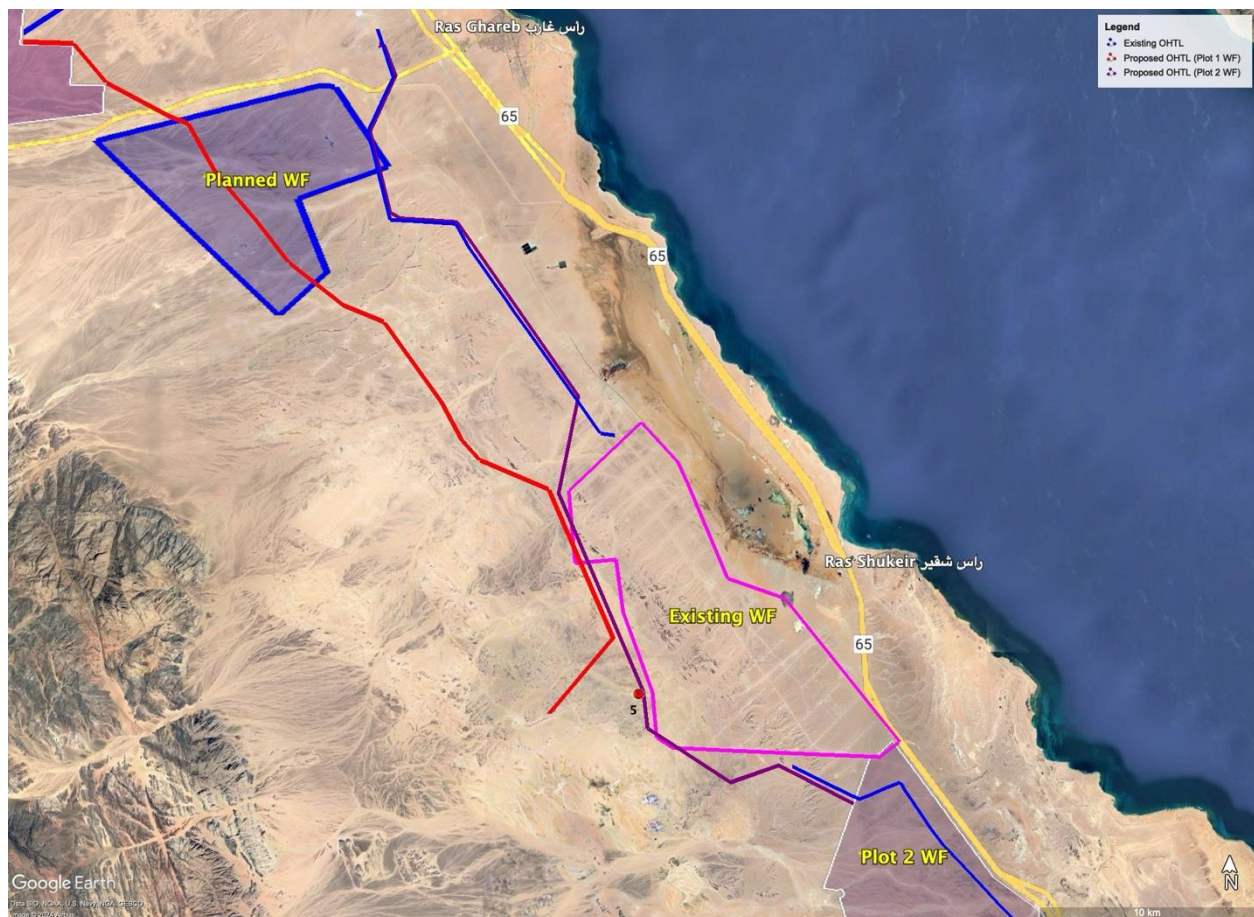


Figure 114: Existing and Planned WFs

11.6 Environmental and Social Impact Assessment

11.6.1 Landscape and Visual

Key impacts are mainly limited to the operational phase. Visual impacts typically concern the OHTL towers themselves (e.g., colour, height, and number) and their interaction with the character of the surrounding landscape and visual receptors. Nevertheless, in general, such structures are not considered mega or huge structures that would impose a significant change on the landscape and visual character of the area. More importantly, such impacts are considered insignificant due to the following:

- Within the project area and surroundings, there are no key sensitive visual receptors as presented earlier in “Section 8.2”;
- The project area is considered a barren and desert area, generally located within industrial areas with petroleum activities and wind farm developments, for which its aesthetic value is diminished; and
- There are several electricity transmission lines within the area (as discussed in “Section 11.4” earlier and “Section 11.5.5” that follows), and therefore the addition of this OHTL will not significantly impact the visual and landscape characteristics of the area.

Taking the above into account, there are no anticipated impacts on landscape and visual receptors.

Mitigation Measures

There are no mitigation or monitoring measures to be considered.

11.6.2 Land Use

There are no anticipated impacts on land use due to the following:

- The OHTL routes and 200 m buffer runs within areas that are uninhabited and vacant with no physical or economical land use activities. Therefore, physical and economical displacement impacts are considered irrelevant; and
- The Project site is under governmental ownership. Therefore, no land acquisition or compensation process is required.

Taking the above into account, there are no anticipated impacts on land use. There are additional requirements related to infrastructure and utilities which are discussed in further details below.

Mitigation Measures

There are no mitigation or monitoring measures to be considered.

11.6.3 Geology, Hydrology and Hydrogeology

A. Potential Impacts from Floods

As noted within “Section 8.4.1” earlier, the entire area within which the Windfarm and OHTL is located is in a flood prone area. It is important to investigate potential risks of local flood hazard from the wadi systems during the rainy season and especially during flash flood events which in turn could affect the Project components – particularly the OHTL towers. Such risks must be taken into consideration throughout the planning phase of the Project as they could inflict damage to the Project and its various components.

Mitigation Measures

The OHTL Contractor must undertake a flood risk assessment to determine whether the OHTL is located within a flood risk area and if so, identify the required engineering measures that should be taken into account as part of the detailed design to account for such risks.

Monitoring Measures

Submission of flood risk study along with final detailed design.

B. Potential Impacts from Improper Management of Waste Streams during Construction

Solid waste is expected to be generated from construction activities. Solid waste generated will likely include construction waste (such as debris) and municipal solid waste (such as cardboard, plastic, food waste, etc.). Municipal solid waste and construction waste generated will likely be collected and stored onsite and then disposed to the closest approved dumpsite (Ras Gharib Public Dumpsite) or, if possible, reused in the construction activities.

Given the generic nature of the impacts on soil and groundwater include potential impacts from improper housekeeping practices (e.g. improper management of waste streams, improper storage of construction material and of hazardous material, etc.). Improper housekeeping practices during construction (such as illegal disposal of waste to land) could contaminate and pollute soil which in turn could pollute groundwater resources. This could also indirectly affect flora/fauna and the general health and safety of workers (from being exposed to such waste streams). Generally, such impacts can be adequately controlled through the implementation of general best practice housekeeping measures as highlighted throughout this section, and which are expected to be implemented by the OHTL Contractor throughout construction phase.

The potential impacts from improper management of waste streams could be of a long-term duration throughout the construction phase. Such impacts are negative in nature, and could be noticeable and are therefore of medium magnitude. However, they are considered of low sensitivity as they are generally controlled through the implementation of general best practice housekeeping measures. Given all of the above, such an impact is considered to be of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the OHTL Contractor during the construction phase:

- Waste that is collected is to be sorted and stored according to its category into solid non-hazardous and hazardous wastes. Hazardous wastes are to be collected by a licensed contractor through a contractual agreement and disposed of at the approved hazardous waste landfills. Solid non-hazardous wastes may be collected by the municipality according to an agreement with them or by a Waste Contractor.
- Coordinate with Ras Gharib City Council for the collection of solid waste from the site to the municipal approved dumpsite (the closest dumpsite being Ras Gharib Public Dumpsite) or for recycling (as discussed in further details below);
- Prohibit fly-dumping of any solid waste to the land;
- Distribute appropriate number of properly contained litter bins and containers properly marked as "Municipal Waste";
- Adhere to waste hierarchy principles with associated mitigation measures to include prevent, minimize, reuse, recycle, recover and dispose.

- Distribute a sufficient number of properly contained containers clearly marked as "Construction Waste" for the dumping and disposal of construction waste.
- During construction, it is recommended that recycling measures are implemented. It is recommended that recycling is undertaken in the following approach: (i) separation and disposal of recyclables in a separate container (cardboard, paper, glass, metal, etc.); and (ii) separation and disposal of non-recyclable materials in a separate container (e.g. food waste). Each container must be clearly marked. In addition, EPC Contractor must seek ways to reduce construction waste by reusing materials (for example through recycling of concrete for road base coarse);
- Implement proper housekeeping practices on the construction site at all times; and
- Maintain records and manifests that indicate volume of waste generated onsite, collected by contractor, and disposed of at the landfill. The numbers within the records are to be consistent to ensure no illegal dumping at the site or other areas.

Following the implementation of the mitigation measures highlighted throughout this section, the residual significance of the above impacts can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the OHTL Contractor during the construction phase:

- Inspection of waste management practices onsite;
- Review of records and manifests for volume of waste generated to ensure consistency; and
- Regular environmental reporting on implementation of the waste management practices onsite.

Wastewater Generation

Wastewater is mainly expected to include black water (sewage water from toilets and sanitation facilities), as well as grey water (from sinks, showers, etc.) generated from workers during the construction phase. Wastewater quantities are expected to be minimal. It is expected that wastewater will be collected and stored in fully contained septic tanks and then collected and transported by transportation tankers to be disposed at the closest Wastewater Treatment Plant (WWTP) (being Ras Gharib WWTP). However, if inadequate disposal of wastewater occurs and is allowed to drain on land, this might contaminate the soil and possibly infiltrate to groundwater.

The potential impacts from inadequate disposal of wastewater could be of a long-term duration throughout the construction phase. Such impacts are negative in nature and could be noticeable and are therefore of medium magnitude. Both are considered of low sensitivity on a local scale. With no mitigation measures, the overall environmental significance before mitigation is rated as minor.

Mitigation Measures

The following identifies the mitigation measures to be applied by OHTL Contractor during the construction phase:

- Coordinate with Ras Gharib Water Company to hire a private contractor for the collection of wastewater from the site to the closest WWTP (being Ras Gharib WWTP);
- Prohibit illegal disposal of wastewater to the land;

- Maintain records and manifests that indicate volume of wastewater generated onsite, collected by contractor, and disposed of at the WWTP. The numbers within the records are to be consistent to ensure no illegal discharge at the site or other areas;

Following the implementation of the mitigation measures highlighted throughout this section, the residual significance of the above impacts can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by OHTL Contractor during the construction phase:

- Inspection of wastewater management practices onsite;
- Review of records and manifests for volume of wastewater generated to ensure consistency; and
- Regular environmental reporting on implementation of the wastewater management practices discussed above.

Hazardous Waste Generation

Hazardous waste is expected to be generated throughout the construction phase and this could include consumed oil, chemicals, paint cans, etc. Hazardous waste generated will likely be collected and stored onsite and then disposed at the approved hazardous waste disposal facilities managed by the Hazardous Waste Management Project and supervised by the governorate and the EEAA.

With no mitigation measures in place, the potential impact from inadequate disposal of hazardous waste is assessed as of a long-term duration and irreversible. The impact will be of a negative nature, and has a medium magnitude and is considered of low sensitivity on a local scale. With no mitigation measures, the overall environmental significance before mitigation is rated as minor.

Mitigation Measures

The following identifies the mitigation measures to be applied by the OHTL Contractor during the construction phase:

- Coordinate and hire a private contractor for the collection of hazardous waste from the site to the approved hazardous waste disposal facilities;
- Ensure that hazardous waste is disposed in a dedicated area that is enclosed; of hard surface; with proper signage and suitable containers as per hazardous waste classifications and that they are labelled for each type of hazardous waste.
- Ensure hazardous waste storage area is equipped with spill kit, fire extinguisher and anti-spillage trays and a hazardous waste inventory is available.
- Prohibit illegal disposal of hazardous waste to the land;
- Possibly contaminated water (e.g. runoff from paved areas) must be drained into appropriate facilities (such as sumps and pits). Contaminated drainage must be orderly disposed of as hazardous waste;
- Ensure that containers are emptied and collected by the contractor at appropriate intervals to prevent overflowing; and
- Maintain records and manifests that indicate volume of hazardous waste generated onsite, collected by contractor, and disposed of at the hazardous waste disposal facilities. The numbers within the records are to be consistent to ensure no illegal discharge at the site or other areas.

Following the implementation of the mitigation measures highlighted throughout this section, the residual significance of the above impacts can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the EPC Contractor during the construction phase:

- Inspection of hazardous waste management practices onsite;
- Review of records and manifests for volume of hazardous waste generated to ensure consistency; and
- Regular environmental reporting on implementation of the hazardous waste management practices onsite.

Hazardous Material

The nature of construction activities entails the use of various hazardous materials such as oil, chemicals, and fuel for the various equipment and machinery. Improper management of hazardous material entails a risk of leakage into the surrounding environment either from storage areas or throughout the use of equipment and machinery.

Should spills occur and with no mitigation measures in place, the potential impact is assessed as of a long-term duration and irreversible. The impact will be of a negative nature and has a medium magnitude. Considering the low sensitivity of the soil and groundwater quality on a local scale, the overall environmental significance before mitigation is rated as minor.

Mitigation Measures

The following identifies the mitigation measures to be applied by the OHTL Contractor during the construction phase:

- Ensure that hazardous materials are stored in proper areas and in a location where they cannot reach the land in case of accidental spillage. This includes storage facilities that are of hard impermeable surface, flame-proof, accessible to authorized personnel only, locked when not in use, and prevents incompatible materials from coming in contact with one another;
- Maintain a register of all hazardous materials used and accompanying Material Safety Data Sheet (MSDS) must present at all times. Spilled material should be tracked and accounted for;
- Incorporate dripping pans at machinery, equipment, and areas that are prone to contamination by leakage of hazardous materials (such as oil, fuel, etc.);
- Regular maintenance of all equipment and machinery used onsite. Maintenance activities and other activities that pose a risk for hazardous material spillage (such as refuelling) must take place at a suitable location (hard surface) with appropriate measures for trapping spilled material;
- Ensure that a minimum of 1,000 liters of general-purpose spill absorbent is available at hazardous material storage facility. Appropriate absorbents include zeolite, clay, peat and other products manufactured for this purpose; and
- If spillage on soil occurs, spill must be immediately contained, cleaned-up, and contaminated soil disposed as hazardous waste.

Following the implementation of the mitigation measures highlighted throughout this section, the residual significance of the above impacts can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by OHTL Contractor during the construction phase:

- Inspection for storage of hazardous materials to include inspections for potential spillages or leakages; and
- Report any spills and the measures taken to minimize the impact and prevent from occurring again.

C. Potential Impacts from Erosion and Runoff during the Construction Phase

Site preparation activities which are to take place onsite by the OHTL Contractor for installation of the OHTL towers are expected to include land clearing activities, excavation, grading, etc.

The nature of construction activities discussed above could disturb soil, exposing it to increased erosion during rainfall events. If onsite erosion and runoff are not controlled, they can result in siltation of surface water. Generally, such impacts can be adequately controlled through the implementation of general best practice housekeeping measures as highlighted throughout this section, and which are expected to be implemented throughout construction phase.

The potential impacts from erosion and runoff are of short-term duration as it is limited to the construction phase. Such impacts are negative in nature and could be noticeable and are therefore of medium magnitude. However, they are considered of low sensitivity as they are generally controlled through the implementation of general best practice housekeeping measures. Given all of the above, such an impact is considered to be of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by EPC Contractor during the construction phase:

- Avoid executing excavation works under aggressive weather conditions.
- Place clear markers indicating stockpiling area of excavated materials to restrict equipment and personnel movement, thus limiting the physical disturbance to land and soils in adjacent areas.
- Erect erosion control barriers around work site during site preparation and construction to prevent silt runoff where applicable.
- Return surfaces disturbed during construction to their original (or better) condition to the greatest extent possible.

Following the implementation of the mitigation measures highlighted throughout this section, the residual significance can be reduced to not significant.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by OHTL Contractor during the construction phase:

- Inspection for erosion and runoff control to include inspections for implementation of mitigation measures.

11.6.4 Biodiversity

A. Impact Assessment

General

This section identifies and assesses the anticipated impacts from the Project activities on identified ecological receptors during the construction and operation phase. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels.

Impact assessment summary tables are relevant, however for some impacts the assessment is provided within the accompanying text and where impact significance is clear (e.g. similar impacts affecting multiple receptors), no table has been provided to avoid significant levels of repetition.

Full methodology for Impact Assessment can be found within Section 3.5 of the Plot 1 ESIA.

This assessment looks at the OHTLs for both Plot 1 and Plot 2 combined, as there will be cumulative impacts across both plots. However, this assessment will comment specifically on Plot 2 where appropriate.

Impacts during construction phase

Habitat Loss, Fragmentation and Degradation

Site clearance and subsequent construction activities associated with the proposed OHTLs will result in the direct loss of areas of natural habitats. Natural habitats are valued as being of Medium Sensitivity as they are not listed as Annex 1 or Priority Habitats, and permanent loss will be limited to the small areas of the transmission tower bases and associated clearance around them and the two switching stations. There is also likely to be temporary habitat loss and degradation of habitats as a result of temporary access roads (although unlikely to be required) and work areas, temporary lay-down areas and other possible temporary facilities (e.g. batching plants, worker accommodation). The final design of the OHTL will be completed by the OHTL Contractor and therefore the full details of required habitat loss is not currently known. However, it is anticipated based on current design that:

- A total of 188 transmission towers will be required across the two Plot 2 500kV lines.
- The total footprint of one 500kV tower would be 20 x 20m and therefore the total habitat loss for this OHTL is 0.07km².
- A presumed working width of 15m will be present temporarily along the length of all OHTL. Any required access roads (although unlikely) to the transmission tower locations will likely be covered by existing road and the above working width.

The EPC contractor will ensure that detailed consideration has been given to locating temporary works areas (laydown areas, workers camps, batching plants, access roads, etc.) are sited within areas that are already modified habitat or degraded, poor condition, natural habitat. The actual loss of natural habitat will therefore be very minor.

The routes of the OHTL show a typical Red Sea coast Biodiversity with all but one species recorded being of IUCN Least Concern and no endemic species noted. Egyptian Spiny-Tailed Lizard is IUCN Vulnerable and was found to have populations in a number of locations along the proposed OHTL, particularly in the areas of the Plot 1 OHTL, but not the plot 2 OHTL. Specific mitigation measures are therefore required to ensure no harm comes to the species during works.

Habitat loss of terrestrial species can lead to a negative impact on overall population viability. In the situation here the impact is reduced due to the nature of the development meaning that habitat loss is spread in small areas over a wider project site. This means that connectivity is maintained through the area and no barriers to

movement put in place or wide areas of specific interest will be lost. Given habitats are found through the area the small loss of habitat, it is considered that there will be no impact on conservation status of these species.

The potential impacts on habitat loss, fragmentation and degradation would be negative in nature yet short-term in duration. Impacts at pylons would be medium in magnitude yet deemed irreversible and along the working route medium to high in magnitude however short term and reversible. Considering the ecology of the site, the receiving environment is determined to be of medium sensitivity. Given the above, the impact is considered overall of minor significance.

Direct Impacts on Sensitive Receptors (Habitats and Flora) – Non-native Species and Introduced Flora

It is possible that non-native or introduced flora could be imported into the area on vehicles or within any imported soil material. The impacts of non-native and introduced flora could have a moderate significant impact in absence of any mitigation as these species could become established and out-compete native flora. Construction works could improve conditions for these species and it is possible earth moving could increase the distribution and spread them along the route of the OHTL.

Impacts associated with non-native, invasive or introduced flora could result in long-term negative impacts, irreversible (if allowed to become established) and moderately significant.

Direct Impacts on Sensitive Receptors (Vertebrates) - Site Clearance and Earthworks

As well as impacts to habitats it is near-certain that site preparation works and construction activities will negative impact sensitive ecological receptors (e.g. reptiles, mammals, breeding birds) as a result of direct mortality.

Egyptian Spiny Tailed Lizard (IUCN VU) are likely to be particularly exposed to impacts during construction works for the Project and OHTL as they are a diurnal species meaning they will be mobile while site works are active. Unmitigated impacts on Egyptian Spiny Tailed Lizard could potentially be medium-term and irreversible (e.g. loss of breeding habitat and mortality).

Direct Impacts on Sensitive Receptors (Vertebrates) – Vehicle Collisions

Vehicle related collision is possible for all vertebrate species present within the Project's Aol and this will result in direct mortality on receptors of low to high sensitivity. Any such impact would be negative, long-term and irreversible and would be of medium to high magnitude and therefore of minor to major significance (depending on the receptor killed).

Both small and large vertebrate species are at risk of vehicle collisions throughout construction. Species such as Egyptian Spiny Tailed Lizard are at higher risk of collision with vehicles and machinery as they are active in the day.

It is possible that carcasses on the road could attract scavenging animals, including birds of prey which in turn would increase their risk of collision with vehicles and machinery.

Direct Impacts on Sensitive Receptors (Habitats, Vertebrates) – Poaching, Collection etc.

It is possible that site worker may poach or take plants and animals from the site, either for firewood or in the case of the Spiny-Tailed Lizard for food, trophy or to be sold. Species such as Red Fox could also face persecution.

Any of the identified receptors are potentially at risk from this long-term, irreversible negative impact. The likelihood of this occurring is possible and the magnitude of this impact ranges from Low to High magnitude depending on the receptor affected.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Disturbance

The presence of site workers and machinery can result in disturbance related impacts to all terrestrial ecological receptors present within the area. These impacts are not certain, and the magnitude of such impacts will vary depending on the sensitivity of each receptor to disturbance. The significance of any such disturbance impacts is likely to range from Minor to Moderate / Major, depending on the sensitivity of the affected receptor. The duration of impact will also likely vary from very short-term (e.g. running away from a vehicle using the access road) to short to medium term in areas adjacent to construction areas or worker accommodation. It is likely that any disturbance impacts, irrespective of duration will be reversible once the disturbance event has passed.

The main feature of interest within the area is the dam which is used by roosting birds during spring as well as feeding birds during spring seasons where water is present. As noted within “Section 11.4.3” earlier, the design of the project has considered to the extent possible a 2km buffer away from such features to ensure no disturbance to birds present takes place.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Reduced Air Quality / Dust

The habitat across the area is very sandy. It is likely that constructed related ground disturbance will likely increase the amount of dust in the air which in turn could result in negative impacts on plants and vertebrate receptors. In addition air pollution from site vehicles from the concrete batching plant could also result in negative impacts on valued receptors. These impacts are possible, short-term and reversible and are considered to be of minor to moderate significance.

Direct Impacts on Sensitive Receptors (Vertebrates) – Noise

Noise as a result of construction can result in direct impacts on valued ecological receptors (vertebrates) due to acoustic masking, disturbance and displacement thereby reducing survivorship and reproductive success.

Any impacts are likely to be short- to medium term (for the duration of construction) and reversible. The magnitude of impact ranges from low to medium and is likely to be of low not significant to moderate significance.

Direct Impacts on Sensitive Receptors (Vertebrates) – Lighting

Lighting could impact foraging and commuting routes for bats.

Any impacts are likely to be short- to medium term (for the duration of construction) and reversible. The magnitude of impact is low and is likely to be of not significant given the lack of bats present. Mitigation measures will help all nocturnal site use by other animals.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Littering, Waste Management

Unmitigated it is possible that poor waste management could result in the proliferation of litter across the Project area including plastic containers, plastic bags and glass. This waste could result in negative impacts to

sensitive receptors through ingestion or entanglement. Any such impact could be long-term and irreversible, and the significance of this impact would be not significant to major depending on the receptor effected.

In addition poor management of other solid wastes, including food waste could result in the presence of pest species such as rats and mice, which could outcompete wild rodents and feral cats and dogs which could increase the risk of predation of wild rodents and other prey species.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Pest Species

As discussed above it is possible that pest species become established within the Project as a result of increased littering or poor waste management as well as the propensity of certain species (e.g. rats, cats and dogs) to associate with human habitation.

An increase in pest species could result in long-term negative impacts on wild animals through direct and indirect competition for food resources, direct mortality through predation, and direct impacts as result of disturbance impacts. Such impacts could be reversible or irreversible, will be between low to high magnitude and as such significance will vary from minor to major depending on the receptor being affected.

Impacts During Operational Phase

Direct and Indirect Impacts on Sensitive Receptors (Birds) – Collision with OHTL

The OHTL Route is split into three sections, two of which are relevant for Plot 1 but will have a cumulative impact with the Plot 2 OHTL. The total OHTL is approximately 115 km long and notably crosses a main bird flyway. There is no refined migration corridor along any part of the route, so birds moving through will be on a broad front generally moving along the flyway adjacent to, or crossing, the Gulf of Suez . Although, it has been identified that the route runs through an IBA designated for migratory birds, Gebel El Zeit IBA, and crosses a known migratory corridor, the East Africa Flyway. As such, these areas are likely to have a higher volume of migratory birds and will potentially have a higher risk of collision with OHTLs. Additionally, due to the scale of the project and the other wind projects within the area of the project, there is likely to be an impact cumulatively.

The operation of OHTLs is likely to have an impact on birds as they are proven mortality factor for migratory and soaring birds. In most cases, impacts from over-head powerlines lead to severe injuries or immediate death. In case of collision accidents, birds crash at high flight speed into cables or wires. The resulting injuries vary widely and are comparable to traumata caused by collisions with cars. Electrocution harms mostly birds sitting on the live components or having ground contact, but this is less of an issue with high power OHTL such as the one proposed here.

Previous studies, along with the vantage point surveys undertaken for the Wind Farms, have documented migratory bird species (MSBs) which may migrate through the proposed OHTL area. These are presented below in the table below.

Table 93: MSBs likely to utilize OHTL area, their conservation status and notes on likelihood of site utilization

Common Name	Conservation Status	Notes
	IUCN	
Egyptian Vulture	EN	Migratory species through the flyway. Migration through the Aol is well recorded with indicative numbers being approximately 250 in spring and XX in autumn
Steppe Eagle	EN	High numbers of birds recorded migrating through Plot 1. Migration through the Aol is well recorded with indicative numbers being approximately 20,000 in spring and XX in autumn
Greater-spotted Eagle	VU	Recorded across Plot 1 in low numbers on migration. Migration through the Aol is likely with indicative numbers being 16 in spring and XX in autumn
Eastern Imperial Eagle	VU	Migratory populations considered to be low following surveys in Plot 1. Migration through the Aol is likely with indicative numbers being 50 in spring and XX in autumn
Red Footed Falcon	VU	A single bird registered on survey. Migration through Aol possible.
Sooty Falcon	VU	A single bird registered on survey. Migration through Aol possible.
Pallid Harrier	VU	Recorded in low numbers during surveys, with 16 individuals in spring. Likely migration through the Project Aol.
White Stork	LC	Very high numbers of birds recorded migrating through Plot 1. Migration through the Aol is well recorded with indicative numbers being 150,000 in spring and 9,000 in autumn
Black Kite	LC	Migratory species through the flyway. Migration through the Aol is likely. with indicative numbers being 250 in spring and none in autumn
Steppe Buzzard	LC	Migratory species through the flyway. Migration through the Aol is likely. with indicative numbers being 83,000 in spring and 200 in autumn
European Honey Buzzard	LC	Very high numbers of birds recorded migrating through Plot 1. Migration through the Aol is well recorded with indicative numbers being 13,000 in spring and 6,000 in autumn
White Pelican	LC	Migratory species through the flyway. Migration through the Aol is well recorded with indicative numbers being 11,000 in spring and 2,000 in autumn
Levant Sparrowhawk	LC	Migratory species through the flyway. Migration through the Aol is well recorded with indicative numbers being 1,000 in spring and 150 in autumn.

Generally, any large soaring or fast flying species is at risk of collision with OHTLs. The size and flight behavior (and sometimes other biological characteristics) of these species results in a low level of detection and being able to avoid collision with such structures.

It is anticipated that most migratory soaring birds will be at insignificant risk to collisions due to their flight behavior, i.e. smaller and more maneuverable birds (such as falcons and harriers) will actively avoid the OHTL. Most large soaring raptors (like eagles and vultures) will be moving at a much greater height than the OHTL and avoid it (Power Lines Guidance V.1, Migratory Soaring Birds Project). The flight heights of these birds is shown in the existing data from the OHTL bird surveys from nearby wind farms and the Wind Farm VP surveys. However, due to the large numbers of birds moving through the AoI and factors such as unsuitable weather for migration and the need to rest or roost is likely to bring them into greater risk of collision.

As noted within “Section A – Assessment of Baseline Conditions” a cumulative risk assessment was undertaken by RCREEE and which is presented in the figure below. The results of this assessment show a range of high and low risk areas within the proposed OHTL line. The perceived risk of MSB collision is higher in the southern portion of the proposed OHTL, along the western edge of the IBA, however there are areas of medium risk throughout the lines, and although the risk is low in sections, collisions are still possible.

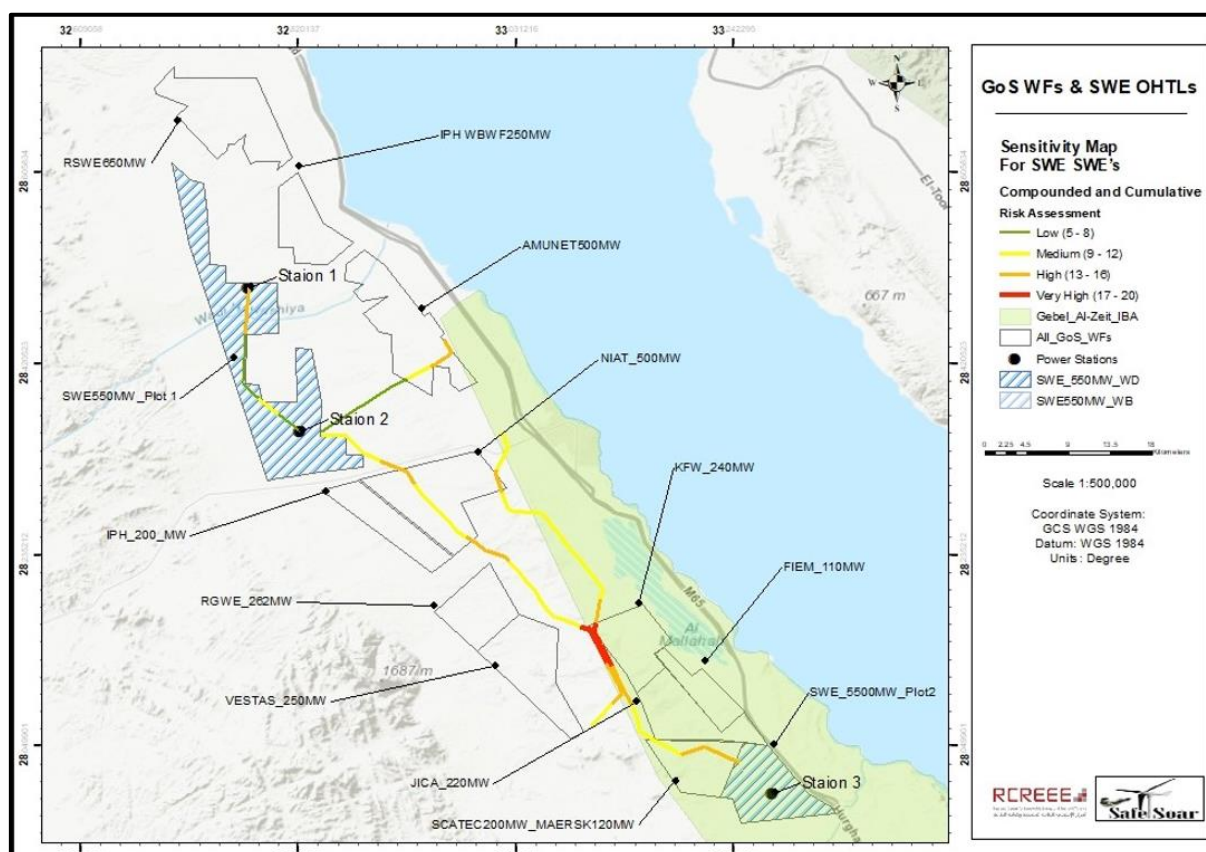


Figure 115: Compound and cumulative risk assessment for predicted bird collisions along the proposed OHTL.

Data from Spring and Autumn seasons was also compared (as shown in figures below). This data showed that bird movements were more concentrated in the southern section of the proposed OHTL with a ‘Very High’ risk along the western edge of the IBA. Spring data is more evenly distributed across the study area and presents a high-risk factor across the scheme as a whole, although there is still a preference for the southern section of the proposed OHTL.

It is important to note that whilst topographical features will not change the exact location of bird migration each season can be impacted by climatic factors (e.g. wind direction).

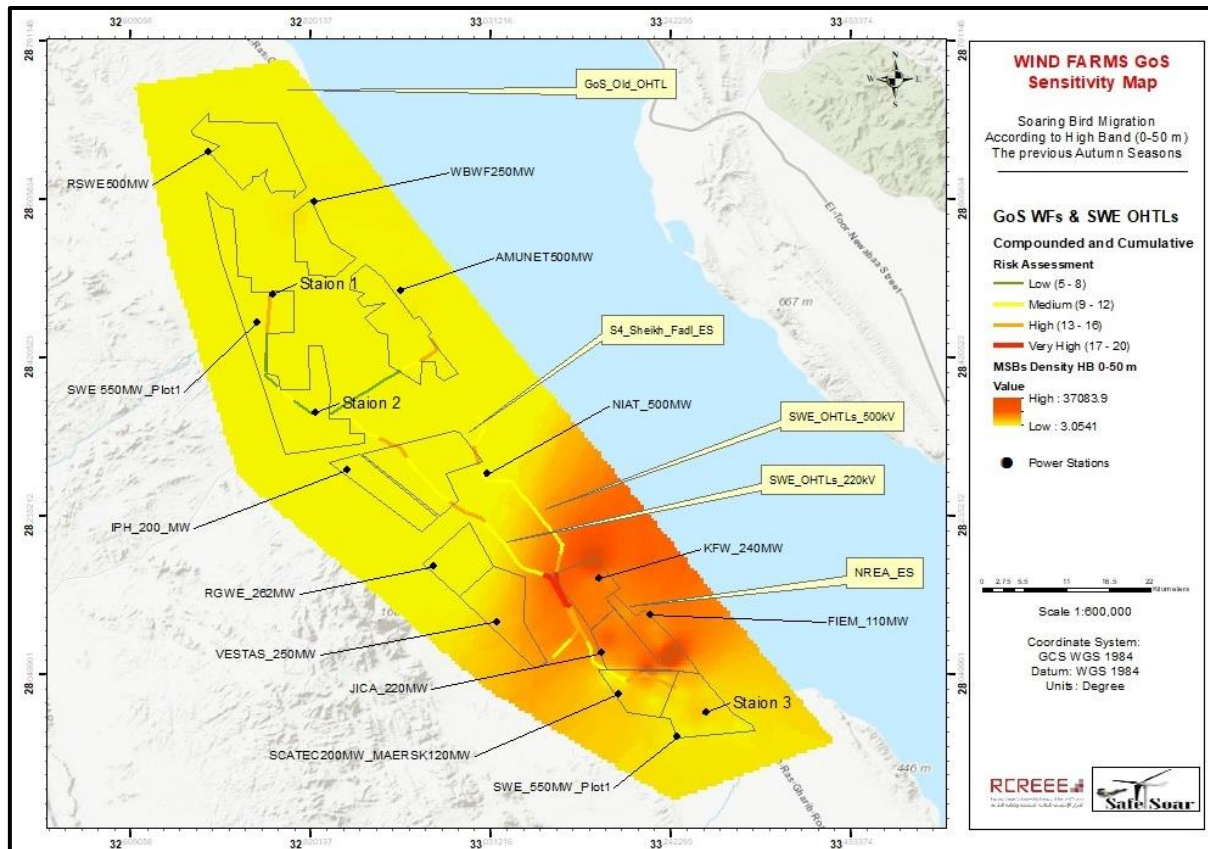


Figure 116: Risk Assessment - Autumn Season

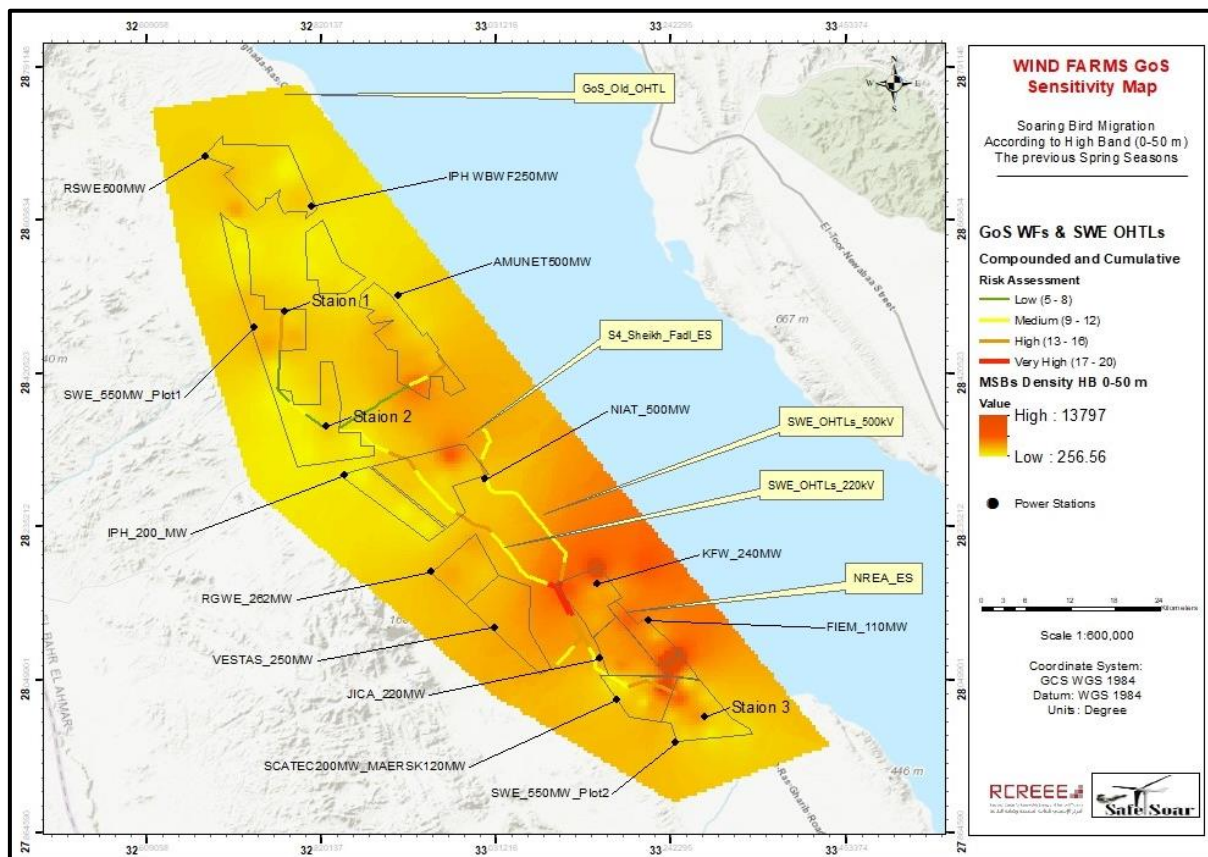


Figure 117: Risk Assessment - Spring Season

Accordingly this assessment is a starting point for understanding risk for the proposed OHTL line, further studies using real data from local OHTL schemes have been used to demonstrate predicted impacts.

Using available data from the monitoring of confirmed bird casualties along 8 OHTLs in the vicinity of Plot 1 and Plot 2 and proposed routes of the OHTL, an assessment has been undertaken to show predicted collision of MSBs for the Plot 2 OHTL as presented in the table below.

Following fatality monitoring at other wind farms locally, it has been predicted that, without the use of diverters, some MSBs will have a high number of collisions per year across the proposed OHTL lines as presented in the table below. White Stork are predicted to have over 46 collisions per year without mitigation. This high number is perhaps to be expected as over 200,000 White Stork have been recorded migrating through this area. Without mitigation this will be a significant impact, however mitigation is discussed in further details below.

Table 94: Predicted Collisions with OHTL for Plots 1 and 2

Species	Predicted Collisions per year Plot 1 OHTL	Predicted Collisions per year Plot 2 OHTL	Predicted Collisions per year combined Plot 1 and 2 OHTL
Black Kite	5.34	3.94	9.28
Honey Buzzard	18.64	13.74	32.38
Long-Legged Buzzard	2.53	1.87	4.40
Marsh Harrier	1.51	1.12	2.63
Steppe Buzzard	7.60	5.60	13.20
Eurasian Sparrowhawk	2.09	1.54	3.64
Steppe Eagle	1.27	0.93	2.20
White Pelican	0.33	0.24	0.58
White Stork	26.89	19.82	46.71

Collisions with OHTLs could result in long-term negative impacts on MSBs through direct mortality and injury. Such impacts could be irreversible, will be between low to high magnitude and as such significance will vary from minor to major depending on the receptor species being affected.

Indirect Impacts on Sensitive Receptors (terrestrial mammals and breeding / resident birds) – Disturbance

During the operation of the OHTL disturbance impacts are likely to be very minor as the site will not be subject to regular activity other than occasional vehicle movements and maintenance operations around the site. It is possible other receptors including breeding passerines and other mammals may experience disturbance impacts during the operation of the OHTL.

Any such impact will have to be very short-term (for the duration of the disturbance impact) and reversible and is likely to only result in impacts of low magnitude. The significance of operational disturbance is therefore considered to be minor, at worst.

Indirect Impacts on Sensitive Receptors (terrestrial mammals and breeding / resident birds) – Disturbance

During operation disturbance impacts are likely to be very minor as the site will not be subject to regular activity other than occasional vehicle movements and maintenance operations around the site. Egyptian Spiny-Tailed Lizard may suffer some minor impact to their daily foraging activities.

Any such impact will be very short-term (for the duration of the disturbance impact) and reversible and is likely to only result in impacts of low magnitude. The significance of operational disturbance is therefore considered to be minor, at worst.

Direct Impacts on Sensitive Receptors (Vertebrates) – Vehicle Collisions

Vehicle related collision are possible for all vertebrate species present within the Project's area and this will result in direct mortality on receptors of low to high sensitivity. Any such impact would be negative, long-term and irreversible and would be of medium to high magnitude and therefore of minor to major significance (depending on the receptor killed).

Species such as Egyptian Spiny-Tailed Lizard have a high risk of collision with vehicles due to their diurnal nature.

It is possible that carcasses on the road could attract scavenging animals, including birds of prey which in turn would increase their risk of collision with vehicles and machinery.

Direct Impacts on Sensitive Receptors (Vertebrates) – Lighting

Lighting could potentially result in negative impacts of a range of ecological receptors including impacting foraging and commuting routes for bats.

Any impacts are likely to be short- to medium term and reversible. The magnitude of impact ranges from low to medium and is likely to be of minor to moderate significance.

Direct Impacts on Sensitive Receptors (Habitats and Flora) – Non-native Species and Introduced Flora

It is possible that non-native or introduced flora could be imported into the area on vehicles or within any imported soil material. The impacts of non-native and introduced flora could potentially be significant in absence of any mitigation as these species could become established and out-compete native flora.

Impacts associated with non-native, invasive or introduced flora could result in long-term negative impacts, irreversible (if allowed to become established) and potentially significant.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Pest Species

It is possible that pest species become established within the Project as a result of increased littering or poor waste management as well as the propensity of certain species (e.g. rats, cats and dogs) to associate with human habitation.

An increase in pest species could result in long-term negative impacts on wild animals through direct and indirect competition for food resources, direct mortality through predation, and direct impacts as result of disturbance impacts. Such impacts could be reversible or irreversible, will be between low to high magnitude and as such significance will vary from minor to major depending on the receptor being affected.

B. Mitigation

Construction Phase

Habitat Loss, Fragmentation and Degradation

The following mitigation measures will be employed to reduce the significance of habitat loss, fragmentation, and degradation during the construction period. Mitigation measures are largely based on avoidance of impact through selection of the working areas to favor areas of degraded natural habitat or those areas where habitats have been modified. Where impacts cannot be avoided the following will be completed

- All site workers will undertake a Project induction before working on site. The induction will include a comprehensive biodiversity element where the baseline ecological value and sensitivity of the site will be discussed.
- Prior to construction works, working areas will be clearly demarked (using temporary fencing (e.g. orange netting attached to wooden posts)) so that site workers fully understand the working area. Encroachment into areas outside of agreed working areas will be prohibited and working areas will be subject to regular check by the EPC Project Ecologist to check enforcement of working areas.
- On completion of phased construction works the EPC Contractor will be responsible for habitat rehabilitation works in all areas that have been subject to temporary disturbance.

Direct Impacts on Sensitive Receptors (Habitats and Flora) – Non-native Species and Introduced Flora

- Prior to construction works, working areas will be subject to a botanical walkover survey to identify areas of non-native or invasive species. Any specimens will be clearly marked, and the area avoided and if this is not possible the specimen will be removed and disposed of.
- Areas of soil in proximity to these species will be stored separately and not used further on the site. It will be collected from the site and disposed of or used as deep sub-soil fill (to reduce the chance of seed germinating).
- Areas of non-native or invasive species will be mapped and a program of mechanical control will be completed over the construction period in order to remove these species from the area. Chemical control will be avoided however if necessary, will be used but in accordance with national and international guidelines as well as those applied by the Lenders (e.g. specific risk assessment and Lender agreement prior to use).
- Soil imports to be taken from local quarries or borrow pits to avoid importing non-native and invasive species.
- Adequate wheel-washing facilities to be constructed at the entrance to the site and any wastewater will be disposed of correctly to prevent spread of undesirable species.
- Regular site walkover surveys throughout the construction period by a suitably qualified botanist to check to the presence and abundance of non-native or invasive species.

Direct Impacts on Sensitive Receptors (Vertebrates) - Site Clearance and Earthworks

A summary of mitigation measure to avoid and mitigate for direct impacts on sensitive vertebrate receptors is included below. These measures will be included (and expanded upon) in a Construction Biodiversity Management Plan/Biodiversity Action Plan.

- All site workers will undertake a Project induction before working on site. The induction will include a comprehensive biodiversity element where the baseline ecological value and sensitivity of the receptors within the area will be discussed.
- Prior to construction works, working areas will be clearly demarked (using temporary fencing (e.g. orange netting attached to wooden posts)) so that site workers fully understand the working area. Encroachment into areas outside of agreed working areas will be prohibited and working areas will be subject to regular check by the EPC Project Ecologist to check enforcement of working areas.
- Working areas should avoid trees / shrubs as these are likely, due to their sporadic distribution across the area to be of importance to breeding birds (e.g. passerines, raptors).

- A pre-construction walk-over survey will be undertaken of all working areas to check for the presence of ground nesting birds. Surveys will be completed by an appropriately qualified ecologist and surveys will be undertaken in the hours after sunrise (up to 10:00). The surveyors will aim to identify behavior indicative of breeding activity (e.g. carrying food / nesting material / fecal sacs, presence of nests, eggs or chicks (both nidifugous and nidicolous).
- Where nests are found they will be recorded in full and their locations mapped, with the data transferred to Excel master sheets and Google Earth. Mapping will then be circulated to the project team along with details of a works exclusion zone. Exclusion zones will be dependent on the species of bird nesting along with its conservation status and be agreed with the qualified Project Ecologist.
- Mitigation during construction will include timing work to remove suitable nesting habitat outside of the most sensitive times of year for ground nesting species, and for all clearance work within this time period to be done under the supervision of an on-site ecologist.

Pre-construction surveys for sensitive species (i.e. those qualifying Priority Biodiversity Features) of herpetofauna have taken place within the Project site and the locations of known/active burrows used by Egyptian Spiny-tailed Lizard have been marked. This survey effort and marking will be repeated for the OHTLs.

Prior to the start of construction suitable sites for the release of relocated Egyptian Spiny-tailed Lizards will be identified and mapped. A suitable translocation receptor site must;

- Be within 10 km of the Project site.
- Contain appropriate vegetation (both for food and cover).
- Have suitable soil types to allow animals to dig and create new burrows.
- Not already be close to carrying capacity for this species.

Capture and movement of Spiny-tailed Lizards will only be completed as a last resort. All works will aim to be completed at least 50m from active burrows. Locations where burrows are present between 50 and 100m of construction will be monitored throughout the construction period and if significant negative impacts (i.e., abandonment of burrows or increased mortality) are observed the remaining burrows in closest proximity will be excavated and the animals translocated to holding areas in accordance with the below protocols for the duration of the construction window in that location.

- Detailed design for the final infrastructure layout will take into account the results of the preconstruction surveys and Project infrastructure will be sited to avoid the identified burrows. Where this is not possible, or where fresh burrows are identified at the commencement of clearance works, these burrows will be excavated by hand and the animals captured and translocated, details of this are provided below.
- Prior to work in an area containing Spiny-tailed Lizard burrows any remaining burrows within 50m of proposed works will be re-checked by the Ecologist using an endoscope and if empty dug out and destroyed. If any animal is found back in the working areas the burrow will be dug out carefully by hand and the animal captured and placed in a secure box before taking to a cool location ready for translocation to the receptor site. Once the lizard is removed from the burrow the hole will be collapsed and made unsuitable for future use.
- If areas suitable for translocation exist within the Project Area these will be prioritized as this minimizes the impacts of transporting animals away from the Project site.
- Studies have shown that soft releasing Spiny-tailed Lizards leads to a better survival rate than simply releasing the animals into a new site so any animal which is translocated will be soft-released into an individual mesh enclosure within an area of suitable habitat. The pen will measure at least 2m x 2m and be covered to provide shade and prevent attack from above. A “starter hole” will be dug using a 20cm auger to a depth of approximately 30cm to provide some initial shelter. Supplementary feeding will also be

undertaken and after a period of seven days the enclosure will be removed to allow the lizards to move and forage naturally.

- After the relocation period, a report will be prepared which will include the following information:
 - Survey dates and timing of capture and release
 - Weather conditions during survey and relocation effort
 - Location of captured individuals
 - Number of captured individuals during each relocation effort
 - Number of juveniles, mature males and mature females
 - Release sites used for relocation of each effort
 - Number of males and females released at each site
 - Number of mortalities during relocation effort

Direct Impacts on Sensitive Receptors (Vertebrates) – Vehicle Collisions

- Speed limits of 20 kph are to be enforced by the EPC Contractor on the OHTL Contractor
- Regular signage will be installed along the site access roads and internal roads informing all drivers of the speed limit
- A gated entrance will be staffed and any visitors or locals using the site roads will be informed of the speed limits and that there are regular checks of vehicle speeds
- A ban of driving at night will be enforced and if absolutely necessary the speed limit will be reduced to 15kph
- Ban against off-road driving at all times of the day
- Regular checks of the road for carcasses and if found these will be moved to at least 10m from the road to reduce the likelihood of hitting scavengers, including birds of prey.
- An incidental / chance find procedure will be included in the BMP so that all workers report any road collisions so that any such incident can be investigated in full.

Direct Impacts on Sensitive Receptors (Habitats, Vertebrates) – Poaching, Collection, etc.

- The Project will enforce strict controls on hunting, gathering, poaching and otherwise disturbing flora and fauna within the Project area. Any breaches of this ban will be strictly enforced, and any workers found in breach of this control measure will be subject to disciplinary procedures.
- The ban on hunting etc. will be included in the site induction along with discussions about the sanctions for breaches of this control measure.
- A chance find procedure will be implemented should any site worker find a wild animal, especially one that has become a nuisance (e.g. scavenger in the works camp, presence of small mammals in worker accommodation, presence of snake or scorpion on the works site) and the EPC Ecologist will arrange for an appropriately qualified person to capture and relocate. Where scavengers have been identified within the works site additional housekeeping measures may be required.

Following mitigation a low magnitude and not-significance would be expected.

Direct Impacts on Sensitive Receptors (Vertebrates) – Disturbance

- Site wide induction to include information regarding disturbance of ecological receptors.
- Chance find procedure to report sightings of potentially sensitive receptor and investigation of any such sightings by the EPC Contractor in order that additional buffer areas can be agreed, where necessary.
- Continued monitoring of the dam to understand use of the area by staging and roosting birds.

Following mitigation an impact low magnitude and not-significant would be expected.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Reduced Air Quality / Dust

- Where necessary tracks will be damped down to reduce the risk of dust. Damping down will also include areas adjacent to roads. These measures will be implemented where necessary.
- Vehicles will be properly maintained to reduce emissions.

Direct Impacts on Sensitive Receptors (Vertebrates) – Noise

- Vehicles will be properly maintained to noise emissions.
- Use of available technology and management practices with construction methodologies to reduce noise.
- Regular monitoring of noise levels within works compounds and works areas as far as possible and apply corrective measures as necessary.

Direct Impacts on Sensitive Receptors (Vertebrates) – Lighting

- Limit the amount of lighting, especially within the wider area (e.g. at transmission tower construction sites). This will be achieved by ensuring that night-time working is limited.
- Where lighting is required within worker compounds, site offices etc. ensure that any lighting is shielded and protected to reduce light-spill and glare. Low intensity lighting should also be used, where possible, to further reduce light spill.
- For external security lights PIR trigger units should be used and these should be timed to automatically switch off after five minutes.
- No lighting will be installed along the access roads.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Littering, Waste Management

- Waste Management will be included in the Site Induction so that all site workers understand their responsibilities to maintaining a clean and tidy site. Where possible all materials than can be recycled will be.
- Zero tolerance to littering on the works site and within the worker compound. This zero-tolerance approach should also be applied to smoking and workers must use appropriate smoking areas (supplied with 'butt

bins') at all times, even when on construction sites. Litter must not be thrown out of vehicle windows when driving to and from or around the site.

- Daily inspections of working areas and worker compound should be completed, and corrective actions applied, where necessary.
- Additional mitigation measures for pest species, including feral cats and dogs are included below.

Direct and Indirect Impacts on Sensitive Receptors (Vertebrates) – Pest Species

Where pest species are identified the EPC Contractor / Ecologist will be notified and an appropriate course of action taken. For small mammal pest's live traps will be used, in order to reduce the risk of bycatch. Poison baits should be avoided, unless it can be certain that non-target species will be affected, and any such use should be in accordance with national and international best practice. If poison baits are to be used it must be certain that any poisoned animal cannot move out on to the wider area to reduce the risk of natural predators eating poisoned animals. Any chemical control of pest must only be undertaken in accordance with national and international guidelines as well as following Lender guidelines including risk assessment and prior agreement with the Lender.

Operational Phase

Direct and Indirect Impacts on Sensitive Receptors (Birds) – Collision with OHTL

Please refer to "Section 11.4" which provides details on route siting considerations taken into account, including routing within the Gebyl Al Zeyt IBA and other E&S constraints such as water dams.

Due to the requirements and length of the OHTL, routing options will never be able to completely avoid the risk to migratory birds or the risk of collision impacts. However, as discussed earlier within "Section 11.4" one factor considered with siting by EETC was to align the route with existing OHTL route. Studies by Pallet et al. (2022) have shown that aligning and staggering the towers could reduce collisions of collision prone MSBs by 67%.

The proposed design of the towers and lines are possibly the least impactful possible as the towers are free standing with no support wires.

An extensive literature review and meta-analysis was performed (Bernardion et al. 2019) to evaluate the overall effectiveness of wire-marking in reducing bird collisions with power lines, including the possible influencing factors of power line voltage, habitat and type of device. Data was gathered from 35 field studies across the world (which included 66 trials) assessing the effectiveness of wire-marking based on regular carcass searches beneath power lines. Overall, wire-marking reduced bird collisions with power lines by 50.4%.

Mitigation is being installed to reduce the operational impact of the OHTL on migrating birds including birds of prey, waterbirds and other large soaring birds. The below table shows the difference in collision predictions with and without diverter mitigation. The results, based on local OHTL data, show that there is a reduction in collisions through the use of diverters and therefore this has been recommended for this project, along the length of the OHTLs.

Species	Collisions per year without diverters for Plot 2	Collisions per year with diverters for Plot 2	Collisions per year without diverters for Plot 1 and Plot 2	Collisions per year with diverters for Plot 1 and Plot 2
Black Kite	3.94	1.99	9.28	4.68
Honey Buzzard	13.74	6.93	32.38	16.32
Long-Legged	1.87	0.94	4.40	2.22
Marsh Harrier	1.12	0.56	2.63	1.32
Steppe Buzzard	5.60	2.82	13.20	6.65
Levant	1.54	0.78	3.64	1.83
Egyptian	0.24	0.12	0.58	0.29
Steppe Eagle	0.93	0.47	2.20	1.11
Great Spotted	0.24	0.12	0.58	0.29
Eastern	0.24	0.12	0.58	0.29
Red Footed	0.24	0.12	0.58	0.29
Sooty Falcon	0.24	0.12	0.58	0.29
Pallid Harrier	0.24	0.12	0.58	0.29
White Pelican	0.24	0.12	0.58	0.29
White Stork	19.82	9.99	46.71	23.54

Bird Flight Diverters (BFDs) are to be installed every 10 m along the entire length of the OHTL on the shield wire. All BFDs installed will be dynamic (e.g. move in the wind) to increase visibility. The BFDs installed within the IBA and within 4km of the dam in Plot 2 will include models that glow or light up at night (e.g. FireFly diverters) to increase visibility for birds staging in the area and arriving late or leaving early.

The Project Developer and EPC Contractor is committed to installing diverters that meet the required long-term guarantee and specifications. Installation of shield/earthing wire and attached BFDs will be completed at the same time (within 1 week). BFDs will be installed to the manufacturer's guidance and assessment of the OHTL, taking into consideration number and spacing, at a minimum of 1 every 10m.

The installation of BFDs will need to be recorded by the Project Ecologist and these checks need to be included in the annual reports. BFDs should be checked every 6 months before the spring and autumn migration seasons so that they are in place and operational for higher risk periods. Any damaged or defective BFDs will need to be replaced within 2 months of being reported as faulty.

However, the need for and extent of replacing damaged / defective BFDs will be undertaken following a review of the outcomes of the PCFM studies (discussed in further details below). This issue will be discussed in agreement with lenders and other relevant stakeholders.

Indirect Impacts on Sensitive Receptors

- Ban on off-road driving, especially during sensitive periods of the year (e.g. breeding bird season) and if off-road driving is required a check of the working area should be completed by the Project's Ecologist.
- Speed limits to be enforced.
- Sensitive species are to be included in the site induction for all operational staff where additional control measures will be discussed including allowing animals to move around the site, not chasing after them in vehicles or approaching them on foot and what to do if they observe breeding birds within their works areas.

In addition, if any significant maintenance work is required (e.g. replacement of any transmission towers or wires etc.) all impacts related to construction will be relevant and all mitigation outlined in previous sections will be followed.

C. Monitoring

Long term monitoring of the Project Aol will be completed as set out above and will include:

- Habitat and Flora monitoring within the Aol to measure the success of habitat rehabilitation work to reasonably demonstrate a net gain in Natural Habitat as well as to record the presence of invasive / non-native flora.
- Post-construction fatality monitoring to be completed throughout the lifetime of operation to record the actual impact of collisions with the OHTL. Additional surveys and or mitigation measures to be implemented as part of an Adaptive Management Strategy.
- All of the above monitoring requirements will be included within Construction and Operational Biodiversity Action Plans which will include KPIs and a BEMP against which the results of the monitoring will be assessed.

Avifauna

- Operational monitoring will be completed in line with best international practice presented in Post-Construction Bird And Bat Fatality Monitoring For Onshore Wind Energy Facilities In Emerging Market Countries (EBRD, IFC, KfW 2023) to monitor actual levels of mortality. Post construction fatality monitoring will be completed along the whole OHTL and the program of post construction monitoring will include carcass searching, searcher efficiency trials and carcass persistence trials. The results of the post-construction fatality monitoring will be used to inform a GenEst Analysis. Post-construction monitoring will follow the latest international best practice including the recently published PCFM Handbook (EBRD, IFC, KfW 2023). Full details of the PCFM Protocol will be included in an Operational BMP/BAP documents. PCFM survey areas will also include OHTLs that are adjacent to the Project Aol, especially in areas that may be subject to greater movement of high-risk species.
- An adaptive management strategy will be developed (in line with the PCFM Handbook), and additional mitigation will be undertaken if the results of the post-construction fatality monitoring indicate higher than predicted mortality, especially in relation to species of elevated conservation concern. Adaptive management could include retrofitting of BFDs (or different type of BFD) on unmarked lines (including adjacent OHTL) where PCFM surveys indicate areas of elevated mortality or provision of additional BFDs on marked lines if the installed BFDs are not preventing (or reducing) mortality. This could include installation of additional BFDs or those that are shown to increase avoidance / reduce collision in species susceptible to OHTL impacts. Installation of BFDs can be undertaken using a drone and would not require powerlines to be disconnected. Installed mitigation could also be changed if additional research into the effectiveness of BFDs comes to light during the construction period which would be agreed with lenders.
- On completion of the post-construction fatality monitoring a decision will be taken to continue or cease this survey effort or reduce it to specific times of the year. This will be undertaken with the Lenders. If monitoring is ceased site workers will continue to record any carcasses they find and this information will be passed on to the Project team.
- A chance find procedure will be implemented and any carcasses seen by site workers will be reported to the Project Ecologist so that they can investigate.

D. Cumulative Impacts

General

Cumulative impacts from the OHTL, wind farm and other wind farm projects and overhead lines have been considered for avifauna, bats and other sensitive receptors.

Significant cumulative impacts may occur (considering the Wind Farm, OHTL and neighbouring projects and power lines). A regional cumulative impact assessment is being undertaken for avifauna, and acceptable mortality thresholds will be estimated (threshold setting is mentioned in the 'Adaptive Management for Avifauna' section, below). A Potential Biological Removal (PBR) threshold is a value that's used to compare the actual number of collisions against an estimated limit, which indicates when a species would be significantly impacted.

The mitigation hierarchy has been implemented, with avoidance and minimization described here, and any residual mortality of priority species should be compensated through offsets to ensure No Net Loss. Offset options will be detailed in the project BAP.

Avifauna

Cumulative Impacts with the SWE wind farm

The cumulative impacts between the turbines and the OHTL have been considered. Without mitigation it is likely there would be a significant impact on MSBs. The turbines themselves are to operate on a 'Shut down on demand' strategy which is described in Section 8.5.2. An adaptive management scheme is proposed which will monitor higher than predicted mortality and further mitigation undertaken.

Cumulative Impacts with other OHTL schemes

There are several windfarms in operation within the same area with associated OHTLs, and therefore the addition of new OHTL lines may have a cumulative impact on species within the area (figure below).

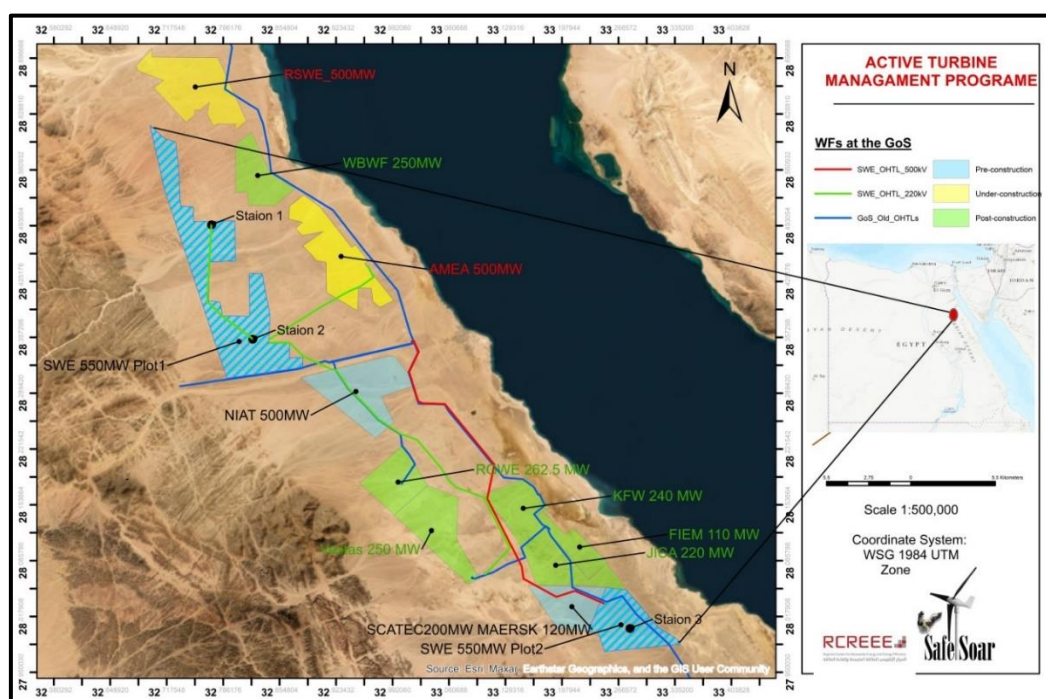


Figure 118: Wind and OHTL schemes within the Gulf of Suez

Because of this the aforementioned projects have been considered within this assessment as each project could potentially affect the same populations of migratory birds. For example birds migrating through NIAT wind farm, JICA wind farm and AMEA wind farm are likely to move across the OHTL and could also possibly migrate through Plot 2.

In combination with those projects already constructed or for those with impact assessments, there is a regional impact assessment being undertaken to assess impacts after the application of impact avoidance through project design or additional mitigation. The cumulative impact with this project is considered to be Moderate and steps to assess this impact are discussed within the project BAP.

Where residual negative impacts are possible and cannot be effectively off-setting will be applied to ensure no net loss to these MSBs. Collision risk and electrocution residual impacts for other species (e.g. raptors, waterfowl) is not significant for any of these projects. The Plot 2 OHTL consists of a double circuit 500KV transmission line which will be constructed with BFDs along its entire length. Collision risk of other species will therefore be minimal as BFDs are known to be effective at significantly reducing collision in other species and electrocution risk for raptors is minimal on HV lines due to their size (and visibility), insulation, distance between any live parts and size of pylons providing ample safe perching opportunities well away from any dangerous components.

The OHTL overlaps the IBA, and Critical Habitat is triggered for this area. Net Gain is therefore a requirement and Net Gain requirements are factored into the BAP (depending on the mortality thresholds defined in the CEA).

Adaptive Management for Avifauna

There is the potential for significant negative impact on priority species, particularly those which are already suffering severe declines. Adaptive management is triggered when target thresholds are exceeded and when new evidence acquired over time shows an increased or decreased risk to a priority MSB or an increased risk to a non-priority population. Increased risk to priority birds requires that mitigation and management measures be revised to uphold thresholds and promote the long-term viability of the population. For priority MSBs that exhibit a decreased risk over time, their primary threshold target may be reassessed, and revised or reassigned to reflect the reduced risk to their long-term population viability. Non-priority populations that exhibit evidence of increased risk may be assigned as priority MSBs, may have an appropriate threshold determined and may be subject to associated adaptive management response strategies. Adaptive management is a key component of threshold setting within the CEA as it provides a mechanism for dealing with the uncertainty associated with determining priority bird populations and with predicting thresholds for priority MSBs.

Mammals (including bats)

Significant negative impacts on bats at each of the proposed and future wind farms and OHTL are not predicted or expected however on-going monitoring will be completed at all projects which will employ adaptive management which will trigger additional industry-wide mitigation should actual impacts exceed predicted impacts and if mortality is shown to breach PBR thresholds.

Although cumulative impacts can occur on biodiversity as a result of multiple projects within the AoI, all existing and future projects within the area will incorporate stringent mitigation measures to ensure that all residual impacts are no greater than minor. Therefore given that residual impacts (when taking in to consideration mitigation) for each project individually is predicted to be negligible to minor, it is not anticipated that that cumulative (in combination) impacts will be significant.

Although predicted to be negligible to minor, any unforeseen impacts will be recorded through PCFM and additional mitigation carried out as part of adaptive management.

Other sensitive receptors

Terrestrial receptors including habitats, non-migrating mammals and reptiles are discounted from this assessment as they are unlikely to be significantly affected by other projects due to the distance. Significant residual cumulative impacts on terrestrial receptors is unlikely as each project area will affect distinct assemblages of plants and animals (e.g. animals won't be displaced by one project to another project area where they will be displaced again). In addition habitat loss for each of these projects is minimal (e.g. small project footprints) and all projects will be undertaking habitat rehabilitation and restoration in line with commitments for no net loss of natural habitat and or as a compensatory measure. None of the existing projects are predicting residual negative impacts on habitats or terrestrial receptors during their construction and operational phases and as such the cumulative impact assessment must conclude that in combination construction and operational impacts on terrestrial receptors will not be significant.

11.6.5 Archaeology and Cultural Heritage

Site preparation activities which are to take place onsite by the OHTL Contractor for the OHTL transmission towers and the various Project components to include foundations, access roads, etc. are expected to include land clearing activities, levelling, excavation, grading, etc.

Although such activities are limited to the relatively small individual footprints of these components and the actual area of disturbance is relatively minimal, if such activities are improperly managed, they could damage or disturb archaeological remains present on the surface of the Project site. However, as discussed earlier there are no surface archaeology or cultural heritages sites within the Project area and therefore no impacts are relevant.

Nevertheless, there is a chance that throughout such construction activities, archaeological remains buried in the ground are discovered. Improper management (if such sites are discovered) could potentially disturb or damage such sites which could potentially be of archaeological importance.

Such potential impacts are of a short-term duration as they are limited to the construction phase and are irreversible as should sites be discovered then inappropriate management could result in disturbance and/or damage, in which such an impact would be of medium magnitude. The impacts will be of a negative nature and low sensitivity given that the likelihood of such impacts is considered low. Given all of the above, such an impact is considered to be of minor significance.

It is important to note that there are no anticipated impacts during the operational phase of the Project.

Mitigation Measures

The following identifies the mitigation measures to be applied by the OHTL Contractor during the construction phase and which include:

- During excavation activities, SCA must be notified to check if they will provide any observers to oversee the process and ensure that no underground archaeological remains of importance are unearthed and/or disturbed.
- Throughout the construction phase, and as the case with any Project development that entails such construction activities, there is a chance that potential archaeological remains in the ground might be discovered. It is expected that appropriate measures for such chance find procedures are implemented. Those mainly require that construction activities be halted and the area fenced along with proper signage, while immediately notifying the Ministry of Tourism and Antiquities/Red Sea and Suez Antiquities Inspection Office. No additional work will be allowed before the Ministry/Inspection Office assesses the found potential archaeological site and grants a clearance to resume the work. Construction activities can continue at other parts of the site if no potential archaeological remains were found. If found, same procedures above apply.

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to not significant, with a low magnitude of impact and low sensitivity of the receiving environment.

Monitoring Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the OHTL Contractor during the construction phase and which include:

- Submission of formal letter of communication with SCA; and
- For chance find procedure, inspection of actions taken in case of new discoveries, including fencing, limiting access to site, and contacting the Ministry of Tourism and Antiquities/ Red Sea and Suez Antiquities Inspection Office. Report should be prepared and submitted to the Ministry in such a case which details the above.

11.6.6 Air Quality and Noise

Site preparation activities, which the OHTL contractor will take place onsite for the OHTL transmission towers and the various Project components, including foundations, cables, access roads, etc., are expected to include land clearing activities, levelling, excavation, grading, etc.

Such activities are limited to the relatively small individual footprints of these facilities and the actual area of disturbance is relatively minimal. Nevertheless, such activities will likely result in an increased level of dust and particulate matter emissions, which in turn will directly and temporarily impact ambient air quality. If improperly managed, there is a risk of nuisance and health effects to construction workers onsite. In addition, construction activities will likely entail the use of vehicles, machinery and equipment (such as generators, compressors, etc.) which are expected to be a source of other pollutant emissions (such as SO₂, NO₂, CO, etc.) which would also have minimal direct impacts on ambient air quality.

In addition, all the above activities will likely include the use of machinery and equipment such as generators, hammers, compressors, etc. and which are expected to be a source of noise and vibration generation within the Project site and its surroundings. If improperly managed, there is risk of nuisance and health affects to construction workers onsite.

Impacts on air quality are not expected during the operation of the OHTLs. Noise impacts during the operation of the OHTL are discussed in “Section 11.6.8” below.

There are no key receptors that are anticipated to be impacted from dust, noise and emission. The above impacts are anticipated to be temporary and of short-term nature as they are limited to the construction period only. Such impacts are of a negative nature, and will be noticeable and therefore of medium magnitude. However, the impacts will be dispersed and are reversible as air quality would revert back to baseline conditions after construction works is completed and thus the receiving environment is considered of low sensitivity. Given the above such an impact is considered of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the OHTL Contractor during the construction phase:

- Based on inspections and visual monitoring undertaken, if dust or pollutant emissions were found to be excessive due to construction activities, the source of such emissions should be identified and adequate control measures must be implemented;
- Comply with the Occupational Safety and Health Administration (OSHA) requirements and the Egyptian Codes to ensure that for activities associated with high dust and noise levels, workers are equipped with proper Personal Protective Equipment (e.g. masks, eye goggles, breathing masks, ear muffs, etc.);

- Apply basic dust control and suppression measures which could include:
 - Regular watering of construction active areas for dust suppression;
 - Proper planning of dust causing activities to take place simultaneously in order to reduce the dust incidents over the construction period.
 - Proper management of stockpiles and excavated material (e.g. watering, containment, covering, bundling).
 - Proper covering of trucks transporting aggregates and fine materials (e.g. through the use of tarpaulin).
 - Adhering to a speed limit of 15km/h for trucks on the construction site.
- Develop a regular inspection and scheduled maintenance program for vehicles, machinery, and equipment to be used throughout the construction phase for early detection of issue to avoid unnecessary pollutant emissions.
- Based on inspections and visual monitoring undertaken, if noise levels were found to be excessive from construction activities, the source of such excessive noise levels should be identified and adequate control measures must be implemented; and
- Apply adequate general noise suppressing measures. This could include the use of well-maintained mufflers and noise suppressants for high noise generating equipment and machinery, developing a regular maintenance schedule of all vehicles, machinery, and equipment for early detection of issues to avoid unnecessary elevated noise level, etc.

Following the implementation of these mitigation measures, the significance of the residual impact is categorized as not significant, with a low magnitude of impact and low sensitivity of the receiving environment.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the OHTL Contractor during the construction phase and which include:

Inspection and visual monitoring of the works should be carried out at all times. In addition, periodic inspections should be conducted at nearby sites (e.g. roads) to determine whether harmful levels of dust and noise from construction activities exist; and

Reporting of any excessive levels of pollutants/dust or noise and the measures taken to minimize the impact and prevent it from occurring again.

11.6.7 Occupational Health and Safety

This section identifies and assesses the anticipated impacts from the Project activities occupational health and safety. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels. Throughout this section, the impacts during the construction and operation phase have been discussed collectively due to the similarity in nature of the impacts.

Throughout the construction phase, there will be generic occupational health and safety risks to workers, as working on construction sites increases the risk of injury or death due to accidents. The following risks are generally associated to construction sites and apply for the construction of the Project and could include:

- Slips and falls;
- Working at heights;

- Struck-by objects;
- Moving machineries;
- Working in confined spaces and excavations;
- Exposure to chemicals, hazardous or flammable materials; and
- Exposure to electric shocks and burns when touching live components.
- Risk of workers from windfarm trespassing into active working areas on OHTL component

Similarly, throughout the operation phase, there are occupational health and safety risks to workers from the various operation and maintenance activities expected to take place for the Project. The following risks are generally associated to such a Project and which could include:

- Working at heights during maintenance activities; and
- Exposure to a variety of hazards such as electric shock, and thermal burn hazards.

Similar to the construction of the wind farm, the above impacts are considered of short-term duration during the construction phase and of long-term duration throughout the Project operation phase, of a negative nature, and are expected to be of medium magnitude and high sensitivity as in extreme cases they could entail permanent impacts (e.g. permanent disability). Nevertheless, such impacts are generally controlled through the implementation of general best practice. Given the above such an impact is considered of moderate significance.

Mitigation Measures

The OHTL Contractor will be required to submit an Occupational Health and Safety Plan (OHSP) regarding the Project's construction activities. The objective of the Plan is to ensure the health and safety of all personnel in order to concur and maintain a smooth and proper progress of work at the site and prevent accident which may injure personnel or damage property of the OHTL Contractor and all involved sub-contractors. It is expected that such a plan provides details on the following:

- Identifies in details information in relation to emergency measures and plans, communication protocols, first aid instructions and facilities, training programs, occupational health and safety culture, inspection programs, monitoring and reporting requirements, incident management, etc.
- Identifies in details the activities that are expected for the Project (e.g. civil works, electrical wiring, tower assembly, electrical installation, commissioning, etc.) and lists the specific jobs which are to be undertaken under each activity and the hazards which may be associated for each (electric hazards, working with machinery, vertical works, etc.);
- For each of the activities above, the OHSP is expected to identify the preventive equipment and systems that must be in place to eliminate or reduce such risks. This includes: (i) collective protective equipment (safety signs, traffic signs, hand signs, marking and signaling of work in progress, etc.); (ii) personal protective equipment (this includes the compulsory equipment for any worker or visitor onsite and obligatory equipment based on the tasks being carried out) (iii) detailed safety measures on how the task should be implemented in a safe manner to reduce any occupational health and safety risks.
- OHSP must include specific measures to prevent trespassing of windfarm workers into OHTL construction active areas. This could include induction training by OHTL Contractor as well as EPC Contractor to windfarm workers, installing warning and informative signs at construction active areas to prevent trespassing – such signs should be Arabic and English and pictorial in nature so that they are understood.

In addition, similar to the above, it is expected that EETC has its own OHSP, which is implemented for all their maintenance activities for high voltage electricity lines in Egypt. It is expected that such a plan will be implemented for this Project in specific.

The OHTL Contractor and EETC are expected to adopt and implement the recommendations/provisions of the OHSP throughout the Project construction and operation phase.

Following the implementation of these mitigation measures, the significance of the residual impact can be reduced to minor, with a low magnitude of impact and high sensitivity of the receptors.

11.6.8 Community Health, Safety and Security

This section identifies and assesses the anticipated impacts from the Project activities on community health, safety and security during the operation phase. For each impact, a set of management measures (which could include mitigation measures, additional requirements, etc.) and monitoring measures have been identified to eliminate or reduce the impact to acceptable levels. There are no foreseen impacts on community health, safety and security during the construction and planning phase.

In particular, the potential impacts on community health and safety, which are discussed throughout this section, include the following:

- Potential impacts from public access to Projects components during operation;
- Potential impacts from exposure of Electric and Magnetic Field (EMF); and
- Potential impacts from noise.

Potential Impacts from Public Access to Project Components during Construction and Operation

Such an impact is related to public access of unauthorized personnel to the various Project components. Such access could result in safety issues such as unauthorized climbing of the transmission tower, which could result in safety hazards (electric shock, thermal burn hazards and other).

Mitigation Measures

The following presents the mitigation measures that are to be implemented by OHTL Contractor and EETC during the construction and operation phase of the Project and which include:

- Post informative signs on construction activities areas and emergency contact information in both Arabic and English language. Signs, especially warnings need to be pictorial as well as written to ensure they are understood by those unable to read.
- Post informative signs on the transmission towers about public safety hazards and emergency contact information in both Arabic and English language. Signs, especially warnings need to be pictorial as well as written to ensure they are understood by those unable to read.

Potential impacts from Exposure of EMF during Operation

EMF are radiation associated with the use of electric power such as household wiring, electric appliances and also from OHTL. Electric fields are produced from the voltage in the transmission line while magnetic fields are produced from the electric current. While electric fields can be shielded by objects (such as buildings or trees), magnetic field pass through most objects. Such fields are strongest at the source and decrease significantly with increasing distance from the source.

Extensive scientific research and studies have been undertaken to address potential human health impacts from long term exposure to EMF from transmission lines. The general consensus is that the overall scientific evidence for human health risk from EMF exposure is weak however EMF exposure could not yet be recognized as entirely safe.

Similarly, the EHS Guidelines for Electric Power Transmission and Distribution issued by the IFC also states that although there is public and scientific concern over the potential health effects associated with exposure to EMF (not only high voltage power lines and substations, but also from everyday household uses of electricity), there is no empirical data demonstrating adverse health effects from exposure to typical EMF levels from power transmissions lines and equipment. However, while the evidence of adverse health risks is weak, it is still sufficient to warrant limited concern.

The IFC EHS Guideline also requires that exposure level limits to the public should remain below the International Commission on Non-Ionizing Radiation Protection (ICNIRP) limits provided in the table below.

Table 95: ICNIRP Exposure Limits for General Public Exposure to EMF

Frequency	Electric Field (V/m)	Magnetic Field (μT)
50 Hz	5000	100
60 Hz	4150	83

The National Grid (an international electricity and gas company based in the UK and north-eastern US) provides typical electric and magnetic field limits for various voltage lines (132kV, 275kV, and other). The values indicate that electric and magnetic fields are within the ICNIRP limits and even reach negligible amounts at around 50m – 100 m from the OHTL²⁶.

In addition, according to the National Institute of Environmental Health Sciences (NIEHS) at a distance of around 100m EMF from power lines are similar to typical background levels found in most homes (“Electric and Magnetic Fields Associated with the Use of Electric Power” (NIEHS, 2012)). Finally, the IFC EHS guideline also state that transmission lines require RoW to protect the system and also protection from potential hazards and in which RoW for transmission lines are generally from 15m to 100 m.

Taking the above into account, as noted earlier, the OHTLs and 200 m buffer on both sides is completely vacant and no activities or receptors were recorded (e.g. permanent settlements or similar) which could be impacted by EMF.

The impact from the OHTL operation is expected to be long-term, lasting throughout the operational phase of the project. This impact is of a negative nature but will be localized and confined to the immediate vicinity of the OHTLs. Given the absence of receptors within the 200 m buffer, the magnitude of the impact is considered low. The impact is reversible, as EMF would dissipate if the OHTL operation were to cease. Due to the lack of receptors in the area, the receiving environment is considered of low sensitivity.

Considering the above, the impact of EMF from the OHTL operation is assessed to be not significant.

Mitigation Measures

There are no mitigation or monitoring measures to be considered.

Potential Impacts from Noise during Operation

According to the “IFC EHS Guidelines for Electric Power Transmission and Distribution” (IFC, 2007) noise in the form of buzzing or humming can be often heard around high voltage power lines producing corona – however

²⁶ source: <http://www.emfs.info/sources/overhead/specific/132-kv/>

noise produced by power lines does not carry any known health risks. In addition, such noise quickly dissipates with distance and is easily drowned out by typical background noises.

As noted earlier, the Project area and 200 m buffer on both sides is completely vacant and no activities or receptors were recorded (e.g. permanent settlements or similar).

The impact of operational noise from the OHTL is anticipated to be long-term in nature, as it will persist throughout the operational life of the project. Such impacts are of a negative nature but will be barely noticeable given the absence of nearby receptors, and therefore of low magnitude. The impact is reversible, as noise levels would return to baseline conditions if the OHTL operation were to cease. Given the absence of receptors, the receiving environment is considered of low sensitivity.

Given the above, the impact of operational noise from the OHTL is considered to be not significant.

Mitigation Measures

There are no mitigation or monitoring measures to be considered.

Potential Impacts from Worker Influx during Construction

During construction there is a possibility that workers from outside of the area might be required throughout the construction duration. The influx of workforce to the area could result in certain community health, safety and security impacts which are discussed below.

Risk of Diseases

Influx of workers may introduce new reservoirs of diseases such as vector-related diseases, water-borne diseases, etc. In addition, there is also a risk of spreading communicable diseases, included sexually transmitted ones. The risk of catching or exchanging communicable diseases (e.g., Virus B, Virus C, and HIV/AIDS) and the lack of awareness on transmission disease can represent a high risk to workers and community health and safety. This could also include in particular risk from COVID-19.

Inappropriate Code of Conduct

Other risks from worker influx include inappropriate code of conduct by workers towards local communities which might result in hostilities and resentment. Such inappropriate conduct could include also disrespecting the traditional culture and social norms of the area and local communities.

Increase in Social Vices

Population influx could result in an increase of social vices including alcoholism, drug abuse, sexual exploitation and harassment (SEAH), particularly in relation to vulnerable groups identified.

Availability of Housing

There is a risk that housing and accommodation within Ras Gharib will not be able to accommodate the construction workers.

Such impacts are considered of short-term duration during the construction phase, of a negative nature, and are expected to be of medium magnitude and medium sensitivity. Given the above such an impact is considered of minor significance.

Mitigation Measures

The OHTL Contractor is required to undertake the following:

- Medical examination program. All workers must be subject to a preliminary medical examination before commencement of any job tasks in accordance with local applicable requirements. In addition, routine medical examination for workers (bi-annually) must be undertaken. Such medical examinations must be undertaken at certified centres. Copies of medical examination results of all workers must be retained onsite.
- Details and procedures for ensuring and maintaining hygienic conditions onsite at all times specifically related to toilet and washing facilities, eating areas, etc.
- Development of a code of conduct for workers which takes into account appropriate behavior by workers at all times, religious customs, traditional cultures and social norms in the area. In addition, it must include specifically requirements for social vices including gender-based violence, sexual harassment, alcoholism, drug abuse, etc.
- Induction training and awareness raising sessions on risks associated to the most common contagious diseases (e.g. influenza virus), communicable diseases, general measures for hygiene, code of conduct expected to be implemented and other as appropriate.
- COVID-19 procedures to be implemented onsite for the workforce (e.g. masks, disinfectants, etc.)
- Should housing be required for the workforce, it must be in accordance with IFC and EBRD's Guidance Note on "Worker's Accommodation: Process and Standards" (August, 2009). If this is the case, EPC Contractor E&S team should aim to the extent possible to undertake an audit prior to housing taking place to confirm that arrangements meet required standards.

Following the implementation of these mitigation measures, the significance of the residual impact₂ remains unchanged.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the EPC Contractor:

- Submission medical examination certificated
- Submission of signed code of conducts by workers
- Submission of audit report on housing

11.6.9 Infrastructure and Utilities

Inadequate design of the OHTLs could affect the infrastructure and utility elements noted above. This could include for example inappropriate vertical height of the transmission line from roads which could be a public safety concern for vehicles on the road, or inappropriate horizontal height of the transmission lines from the other nearby OHTL lines which could also entail public safety concerns. In addition, during the construction phase, there is a potential risk of damage to the OHTLs. The use of tall equipment, such as cranes, in proximity to existing OHTLs poses a safety hazard to construction workers.

Taking all of the above into account, the anticipated impacts are considered of short-term during construction and long-term duration during the operation phase. Such impacts are of a negative nature, and if such impacts are improperly managed, then they are expected to be of medium magnitude and medium sensitivity due to their distance from the Project site. Given the above impact is considered of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the OHTL Contractor and/or EETC during the detailed design phase of the OHT:

Plan and design the OHTL routes to maintain safe distances and the required buffer zones from all existing infrastructure elements once identified and/or consider engineering adjustment required as part of the detailed design, including existing and planned OHTLs, WFs, oil and gas pipelines (if applicable) and roads/highways based on local regulations and industry standards. This should be done in consultation with relevant entities and should also include obtaining formal approvals on final detailed design from entities managing such infrastructure elements (e.g. EETC for other lines, NIAT/AMUNET WF, Road Directorate, etc.);

Ensure the OHSP (required under “Section 11.6.7” takes into account health and safety requirements for working near such infrastructure elements such as intersections with roads, proximity to other OHTLs and windfarms, etc.

Following the implementation of these mitigation measures, the significance of the residual impact remains unchanged.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements that must be adhered to by the OHTL Contractor and/or EETC during the planning phase and which include:

- Submission of proof of coordination with relevant entities including formal approvals / permits on final detailed design;
- Review of detailed design to ensure appropriate buffer distances and engineering requirements as applicable are considered and maintained for all infrastructure and utility elements recorded within the OHTL routes; and
- Submission of OHSP with required measures for working in proximity to such infrastructure elements.

11.6.10 Labor and Working Conditions

Inappropriate management of the workforce during both the construction phase could entail several human right risks and violations by employing entities such as the OHTL Contractor. This could include violations such as child labor, forced labor, inappropriate working conditions (e.g. unsuitable working hours), human rights violations (e.g. confiscation of passports for foreign workers), etc.

Taking all of the above into account, the anticipated impacts are considered of short-term during construction. Such impacts are of a negative nature, and if such impacts are improperly managed, then they are expected to be of medium magnitude and medium sensitivity. Given the above impact is considered of minor significance.

Mitigation Measures

The following identifies the mitigation measures to be applied by the Developer and OHTL Contractor:

Developer should aim to the greatest extent possible (through EETC) to require the OHTL Contractor to submit a HR Policies and procedures. Any key deviations against ERBD PR 2 should be identified and OHTL Contractor should be notified on such gaps and required updated policies accordingly.

Developer should aim to the greatest extent possible (through EETC) to undertake regular labour audits on OHTL Contractor to ensure compliance with EBRD PR 2 requirements. Any key non-compliances/deviations identified should be rectified immediately through communicating such issues to EETC. Follow up inspections must be undertaken to ensure such non-compliances are rectified.

Following the implementation of these mitigation measures, the significance of the residual impact remains unchanged.

Monitoring and Reporting Requirements

The following identifies the monitoring and reporting requirements:

- Submission of HR policies and procedures;
- Submission of labor audits reports

12. ANNEX

12.1 Key Outcomes and Responses of the Public Disclosure Session May 24, 2023

Table 96: Key Outcomes of the Public Disclosure Session

Topic	Questions and Concerns	Reponses
Dismantlement: End of Operations	Local Community Member: Inquiry on the justification for the 25-year timeline for dismantlement of wind project.	RCREEE: Twenty years (25) represents the expected viability of the project. As technologies age, such as after 20 years, new technologies are needed to maintain viability. At the end of this timeline, the EETC would announce a new tender for the development of what is known as the (Regional Centre for Energy Export). EEAA: The Renewable Energy Authority, which is represented by the Energy Authority, offers project tenders at a timeline of 25 years for solar energy and also 25 years for wind energy initiatives. After the project has completed, the project is dismantled or the equipment is utilized by the same company (under a new contract) or to another company.
	Local Community Member: Another inquiry to clarify the decommissioning of the windfarm; specifically, whether the equipment and	RCREEE: Dismantling and maintenance are common practices in various industries, including construction, ownership, and operation. In other projects (such as

Topic	Questions and Concerns	Responses
	land are transferred to the government while the project is still operational is the typical framework for these initiatives.	construction, ownership, operation and transportation), it is common for the project to be transferred or handed over.
Negative Impacts: Community Health and Safety	Cleric: Inquiry regarding protection against exposure to electromagnetic waves resulting from operations and the means by which potential impacts could be mitigated.	EETC: There is no evidence that the electromagnetic waves emitted from power generation projects have any negative impact on human health or the environment. RCREEE: All electric currents produce electromagnetic waves, yet the generators used in wind energy projects do not emit significant levels. The project has been designed to minimize impact. Negative impacts are to be monitored closely. If any negative effects are found, the project is to be modified alongside the introduction of applicable mitigative actions. The design of the project in its layout reduces such risks. According to the law for the construction of OHTLs, there is a buffer zone of 50m from the center of the OHTL. Additionally, all wind power stations have passivation cables, which help to reduce the amount of electromagnetic radiation emitted by the turbines. NREA: Wind turbines have no reported negative impacts on humans or animals as a result of electromagnetic waves produced.
Social responsibility programs	Ras Gharib Educational Administration: Referring to another renewable energy initiative that is affecting subsidies of electricity costs, the attendee asked about the reason subsidies are not more ubiquitous and to the benefit of more local communities.	RCREEE: The private sector is the executor of the project, and the state has an electricity regulatory center for determining the subsidies that are distributed among electricity consumer segments. Since the prices of gasoline and gas have increased, an increase in electricity prices is expected. However, as part of the state's mitigation measures, it is to inject 42% of the energy production from renewable sources.
	Red Sea Bedouin Community Member: Inquiry regarding the entailed tangible returns from wind farm development.	RCREEE: There are plans to provide training for local residents in collaboration with the Regional Center prior to the establishment of the projects. Among the trainees, a team will be formed and responsible for conducting a survey to determine the number of birds in the area. Additionally, there is to be theoretical training for a selected group of Bedouins on bird classification. During the implementation phase, which is to take approximately one and a half to two years, these trainees are to be appointed in the bird classification exercise.

Topic	Questions and Concerns	Responses
		Unemployment may be addressed as the project aims to recruit locally.
Positive Impact: Employment Opportunities	Wind Energy Company: Inquiry regarding employment opportunities regarding the opportunities entailed under specialized and non-specialized labour and the employment requirements of such.	RCREEE: The initiative will work on compounding the efforts of other wind farm development projects in the area to support the local community. The initiative is to provide training for the local residents in collaboration with the Regional Center prior to the establishment of the projects. A team will be responsible for conducting a survey to determine the number of birds in the area. The initiative is to host theoretical training for a selected group of Bedouins on bird classification, for example. The implementation phase is to take approximately one and a half to two years, and a group of these young individuals will be appointed for the task.
	General Petroleum Company: Referencing a an anticipated workforce size of the project, the participant requested that more information be provided to the local community regarding announcements, specializations and required skills.	RCREEE: The community will be provided with precise numbers once the studies and the figures are determined. Red Sea Governorate: In supporting workforce development, the intention is to research the establishment of two classrooms for technical education on clean energy to facilitate local skills development and employability.
	Community Member: Inquiry on the number of jobs to be made available to the residents of Ras Gharib as well as expressed dismay that employment has gone to outside hires (regarding local development, not exclusively renewable energy development projects). Bahari Middle of Egypt Association NGO: Asked to clarify the means by which job opportunities will be communicated.	RCREEE: The study for this project (regarding the number of required staff) has not been completed (i.e. <i>not completed at the time of the Public Disclosure session</i>). The work of the Wind Investors Association is to be implemented. This is a new announcement, and a major branch and office will be established to communicate with the public and respond to questions. ESIA Consultant: The construction phase is the most labour-intensive phase, but it is a temporary phase. The recruitment process will be based on the project's employment needs, both in terms of technical specialization and number. The ESIA includes a comprehensive plan for the communication program. A Community Liaison Officer will be assigned and based in Ras Gharib from the beginning of the construction phase.
	Community Leader:	NREA:

Topic	Questions and Concerns	Responses
	Referencing a protocol established in 2007 between the Red Sea Governorate and NREA to implement a wind energy project, there had been an announcement that technical schools would be established in Ras Gharib to teach and aid the employability of youth. Until now, according to the participant, no such technical school has been established while the lack of employment remains. .	If the government announces appointments in an advertisement, NREA stated that it will comply accordingly. As mentioned previously, the formation of a Wind Energy Investors Association in Red Sea is to aid in linking applicable persons to job opportunities. RCREEE: The current outlook is to support the employment of local as it is established and supported by national decree. The Wind Energy Investors Association is to be the main source of communication regarding this topic.
Baseline – Flood risks	General Administration of Groundwater, Red Sea: The General Administration of Groundwater Water in Red Sea, according to the participant, had conducted a study of the project area in cooperation with the Water Resources Research Institute, to establish a number of artificial lakes, dams and channels to avoid the risks of floods in the area. The participant emphasized the importance of accounting for the potential flood risk inherent in the area.	Developer: Prior to the placement of a turbine, there is a thorough inspection undertaken to review all risks including surface water movement. Generally, the turbine is affixed by concrete structures to prevent any erosion. Climate change is also an important topic, particularly its impact on energy projects. Desk reviews and field surveys are conducted by a team of specialists before construction begins, and their results are taken into account in designing the project site.
Land Use	President of WDCALR: His inquiry was regarding the area of land allocated for agricultural reclamation and animal production in Wadi Dara Village: because the land that was allocated to the association and divided among its members (having become private land owners), the question was whether owners of these lands would receive compensation having had invested in developing (rehabilitating) the land once allocated to them.	RCREEE: The topic would be reviewed with the NREA and the response will be through the NREA.

12.2 Letter of No Objection from Radio and Television Unit of Ras Ghareb and the Red Sea Governorate

Table 97 Letter of No Objection from Television Unit of Ras Ghareb and Red Sea Governorate

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الهيئة الوطنية للإعلام
قطاع الهندسة الإذاعية
القاهرة في ٢٠٢٣/٧/٢٥

السيد الدكتور / طارق جنيته

رئيس مجلس الإدارة والعضو المنتدب لشركة إيكونسرف

تحية طيبة وبعد ...؛

إيماء الى خطاب سيادتكم بشأن قرار السيد رئيس الجمهورية رقم ١١٦ لسنة ٢٠١٦ بشأن تخصيص مساحات من الاراضى لصالح هيئة تنمية واستخدام الطاقه الجديده والمتجدده بمنطقة خليج السويس لاستخدامها في انتاج الكهرباء من مصادر الطاقه المتجددة..

وان شركة إيكونسرف للحلول البيئية وشركة ايكونسلت هم المكلف باعداد الدراسات البيئية والاجتماعيية لانشاء محطات الرياح.. وطلب سيادتكم موافاتكم بمدى إمكانية تأثير المشروعات [أكوا خليج السويس - أكوا جبل الزيت] على شبكات الميكروغريف العاملة بمنطقة رأس غارب طبقا للاحداثيات المرسله من سيادتكم.

نتشرف ان نفيد سيادتكم بأنه طبقا للاحداثيات المرسله من سيادتكم فإنه لا يوجد تأثير للمشروع على محطات الارسال الاذاعي والتليفزيونى في منطقة رأس غارب .

وتفضلوا سيادتكم بقبول وافر الاحترام....؛

رئيس قطاع الهندسة الإذاعية

مهندس/ اشرف حامد

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RECEIVED
26 JUL 2023
EcoConServ

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