

Nefer Menya for Renewable Energy

ESIA for Nefer Menya Solar and BESS Power Plant

Menya Governorate

Non-Technical Summary

Prepared by:



6 Dokki St. 12th Floor, Giza 12311
Tel.: (+2010) 164 81 84 – (+202) 376 015 95 – 374 956 86 / 96
Fax: (+202) 333 605 99
Email: environics@environics.org
Website: www.environics.org

April 2026

1. Introduction

Nefer Menya for Renewable Energy is planning to develop a large-scale photovoltaic (PV) solar power facility integrated with a Battery Energy Storage System (BESS) in the desert hinterland of Menya Governorate, Egypt. The proposed project will comprise a 1,000 MW solar PV generation capacity, coupled with 600 MWh of battery storage capacity. The project will be connected to the national grid through an overhead transmission line (OHTL) to be constructed by EETC.

Environics was assigned to develop the project's ESIA to ensure that it is environmentally sound and socially sustainable and that any potential negative environmental consequences are recognized early in the project cycle and taken into account before project implementation and to satisfy the legal environmental requirements. As the project will be implemented in collaboration with international financing institutions, the ESIA will also abide by the environmental and social requirements of the international funding institutions, including specifically the European Bank for Reconstruction and Development (EBRD), the International Finance Corporation (IFC) and the Equator Principles (EP4).

The Nefer project ESIA package will be disclosed and uploaded to the following websites:

IPH: <https://weareinfinitypower.com/projects>

HAU: <https://www.hassanallam.com/sustainability>

EBRD: <https://www.ebrd.com/>

The ESIA disclosure package, including a disclosure log and external grievance leaflet, will be available at the following locations (where approved by authorities):

1. Governorate-level government buildings (Minya City)

- Minya Governorate Diwan (Diwan Aam El Mohafza) — Corniche El Nile, Minya City. Office of the Governor's Secretariat (Sekertaria Aama).
- Egyptian Environmental Affairs Agency (EEAA) – Central Department for Upper Egypt, Minya
- Minya Manpower & Labour Directorate (Mudiriyat El Quwa El Aamlia)

2. Markaz / city-level government buildings (closest to the site)

- Mallawi Markaz & City Council (Magles Madinat Mallawi / Wahda Mahaliya)
- Abu Qurqas Markaz Council
- Toukh El Kheil Local Unit
- Saft El Khammar Local Unit

3. Public spaces

- Egypt Post – Minya Main Office (Maktab Bareed Minya El Raisi)

- Egypt Post – Mallawi Main Office (Maktab Bareed Mallawi El Raisi)
- Mallawi Youth Centre (Markaz Shabab Mallawi)

4. NGOs

- Caritas Egypt – Minya Office
- Upper Egypt Association for Education and Development (Gameiyat Saeed Misr)
- Egyptian Red Crescent – Minya Branch
- National Council for Women (NCW) – Minya Branch (Far' El Magles El Qawmi lel Maraa)
- National Council for Persons with Disabilities – Minya Branch

5. Project- and lender-specific

- Project sponsor's site/liaison office (on or near the project footprint, with posted opening hours).
- EBRD Resident Office in Cairo — EGID Building, Block 72, Ninety Axis, 5th Settlement, New Cairo.

2. Overview of the Project

2.1 Goals

NeferSolar Power Plant Project represents a strategic step in Egypt's efforts to:

- Transition to a low-carbon economy, by replacing emissions Green House Gases per unit of energy
- The country's efforts to increase its renewable energy share of total energy generation, planned to reach 42% in 2035.

The Project will also enhance the reliability of solar power generation in Egypt by incorporating battery storage and pave the way for a broader rollout of storage-integrated renewable projects, to address the challenges posed by the intermittent nature of renewable energy sources.

2.2 Project Location

The Project Site's area is approximately 20.21 km². is located within the West Nile Concession area designated to the New and Renewable Energy Authority (NREA) by Presidential Decree. The site lies approximately 33.5km west of the Western Desert Road and 53.45 km south of the Bani Mazar–El Wahat Road. The surrounding region consists of a desert/vacant land and reclaimed agricultural zones. The immediate land uses bordering the site are, as illustrated in Figure 1, are Canal Sugar reclamation project to the south, Elreef ElMasry reclamation project to the west, and vacant desert land within the NREA concession to the east and north

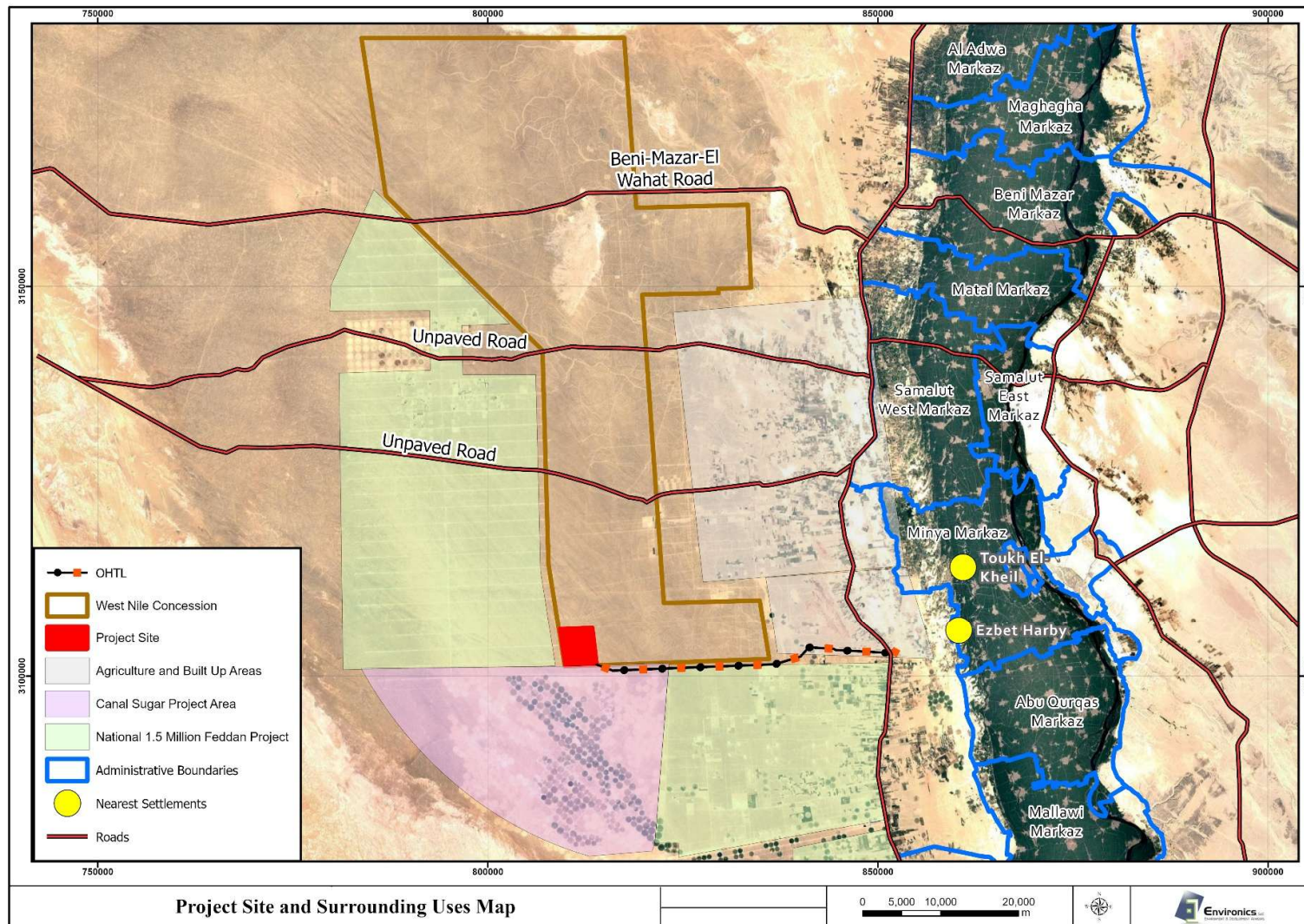


Figure 1: Proposed Project Location and the Surroundings

3. Project Description

3.1 General outline

The Photovoltaic Power Plant will utilize high-efficiency mono-crystalline silicon solar panels with anti-reflection coating along with horizontal single-axis tracking systems to maximize energy capture. Additionally, a BESS using lithium-ion battery modules will be integrated to store and manage the generated energy.

The project will be connected to the national grid through an overhead transmission line (OHTL) to be constructed by EETC. As shown in Figure1, the OHTL extending from the PV site for approximately 36 km, through a mix of desert and reclaimed agricultural lands, connects the Project to an existing north-south High voltage transmission line running parallel to the Giza-Aswan Western Desert Road.

3.2 Project Components

- **Solar Panels**

The PV plant comprises approximately 1.9 million N-Type photovoltaic modules, installed on a single-axis horizontal tracking system with a maximum height of approximately 1.6 meters. Bifacial technology will be used, which allows for maximizing the energy output.

- **Inverters**

To convert the electricity generated by solar panels from Direct Current (DC) to Alternating Current (AC)

- **Switchgear**

This AC power passes through 33 kV medium-voltage switchgear, which controls and protects, and isolates medium voltage (33kV) circuits. from the 220kV high-voltage transformer system.

- **Battery Modules**

Solid-state lithium-ion battery modules will be used, arranged in series and parallel within weatherproof, insulated containers elevated slightly off the ground and arranged in rows. The Power Conversion System (PCS) converts DC power from battery modules into grid-compatible AC power.

- **Cooling and Ventilation Systems**

A liquid-cooled temperature control system is used to maintain safe operating temperatures during charging and discharging, ensuring battery safety and performance.

- **Step-up Substation**

A 33/220kV step-up substation within the project boundaries will collect power from the solar field and BESS systems via 33 kV feeders.

This is in addition to Control and Monitoring Systems and other auxiliary systems such as emergency power supplies, and fire suppression systems.

- **Workers Accommodation and Welfare Facilities**

All contractors will be encouraged to continuously increase the percentage of local workforce. However, non-local workforce accommodation will be arranged through a combination of on-site (labour camp) and rented accommodations in the closest large town, primarily El-Menya,

All accommodation will comply with Good International Industry Practice, lenders' standards (namely EBRD ESR2, IFC PS2, the 2009 IFC/EBRD "Workers' Accommodation" guidelines) the Egyptian Labour Law No. 14/2025, relevant safety decrees, and Civil Defense fire-safety requirements.

- **Overhead Transmission Line (OHTL)**

The stepped-up electricity will be transmitted via a high-voltage overhead transmission line (OHTL) extending from the PV site for approximately 36 km and connects the Project to an existing north-south High voltage transmission line running parallel to the Giza-Aswan Western Desert Road. Its proposed route traverses a mix of desert and reclaimed agricultural lands to ultimately connect to the existing OHTL. The final route alignment and tower distribution will be confirmed during the detailed design phase. Typically, towers are spaced between 400 and 600 meters apart, depending on terrain and technical constraints.

The OHTL is not part of the project. It will be constructed and operated by the Egyptian Electricity Transmission Company (EETC). A separate ESIA for the OHTL will be prepared by EETC and submitted to the Egyptian Environmental Affairs Agency (EEAA) for review and approval.

3.3 Project Schedule

The Nefer Solar Power Project is planned to commence construction activities following the receipt of all required permits and approvals. The total implementation period is estimated at approximately 15 months.

3.4 Project Phases

The Project will include three main phases: Construction, Operation, and Decommissioning.

a) Construction Phase

Major on-site activities will include ground levelling and clearing, civil works, construction of buildings, installation of equipment and utilities, as well as ramming of PV supports and the installation of the modules on their mounting structures. This phase will also include the building of foundations and installation of BESS components, as well as transmission cables and substation. The construction phase will end with the testing and commissioning of equipment.

Daily water consumption during the peak construction period is expected to be approximately 80-120 m³/day for construction purposes. Water will also be required for the workforce needs.

Water will be supplied from different water treatment plants according to a plan to be agreed with Menya Water and Wastewater company. Potential plants will include the nearest water treatment plant in Abu Qurqas at about 60km east of the project site. Water for the construction activities and sanitary purposes will be trucked and stored in water tanks at the site, while bottled water will be provided for drinking.

The construction phase will entail a number of temporary facilities to serve employees and contractors, including laydown areas, offices, welfare and sanitary facilities as well as labor accommodations. Most of the temporary structures and facilities will be dismantled when the construction works are completed.

b) Operation Phase

During operation, activities are limited to Control, monitoring and maintenance.

c) Decommissioning Phase

At the end of the project's life, the site will be safely dismantled and restored. Activities include the removal of Equipment, or which reusable components will be recycled, while other materials will be disposed of according to environmental regulations. The land will be restored to its original state or re-purposed for other sustainable uses.

3.5 Environmental and Social Aspects

The project aspects result from activities that may interact with the baseline physical, biological or social environment. Based on the project components, the key environmental and social aspects of the project are summarized in Table 1. The table also indicates and shortly justifies whether a specific aspect is relevant to both construction and operation phases.

Table 1: Project E&S aspects

PV Plant and BESS		Construction	O&M
Land Uptake (utilization)	Land Access Restriction	Security measures to protect project infrastructure and assets	Security measures will restrict access to the e Project.
	Land Transformation	– Land will be totally transformed from its original state	No additional land transformation .
	Land Acquisition	N/A (Project Site is on publicly owned land)	N/A
Transportation Demand		<ul style="list-style-type: none"> – Transportation of construction machinery, equipment, and project components – Transportation of water, fuel and other construction materials – Transportation of workers. 	Limited transportation requirements for the operation and maintenance workforce.
Workers influx		– Non-local, mostly skilled, construction workers	Limited workforce
Workers Welfare		– Construction workers need to be provided with safe drinking water, adequate food, proper sanitation facilities, medical	Fewer O&M workers will have the same needs at a smaller scale.

PV Plant and BESS	Construction	O&M
	treatment and response, safety gear and PPE, and break facilities.	
Water Demand	<ul style="list-style-type: none"> – Potable water for construction and sanitation – Bottled water for drinking – Low quality water for dust suppression 	<p>Limited O&M workforce, drinking, and sanitation facilities.</p> <p>Occasional module cleaning</p>
Noise & Vibration	<ul style="list-style-type: none"> – Ramming machines – Operation of heavy equipment such as excavators, bulldozers, mixers, etc.... 	Minor workplace noise from transformers
Dust, Particulate Matter, and Gaseous Emissions	<ul style="list-style-type: none"> – Site preparation (site clearing, grading, excavation), – Circulation on unpaved roads. – Exhaust from Vehicles on and off site . – Onsite diesel-powered generators 	<ul style="list-style-type: none"> – Limited transportation of workers, and other O&M materials. – The maintenance of transformers can cause minimal emission of SF6.
Wastewater Generation	<ul style="list-style-type: none"> – Domestic waste from the large number of construction workers. 	Limited generation from the workforce use of sanitation facilities.
Waste Generation (Hazardous and non-hazardous)	<p>Non-hazardous</p> <ul style="list-style-type: none"> – Domestic waste from workforce – Scrap materials. – Construction debris and excess soil and waste <p>Hazardous</p> <ul style="list-style-type: none"> – Spent solvents, paints, coatings, adhesives, hydraulic fluids, lubricant oils. 	<p>Non-hazardous</p> <p>Limited quantities of</p> <ul style="list-style-type: none"> – O&M material packaging – Domestic waste from workforce. <p>Hazardous</p> <ul style="list-style-type: none"> – Absorbent material, waste oil from machinery, lubricants and solvents – Empty containers of hazardous substances – End of life lithium batteries
Glare	N/A	Photovoltaic (PV) modules, can reflect sunlight particularly when the sun is at a low angle during minimal periods for PV systems equipped with tracking mechanisms, especially using anti-reflective coatings
Electromagnetic waves	N/A	<ul style="list-style-type: none"> – Substation and transformer – Switch gears

3.6 Area of Influence

The identified project E&S aspects within the project's direct area of influence are described in the tables below. The Area of Influence in this table means the regions likely to be affected by each specific aspect.

Table 2: Environmental and Social Aspects Aol during the construction phase

E&S Aspects PV plant and BESS		Anticipated Aol
Land Uptake (utilization)	Land Access Restriction	Project Footprint
	Land Transformation	
	Land Acquisition	N/A (the land is publicly owned and allocated for renewable energy)
Transportation Demand		Main Roads Supporting Site Accessibility and Logistics Roads from the nearest import port (Sokhna or Safaga)
Workers Influx		Communities in which workers might be accommodated
Water Demand		Water treatment plants and the community it serves
Waste Generation		The disposal facility where waste will be disposed of.
Wastewater Generation		The treatment plant where wastewater will be disposed of
Noise & Vibration		A general default distance of 350 m would be considered for dust effects, regardless of the receptor (EA, 2013, IAQM 2014) ¹
Dust/Particulate Matter/Gaseous Emissions		

Table 3: Environmental and Social Aspects Aol during the operation phase

E&S Aspects Associated Facilities	Anticipated Aol
Land Access Restriction	The project footprint.
Transportation Demand	The same roads serving the Project
Water Demand	Water treatment plants and the community it serves
Wastewater Generation	The treatment plant where wastewater will be disposed of
Waste Generation	The disposal sites where waste will be disposed of
Glare	Could extend to a distance of 1-2 km
Noise & Vibration	A general default distance of 350 m would be considered for dust effects.
Dust/Particulate Matter/Gaseous Emissions	

Based on the two tables above, the Aol during the construction phase extend to encompass transportation routes, nearby urban centers where workers will be accommodated and workforce needs will be acquired . During operation, although the IFC standards do not define a specific extent of the Aol for solar panels' projects, previous studies proposed best practices that consider a buffer area of 1 km from the project site boundaries.

¹ **Environment Agency (EA) (2013).** *Guidance on the assessment of dust from demolition and construction.* Bristol, UK: Environment Agency, **Institute of Air Quality Management (IAQM) (2014).** *Guidance on the assessment of dust from demolition and construction*

4. Environmental and Social Baseline

4.1 Project Site Location

The project is located within the West Nile NREA concession, situated in the Menya Governorate, west of the Nile River, approximately 55 km west of Menya city. The site lies within a desertic and uninhabited part of the governorate, the nearest settlement is Izbet Harbi (Toukh El Kheil, Markaz El-Menya), situated about 43.5 km away. However, land reclamation for agriculture has advanced to the west of the Nile Valley and is now contiguous (Figure 2).

4.2 Physical Environment

Climate and Meteorology

The Project Site is in a region, characterized by an arid climate where mean annual precipitation is less than 1mm. It has high solar irradiance, hot and dry summers when temperatures often exceed 40°C., mild winters, and a significant diurnal temperature variation typical of desert environments. The wind direction in the project area is northern and north-northwest most of the year. The average highest wind speed ranges from 38 to 50 km/h.

Dust and Sandstorms

The project site, similar to other areas in Upper Egypt, is exposed to dust, sandstorms, and haze, as recorded over a 11-year monitoring period:

- **Dust Storms:** Over 11 years, the total number of dust storms and sandstorms are 741 hours in 155 days (0.7 % and 3.8 % respectively)
- **Rising Sand:** Sand rising events in this region typically occur under sustained wind speeds exceeding 25–30 km/h, which are frequent during March to May and October to November and may be associated with Khamasin winds.

Air Quality

The area is remote, with no stationary emission sources nearby. The closest human activity includes agricultural developments to the south. However, the desert setting leads to naturally high levels of windblown dust. Particulate matter (PM₁₀, PM_{2.5}) may peak during storm events.

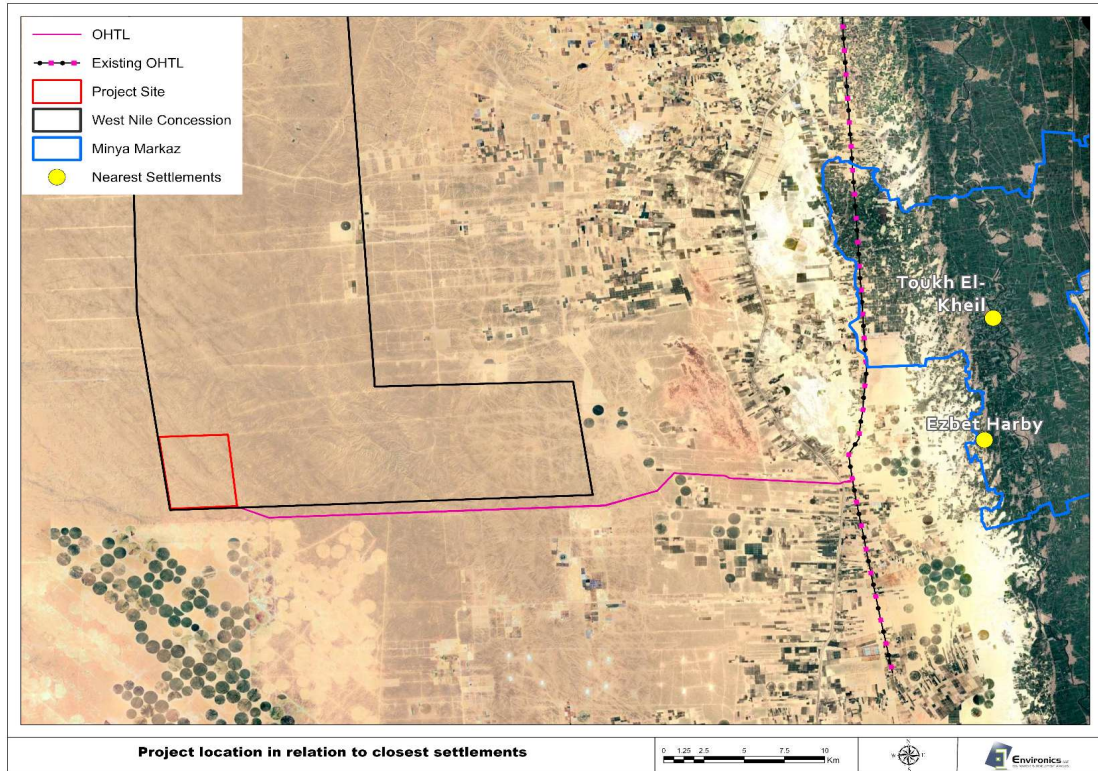


Figure 2: Project Site and OHTL route

Topography

Overall, the Project site shows gentle elevation variation, supporting ease of access and construction. Within the site, elevations range from 90–100 m above MSL in the east and southeast, 120–130 m in the west and northwest, and 110–120 m in the central zone.

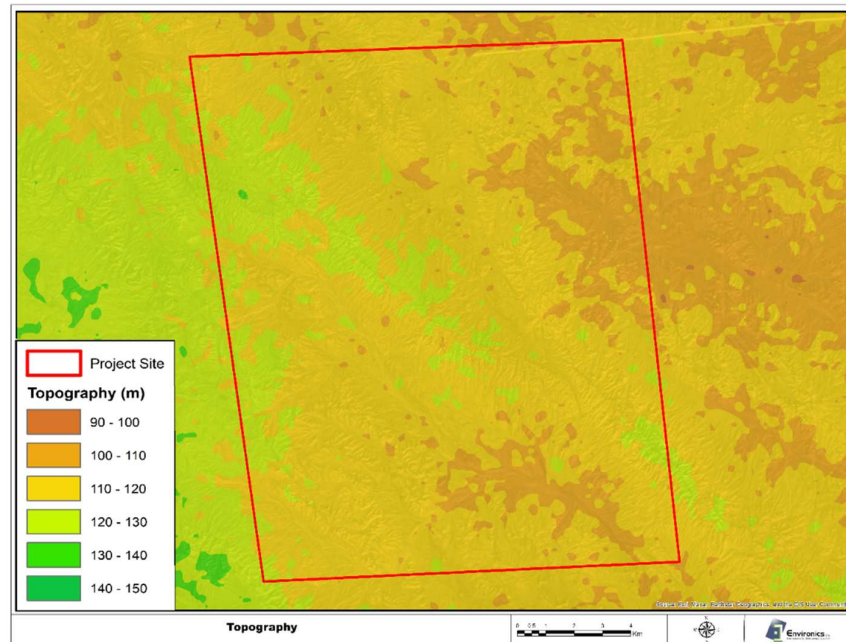


Figure 3: Topography of the Project Site

Surface Hydrology

There are no surface watercourses within or near the project area.

No natural wadis (ephemeral drainage channels) or floodplains exist within the project footprint and surroundings.

Groundwater

The depth of the aquifer varies between 120 to 140 m, and piezometric head² ranges from 45 to 74 meters, depending on the specific location. The salinity of the Nubian Sandstone Aquifer under the Project Site is between 1000 and 2000 ppm.

Flash Flood Hazards

The region where the Project Site lies is marked by flat to gently undulating terrain, extremely low rainfall, and an absence of developed drainage systems. There is, therefore, no risk of flash flooding while rare storms may trigger minor localized runoff, especially given the soil's high infiltration capacity.

4.3 Biological Environment

The Project Site is located in the Middle Limestone Plateau of the Egyptian Western Desert (WD). The plateau is a dry sand plateau with very little or no precipitation. Outside of its depressions and oases, the habitats available are bare ground habitats.

- **Habitat Near the Project Site**

In addition to the base ground habitat typical of the region, the Project's wider area includes three main types of habitats, to which biodiversity is adapted.

² The elevation to which water rises in a well

Nile Valley Farmlands: The Nile Valley farmlands, located more than 40km east of the project site,

- **Reclaimed Agricultural Lands:** Several reclaimed agricultural areas, including mega agricultural projects, exist near the Project Site, with the closest located approximately 1 km to the south. The expansion of agriculture has created a vegetated corridor extending from the Nile Valley into the desert, enhancing local biodiversity in proximity to the project site.



Figure 4: Reclaimed agricultural land in the wider region



Figure 5: Levelling of a desert land for agricultural reclamation

- **Urban Habitats:** Urban and man-made habitats are scattered throughout the Nile Valley farmlands and reclaimed agricultural lands, such as towns and villages, banks of canals and drains, roadsides, railways and wastelands.

The Project site

The Project Site lies within a hyper-arid desert landscape that differs markedly from surrounding ecological regions, such as the Nile Valley farmlands and reclaimed agricultural corridors.

The field investigations confirmed that the Project Site is an extension of the desert area located in the **Error! Reference source not found.**, and consists of a single, homogeneous, arid desert habitat entirely composed of a bare sandy soil covered with gravel, with gravel-free sandy corridors present in low-lying areas.

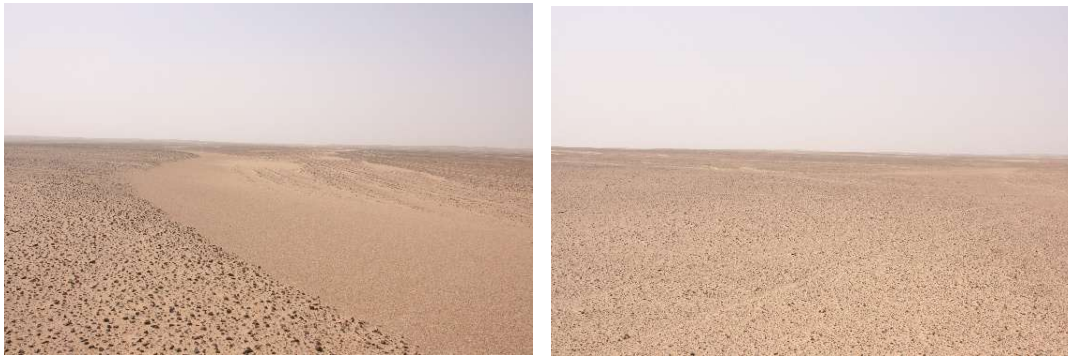


Figure 6: View of the Project Site at different locations showing its uniformity

Flora

The NREA West Menya concession area is almost devoid of vegetation. Investigations on the concession carried out by Al Amar (2012) reported most of the region as a desert with small patches of vegetation. On the other hand, results of the November 2025 survey indicate that the Project Site is totally devoid of vegetation.

Fauna

Reptiles

The Middle Limestone Plateau of the Western Desert (where the Project Site is located) is poor in reptiles. Only one reptile species was recorded during the preparation of the strategic assessment of NREA concession (Al Amar, 2012), namely the Red-spotted Lizard (*Mesalina rubropunctata*), which is categorized as a species of Least Concern (LC) by the International Union for the Conservation of Nature, IUCN (2025). Although no signs indicating the presence of reptiles were noticed during the recent visit to the Project Site, this does not totally exclude the potential of their presence.

Birds

Given the arid nature of the desert environment, with limited vegetation, food and shelter, it is highly unlikely that birds would intentionally land in the Project location. In fact, birds would actively avoid flying over or landing in the project area due to its harsh conditions preferring more suitable habitats (in this case, the Nile Valley).

Resident Birds: the Greater Hoopoe-lark (*Alaemon alaudipes*) had been previously recorded by Environics in 2018. The presence of the Cattle Egret among the recorded species (a typical

bird of agricultural fields) provides a clear indication of the consequences of desert reclamation for agriculture in terms of Nile Valley species’ expansion. None of the resident bird species is threatened and all the recorded species are common and widespread.



Figure 7: Greater Hoopoe-lark (*Alaemon alaudipes*) recorded in the project’s wider area by Environics

Migratory Birds including soaring birds: According to the NREA concession strategic assessment, the importance of the study area for migrating soaring and gliding birds was very low.

Additionally, according to an using the Migratory Soaring Birds Tool (MSBT) carried out at the regional and Project Site (within a 5 km buffer) levels, the sensitivity of the Project Site is classified as “potential, score: 0.000” and has the least sensitivity to soaring migratory birds.

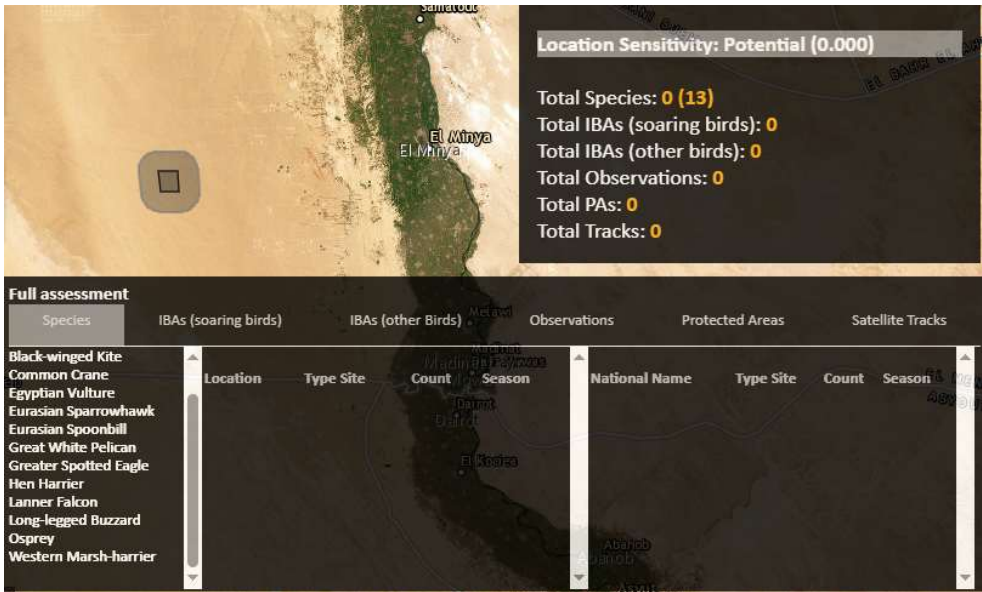


Figure 8: Location sensitivity of the Project Site to migratory soaring birds

Furthermore, based on AVISTEP, Figure 9 the project site falls within a green zone of low risk to bird populations.

**Figure 9: The AVISTEP Tool showing Low Risk to Birds in the Project Site**

Although the wider area has witnessed some changes, the Project Site is still an undeveloped desert habitat, similar to how it was at the time of the 2012 Ecoda survey. The Project Site is totally devoid of vegetation with no suitable habitats for migratory birds to land or rest. The environment of the project area is likely to be a "bird barrier" where birds would actively avoid flying over or landing in the area due to its harsh conditions, resulting in a "migration bottleneck" over more suitable habitats (in this case, the Nile Valley).

Moreover, discussions with neighbouring farms operators, who were asked about potential birds landing in nearby reclaimed agricultural areas, reported no landing or even sightings of migratory species.

Although reclaimed agricultural lands are known to attract species from the Nile Valley, yet these species are not adapted to the desert environment and will not venture into the desert where the project site is located, even the most common species with high dispersal capacity were not present.

Ecological Value and Significance

None of the species potentially present in the Middle Limestone Plateau have been formally recorded from within the Project Site or its proximity. Thus, the probability of their actual occurrence within the Project Site is considerably low. Even if one or more of these species were present on site, alternative habitats would be readily available, and the project is unlikely to have any significant effect on their population levels.

Moreover, the Project Site does not encompass any Key Biodiversity Areas (KBAs), including Protected Areas (PAs) legally protected by the Egyptian Government, BirdLife International designated Important Bird Area (IBAs), or PlantLife International designated Important Plant Areas (IPAs).

The closest ecologically sensitive area is Wadi El Rayan Protected Area, located 106 km north of the Project Site.

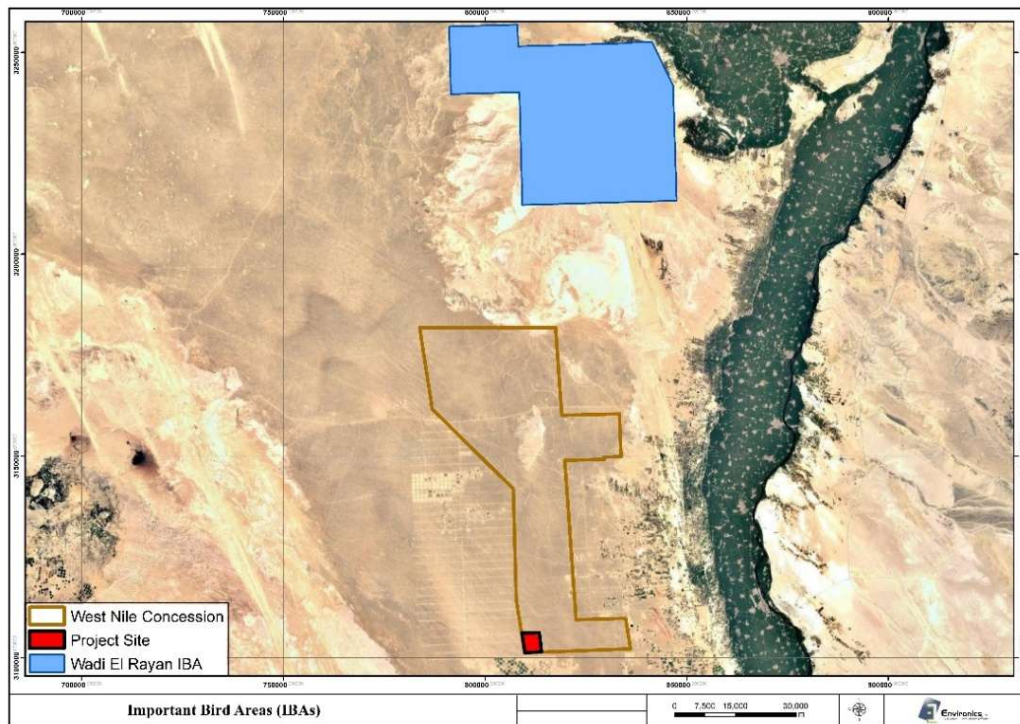


Figure 10: Nearest Key Biodiversity Areas (KBAs) to the Project Site

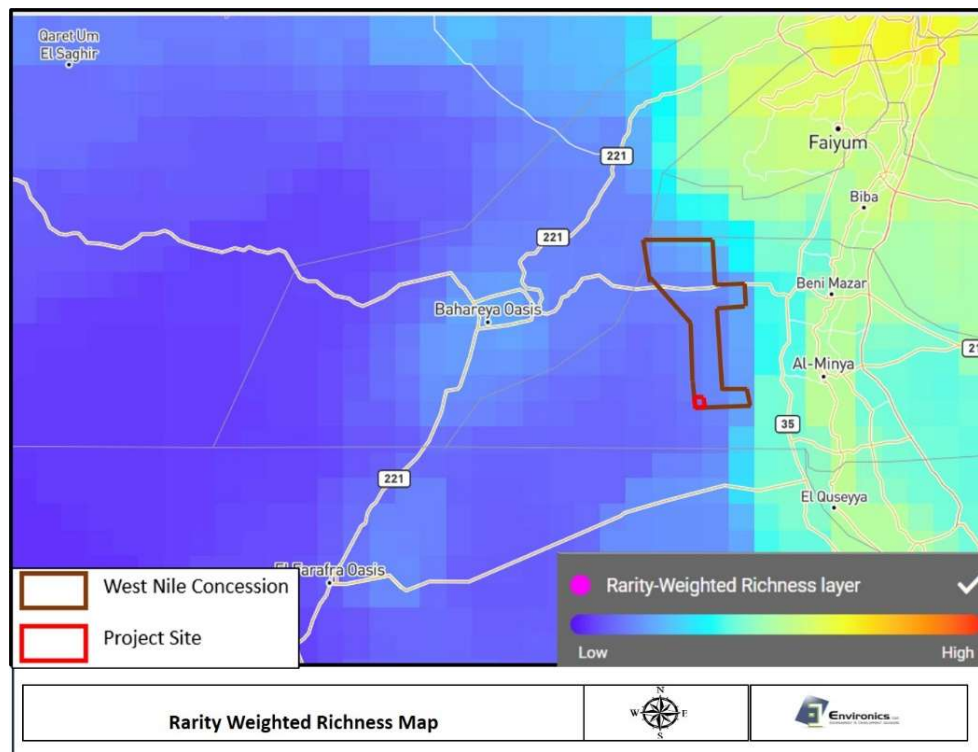


Figure 11: Rarity-weighted richness map of the Project Site

Ecosystem Services

The Project Site is not being currently utilized by humans, and no benefits are derived from the bare ground covering the entirety of the Project Site.

Critical Habitat Assessment

The screening process indicated that the area does not qualify as a Critical Habitat (CH) under international biodiversity standards.

4.4 Socio-Demographic Overview

Although the project is within the administrative borders of Menya Governorate, it is not officially affiliated to a specific administrative Markaz in Menya, as shown in Figure 12 below. The village of Izbet Harbi, (Toukh El Kheil Local Unit, Markaz El-Menya) is the closest settlement to the project, located at a distance of about 50 km.

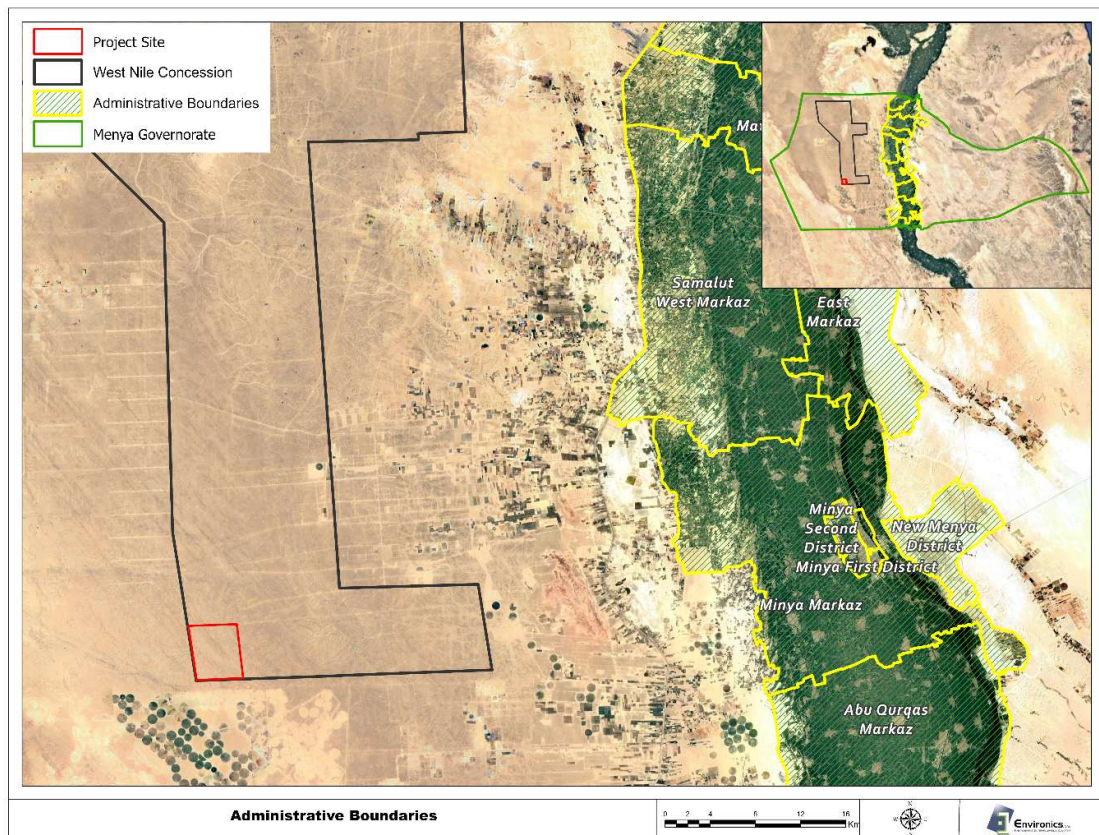


Figure 12: Menya Governorate borders and administrative centers in relation to the NREA West Menya concession and the Project Site

Population & Settlements

The population of Menya Governorate has grown significantly since the 2017 census. As of 2025³, the governorate boasted an estimated 6,511,377 inhabitants, up from 5,497,095 in

³ Central Agency for Public Mobilization and Statistics (CAPMAS). Annual Statistical Yearbook of the Arab Republic of Egypt, 2025.

2017⁴—a rise of approximately 18.5% over six years. An estimated 81% of Menya's population lives in rural areas, compared to Egypt's national average of 57%. The population of Markaz El-Menya in 2017 was 676,181 people, equivalent to 12.3% of the total population of the governorate.

- **Education:** Illiteracy rate among those over 10 years reached 27% in Menya in 2016, which is higher than the national average of 25%. Illiteracy rate among females (45%) is higher than males (29%) in the governorate (CAPMAS, 2016). Some children drop out of school as sometimes low-income families encourage their children to work for extra income.
- **Employment:** Employment in Menya is predominantly informal. The informal economy is driven by agriculture, construction, retail, and family-owned trades. Public sector jobs continue to dominate formal employment, particularly in education and healthcare.
- **Health facilities:** There are five governmental and 6 private hospitals in Markaz El Menya (Menya Governorate Information Center, 2025).
- **Infrastructure:** The project site does not have access to telephone, natural gas, a water network, or a sewage network. The closest paved road to the project site is the Giza–Aswan West Desert Road, located about 40 km to the east, followed by the Beni Mazar–El Wahat Road, located approximately 60 km to the north. Moreover, several unpaved tracks serve the surrounding land reclamation projects; these tracks originate from the Giza–Aswan Road and generally run in an east–west direction
- **Drinking water:** The total water design capacities of the water treatment plants in Menya and Abo Qurkas are 313,240 and 106,320 m³/day respectively. The Markaz of Menya has a total of 15 water treatment plants. Their capabilities vary from 2000 to over 100,000 m³/day of which only 5 have capacities of more than 20,000 m³/day. On the other hand, Markaz Abo Qurkas has only 2 treatment plants of capacities of 4,320 and 102,000 m³ /day.
- **Sewage:** The wastewater of the town of Menya is treated in the Talla Wastewater treatment plant which has a capacity of 53,600 m³/day and could accommodate the wastewater generated by the project in its peak construction period.

Cultural heritage: There are no registered antiquities or cultural heritage sites in the vicinity of the project site. The nearest recorded archaeological site in West Menya is the ancient city of *Oxyrhynchus* (Al-Bahnasa), located approximately 71 km northeast of the project area (Kwok and Peters, 2020). Additionally, the Beni Hassan tombs, situated on the eastern bank of the Nile, are located about 67 km from the Project Site. Regarding the intangible cultural heritage, based on UNESCOs List of Intangible Cultural Heritage (ICH) in Egypt, none of the identified ICH elements are practiced within the Project Site. However, some elements may be practiced within Menya governorate, examples including local artistic and historical traditions such as local handicrafts and folkloric performances and Cultural Festivities, where the governorate hosts major Christian and Islamic festivals that are key to its intangible heritage, particularly around the monasteries of Gabal El-Tayr and the religious sites in Al-Bahnasa areas at about 65 and 75 km from the project site respectively.

⁴ Central Agency for Public Mobilization and Statistics (CAPMAS). *Population Census of the Arab Republic of Egypt, 2017*.

5. Environmental and Social Legislation and Regulations Related to the Project

5.1 National Legislations

As per Egypt's Environmental Law 4 of 1994 (as amended by Laws 9 of 2009 and 105 of 2015), an Environmental Impact Assessment (EIA) must be conducted for new projects. The New and Renewable Energy Authority (NREA) serves as the Competent Administrative Authority (CAA) for this project, overseeing the submission and review process through the Egyptian Environmental Affairs Agency (EEAA).

The EEAA classifies projects into four categories (A, B, Scoped B, and C) based on their potential environmental impact. Nefer PV Plant and Battery Energy Storage System (BESS) are classified as a Scoped B project, meaning a full Environmental and Social Impact Assessment (ESIA) is not required, and public consultation is not mandatory.

The table below lists the key legislation relevant to this ESIA.

Table 4: National Regulations and Laws

Legislation Related to the Project
Management of non-hazardous solid waste and hazardous waste generated from the facility during generation, handling, transportation and disposal
Law 4/1994 amended by Law 9/2009, and its ER 1095/2011, amended by Decree 710/2012
Law 202/2020 on waste management and its executive regulation 722/2022 and 1113/2024
Biodiversity Protection
Article 28 of the Environmental Law 4 of 1994
Annex 4, as amended by ERs 1095 of 2011 of the Environmental Law 4 of 1994,
Law 102 of 1983 Concerning Natural Protected Areas
Law 53 of 1966 (the Law of Agriculture) and amended by Decree 1227 of 1988
Cultural Heritage
Antiquities Protection Law 117/1983 amended by Laws 3/2010, 61/2010, 91/2018 and 20/2020
Air quality and noise
Article 36 of Environmental Law 4/1994 and Article 37 of ER 1095/2011
Article 35 of Environmental Law 4/1994, article 34 of its modified ER 1741/2005, and annex (5) of modified ER 710/2012
Article 42 of Environmental Law 9/2009 and Article 44 of its modified ER (1095/2011)
Annex 7 of the ER replaced by Decree 710/2012
Executive regulations 81/2023 amended by decree 164/2025
Potable Water
Decree 458/2007, amended by Decree 182/2025, regarding the specifications and standards required for water to be considered potable
Decree No. 166 of 2000 regarding the requirements for the cleaning and disinfecting of potable water tanks
Register/Records: Environmental Register & Hazardous Materials & Waste Register
Article 22 of Environmental Law 9 of 2009
Article 17 of Law 1741 of 2005 Article 17 and Annex 3 of the executive Regulation.
Article 56 of Waste Law 202 of 2020
Appendix (3) of the ERs of Environmental Law 4/1994
Article 50 and Appendix (7) of the ER of Waste Law 202/2020 on waste management and its executive regulations (654/2021)
Workplace Emissions
The Ministerial Decree 134/2003 concerning committees for vocational safety and health

Ministerial Decree 211/2003 concerning safety levels, precautions, and terms to prevent detrimental physical, chemical, biological, and mechanical hazards
Workplace Noise
Annex 7 of the ER 710/2012 of the Environmental Law 4/1994, amended by decree 2466/2024.
Occupational health and safety
Law 14/2025 on Labour and Workforce Safety
Ministerial decree 211/2003 concerning safety levels, precautions, and terms to prevent detrimental physical, chemical, biological, and mechanical hazards
Child Labour
Article 64 of the “Child Law” 12/1996
Articles 62, 63, 64, and 65 of the Labor Law 14/2024
Decree 215/2021 regarding the child employment and training
Persons with Disabilities
Law 10 of 2018 amended by Law 156/2021 on the Rights of Persons with Disabilities
Article 37 of Labour Law 14/2025
Equal opportunities
Article 9 of the Egyptian Constitution
Article 5 of Labour Law 14/2025
Law 10/2018 related to the rights of people with disabilities
Protection from Harassment
Article 254 of Labour Law 14/2025
Anti-harassment Law 141/2021
Grievance
Article 85 of the Egyptian Constitution
Article 103 of the Environmental law 4/1994
Community Investment:
the Egyptian Investment Law 72/ 2017

5.2 International Conventions

Biodiversity Conventions

- Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) (1995): Protects migratory waterbirds and their wetland habitats.
- The United Nation Convention on Biological Diversity (UNCBD) (1992): Promotes the sustainable management of biological diversity.
- The Convention on the Conservation of Migratory Species of Wild Animals (CMS) (1979): Ensures the conservation of migratory species.
- Convention on International Trade in Endangered Species of Wild Fauna and Flora CITES (1973): Regulates international trade in endangered species.
- African Conservation Convention (1968): Promotes the sustainable use of natural resources.

Climate Change Conventions

- United Nations Framework Convention on Climate Change (UNFCCC (1992): Establishes a global framework for addressing climate change.
- Kyoto Protocol (1997): Sets binding emission reduction targets.
- Paris Agreement (2016): Aims to limit the global temperature increase to below 2°C.

Cultural Heritage Conventions

- United Nations Educational, Scientific and Cultural Organization (UNESCO) Convention for the Safeguarding of the Intangible Cultural Heritage (2003): Protects traditions, expressions, and traditional knowledge.
- World Heritage Convention (1972): Identifies and preserves sites of cultural and natural heritage.

Labour Related Conventions

- Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87)
- Right to Organise and Collective Bargaining Convention, 1949 (No. 98)
- Forced Labour Convention, 1930 (No. 29) and its 2014 Protocol
- Abolition of Forced Labour Convention, 1957 (No. 105)
- Minimum Age Convention, 1973 (No. 138)
- Worst Forms of Child Labour Convention, 1999 (No. 182)
- Equal Remuneration Convention, 1951 (No. 100)
- Discrimination (Employment and Occupation) Convention, 1958 (No. 111)
- Occupational Safety and Health Convention, 1981 (No. 155)
- Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187)

5.3 International Standards and Guidelines

The Environmental and Social Impact Assessment (ESIA) for the Nefer PV Power Plant and Battery Energy Storage System (BESS) complies with both Egyptian Law 4/ 1994 and international financial institutions' requirements, including mainly EBRD ESR and the Equator principles.

EBRD Environmental and Social Requirements (ESRs)

- **ESR1:** Calls for integrated environmental and social impact assessment and stakeholder engagement.
- **ESR2:** Ensures fair labor conditions, health and safety standards, and monitoring of suppliers.
- **ESR3:** Focuses on pollution prevention and resource efficiency.
- **ESR4:** Addresses health, safety, and security risks, including gender-based violence risk assessment.
- **ESR5:** Land acquisition and resettlement provisions are not applicable to this project.
- **ESR6:** Assesses biodiversity conservation and sustainable resource management.
- **ESR7:** Indigenous peoples' provisions are not applicable.
- **ESR8:** Ensures protection of cultural heritage (no registered sites found).
- **ESR10:** Emphasizes stakeholder engagement and transparent information disclosure.

IFC E&S Performance Standards

- PS1 Assessment and Management of Environmental and Social Risks and Impact
- PS2: Labor and Working Conditions
- PS3: Resource Efficiency and Pollution Prevention
- PS4: Community Health, Safety, and Security
- PS5: Land Acquisition and Involuntary Resettlement
- PS6: Biodiversity Conservation and Sustainable Natural Resource Management

- PS7: Indigenous Peoples
- PS8: Cultural Heritage

Equator Principles

- EP1: Review and Categorisation
- EP2: Environmental and Social Assessment
- EP3: Applicable Environmental and Social Standards
- EP4: Environmental and Social Management System and Equator Principles Action Plan
- EP5: Stakeholder Engagement
- EP6: Grievance Mechanism
- EP7: Independent Review
- EP8: Covenants
- EP9: Independent Monitoring and Reporting
- EP10: Reporting and Transparency

6. Stakeholders Consultation

6.1 Stakeholder Identification and Analysis

As stakeholder engagement is an ongoing process, future engagement activities during the pre-construction and mobilization, construction and operations will ensure that information disclosure and consultation activities are effective and meaningful for all stakeholders over the lifetime of the project. Initial stakeholder consultation activities were initiated at the scoping and ESIA stage.

Stakeholder Groups:

Primary stakeholders: those who will be directly affected, positively or negatively by a development. These would, in particular, include low-income and marginalized groups who have traditionally been excluded from participating in development efforts and outcomes; as well as the local community-based organizations which might represent their interests in the project, and in all cases, can help to access communities in general and these groups in particular.

Secondary stakeholders: include agencies, experts, interested parties and anyone able to influence the outcome of the development. These mainly include Central Government, line ministries, local government/authorities, implementing agencies, national and international lending institutions, media, and academic institutions. Secondary stakeholders are important as they provide valuable data and information specific to the area, i.e. they are a source of secondary data.

A preliminary stakeholder analysis was conducted to assess their importance, roles, and engagement approach.

Stakeholders have been identified considering the following factors:

- Project's nature and activities.
- Geographical extension and location of the project; and
- Environmental and Social aspects and potential impacts of the project

6.2 Stakeholder Engagement Process and Previous Consultation during the Scoping and ESIA stages

6.2.1 ESIA Scoping Stage

Initial stakeholder consultation activities were initiated at the scoping and ESIA stage. The following presents a brief summary of the stakeholders' consultation activities to date

Stakeholders met:

- Officials at Menya Governorate;
- Menya City Council
- Menya and Abot Qurqas local council environmental units
- Menya Water and Wastewater company
- Menya governorate environmental unit

- EEAA Regional Branch office
- NGOs
- Manager of ATLAS for Surveying, Engineering and General Contracting;
- Local investors in surrounding agricultural activities;
- Saft El Khammar Local Unit;
- Toukh El Kheil Local Unit; and
- Toukh El Kheil Potable Water Treatment Plant.

Key Discussion Points:

All discussions with the stakeholders were conducted in Arabic and all stakeholders had the opportunity to ask questions and express their view regarding the project.

The key message received from all attendees, that all were supporting the national efforts taken to enhance the infrastructure that would secure the national energy supply to meet the domestic and industrial growing needs. Meeting this growing demand with energy generated from renewable sources was specifically welcome as it cleaner and more reliable. Stakeholders also supported the project as it will provide work opportunities to the community members.

Issues raised by stakeholders were considered in the ESIA.

The topics raised by the stakeholders during discussions can be categorized as follows:

- **General feedback on the project**

- The project is highly welcomed, not only because of its benefits on the national level, but will also contribute to reducing power outage in the region.
- The noise impact, which is the most significant during construction, was seen not to highly affect the neighbouring agricultural areas due to distance, as well as its temporary and intermittent nature.

- **Labour related issues**

- Labour and job opportunities: provision of job opportunities was the dominant topic in all stakeholders meetings. Stakeholders emphasised on the importance of provision of work opportunities for the communities and required that El Menya people should have the priority in employment. All parties are willing to cooperate with the project in this regard.
- Labour accommodation: was also discussed mainly due to the significant distance between the project location and the communities. The housing of workers in the closest communities, which are smaller villages, was rejected mainly for social reasons.
- Labour enrolment in the project's construction may affect availability of construction workers in the area.

- **Adequacy of infrastructure**

- Ability of water and wastewater treatment plants to meet the project demand during construction activities was confirmed. However, supply should be limited to the larger treatment plants serving cities as opposed to those serving villages.
- Available waste management infrastructure within Menya governorate
- Medical facilities in Menya governorate, are available to serve the workforce, but the remoteness of the site will require provision of emergency services on site and swift transportation to better equipped medical facilities.

- Road infrastructure for Nile crossing for transportation of PV and BESS components and construction material are adequate through the new Samallout and Mallawi Axes. t In terms of energy needs of neighbouring agricultural activities, and communities, it was clarified that energy generated by the project will be distributed through the national network.
- **Corporate social responsibility**
 - Potential support to vulnerable groups in the communities, through Corporate Social Responsibility (CSR)
 - Provision of capacity building and training to the workforce might not be possible for the project purposes, except as on-the-job training, but could be provided as CSR in cooperation with educational institutions for the long term benefit of the workforce
- **Role of NGOs**

This could include effective contact to communities, awareness of job opportunities and channels for recruitment as well as monitoring impacts on behalf of the project.
- **Impacts of the environment on the project:** with specific reference to potential impact of venomous species at the project site.

6.2.2 Environmental and Social Impact Assessment Public Consultation

A public ESIA Consultation meeting took place on April 16, 2026, in Menya city. The meeting aimed to present the draft study, including preliminary consultation session results, project environmental impact assessment findings, proposed mitigation measures, and environmental and social management plans.

The following key issues and observations were discussed:

- Employment and job opportunities and capacity building.
- Workers accommodation and workers welfare
- Waste and wastewater management
- Transportation and traffic management
- Workers code of conduct and grievance mechanism
- Role of NGOs and women contribution in the project
- PV panel cleaning and maintenance

7. Analysis of Alternatives

The "no-project" alternative was excluded from consideration, as the proposed land would still be utilized for other renewable energy projects. Key alternatives considered include:

Site Location: The proposed project, located in a vacant desert land within West Nile Concession area that has been allocated by the Egyptian government to NREA for Renewable Energy Project and does not conflict with other land uses. Therefore, alternative site options were not considered, making the selected site suitable for the project.

PV Panel Types: Different PV panel technologies, including monocrystalline and thin film, were assessed. High-efficiency mono-crystalline silicon panels were selected for their optimal balance of performance, cost-effectiveness, and environmental considerations.

Tracking Systems: The investigation of tracking systems for maximizing solar energy capture led to the selection of an active single-axis solar tracking system for the project. This choice was made because it is generally less expensive than the dual-tracking system and requires less maintenance due to having fewer moving parts.

Module Cleaning: Various module cleaning methods, including manual cleaning and automated systems, were evaluated. The selected option for PV Module Cleaning is the automatic robotic dry- cleaning system, as it is more reliable than labour based cleaning and saves scarce water in a desert environment.

BESS Alternatives: Different BESS technologies, such as lithium-ion and flow batteries, were considered. Lithium nickel manganese cobalt oxide (NMC) or lithium iron phosphate (LFP) were selected for their high energy density, efficiency, and proven track record in utility-scale applications.

Selection criteria for suppliers of these components will clearly include supply chain and human rights considerations to avoid potential exposure to forced or child labour.

Water Sources: Alternative water sources, including groundwater abstraction and water trucking from the nearest water plant, were investigated. Ultimately, the project will utilize water trucking for its water needs will also be considered.

Wastewater Management alternatives during construction including on-site wastewater treatment and use of grey water and off-site wastewater disposal were investigated. The project will use off-site wastewater disposal in authorized wastewater treatment plants and on-site utilization of grey water for dust suppression.

Alternatives for worker accommodation

Options considered for workers accommodation included on-site camp or accommodation in closest settlements, which are smaller villages, or in larger towns which are more distant from the site. These were compared according to multiple criteria including capital investment, transportation, provisions and social impacts on local communities.

Based on this comparison, a mix between onsite camps and off site in larger urban centers is selected. The option of accommodation in smaller villages was rejected to avoid related social impacts.

8. Summary of Impacts and Mitigation Measures

Impact assessment is the assignment of **SIGNIFICANCE** to each impact considering the **MAGNITUDE** of an **ASPECT** in combination with the importance of the **RECEPTOR** exposed to this aspect through a defined **PATH**.

Aspect Magnitude is determined according to the following criteria:

- The temporal scale or duration of the aspect.
- The spatial scale or geographic extent of the aspect.
- The intensity scale of the aspect.

Receptor Importance is determined based its sensitivity, vulnerability and value

The following table combines the aspect magnitude with the importance of the receptor

Magnitude of impact	Importance of Receptor		
	Low	Medium	High
Negligible	Insignificant	Insignificant	Insignificant
Small	Insignificant	Minor	Moderate
Medium	Minor	Moderate	Major
Large	Moderate	Major	Extreme

Table 5: Summary of the Project Impacts and Mitigation Measures for the Construction Phase

Impacts/Risks		Without Mitigation					Level of Residual Impacts after Mitigation	
		Temporal scale	Spatial Scale	Intensity Scale	Magnitude	Sensitivity / Value of Resource / Receptor	Level of Impact before Mitigation	
Construction Phase (00 months)								
Air Quality		Short term	Localized	Moderate	MEDIUM	Low	MINOR	INSIGNIFICANT
Ambient Noise		Short term	Localized	Moderate	MEDIUM	Low	MINOR	INSIGNIFICANT
Soil		Short term	Localized	Moderate	SMALL	Medium	MINOR	INSIGNIFICANT
Biological Environment	Habitat loss, modification, and fragmentation	Permanent	Study area	Moderate	MEDIUM	Low	MINOR	INSIGNIFICANT
	Disturbance to wildlife	Short term	Study area	Moderate	MEDIUM	Medium	MODERATE	MINOR
	Attraction of pests and propagation of invasive species	Short term	Study area	Slight	SMALL	Low	INSIGNIFICANT	INSIGNIFICANT
Social Environment	Impact on community Water resources	Short term	Regional	Slight	MEDIUM	Medium	INSIGNIFICANT	INSIGNIFICANT
	Worker Influx	Short term	District	Slight	SMALL	Medium	MINOR	INSIGNIFICANT
	Site Security	Short term	Localized	Slight	SMALL	Medium	MINOR	INSIGNIFICANT
	Land use	Short term	Localized	High	MEDIUM	Low	MINOR	INSIGNIFICANT
	Cultural heritage	Short term	Localized	Moderate	SMALL	Medium	MINOR	INSIGNIFICANT
Infrastructure	Traffic	Short term	Regional	Moderate	MEDIUM	Medium	MODERATE	MINOR
Occupational Health and Safety		Short term	Localized	Moderate	MEDIUM	Medium	MODERATE	MINOR

Impacts/Risks		Without Mitigation					Level of Residual Impacts after Mitigation	
		Temporal scale	Spatial Scale	Severity	Magnitude	Sensitivity / Value of Resource / Receptor		Level of Impact Before Mitigation
Operation Phase								
Air Quality		<u>Long-term</u>	localized	Slight	MEDIUM	Low	MINOR	INSIGNIFICANT
Ambient Noise and Vibration		<u>Long-term</u>	localized	Slight	SMALL	Medium-Low	MINOR-INSIGNIFICANT	INSIGNIFICANT
Biological Environment	Disturbance to wildlife (excluding avifauna)	<u>Long-term</u>	Study area	Slight	MEDIUM	Low	MINOR	INSIGNIFICANT
	Risks & Impacts on Avifauna	<u>Long-term</u>	Study area	Slight	MEDIUM	Medium	MODERATE	MINOR
	Electrocution Risks	<u>Long-term</u>	Study area	Moderate	MEDIUM	Medium	MODERATE	MINOR- INSIGNIFICANT
Social Environment	Water resource	<u>Long-term</u>	localized	Slight	SMALL	Medium	MINOR	NO RESIDUAL IMPACT
	Waste generation	<u>Long-term</u>	localized	Slight	SMALL	Low	INSIGNIFICANT	INSIGNIFICANT
	Site Security	<u>Long-term</u>	localized	Slight	SMALL	Low	INSIGNIFICANT	INSIGNIFICANT
Occupational Health and Safety		<u>Long-term</u>	localized	Slight	SMALL	Medium	MINOR	INSIGNIFICANT
Glare		<u>Long Term</u>	Localized	Slight	SMALL	Low	INSIGNIFICANT	INSIGNIFICANT

9. Environmental and Social Management Plan (ESMP)

The project will develop and implement an Environmental and Social Management Plan (ESMP) outlining specific mitigation and monitoring measures to ensure compliance with all applicable legal and institutional requirements, as well as EBRD Performance Requirements. The ESMP encompasses the following key components:

- Summary of Impacts and Mitigation Measures
- Health, Safety and Environment (HSE) Plan
- Transportation Management Plan
- Noise Management plan
- Hazardous and Non-hazardous Waste Management Plan
- Water and Wastewater Management
- Chance Find Procedure
- Preventive and Corrective Maintenance
- Wastewater Management Plan
- Biodiversity Management Plan
- Housekeeping and Cleanliness
- Social Management Plan including SEAH and GBV Management Plan
- Institutional Arrangements: Defined roles and responsibilities for implementing the ESMP, involving the project proponent, contractors, and relevant government agencies to ensure accountability and effective coordination among stakeholders.
- Capacity Building: Provisions for training and capacity building for project staff and contractors on best practices in environmental and social management, enhancing their ability to effectively implement the ESMP.

Environmental and Social Monitoring Plan

Ensuring compliance with regulatory standards and the effectiveness of mitigation measures through regular checks of air quality and noise levels in workplace. Also, the project will regularly monitor community satisfaction, local needs (healthcare, water, etc.), understanding of the grievance mechanism, and unresolved grievances.