NOOR Laayoune 80 MW Photovoltaic Power Project and 225kV Power Line

Laayoune Province

Specific Environmental and Social Impact Assessment Vol1:

Non-technical Summary

Prepared for:

ACWA Power

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1	Financial Capital
2	Social Capital
3	Natural Capital
4	Manufactured Capital
5	Human Capital

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LIST OF ABBREVIATIONS

Abbreviation	Meaning
AC	Alternate Current
CO_2	Carbon Dioxide
DC	Direct Current
ESMP	Environmental and Social Management Plan
FESIA	Framework Environmental and Social Impact Assessment
IFC	International Finance Corporation
IUCN	International Union for conservation
MASEN	Moroccan Agency for Solar Energy
ONEE	Office National d'Electricité et de d'Eau Potable
O&M	Operation and Maintenance
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometers.
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5 micrometers.
PS	Performance Standards (on Environmental and Social Sustainability)
PV	Photovoltaic
SESIA	Specific Environmental and Social Impact Assessment
VOC	Volatile Organic Compounds
5 Capitals	5 Capitals Environmental and Management Consulting

1 INTRODUCTION

The Moroccan Agency for Solar Energy (MASEN) has declared ACWA Power as the preferred bidder to develop a 80 MW photovoltaic (PV) power project in Laayoune Province. The NOOR Laayoune project (the Project) also includes the construction of a 225kV power line (PL) to connect the proposed power plant to an existing power line. The construction of the access road to connect the PV site with the national road system will be the responsibility of MASEN.

ACWA Power has engaged an independent environmental and social consulting firm, 5 Capitals, to prepare two Specific Environmental and Social Impact Assessment (SESIA), one for the 80 MW photovoltaic facilities and one for the 225 kV power line. These SESIA reports have been prepared in accordance with national requirements, the World Bank/International Finance Corporation (IFC) Performance Standards (PS) on Environmental and Social Sustainability, the IFC Environmental, Health and Safety (EHS) Guidelines and the IFC EHS Guidelines for Electric Power Transmission and Distribution. In addition, the SESIAs have adopted the requirements established in the Framework Environmental and Social Impact Assessment (FESIA) prepared by MASEN for the PV project in May 2016.

The two SESIA reports have being prepared by 5 Capitals and Phenixa (a Moroccan environmental and social consultancy firm) in coordination with ACWA Power and MASEN. The SESIAs have identified the impacts on all the environmental and social aspects deemed significant for the PV facility, the power line, and the access road (henceforth the Project). The SESIA reports include a mitigation strategy for all impacts identified and an Environmental and Social Management Plan (ESMP) to ensure appropriate implementation and monitoring through construction, operation and decommissioning phases.

The 5 Capitals' team undertook a site visit in February 2016 together with MASEN and ACWA Power to evaluate the environmental and social conditions of the Project area and obtain a comprehensive understanding of the technical aspects of the Project.

This Non-Technical Summary summarises the key aspects of the two SESIA reports.

2 PROJECT LOCATION

2.1 Laayoune 80MW Photovoltaic Plant

The proposed PV project site occupies 240 hectares and is located 10 Km from the rural community of Edchera (or Decheira or Ad Dchira) in the province of Laayoune. The site is currently accessible by using the Route Provinciale1400, either from the N5 (~8 km) or the N1 road (~25.5 km), to Edchera and then taking an existing unpaved track (~10.6 km) to the proposed project site. The access road will be constructed along the existing unpaved track

and the connection from Edchera to the Route Provinciale 1400 will be upgraded. No bypass has been included in the design of the proposed access road and therefore all construction vehicles will drive through Edchera.

The proposed PV site and the access road to Edchera road are situated in an undeveloped desert area. There are no residential or industrial sites in or adjacent to the proposed Project site, as such it is a greenfield.

The proposed site has been selected for the following reasons:

- Abundant unoccupied land;
- No nearby sensitive receptors (communities, industries, agricultural land, etc.)
- Lack of biological features of significant concern;
- No economic or physical displacement required;
- Convenient topographic conditions;
- No surface water bodies in the project site or nearby;
- No areas or archaeological sensitivity;
- Availability of fresh water from the local desalination facility, and
- Significant solar radiation (2,100 to 2,250 kWh/m GHI).

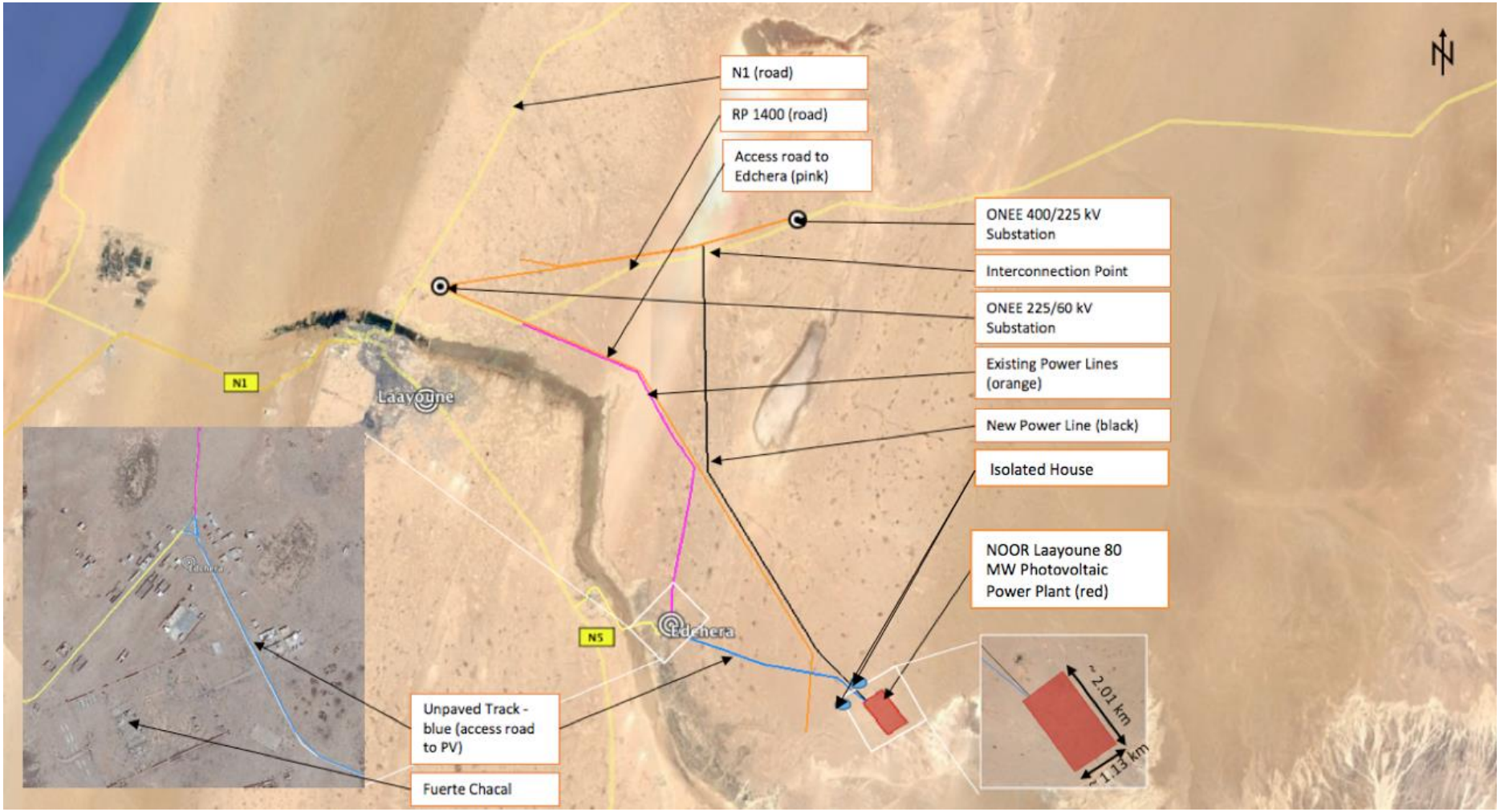
2.2 225 kV Power Line

The Project includes the construction of an overhead 225kV power line that will connect the proposed PV to an existing ONEE-owned power line (Interconnection Point) located ~ 24 km NW from the PV plant.

The PL corridor is located approximately 5km to the northeast of Edchera and 14 km to the east of Laayoune. The Interconnection Point is located 18 km of the city of Laayoune and 18 km from the village of Edchera

A detailed map of the area, the proposed Laayoune 80MW PV and the 225 kV power line is included below.

Figure 2-1. 10 Project location and Adjacent Area



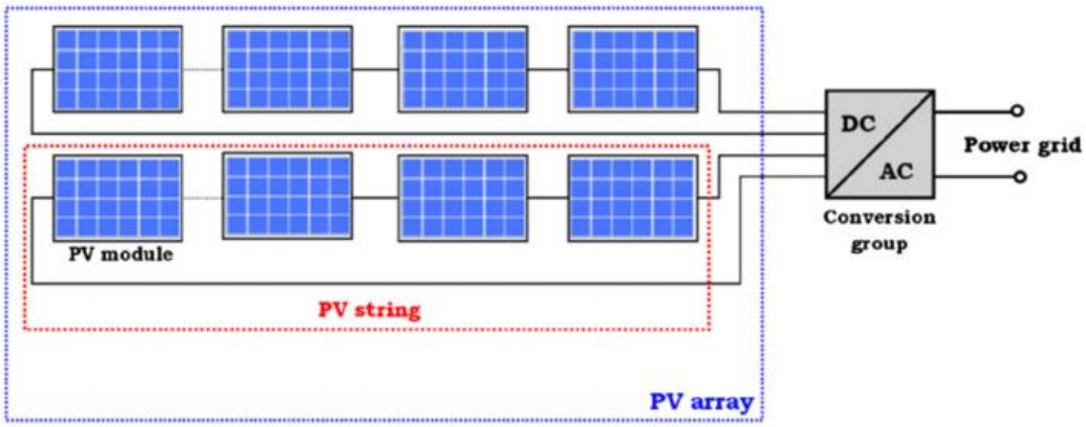
3 PROJECT DESCRIPTION

3.1 Laayoune 80MW Photovoltaic Plant

The PV Station has the capacity to generate 84.5 MW_p (65 MW_{AC}) of electricity without releasing harmful pollutants to the environment and avoiding the emission of 124,438.23 tonnes of CO_2 per year.

The PV array will occupy a total of 510,852 m^2 and consist on 264,080 modules distributed in 13,204 strings (see figure below). The PV Station will also comprise inverters to change direct current (DC), as electricity is produced by PV cells, to alternating current (AC), as the electricity generated will be transported through the power line.

Figure 3-1 General PV Assembly



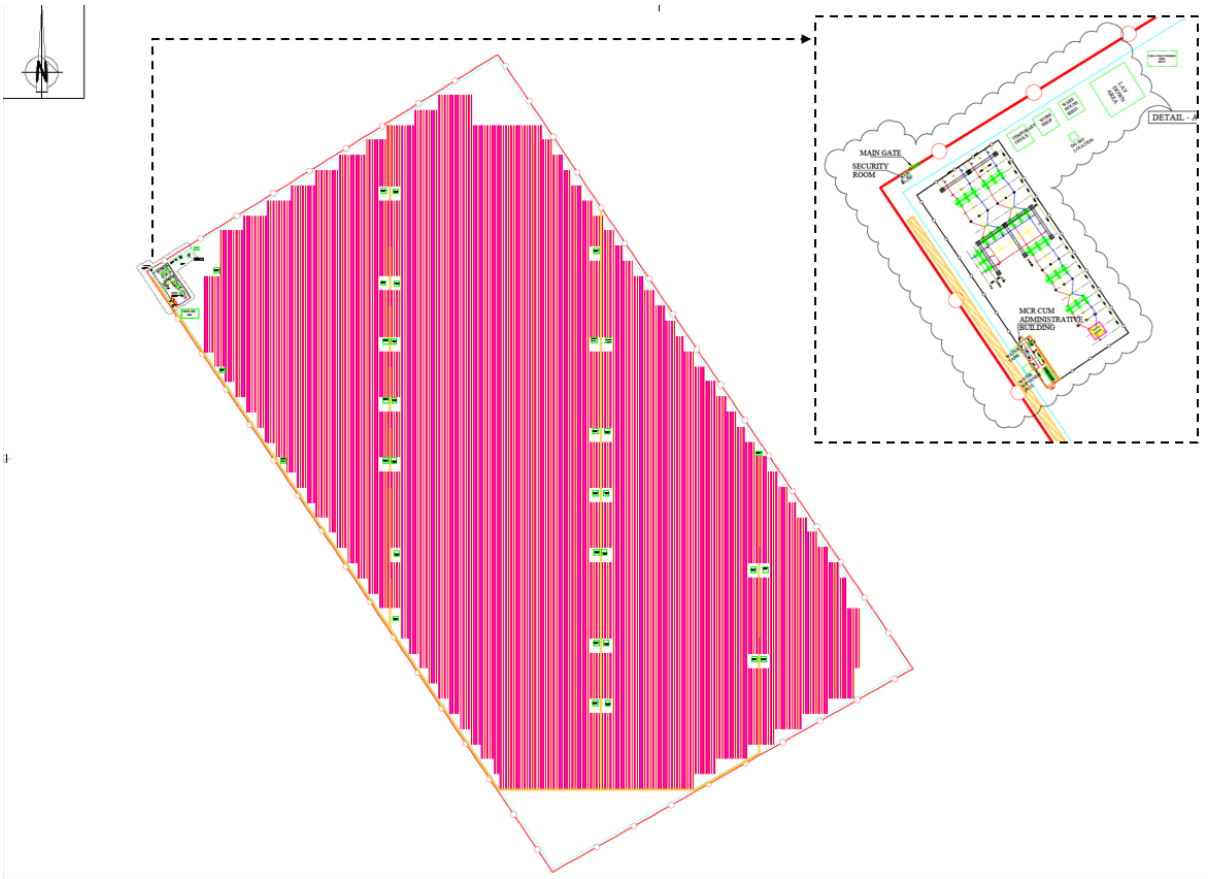
Photovoltaic power plants have a number of advantages in comparison to other solar power technologies, for example, they do not require hazardous fluids for heat transmission, nor any heat exchange system, or cooling requirements. In addition, they are low maintenance, require minimal water consumption, and provide higher efficiency and generation of electricity during periods of cloud.

The proposed project site will be connected with Edchera by a ~21 km access road to be constructed by MASEN.

The proposed site will be fenced and security personnel will be employed to prevent unauthorized access. The security arrangements and practices will be aligned with best international practices and human rights.

A detailed layout is provided below.

Figure 3-2 Laydown Area



3.2 225 kV Power Line

The Project includes the construction of an overhead power line with 225 kV capacity to connect the proposed PV facility to an existing power line owned by the Office National d'Electricité et de d'Eau Potable(ONEE). This power line will transmit the power generated in the PV facility to the national grid.

The table below details the main design features of the power line.

Table 3-1 PL Design

Design Elements		Description
General	Distance	~ 25.5 km
	Type	Over ground
	Capacity	225 kV
Poles	Total number	74
	Types (e.g. suspension tower, deviation tower, termination tower)	18 Guyed Delta Transmission Towers 56 Suspension Transmission Towers (See Figures below)
	Anti-corrosion protection	Hot Dip Galvanized

Design Elements		Description
Wire Conductors	Number	2x3x570 mm²
	Material	Almelec
	Anti-corrosion protection	Hot Dip Galvanized

A detailed map of the area and the project is included in the Appendix 1.

The power line will be transferred to ONEE upon construction.

(*) Redundant power line paths are often provided so that power can be routed from a variety of routes and allow the evacuation of power in case of planned maintenance or system failure of the existing line.

3.3 Construction Program

It is understood that the construction phase for the PV facility is expected to last approximately twelve months from the notice to proceed, possibly during the beginning of 2017.

The following main series of works will be undertaken during the construction of the Project:

- Civil works ("cut and fill"). For the PV site, it is anticipated that the platform will be distributed in one level. The right-of-way corridor for the power line will not require significant preparation.
- Infrastructure works (PV site): construction of the fence, internal road, drainage system, etc.
- Infrastructure works (power line): foundations, erection of poles and installation of wire conductors (i.e. stringing, tensioning, clipping, etc.), connection to interconnection point.
- Construction of PV site facilities, pipework, etc.
- Installation of PV panels, mounted on a single axis tracker system foundation, and other equipment (e.g. Reverse Osmosis Plant).
- PV connection to power line.

During this phase, temporary facilities and equipment will be installed within the proposed PV site boundaries and will be removed once the construction is finalised. These facilities and equipment include:

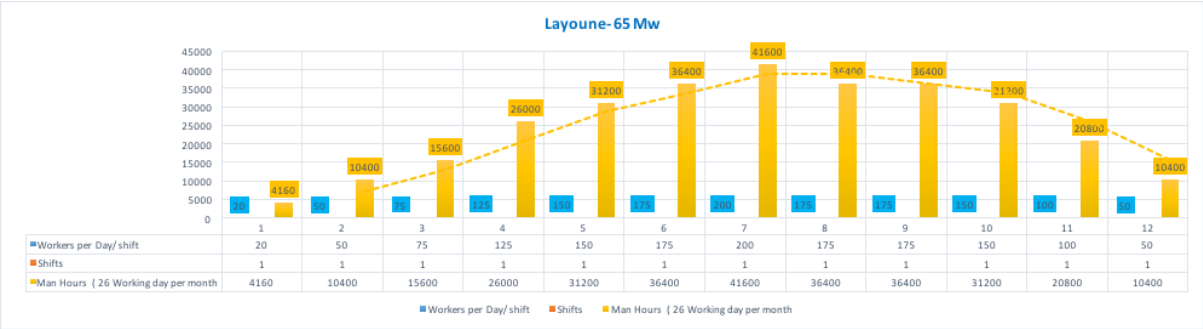
- Laydown area
- Material storage area
- Site offices and canteen
- Potable water storage

- Wastewater and solid waste storage
- Security office
- Workshops
- Generators
- Cranes, etc.

The power line is not expected to have a dedicated laydown area but will use the laydown area of the PV in the proposed project site.

The figure below includes the estimated total workforce and man hours per month during the construction phase of the photovoltaic power facility. The expected workforce for the power line and the access road are not available at this stage but will be significantly lower than the number of workers required for the PV facility.

Figure 3-3 Expected Construction Workforce



Foreign workers will likely be accommodated in the city of Laayoune or other adjacent cities.

The project is likely to result in local employment creation during both construction and operation and, subsequently, the dissemination of best practice construction skills into the local labour force. The local economy is likely to benefit from the use of local businesses and services.

3.4 Water consumption

It is estimated that during the construction phase of the power plant the amount of water required will be approximately 11,200 m^3, and 2,800 m^3 for the testing month (testing firefighting system, spray system and containers, and equipment cleaning, etc.). Water will be used for domestic purposes, dust suppression measures and typical construction requirements (e.g. cement mixing).

During operation, automated wet cleaning technology will be used to remove dust accumulated on the panels. This will demand around 0.6 to 1.2 l per panel, approximately 8,500 m^3/year (considerably less that the 14,000 m^3/year established in the bid

documentation). The PV will include a reverse osmosis water treatment plant for polishing of the stored water for use in the PV panel cleaning and ensure that water for panel cleaning complies with the specifications established by MASEN.

Water will be tankered to site from the ONEE-owned desalination plant located in Laayoune. The onsite water storage tank will have at least 50 m^3 capacity.

4 Land Acquisition

The land acquisition procedure is not within the scope of ACWA Power as MASEN is the owner of the land and will lease the plot allocated for the proposed project.

MASEN procured 1,575 ha of land through a voluntary buyer-seller agreement between the Moroccan State and MASEN. The cost of the transaction was agreed on 10,000 Moroccan Dirhams per ha.

No economic or physical displacement will be required as no economic or residential activity is undertaken in the parcel of land or adjacent areas.

The NOOR Laayoune project will occupy 240 ha of land that the Project Company (entity created for the construction and operation of the power plant) will lease from MASEN during the 25-year period.

5 Summary of Environmental and Social Conditions, Impacts and Management Measures

The two SESIA reports have considered all environmental and social issues relating to the construction and operation works associated with the project. In response, a range of specific mitigation measures have been set out to prevent, reduce or remediate the potential impacts. The SESIA reports include a management and monitoring plan to ensure that the mitigation measures are fully applied and that the results are in line with the expected outcome. The decommissioning phase has been discussed in general terms since the ownership of the plant will be handed over to MASEN at the end of the 25-year period and the power line to ONEE after construction.

5.1 Air quality

5.1.1 Power Plant

The proposed NOOR Laayoune Plant will be built in a remote desert area where no heavy industries or other sources of air pollution are found. The closest non-point emission sources are the vehicles travelling on the unpaved track road connecting the site with Edchera.

Ambient air quality monitoring was undertaken on November 11th for 24 hours at the centre of the PV and at the village of Edchera site using a continuous high volume mass sampler. The monitoring values observed for coarse dust particles and fine dust particles show that the ambient air quality conditions are well within the national and international ambient air quality standards, and considered good.

Throughout the construction phase, the ambient air quality may potentially be affected by increased dust, particularly during earthworks, and by emissions from construction vehicles/plant. However, dust will be the main pollutant as exhaust gases from construction vehicles are not expected to cause a significant impact due to the scale and type of facility, duration of construction and the volume of the materials that will need to be mobilised.

The SESIA report has identified the sensitive receptors within 500 m of the proposed Project. Two isolated houses were identified less than 500m from the access road and the PV plant). Other sensitive receptors are the residents of Edchera, as they could potentially be impacted by construction vehicles using the access road that goes through the village, and site employees.

During the operational phase, there will be no impacts to the local airshed, and the project will prevent the generation of 124,438.23 tonnes of CO_2 greenhouse gases, helping to offset the effects of Global Warming. Only limited emissions from maintenance/cleaning vehicles are expected.

5.1.2 Power line

The proposed power line will be erected in an undeveloped desert area, parallel to an existing power line (the interconnection point) located adjacent to a small road. As a result, background air quality is considered good through the power line corridor.

The ambient air quality monitoring was undertaken at two locations along the corridor on November 11th for coarse and fine dust particles. The results showed that the ambient air quality conditions are well within the national and international ambient air quality standards, and considered good.

Impact expected during the construction phase of the power line are similar to those described for the power plant. Sensitive receptors identified within 500 m to the proposed corridor include one isolated house and construction workers.

During construction, the ambient air quality at the project site may potentially be affected by increased dust, mainly due to movement of vehicles and tracks on unpaved surfaces.

At the operational phase impacts to the air will be neutral. Only very limited emissions from maintenance vehicles could be expected.

5.1.3 Mitigation

Measures to prevent increased dust (e.g. cover powdery material during transport and stockpile, or dust suppression) and exhaust fumes (e.g. equipment and vehicle maintenance and efficient management of deliveries) have been included in the SESIA. Unintended emissions (releases of volatile compounds –e.g. fuel) have also being considered and preventive measures on storage have been listed.

A summary of the main mitigation measures and monitoring activities is presented in Chapter 8 and Chapter 9 respectively. .

5.2 Noise and Vibration

5.2.1 Power Plant

The proposed NOOR Laayoune Plant will be located in an isolated desert area, with no residential centres near to the project site. There is an isolated house in close proximity to the PV site (~ 600 m) and the access road goes through the village of Edchera.

In order to establish a benchmark of the noise conditions, an environmental noise survey was undertaken in the day and night time on November 11th at two location (PV site and village of Edchera). Average noise levels generally were slightly above the maximum allowable standards for residential areas during both day and night time. Noise levels reflected the wind conditions at the sampling locations (10-11 m/s).

A basic assessment of the likely construction noise levels to be experienced within the boundaries of the construction site has been included in the SESIA report in regard to the expected construction plant/machinery to be used. Due to the impact of distance on propagation, the construction activities are unlikely to affect ambient noise levels beyond the neighbouring area, including the isolated houses. Construction and operational vehicles will use the access road to the project site, which goes through the village of Edchera, and is located 550 m from one of the identified isolated houses. Increased heavy and light traffic is likely to result in increased noise levels.

For the operational phase, noise modelling has been undertaken. The modelling results predict that noise levels will be insignificant at the project boundary of the proposed site and therefore, the closest residents or even people walking nearby will not notice the operation of the PV plant.

5.2.2 Power line

The proposed power line will be erected across an undeveloped desert area to the interconnection point, located adjacent to a small road. Therefore, no significant sources of

noise attributable to traffic or other activities were identified during site visit. There are two isolated houses located 420 m and 990 m from the PL corridor.

The noise survey was undertaken in the day and night time on November 11th at two location of the PL corridor. Average noise levels generally were generally at the maximum limit for residential environments, but well within the guidelines for commercial/Industrial.

During the construction of the power line, noise and vibration will be generated principally as a result of the preparation of foundations and erection of poles. Construction vehicles will use the access road available to the project site, which goes through the village of Edchera. Increased heavy and light traffic is likely to result in increased noise levels.

Works undertaken at the interconnection point will not generate significant noise/vibration levels and will be undertaken only once during the entire construction schedule.

5.2.3 Mitigation

Mitigation measures including time restrictions of noisy activities, noise attenuation barriers for specific equipment, appropriate equipment maintenance and protective equipment for workers have been included in the SESIA reports.

A summary of the main mitigation measures and monitoring activities is presented in Chapter 8 and Chapter 9 respectively. .

5.3 Soil and Groundwater

5.3.1 Power Plant

The relatively undisturbed and undeveloped nature of the proposed site signifies that the potential for existing contamination to the soil is unlikely. There is a small wadi located ~ 2.8 km southeast from the site. Groundwater table at the project area is approximately 200 m deep.

As part of the establishment of the baseline soil conditions at the proposed site, 5 Capitals undertook a soil sampling and analysis campaign. The sampling comprised of the collection of the topsoil layer (at 0.1-0.2m depth) collected from the proposed project site, which was then analysed for heavy metals. Based on the analytical information, historical land use and site observations, it can be concluded that the soils on site are not contaminated by heavy metals. No evidence of other types of contamination was identified during the site studies.

Soil and groundwater will be susceptible to contamination from various sources during the construction and operational phases of the project. The main sources of contamination are typically the handling, transport and storage of hazardous material and the potential threat

of releases and spills into the ground. The only hazardous materials onsite will be limited amounts of fuel and oil/lubricants, domestic wastewater and municipal waste. Given the small amounts of hazardous materials required, the risk to soil and groundwater contamination during construction and operation is low.

Earthworks and changes in the drainage regime could lead to increased erosion.

5.3.2 Power line

The power line will be mostly constructed through undeveloped desert and soil contamination is unlikely. Part of the corridor is adjacent to an existing power line and roads/tracks.

5 Capitals undertook a limited soil sampling and analysis campaign in November 2016. The sampling comprised of the collection of the topsoil layer (at 0.1-0.2m depth) collected at four different locations along the PL corridor, which was then analysed for heavy metals. The results revealed that heavy metal concentrations are within international values (Dutch Standards).

During the construction of the power line soil will be susceptible to contamination from sources related to construction vehicles and equipment handling. It is planned that all construction equipment will be stored in the laydown area proposed within the power plant site. Given the small amount of hazardous materials required, and that the laydown areas will be localised at the power plant, the potential risk to ground contamination is low.

Only minor earthworks will be required in the corridor of the proposed power line, and therefore changes in the natural drainage are not expected.

At the operational phase, no impacts to soil are expected from maintenance vehicles and activities.

5.3.3 Mitigation

The SESIA reports include measures to ensure suitable storage areas and containers for hazardous material and soils and liquid waste, as well as collection by licensed operators and auditing and control measures.

A summary of the main mitigation measures and monitoring activities is presented in Chapter 8 and Chapter 9 respectively.

5.4 Ecology and Biodiversity

An Ecological Assessment has been conducted by undertaking a combination of desk studies and field surveys to assess the ecological sensitivities of the PV and associated PL areas.

The proposed PV and associated PL are not located within any national or international protected areas. The nearest international Designated Area (an Important Bird Area IBA) is located approximately 28km of the proposed Project site: Zone Humide de Layounne (MA043). The site is chiefly important as a stopover area for migrating waders and waterfowl.

A total of five habitats were identified in the study area of the PV and associated PL. The identified habitats included: (i) Rocky Plateau, (ii) Depressions, (iii) Graras, (iv) Krebs and (v) Base Regs. Only two of these habitats are located within the proposed PV site: (i) Rocky Plateau and (ii) Depressions. The observed flora included two Moroccan and Mauritanian endemic species within the proposed footprint of the PV and four endemic/rare species within the PL buffer area. The observed fauna included an endemic species of reptile in Morocco and a Globally Threatened species of reptile.

5.4.1 Power Plant

During the construction of the proposed PV Project, the removal of vegetation cover, earthworks and the establishment of laydown areas will remove the flora onsite. Vegetation clearance and earthworks may result in the destruction of burrows and nests, should any be present onsite. Further impacts on fauna include potential direct mortality of small fauna due to vehicle movements, open trenches and illegal hunting or poaching.

During the operational phase, some species of birds may collide with the PV panels. The proposed site is not located on a main migratory flyway path; however, some wader migratory species have been identified using the proposed area as an occasional flyway during migration. These species are not of international conservation concern (IUCN, 2016).

5.4.2 Power Line

High voltage power lines may generate impacts on biodiversity in the form of direct mortality of avifauna by collision due to the low visibility of conductor cables and the neutral cable. Because of their long suspended insulators the risk of electrocution on high-voltage power lines is low.

5.4.3 Mitigation

Based on the vulnerable species and the identified threats, the SESIA reports have proposed measures to avoid impacts on the existing biodiversity. This included design measures to

avoid bird mortality associated with electrocution or collision with PLs, measures to avoid or compensate for impacts on terrestrial fauna and flora species (i.e. translocation of fauna and planting of endemic flora species, etc.).

A summary of the main mitigation measures and monitoring activities is presented in Chapter 8 and Chapter 9 respectively.

5.5 Hazardous and Non-Hazardous Materials and Waste Management

Non-Hazardous Waste and Materials

Typically, the type of non-hazardous and hazardous waste and materials generated during the construction of a power line and a power plant are similar and so management is. And therefore, these will be described jointly.

The main types of waste generated during the construction of the power line and the power plant would be inert (sand, gravel, glass, plastic, cables, metals, packaging materials, etc.) and domestic waste from workers during both construction and operation.

The total amount of waste will be small and does not pose a significant threat to human health or the environment. However, proper management is required in order to reduce associated impacts such as resource use and habitat destruction.

Minor amounts of hazardous materials (including waste) will be generated and stored in the shared laydown area for the power plant and the power line. The only hazardous materials during construction will be diesel, lubricants, batteries, used drums, and clean-up materials.

During the operation phase of the power plant, only miscellaneous hazardous materials (e.g. batteries) and clean-up materials will be stored onsite. Small amounts of hazardous materials (e.g. insulating oil) will only be contained inside electrical components. Pesticides will not be stored onsite.

Examples of likely hazardous materials/waste streams that may be used/produced during the operation of the Project include chemical, soil contaminated from spills, miscellaneous wastes, and general clean-up materials.

5.5.1 Mitigation

The mitigation measures related to hazardous materials waste and non-hazardous waste management in the SESIA reports has considered minimization, appropriate storage, segregation, reuse and recycling, and collection by licensed operators. Storage of waste outside the project site will not be permitted.

In addition, the SESIA reports include mitigation measures to help reduce the impact of those issues associated to non-hazardous and hazardous waste and hazardous materials such as appropriate handling and storage (impermeable bunds, roofed, etc.), proper transport, regular inspections, audits, monitoring and training.

A summary of the main mitigation measures and monitoring activities is presented in Chapter 8 and Chapter 9 respectively.

5.6 Water and Wastewater Management

5.6.1 Power Plant

The construction and operation of the power plant will result in the generation of domestic wastewater from canteens and lavatories. Domestic wastewater will be stored in septic tanks during construction and operation site. Septic tanks will be emptied by an external operator for offsite treatment and disposal.

Additionally, during the operational phase, a Reverse Osmosis plant will be used to polish the water received from the local desalination plant, so that it is of suitable quality for use in the washing of the PV panels. The wastewater generated from the polishing process will only contain few trace minerals and suspended solids, resulting from the polishing of potable water. This wastewater stream will be stored in a dedicated store tank that will be collected by licensed operators.

Other wastewater streams have been avoided by prohibiting the maintenance of vehicles on the project site or in the corridor, and providing rain shelters in the shared laydown area where the hazardous storage or equipment maintenance areas area located.

The earthworks on site will disturb natural drainage patterns, potentially increasing erosion on site. The changes in the soil characteristics and increased earthworks activity may result with increased siltation in the storm water, however, given the construction activities will be temporary and most soils will be compacted, the risk for increased siltation will be temporary and of low magnitude.

The O&M will focus on implementing the most environmentally and cost effective cleaning solution and manual cleaning with soft sponges and squeegees will be considered as an option to reduce the water consumption over the operational phase.

5.6.2 Power Line

During the construction phase of the power line, chemical toilets are likely to be installed at appropriate locations through the power line corridor and/or in the shared laydown area

during the construction phase. Chemical toilets will be collected by an external operator for offsite treatment and disposal.

Canteens and other facilities that will generate domestic wastewater will be located in the shared laydown area, which will be collected by an external operator for offsite treatment and disposal.

Given the flat topography of the area, the construction of the power line will not require major earthworks and therefore, changes in the natural drainage are not expected.

5.6.3 Mitigation

The SESIA include the necessary measures to ensure appropriate storage (septic tank with secondary containment), collection (licenced operator) and transfer to avoid leaks and spills of domestic liquid waste to avoid ground contamination.

The drainage system of the proposed power plant site has been designed to avoid entering areas where hazardous materials are stored or transferred and the SESIA reports have incorporated specific mitigation measures to avoid, or minimise erosion.

A summary of the main mitigation measures and monitoring activities is presented in Chapter 8 and Chapter 9 respectively. .

5.7 Traffic and Transportation

5.7.1 Power Plant

The main traffic impacts during the construction and, at a lower magnitude, during the operation phase, will be the transport of equipment and staff to the site. The relative contribution from the increase in traffic movements on the N1 and N5 is considered minor given the existing low traffic movements and the capacity of the road. The increased in traffic levels could potentially lead to road safety issues. MASEN will build a ~11 km access road to connect the PV site with Edchera and will upgrade the existing road that connects Edchera with the RP1400 to ensure that access to site is done through an adequate road access.

Workers are likely to be accommodated in Laayoune. Transport services will therefore need to be included as part of the daily construction activities.

5.7.2 Power Line

The main traffic impacts during the construction phase will be the transport of heavy and large structures and the use of cranes to offload and erect poles. Special transportation is likely to be required.

Other traffic impacts during the construction phase will be the disturbance to road users and residents as a result of heavy trucks, truck-mounted cranes and construction workers, and dust generated from typical power line construction activities and vehicles movement. Disturbance and increased levels of dust can lead to road safety issues. Transport of equipment and staff to the site and offload and erection of heavy structures are also a major threat for road safety issues.

5.7.3 Mitigation

Mitigation measures have been established in the SESIA for both internal roads (Complex and Project) and national road systems.

A summary of the main mitigation measures and monitoring activities is presented in Chapter 8 and Chapter 9 respectively.

5.8 Archaeology and Heritage

No archaeological resources were identified in the power plant project site and adjacent areas, and power line corridor. As such, it is considered unlikely that potential impacts of cultural or archaeological value will occur during the construction phase.

The nearest archaeological site, Fuerte Chacal, is located 10 km from the PV and 100 m from the proposed access road. It consists on quadrangular enclosure surrounded by adobe walls, which is currently partially demolished, and in ruins. Fuerte Chacal was a Sahrawi medieval fortress converted into military area between 1961 and 1964 by the Spanish Army.

5.8.1 Mitigation

The SESIA reports have included the necessary measures to avoid impact on archaeological heritage if deemed necessary during construction. Additionally, the SESIA reports require a protocol for an archaeological watching brief to be implemented in case a chance find occurs, which will detail the required procedures to protect, report and preserve any archaeological finds.

A summary of the main mitigation measures and monitoring activities is presented in Chapter 8 and Chapter 9 respectively.

5.9 Landscape and Visual Impact

5.9.1 Power Plant

The PV plant does not require any tower facility and as such, will not be visible from the city of Laayoune, from Edchera or from the N5 road. During the operation of the proposed PV plant, glint and glare effects are unlikely to be noticeable.

5.9.2 Power Line

Most of the power line will be co-located with existing power line and therefore, the new power line will not change the landscape character of the area.

5.9.3 Mitigation

The SESIA reports include measures to ensure that pollution from flood lights is reduced by setting a number of conditions applicable to the lighting system (e.g. previsions, position, angles, etc.) to avoid reflected glare and disturbance to drivers and fauna.

A summary of the main mitigation measures and monitoring activities is presented in Chapter 8 and Chapter 9 respectively.

5.10 Electric and Magnetic Fields

Power lines generate electric and magnetic fields when electricity is being transmitted. The strength of the electromagnetic field at ground level varies in accordance with the design characteristics of the power line and the distance of the latest from the ground. There are no sensitive receptors within the potential impact corridor of electromagnetic field.

Taking into consideration the low voltage transmitted by the 225 kV PL, the low EMF field levels emitted, the dissipation of EMF over distance, and the absence of any sensitive receptors within the potential impact corridor, the significance of negative impacts are considered negligible.

5.11 Socio - Economic

The type of positive and potential negative socioeconomic impacts resulting from the development of the are considered similar to the ones generated by the construction of the associated PL and therefore these two are described jointly.

The Project (including PV and PL) will result in positive socioeconomic impacts, mostly associated to local employment creation, which will range from 50 to 200 workers at the peak of construction. As well as the direct monetary uplift to the families of those employed,

salaries to local workers will also stimulate the local economy. Local employment will also promote dissemination of skills into the local labour force.

It is likely that the project construction also require a proportion of work on the site to be undertaken by immigrant population. Potential negative socioeconomic impacts resulting from the development of the proposed projects (PV and PL) include conflicts between workers, community members or onsite security staff and transmission of communicable diseases as a result of the influx of workers.

Socioeconomic negative and positive impacts are expected to have a lower magnitude during the operational phase.

5.11.1 Mitigation

This SESIA include measures to ensure that the security staff are trained in line with the UN Voluntary Principles on Security and Human Rights and all staff onsite is trained to avoid the spread of diseases. This SESIA also include measures to maximise local employment, positive impacts on the local economy, prevent child and forced labour, exploitation, excessive overtime, insufficient wages, harassment at the workplace, and unsafe/unhygienic living and working conditions.

The main mitigation measures and monitoring activities is presented in Chapter 8 and Chapter 9 respectively.

6 STAKEHOLDER ENGAGEMENT PLAN

A Stakeholder Engagement Plan (SEP) has been prepared to ensure efficient and transparent public participation during the lifecycle of the Project.

6.1 Public Consultation

A public consultation was carried out on November 30th 2016. The stakeholders present at the meeting consisted of population, the Provincial technical departments the elected Communal councillors, Non- Governmental Organisations and Government bodies.

The following is a summary of the perspectives and concerns of the stakeholders: Protection and sustainable use of freshwater resources, Water consumption, Employment and training opportunities for the local population, Renovation of health and education centres in the town of Dhira, and Communications and grievance mechanisms.

A summary description of each question raised during the meeting is provided in Volume 2 of the SESIA, the detailed Minutes of this public consultation and the detailed SEP are included in SESIA Vol.

6.2 Grievance Mechanism

A Grievance Mechanism, described in the SEP, will be implemented by APO, to address stakeholder concerns during the Projects lifecycle.

7 Environmental and Social Management Plan

The requirements for the Environmental and Social Management Plan for construction and operation are presented in Volume 3 of the SESIA. The ESMP serves as a basis for the preparation of comprehensive management plans in order to avoid, prevent, reduce or rectify environmental and social impacts that may arise during both construction and operation.

For construction the ESMP is termed Construction Environmental and Social Management Plan (CESMP) and for Operation it is termed Operation Environmental and Social Management Plan (OESMP). The EPC Constructor is responsible for the preparation and implementation of the CESMP and the O&M contractor for the preparation and implementation of the OESMP.

Issues covered within each framework include: environmental and social management staff roles and responsibilities, environmental and social requirements and compliance, environmental training and social awareness programmes, and monitoring, recording, inspection and auditing protocol.

8 Environmental Impacts, Mitigation Measures - Summary Tables

The following tables provide a summary of the identified environmental impacts, their significance, the main mitigation measures proposed, and the responsibilities for the implementation of the mitigation measures. This table only outlines what are considered to be the main mitigation measures.

A full description of the main mitigation measures for the NOOR IV Laayoune PV Plant and PL is provided on the SESIA Volume 2 (Main text) and SESIA Vol. 3 (ESMP) of the respective Project.

8.1 Construction Phase - Laayoune 80MW Photovoltaic Power Plant

This section outlines the mitigation measures for the potential environmental and social impacts of the power plant during the construction phase identified through the SESIA process (SESIA Vol2).

8.1.1 Air Quality

Table 8-1 Air quality mitigation measures – construction phase

Issue	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Dust Generation due to site preparation, site activities and vehicles	Negligible to Moderate	Site preparation and, levelling will be undertaken during periods of low winds (<15 km/h).	EPC	As soon as the works start and throughout construction period.	Negligible to Minor
		Material stockpiles of dusty materials higher than 5 metres will be avoided where possible, with dust suppression sprays being utilised on any piles during periods where the wind speed exceeds 15km/h. Alternatively, stockpiles of dusty materials can be covered.	EPC	As soon as the works start and throughout construction period.	
		Adding to stockpiles of dusty materials will be stopped when high winds are present (15 km/h).	EPC	As soon as the works start and throughout construction period.	
		Dusty material stockpiles will be located only onsite and away from the site boundaries.	EPC	As soon as the works start and throughout construction period.	
		Where sand and other dusty materials are transported to the site, trucks will not be overloaded and will be appropriately covered / sheeted to avoid loses en-route	EPC	As soon as the works start and throughout construction period.	
		Powdery materials (e.g. cements) will be stored and transported in sealed containers	EPC	As soon as the works start and throughout construction period.	
		No burning of wastes or other materials will be allowed on site through the construction phase	EPC	As soon as the works start and throughout	

Issue	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
				construction period.	
		Undertake daily visual assessment of dust levels and take actions (dust suppression) to reduce emissions, when they are identified as excessive.	EPC	As soon as the works start and throughout construction period.	
		Transport of uncovered dusty loads (materials and waste) is strictly forbidden	EPC	As soon as the works start and throughout construction period.	
Gaseous and Particulate Emissions from Vehicles	Minor to Moderate	Onsite/offsite speed limits are included in the Traffic and Road Safety Section of this SESIA. Besides road safety, these limits will contribute to reduce exhaust gases resulting from traffic movements.	EPC	As soon as the works start and throughout construction period.	Negligible to Minor
		Efficiently manage deliveries of equipment/plant to the site, to reduce the number of trips.	EPC	As soon as the works start and throughout construction period.	
		Minimise exhaust fumes and particulates emitted from trucks and vehicles by ensuring the use of vehicles in good condition. Vehicles entering the site for the first time will be inspected for their worthiness and where necessary will not be permitted to enter the site.	EPC	As soon as the works start and throughout construction period.	
VOCs and other Fugitive Emissions	Negligible to Moderate	Hazardous materials stored and used on site with potential gas emissions (e.g. Volatile Organic Compounds) will be located in well-ventilated, secure low-risk areas.	EPC	As soon as the works start and throughout construction period.	Negligible to Minor
		Fires and material burning is prohibited on the Project site.	EPC	As soon as the works start and throughout construction period.	
General	Moderate	Personal Protection Equipment will be provided to all	EPC	As soon as the works	Negligible

Issue	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		employees when necessary. Special attention will be given during site preparation and other activities likely to cause significant levels of dust.		start and throughout construction period.	to Minor

8.1.2 Noise and Vibration

Table 8-2 Noise and Vibration mitigation measures – construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Construction Noise and vibration	Moderate to Major	Diesel compression equipment or generators will be equipped with effective silencers when necessary	EPC	As soon as the works start and throughout construction period.	Minor
		Electrically powered equipment will be preferred, where practical, to mechanically powered alternatives. All mechanically powered equipment will also be fitted with suitable silencers when necessary.	EPC	As soon as the works start and throughout construction period. .	
		Where appropriate, noise barriers /attenuation to be employed (e.g. for generators) to ensure that the maximum noise level at 1 m distance from a single source will not exceed 85 dB(A).	EPC	As soon as the works start and throughout construction period.	
		Items of plant on site operating intermittently will be shut down in the intervening periods between uses.	EPC	As soon as the works start and throughout construction period.	
		Construction employees will, at all times, carry out all work in such a manner as to keep any disturbance from noise and vibration to a minimum.	EPC	As soon as the works start and throughout construction period.	
		Where noise levels exceed 85dB(A) for duration of more than 8 hours per day without hearing protection noise protection, devices shall be provided to personnel on-site. No unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C)	EPC	As soon as the works start and throughout construction period.	
Vehicle Noise	Moderate to Major	Vehicles will be equipped with effective silencers when necessary and switched off when are not in motion for more than 2 minutes	EPC	As soon as the works start and throughout construction period.	Minor

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		The movement of heavy vehicles through residential areas during the night will be minimised.	EPC	As soon as the works start and throughout construction period.	
		Deliveries of fuel and materials and removals of waste are to be undertaken during day hours, when possible.	EPC	As soon as the works start and throughout construction period.	
		All vehicles will be adequately maintained in order to minimise sound emissions	EPC	As soon as the works start and throughout construction period.	
		Onsite/offsite speed limits are included in the Traffic and Road Safety Section. Besides road safety, these limits will contribute to reduce noise levels resulting from traffic movements in the village of Edchera and in the isolated house.	-		

8.1.3 Soil and Groundwater Protection

Table 8-3 Soil mitigation measures – construction phase

Impact/ Source	Potential impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Spillage and leakage	Minor to Moderate	Chemicals, fuels, lubricants and paints will be stored in dedicated locations on impermeable surfaces to prevent leakage into the ground and contained inside a secondary bund (110% of largest container). Additional mitigation measures are included in the Non-hazardous Waste and Hazardous Materials section.	EPC	As soon as the works start and throughout construction period.	Negligible to Minor
		Permanent/temporary storage areas will be designed and located considering potential ground contamination risks. Runoff will be prevented from entering areas where hazardous materials are stored, handled or transferred. If runoff can enter potentially contaminated areas, a dedicated drainage system will direct the run off to dedicated tanks to avoid impacts to soils and groundwater. The fluids in these tanks will be collected by licensed operators and managed as Hazardous wastewater.	EPC	As soon as the works start and throughout construction period.	
		Hazardous materials storage areas will be positioned away from major transport corridors and construction activities, in order to avoid potential collisions from vehicles or other machinery.	EPC	As soon as the works start and throughout construction period.	
		All chemicals will be handled in accordance with relevant instructions (MSDS).	EPC	As soon as the works start and throughout construction period.	
		Reduce quantity of chemicals and fuels on site to minimum practicable levels.	EPC	As soon as the works start and throughout construction period.	
		Provide spill kits at all areas where hazardous liquids are stored.	EPC	As soon as the works start and throughout construction period.	

Impact/ Source	Potential impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Develop and implement an Emergency preparedness and Response Plan, to immediately remediate the affected area in the event of a spill or leakage of chemicals, fuels, paints, and any hazardous material.	EPC	As soon as the works start and throughout construction period.	
		Develop a Vehicle Maintenance Plan	EPC	Before the start of the construction works and throughout construction period.	
		Washing of equipment, machinery, and vehicles will not permitted on site and will only be carried out in adequate premises.	EPC	As soon as the works start and throughout construction period.	
		Vehicle maintenance will not be undertaken in the project site and will be carried out only in offsite permitted premises	EPC	As soon as the works start and throughout construction period.	
		If vehicles and machinery are too large to be moved off site, or if it is not practicable to move the machinery for regular maintenance during the construction phase, then measures to protect the soils from spills and leaks during the cleaning/maintenance activity must be implemented (impermeable hard standing area with dedicated drainage system).	EPC	As soon as the works start and throughout construction period.	
Cross contamination of soils	Minor	Implement good housekeeping practices during construction activities including procedure and requirements for proper handling, storage, and transport of hazardous chemicals and waste	EPC	As soon as the works start and throughout construction period.	Negligible
		If contaminated soil is observed during construction activity, the identified contaminated soil will be excavated separately, and stored onsite in accordance with environmentally adequate measures for waste management, to avoid cross-contamination. A licensed operator will collect the contaminated soil for disposal.	EPC	As soon as the works start and throughout construction period.	

Impact/ Source	Potential impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Construction Workers will attend training programmes, and safety induction sessions with regards to the transportation and handling of hazardous materials. Toolbox talks will also be held.	EPC	As soon as the works start and throughout construction period.	
Storage and waste management	Minor to Moderate	All hazardous construction waste and chemicals, such as fuel, will be stored in well-equipped, leak-tight enclosures where drums have drip trays to avoid spillage to the ground. The storage tanks of fuels or chemicals and septic tanks will be properly maintained and stored in bunded areas equivalent to 110% of the storage capacity.	EPC	As soon as the works start and throughout construction period.	Negligible to Minor
		Wherever possible, reduce the quantity of chemicals and fuel stored on site to minimum practical level. Infrequently used chemicals will be ordered just before they are needed.	EPC	As soon as the works start and throughout construction period.	
		All servicing, refuelling, stockpiles, waste disposal and storage areas will be located as far as possible from the run-off drainage system to reduce potential of pollution via spillage or windblown debris.	EPC	As soon as the works start and throughout construction period.	
		No hazardous material will be stockpiled.	EPC	As soon as the works start and throughout construction period.	
		Minimise the size and height of the stockpile as far as possible.	EPC	As soon as the works start and throughout construction period.	
Removal of natural site drainage / Soil erosion	Moderate	The storm water and drainage system will minimize and control surface run off and erosion. This will include the necessary sediment retaining systems.	EPC	As soon as the works start and throughout construction period.	Minor
		Minimise disturbed areas	EPC	As soon as the works start and throughout construction period.	
		Road gradient will be avoided or minimized (contour and slopes) in order reduce run-off induced erosion.	EPC	As soon as the works start and throughout construction period.	

Impact/ Source	Potential impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Excavated materials will be kept in the stockpile for as short a time as possible and, once an area is back-filled with soil material, compacted in a short time	EPC	As soon as the works start and throughout construction period.	
		Disturbed areas will be stabilized to minimise further erosion.	EPC	As soon as the works start and throughout construction period.	
		Runoff from the PV site will be free of excessive sediment and other constituents.	EPC	As soon as the works start and throughout construction period.	
Soil Compaction	Minor	Areas where visiting vehicles are allowed to circulate or park will be minimized and located only inside the project boundaries or access road.	EPC	As soon as the works start and throughout construction period.	Minor to Negligible

8.1.4 Biodiversity

Table 8-5 Biodiversity and conservation mitigation measures – construction phase

Impact	Mitigation	Responsibility	Schedule
Habitat Loss	The laydown areas of the site will be minimised in size wherever possible, and preferably located in areas with little or no vegetation, wherever possible. Post construction restoration may include sowing seed from local endemic species.	EPC	CESMP – Design, Management
	All temporary facilities and infrastructure for the construction phase will be located within the project site boundaries. The contractor will ensure that no encroachment to the nearby, adjacent land will occur.	EPC	CESMP – Design, Management
	Vehicles will keep to the designated routes in order to prevent unnecessary land encroachment.	EPC	CESMP – Design, Management
	Two endemic *species* were identified within the project footprint. These endemic	EPC	CESMP –

Impact	Mitigation	Responsibility	Schedule
	species will be selected for landscaping, where practical, at the end of construction phase, to mitigate site clearance. This can be undertaken by collection of seed within the Region for sowing on site If agreed by the relevant stakeholders, the project company will support efforts for habitat restoration in the region (project area or nearby protected areas).		Management
Poaching/ Hunting	Hunting, falconry and fauna/flora trade will be strictly forbidden on site. Warning signs will be placed around the site.	EPC	CESMP – Management and monitoring
Direct Mortality of Fauna	Speed limit will be imposed across the construction site in order to avoid direct mortality of fauna. Speed limits onsite are specified on the Traffic chapter.	EPC	CESMP – Management and monitoring
	Workers will be trained to report trapped herpetofauna or small mammals encountered inside any trenches. Trapped wildlife will be released on the natural areas outside the construction area. Photographs of captured / released fauna to be retained by HSE Manager for inspection during external audits.	EPC	CESMP – Management and monitoring
	Establish procedures for the occasion any species are found on the construction site including procedures for reporting, identification and potential relocation.	EPC	CESMP – Management and monitoring
	Transportation within, to and from the site will be minimised through efficient transport management in order to minimise the risk of running animals over.	EPC	CESMP –Planning
	Fires will be forbidden onsite.	EPC	CESMP – Management and monitoring
	Induction training will include content to raise awareness of fauna that may be	EPC	CESMP –

Impact	Mitigation	Responsibility	Schedule
	encountered, including reptiles and insects and protocols for alerting HSE Manager and avoiding harm to the fauna.		Management and monitoring
	In order to avoid destruction of nests / burrows, vegetation clearing will be scheduled before work begins.	EPC	CESMP – Management and monitoring
	Workers will be trained and sensitized on site so as not to kill or harm birds or nests if they are on site. These birds or nests will be identified and reported to the HSE manager and will be moved off site.	EPC	CESMP – Management and monitoring
	Reptile translocation will be implemented during site clearance. The objective of the program is to avoid the killing or harm of any reptiles living within the construction footprint of the project, and specifically the Helmethead Gecko. The translocation will be designed and overseen by an ecologist. Photographs of captured / released fauna will be retained by the HSE Manager for inspection during external audits.	EPC	CESMP – Management and monitoring
	Fencing design will minimise the permeability for fauna, where practical, as there is a direct mortality risk due to the operation of vehicles onsite during both construction and operations.	EPC	CESMP – Management and monitoring

8.1.5 Non-hazardous Waste and Hazardous Materials

Table 8-6 Non-hazardous Waste and Hazardous Materials mitigation measures – construction phase

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Solid waste volumes/quantities	Minor	Prepare a site-specific Waste Management Plan (WMP) including hazardous and non-hazardous waste. The plan will include training of staff.	EPC	Before the start of the construction works and throughout construction period.	Negligible
		Waste masonry will be re-used in the internal road construction and base fillings. Reasonable levels of utilization would be 60 to 80%.	EPC	As soon as the works start and throughout construction period.	
		100% waste metal will be recycled	EPC	As soon as the works start and throughout construction period.	
		Ordering materials that have reusable packaging and/or in bulk to reduce waste generated.	EPC	As soon as the works start and throughout construction period.	
		Request suppliers to use minimal packaging.	EPC	As soon as the works start and throughout construction period.	
		Chemicals should be ordered in returnable drums.	EPC	As soon as the works start and throughout construction period.	
		"Buy-back" arrangements should be made with key suppliers so that any surplus chemicals or materials can be returned.	EPC	As soon as the works start and throughout construction period.	
		Refillable containers will be used, where possible, for collection of	EPC	As soon as the works	

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		solid and liquid wastes.		start and throughout construction period.	
Housekeeping	Minor	Separate waste streams to facilitate recycling. All storage areas must be well organised and waste appropriately managed through segregation of hazardous and non-hazardous waste. Waste within each category will be further segregated by type (paper, plastic, metal, masonry) and whether the material is recyclable or non-recyclable.	EPC	As soon as the works start and throughout construction period.	Negligible
		A waste log will be kept onsite and will contain, at least, information about quantities, management solution (according to the waste management hierarchy described in the baseline section) types, operator, final disposal/destination, etc.)	EPC	As soon as the works start and throughout construction period.	
		Install adequate storage facilities for non-hazardous waste in designated areas to prevent waste from dispersing throughout the site	EPC	As soon as the works start and throughout construction period	
		Include in the employees' inception training information to increase their awareness of waste management protocols including proper handling and storage of waste, and emergency response and contingency plans.	EPC	As soon as the works start and throughout construction period.	
Waste Storage	Minor	Food waste must be stored within a sealed metal or plastic skip or bin with self-closing lid, in order to prevent birds/vermin/pests gaining access	EPC	As soon as the works start and throughout construction period.	Negligible
		Lightweight waste e.g. paper, cardboard, plastics: Must be stored within a skip sealed with a secured tarpaulin/netting sufficient to prevent any material being dispersed.	EPC	As soon as the works start and throughout construction period.	
		Heavy waste can be contained within an open skip, providing that segregation occurs effectively enough to remove all	EPC	As soon as the works start and throughout	

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		lightweight material that could be blown away.		construction period.	
		Litter, bins for different types of waste (food waste, domestic waste) categories will be placed throughout the site at locations where construction workers and staff consume food. These will be regularly collected and taken to the main waste storage area. Portable separate bins will also be placed at areas where works will be undertaken (interconnection point, power line, access road, etc.)	EPC	As soon as the works start and throughout construction period.	
		No underground waste containers will be deployed.	EPC	As soon as the works start and throughout construction period.	
		Waste containers will be clearly marked with appropriate labels to accurately describe their contents and detailed safety precautions. Labels will be waterproof, and securely attached. Wherever possible, chemicals will be kept in their original container	EPC	As soon as the works start and throughout construction period.	
		Waste generated during construction will only be transported off-site for disposal by an appropriately licensed vendor. This service provider will follow the proper protocols to ensure that all waste handling and disposal from the site is carried out according to the environmental regulations. A record for all waste streams will be kept onsite.	EPC	As soon as the works start and throughout construction period.	
		Regular training of site personnel in proper waste management and chemical handling procedures will be conducted at regular intervals.	EPC	As soon as the works start and throughout construction period.	
		Incineration/burning of wastes will not be allowed onsite	EPC	As soon as the works start and throughout construction period.	
Hazardous Materials	Moderate	Implement best practice and regulations procedures for	EPC	As soon as the works	Negligible

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		adequate handling, establishment of secure temporary storage areas, and disposal of waste by approved contractors.		start and throughout construction period.	
		Hazardous wastes will be disposed in an environmentally safe manner and by licensed hazardous waste operators	EPC	As soon as the works start and throughout construction period.	
		Materials will be separated into combustible and non-combustible, and all flammable substances must be kept away from sources of ignition.	EPC	As soon as the works start and throughout construction period.	
		No underground hazardous materials storage containers will be deployed. Storage of hazardous materials will be undertaken in a fenced dedicated area with a dedicated drainage system and roofed to prevent rainwater from entering the area. This hazardous materials storage area will be located considering potential risks (e.g. traffic accidents/collisions, fall of items, drainage system, etc.).	EPC	As soon as the works start and throughout construction period.	
		Provide bunds for storing hazardous materials containers. The bunds will have the capacity to contain 110% of the total volume of stored materials and will be protected from vehicles or other risks. This area must be placed away from any sources of ignition. Storage areas will have impermeable bases (this need to cover a wider area if needed to avoid soil contamination, e.g. refuelling areas will include an impermeable base that protects the ground where the vehicles will be parked), will be roofed and be equipped with spills kits.	EPC	As soon as the works start and throughout construction period.	
		Hazardous Materials containers will be clearly marked with appropriate warning labels to accurately describe their contents and detailed technical specifications and safety precautions. Labels will be waterproof, and securely attached. Wherever possible, hazardous materials will be kept in their	EPC	As soon as the works start and throughout construction period.	

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		original container			
		Hazardous materials will only be transported to/from the site by a licensed operator. This service provider will follow the proper protocols to ensure that all hazardous materials are transported and transferred according to the environmental regulations. A record for all hazardous materials will be kept onsite.	EPC	As soon as the works start and throughout construction period.	
		Only trained personnel will be permitted to handle hazardous materials.	EPC	As soon as the works start and throughout construction period.	
Waste Facilities	Moderate	Only licensed waste management facilities shall be used for the disposal of non-hazardous and hazardous wastes, respectively.	EPC	As soon as the works start and throughout construction period.	Negligible

8.1.6 Wastewater Management

Table 8-7 Wastewater mitigation measures – construction phase

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Sanitary wastewater	Moderate	Develop a Wastewater Management Plan.	EPC	Before the start of the construction activities and throughout the construction period.	Negligible
		The reuse of wastewater on site is allowed if the following conditions are met : - Wastewater is treated in the ONEE STEP; - Analysis are provided to Masen showing that national and	EPC	Throughout the construction period.	

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		international water quality standards are met before its discharge into the environment; Authorizations are obtained from local authorities allowing the reuse of the water.			
		Chemical toilets/ septic tanks will be available at the construction site in sufficient number to attend the number of employees expected	EPC	As soon as the works start and throughout construction period.	
		No domestic wastewater will be discharged outside the chemical toilets / septic tanks	EPC	As soon as the works start and throughout construction period.	
		Wastewater from chemical toilets/ septic tanks will be collected by licensed operators. Each chemical toilets/ septic tank will be collected and emptied before its contents reach 80% of its capacity.	EPC	As soon as the works start and throughout construction period.	
		Septic tanks must be completely emptied before demobilisation to avoid contamination to the site area. The demobilisation procedure will ensure that tanks are not destroyed or damaged during the removal process.	EPC	As soon as the works start and throughout construction period.	
Storm Water Drainage	Moderate	Construct a specific area for site equipment maintenance (lubrication, oil and filter changes, repair work, etc.). A waterproof concrete area or impermeable geo-textile liner shall be provided with a tank or perimeter ditch to collect any liquid waste that will be stored in a dedicated septic tank and collected by a licensed operator. Maintenance of vehicles will only be undertaken offsite in appropriate premises.	EPC	As soon as the works start and throughout construction period.	Negligible
		Hazardous materials storage areas will be roofed to prevent rainfall entering such areas and avoid polluted runoff	EPC	As soon as the works start and throughout construction period.	
		Permanent/temporary storage areas will be designed and located considering potential ground contamination risks. Runoff will be prevented from entering areas where hazardous materials are stored, handled or transferred. If runoff can enter potentially contaminated	EPC	As soon as the works start and throughout construction period.	

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		areas, a dedicated drainage system will direct the run off to dedicated tanks to avoid impacts to soils and groundwater. The fluids in these tanks will be collected by licensed operators and managed as Hazardous wastewater.			
		The stormwater drainage system will be able to accommodate and evacuate runoff so that it protects equipment during the worst case scenario as per local rain conditions and site area (funnelled to the channel) and soil and vegetation coverage conditions.	EPC	As soon as the works start and throughout construction period.	
		The stormwater drainage system will need to consider the increase on speed of the water flow with a concrete channel and consider the flood conditions that can potentially be caused downstream (particularly at the discharge point) to avoid erosion.	EPC	As soon as the works start and throughout construction period.	
		Adequate drainage systems will be provided to minimize and control infiltration. Sediment traps (i.e. filter fabric) will also be installed.	EPC	As soon as the works start and throughout construction period.	
		The stormwater drainage system will include a system to retain garbage carried by the runoff water. The system will be at the project boundary and allow easy access to collect retained materials.	EPC	As soon as the works start and throughout construction period.	
		The site will be fenced to ensure that no soil disturbance occurs outside of the site area. The areas requiring excavation/filling shall be clearly demarcated to ensure that the soil is no disturbed outside that area	EPC	As soon as the works start and throughout construction period.	
		Internal roads/routes gradients should not exceed 15%	EPC	As soon as the works start and throughout construction period.	
		The longitudinal slope of the road must be at least 3% in order to facilitate surface run-off of water and to avoid the build-up of sediment in gutters	EPC	As soon as the works start and throughout construction period.	
		Reduce height of any built up embankments and slopes, if possible.	EPC	As soon as the works start and throughout construction period.	
		Recover vegetation on slopes and embankments where possible and in	EPC	As soon as the works	

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		areas away from electrical equipment to avoid fires		start and throughout construction period.	
		Construct gabions and concrete barriers for containment, use metal mesh and nets, drains and gutters in slopes for terrain stability	EPC	As soon as the works start and throughout construction period.	
		From the outset of work, plan, select and define areas for clearing, stripping and access routes in order to minimise unnecessary stripping of vegetation	EPC	As soon as the works start and throughout construction period.	
		Reduce cut-offs and embankments, if possible.	EPC	As soon as the works start and throughout construction period.	

8.1.7 Traffic and Road Safety

Table 8-8 Traffic and Road Safety mitigation measures – construction phase

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Increased congestion in national/local roads & Movement of vehicles on residential areas	Moderate to Major	Develop a Traffic Management Plan	EPC	Before the start of the construction works and throughout construction period.	Minor
		Determine the designated access routes for delivery of equipment, road capacity, site entrance/exit points, etc.	EPC	As soon as the works start and throughout construction period.	
		Determine requirements for regular maintenance of vehicles (currently implemented) and use of manufacturer approved parts	EPC	As soon as the works start and throughout construction period.	
		Identify areas/spots sensitive to road safety issues and implement	EPC	As soon as the works	

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		the necessary road safety measures, including residential areas where construction-related vehicles will pass through and at the interconnection point of the access road with the N1 road. Sensitive area will be communicated in advance to all drivers who will be provided with maps to ensure awareness. Special measures will need to be implemented if deemed necessary and appropriately communicated to drivers (e.g. lowers speed at a specific vulnerable spot in the route).		start and throughout construction period.	
		Post designated routes and indications for directions and speed limits along the route to access the site from main roads (N1, N5 or RP1400).	EPC	As soon as the works start and throughout construction period.	
		Construction heavy and light vehicles will not exceed 20 km/h in the village of Edchera and in areas in close proximity to isolated houses.	EPC	As soon as the works start and throughout construction period.	
		Manage deliveries of equipment/plant to the site so that construction vehicles avoid passing through the village of Edchera in public holiday/festivities, school enter/exit hours and night time (8 p.m. to 7 a.m.)	EPC	As soon as the works start and throughout construction period.	
		Manage delivery times of construction materials and equipment outside of peak hours.	EPC	As soon as the works start and throughout construction period.	
		Stagger key deliveries or periods of high vehicle movements to the site and reduce waiting times for drivers and over demand on receiving staff at the site.	EPC	As soon as the works start and throughout construction period.	
		Engines will be turned off while waiting in or outside the project site.	EPC	As soon as the works start and throughout construction period.	

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Staff will not be allowed to rest in vehicles to prevent excessive fuel wastage through the need to use air conditioning. Appropriate resting facilities will be provided at the landing for the drivers.	EPC	As soon as the works start and throughout construction period.	
		Drivers should be fully competent and authorised to drive HGVs and should receive specific road safety training	EPC	As soon as the works start and throughout construction period.	
		All vehicles dedicated full time for the project and circulating on roads outside the project site (owned or used by the Project Company, EPC or subcontractors) will have a clearly visible unique identification number and a sign with a telephone number for any road user that identifies reckless driving behaviour to be able to report it. Reports will be documented as grievances and investigated.	EPC	As soon as the works start and throughout construction period.	
Movement of vehicles on the site	Moderate to Major	The access road will be clearly signalled and compacted (as a minimum) or tarmacked. Dust suppression measures will be conducted where and when required.	EPC	As soon as the works start and throughout construction period.	Minor
		Determine the designated access routes for delivery of equipment, site entrance points, laydown areas and parking areas, etc.	EPC	As soon as the works start and throughout construction period.	
		A 30km/h speed limit will be imposed across the construction site in order to avoid direct mortality of fauna. Vehicle speeds will be restricted to 20Km/h on haul roads and unpaved areas of the site	EPC	As soon as the works start and throughout construction period.	
		Post designated routes and signs for directions and speed limits onsite and along the route to access the main road.	EPC	As soon as the works start and throughout construction period.	
		Specific waiting areas will be designated in suitable locations. No	EPC	As soon as the works	

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		waiting areas will be designate in proximity to residential units or settlements.		start and throughout construction period.	
		Inspect access and local roads and remove construction materials.	EPC	As soon as the works start and throughout construction period.	

8.1.8 Archaeology and Heritage

Table 8-9 Archaeology and Heritage mitigation measures – construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Destruction of unknown archaeological remains onsite	Minor to Moderate	Implement the Chance Find Procedure as per the best practice guidelines outlined on the SESIA.	EPC	Before the start of the construction works and throughout construction period.	Negligible

8.1.9 Landscape and Visual

Table 8-10 Traffic and Road Safety mitigation measures – construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Light Pollution	Moderate	Any flood lights required during night time construction activities will be directed onto the site, with a maximum position angle of 30° from vertical, therefore minimising any potential light leakage and impacts at night.	EPC	As soon as the works start and throughout construction period.	Minor
Topographical impacts to	Minor	The heights of building, fences and any other tall structures will aim to minimise their visibility from the road.	EPC	As soon as the works start and throughout	Negligible

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
landscape		The grading of the site, will aim to match the surrounding topography and avoid any sudden changes in ground height between the project boundary and surrounding landscape.		construction period.	

8.1.10 Socio-economic

Table 8-11 Socio-economic mitigation measures – construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Employment and Accommodation	Minor Positive	The project will seek to employ local workers where they are willing and available and have the skills required for the task. Non-specialist job opportunities will be offered to the local residents prior to hiring of employees from other areas when possible. The employment of women and vulnerable groups will be specifically targeted when possible.	EPC	As soon as the works start and throughout construction period.	Moderate Positive
		Establish and implement a recruiting policy and ensure that the necessary measures to mitigate negative impacts associated to labour and working conditions are implemented (e.g. child and forced labour, exploitation, excessive overtime, insufficient wages, harassment, unsafe/unhygienic living and working conditions, etc.). Labour and working conditions will be aligned with IFC standards.			
		Workers' accommodation (if required, as it is not envisaged at this stage) will comply with IFC standards and will not be located next to the isolated households that are near the project site.	EPC		
		Strict controls over the provision of housing shall prevent any unplanned settlements from developing.	EPC		
		A Retrenchment Plan will be prepared for the transition from construction to operation.	EPC & Project Company		
Purchases	Minor			As soon as the	Moderate

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
	Positive	The EPC will only engage with reputable subcontractors that do not use force or child labour and are capable to implement the applicable with environmental and social measures established in the CESMP and other documents applicable to the construction of the project.		works start and throughout construction period.	Positive
		Purchase of goods and services within the local/regional area will be prioritized.			
Community E&S and Health and Safety Risks	Negligible to Minor Negative	If any activities that have not been assessed on the SESIA are proposed, potential E&S and HS risks to the communities will be assessed prior to their implementation or development.	EPC	As soon as the works start and throughout construction period.	Negligible Negative
		The site will be fenced and access to the construction site will be controlled by the security staff.			
Dissemination of Skills	Minor Positive	Local employees will receive E&S and OHS training to enhance the development of skills. A certificate outlining the contents of the training and signed by the management of the PV plant will be provided to employees upon finalisation of the employment contract.	EPC	As soon as the works start and throughout construction period.	Moderate Positive
Conflict-workforce/local residents	Minor Negative	Training for foreign employees will include information on the cultural background of the local population.	EPC	As soon as the works start and throughout construction period.	Negligible Negative
		The interaction between the workforce and the isolated households will not be encouraged. A canteen will be available onsite and buses to Laayoune will be provided.	EPC		
Conflict with security staff	Minor Negative	Develop and implement a Policy on Security and a Code of Conduct for Security Personnel.	EPC	Before the start of the construction works and throughout construction period.	Negligible Negative
		The security provider and personnel will adhere to international human right code of conduct. Only security personnel and companies with no human right violations will be employed.			
		Security personnel will undergo a dedicated training program which			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		will include, as a minimum, information on how to exercise practices following GIIP (UN Voluntary Principles on Security and Human Rights), cultural background of the area and the workforce (main groups), and the way they should interact with local communities and workers.			
Spread of STDs	Minor Negative	Prevention of diseases (including STDs) will be included in the training programme through toolbox talks or separate training sessions.	EPC	As soon as the works start and throughout construction period.	Minor negative
Informal settlements and encroachment	Minor Negative	Unplanned settlements will be monitored by onsite security personnel and reported to the authorities.	EPC	As soon as the works start and throughout construction period.	Negligible Negative
		The local public security forces will be required to deal with encroachers as per national requirements.			

8.2 Operational Phase – Laayoune 80MW Photovoltaic Power Plant

The following tables provide mitigation measures for potential negative environmental and social impacts resulting from the operation of the Power plant.

8.2.1 Air Quality

Table 8-4 Air Quality mitigation measures – operational phase

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Schedule	Implementation Schedule/Cost	Residual Impact
Air emission from vehicles	Negligible to Minor	Regular vehicle maintenance in dedicated maintenance areas.	O&M	OESMP – operation	As soon as the operation start and throughout operation period. Cost should be integrated into the operational budget.	Negligible
		Onsite/offsite speed limits are included in the Traffic and Road Safety Section of this SESIA. Besides road safety, these limits will contribute to reduce exhaust gases resulting from traffic movements. Third parties employed to provide services during the operation of the project which involves regular transport to site (e.g. waste or septic tanks collectors) will be required to use vehicles regularly maintained and in good condition and will be inspected before entering the site.	O&M	OESMP – operation		

8.2.2 Noise and Vibration

Table 8-5 Noise and Vibration mitigation measures – operational phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Vehicle Noise	Minor Negative	Deliveries of fuel and materials and removals of waste are to be undertaken during daytime.	O&M	As soon as the operation start and throughout operation period.	Negligible
		All vehicles will be adequately maintained in order to minimise sound emissions	O&M	As soon as the operation start and throughout operation period.	
		Offsite speed limits are included in the Traffic and Road Safety Section. Besides road safety, these limits will contribute to reduce noise levels resulting from traffic movements in the village of Edchera and close to the isolated house.	O&M	As soon as the operation start and throughout operation period.	
Operational Noise	Negligible Negative	All machinery will be adequately maintained in order to minimise sound emissions	O&M	As soon as the operation start and throughout operation period.	Negligible
		All equipment specifications, will limit near field noise to 85 dB(A) at 1m. Where equipment and plant exceed 85 dB(A) at 1m under typical operating conditions, noise suppression techniques will be developed, these may include: silencers, noise insulation, noise attenuation barriers and housing for equipment. This will be determined and validated during performance testing	O&M	As soon as the operation start and throughout operation period. Cost should be integrated into the design operational budget	

8.2.3 Soil and Groundwater

Table 8-6 Soil and Groundwater mitigation measures – operational phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Spillage	Moderate	Develop and implement a spill emergency and contingency plan	O&M	Before the operation starts and throughout operation period.	Negligible
		Develop and implement training program for employees to increase their awareness of chemical management protocols including proper handling and storage of chemicals, emergency response, contingency plans and appropriate PPE, if needed.	O&M	As soon as the operation start and throughout operation period.	
Storage and waste management	Moderate	Storage areas for domestic waste will be sealed, covered, leak tight flooring, and correct shelving / cabinets in order to prevent spillage and leakage into the ground.	O&M	As soon as the operation start and throughout operation period.	Negligible
		The storage tanks of fuels/chemicals/sewage will be properly maintained and stored within a bunded area of 110% of their storage capacity.	O&M	As soon as the operation start and throughout operation	

8.2.4 Biodiversity

Table 8-5 Ecology and Biodiversity mitigation measures – operational phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Direct mortality of avifauna due to collision	Minor	If significant direct mortality is identified through the monitoring programme, bird deterrence measures will be implemented to avoid migratory birds from attempting to "land" on the plant. Since there are no comprehensive international studies for bird collision with PV panels, it is not possible to recommend a single technique to avoid collisions. The mitigation will follow the following two principles: • The objective will be to avoid bird collisions, as this is the preferred approach in the mitigation hierarchy; • The latest methods that are used internationally will be applied onsite. If specific guidance for PV plants is issued addressing this risk before the operational phase commences, it will be followed. Alternatively, the methods outlined in the guidelines to deter large flocks of birds from approaching airports (such as the UK Civil Aviation Authority 2014 Wildlife Hazard Management at Aerodromes CAP 772) will be applied.	O&M	As soon as the operation start and throughout operation period. Cost should be integrated into the design operational budget	Minor
Direct Mortality of Fauna	Negligible to Minor	Speed limit will be imposed across the construction site in order to avoid direct mortality of fauna. Speed limits onsite are specified on the traffic chapter.	O&M	As soon as the operation start and throughout operation period.	Negligible
		Vehicles will keep to the designated routes in order to prevent unnecessary land encroachment, thus protecting the natural resources and reducing dust emissions	O&M		
Poaching / Hunting	Minor to Moderate	Hunting, falconry and fauna/flora trade will be strictly forbidden on site. Warning signs will be placed around the site.	O&M	As soon as the operation start and throughout operation period.	Negligible

8.2.5 Non-hazardous Waste and Hazardous Materials Management

Table 8-6 Non-hazardous waste and hazardous materials mitigation measures – operational phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Solid waste volumes/quantities	Minor to Moderate	Prepare a site-specific Waste Management Plan (WMP) including both hazardous and non hazardous waste. The plan will include training of staff.	O&M	Before the operation activities start and throughout operation period.	Minor
		100% waste metal will be recycled	O&M	As soon as the operation start and throughout operation period.	
		Ordering materials that have reusable packaging and/or in bulk can to reduce waste generated			
		Request that suppliers use minimal packaging.			
		Chemicals should be ordered in returnable drums.			
		"Buy-back" arrangements should be made with key suppliers so that any surplus chemicals or materials can be returned			
		Refillable containers will be used, where possible, for collection of solid and liquid wastes			
Housekeeping	Minor to Moderate	Separate waste streams to facilitate recycling. All storage areas must be well organised and waste appropriately managed through segregation of hazardous and non-hazardous waste. Waste within each category will be further segregated by type (paper, plastic, metal) and whether the material is recyclable or non-recyclable. A waste log will be kept onsite and will contain, at least, information about quantities, management solution (according to the waste management hierarchy described in the baseline section) types, operator, final disposal/destination, etc.)	O&M	As soon as the operation start and throughout operation period.	Minor
		Install adequate storage facilities for non-hazardous waste in	O&M	As soon as the	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		designated areas to prevent waste from dispersing throughout the site.		operation start and throughout operation period. Cost should be integrated into the design operational budget	
		Include in the inception training for employees contents to increase their awareness of waste management protocols including proper handling and storage of waste, and emergency response and contingency plans.	EPC	As soon as the operation start and throughout operation period.	
Waste Storage	Minor to Moderate	Food waste must be stored within a lidded metal or plastic skip or bin, in order to prevent vermin/pests gaining access.	O&M	As soon as the operation start and throughout operation period.	Minor
		Lightweight waste e.g. paper, cardboard, plastics must be stored within a skip lidded with a secured tarpaulin/netting sufficient to prevent any material being dispersed.		As soon as the operation start and throughout operation period.	
		For litter (food waste, domestic waste), bins for separate categories will be placed throughout the site at locations where construction workers and staff consume food. These will be regularly collected and taken to the main waste storage area.		As soon as the operation start and throughout operation period.	
		Waste containers will be clearly marked with appropriate warning labels to accurately describe their contents and detailed safety precautions. Labels will be waterproof, and securely attached. Wherever possible, chemicals will be kept in their original container		As soon as the operation start and throughout operation period.	
		Waste generated during operation will only be transported off-site for disposal by an appropriately licensed vendor. This		As soon as the operation start and	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		service provider will follow the proper protocols to ensure that all waste handling and disposal from the site is carried out according to the environmental regulations. A record for all streams of generated and collected waste will be kept onsite.		throughout operation period.	
		Regular training of site personnel in proper waste management and chemical handling procedures will be conducted at regular intervals.		As soon as the operation start and throughout operation period.	
		Incineration/burning of wastes will not be allowed.		As soon as the operation start and throughout operation period.	
		Food waste must be stored within a lidded metal or plastic skip or bin, in order to prevent vermin/pests gaining access.	O&M	As soon as the operation start and throughout operation period.	
Hazardous Materials	Minor	Implement best practice and regulations procedures for adequate handling, establishment of secure temporary storage areas, and disposal of waste by approved contractors.	O&M	As soon as the operation start and throughout operation period.	Negligible
		Hazardous wastes be disposed in an environmentally safe manner and by licensed hazardous waste operator		As soon as the operation start and throughout operation period.	
		Materials will be separated into combustible and non-combustible, and all flammable substances must be kept away from sources of ignition.		As soon as the operation start and throughout operation period.	
		No underground hazardous materials storage containers will be deployed. Storage of hazardous materials will be		As soon as the operation start and	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		undertaken in a fenced dedicated area with a dedicated drainage system and roofed, to prevent rainwater from entering the area. Hazardous materials storage areas will be located taking into consideration potential risks (e.g. traffic accidents/collisions, fall of items, drainage system, etc.).		throughout operation period.	
		Provide bunds for storing hazardous materials containers. The bunds will have the capacity to contain 110% of the total volume of stored materials and will be protected from vehicles or other risks. This area must be placed away from any sources of ignition. Storage areas will have impermeable bases (this need to cover a wider area if needed to avoid soil contamination, e.g. refuelling areas will include an impermeable base that protects the ground where the vehicles will be parked), will be roofed and be equipped with spill kits.		As soon as the operation start and throughout operation period. Cost should be integrated into the design operational budget	
		Hazardous Materials containers will be clearly marked with appropriate warning labels to accurately describe their contents and detailed technical specifications and safety precautions. Labels will be waterproof, and securely attached. Wherever possible, hazardous materials will be kept in their original container		As soon as the operation start and throughout operation period.	
		Hazardous materials will only be transported to/from the site by an appropriately licensed operator. This service provider will follow the proper protocols to ensure that all hazardous materials are transported and transferred according to the environmental regulations. A record for all hazardous materials will be kept onsite.		As soon as the operation start and throughout operation period. Cost should be integrated into the design operational budget	
		Only trained personnel will be permitted to handle hazardous materials.		As soon as the operation start and	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
				throughout operation period.	
		Implement best practice and regulations procedures for adequate handling, establishment of secure temporary storage areas, and disposal of waste by approved contractors.		As soon as the operation start and throughout operation period.	
Waste Facilities	Minor	Only licensed waste management facilities approved by national/regional authorities shall be used for the disposal of non-hazardous and hazardous wastes, respectively.	O&M	As soon as the operation start and throughout operation period.	Negligible

8.2.6 Wastewater Management

Table 8-7 Wastewater and Storm Water Drainage mitigation measures – operational phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Sanitary Wastewater Generation	Minor negative	Develop a Wastewater Management Plan.	O&M	Before the start of the operation activities and throughout operation period.	Negligible
		The reuse of wastewater on site is allowed if the following conditions are met : - Wastewater is treated in the ONEE STEP; - Analysis are provided to Masen showing that national and international water quality standards are met before its discharge into the environment; Authorizations are obtained from local authorities allowing the reuse of the water.	O&M	Throughout the operation period	
		Sanitary and domestic wastewater will only be discharged to	O&M	As soon as the operation	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		chemical toilets/ septic tanks that will be available on the project site.		start and throughout operation period.	
		The septic tanks will be sited away from vehicle traffic, in order to prevent any damage to the tanks.	O&M	As soon as the operation start and throughout operation period.	
		Wastewater from the chemical toilets/ septic tanks will be collected by a licensed operator.	O&M	As soon as the operation start and throughout operation period.	
Storm Water Drainage	Minor Negative	The site will be inspected regularly to ensure that no spills have occurred in areas that may be susceptible to storm water run off. Any and all spills must be immediately contained and cleaned, in order to prevent direct and indirect contamination to soils and water sources.	O&M	As soon as the operation start and throughout operation period.	Negligible
		Runoff collection system will be inspected monthly and at the start of a rain event to ensure that no blockages could result with overflowing.	O&M	As soon as the operation start and throughout operation period.	
		Waste storage areas have to be designed in such a way that rainwater is not in contact at any point with the waste.	O&M	As soon as the operation start and throughout operation period.	
		The effectiveness of erosion prevention mitigation measures at rainwater discharge points will be verified after storm events to ensure that the adequacy of the design measures. Otherwise, these should be upgraded to meet storm water flows.	O&M	As soon as the operation start and throughout operation period.	
		A re-vegetation programme on the slopes and embankments where storm water will be discharged shall be considered to reduce soil erosion. Only native species of shrubs native to the area shall be used.	O&M	As soon as the operation start and throughout operation period.	

8.2.7 Traffic and Road Safety

Table 8-7 Traffic and Road Safety Mitigation Measures – Operational Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Movement of vehicles along the site access road and onsite	Negligible to Major	Determine the designated access routes for collecting and delivering, site entrance points, and parking areas, etc.	O&M	As soon as the operation start and throughout operation period.	Negligible to Minor
		Determine requirements for regular maintenance of vehicles in line with national requirements and GIIP. Maintenance of vehicles will be undertaken in appropriate premises outside the project site.		As soon as the operation start and throughout operation period.	
		Specific waiting areas for vehicles and drivers will be designated in suitable locations.		As soon as the operation start and throughout operation period.	
		The movement of vehicles along the access road will be minimized to essential operational and maintenance related activities.		As soon as the operation start and throughout operation period.	
		All vehicles dedicated full time for the project and circulating on roads outside the project site (owned or used by the Project Company, EPC or subcontractors) will have a clearly visible unique identification number and a sign with a telephone number for any road user that identifies reckless driving behaviour to be able to report it. Reports will be documented as grievances and investigated.		As soon as the operation start and throughout operation period.	
		Speed limit to be established onsite (30km), in the access road to Edchera (35 Km) and in the village of Edchera and in close proximity to the isolated houses (20 km). Speed limits will be clearly indicated.		As soon as the operation start and throughout operation period.	

8.2.8 Archaeology and Cultural Heritage

It is not considered that any significant impacts upon archaeological or cultural resources could occur during the operational phase.

8.2.9 Landscape and Visual

Table 8-10 Landscape and Visual mitigation measures – construction/operational phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Light Pollution	Moderate	Lighting provision shall not be excessive or unnecessary – Lights for the plant will be switched on only when strictly necessary	O&M	As soon as the operation start and throughout operation period.	Minor
		Lights required during night time will be directed onto the site, with a maximum position angle of 30° from vertical, therefore minimising any potential back spill and impacts at night to avoid disturbance to fauna.	O&M	As soon as the operation start and throughout operation period.	
		Strictly monitor the light intensity, direction and duration. Design and install lighting such that light bulbs and reflectors are not visible from public viewing areas. Lighting should not cause reflected glare	O&M	As soon as the operation start and throughout operation period.	

8.2.10 Socio-economic

Table 8-11 Socio-economic mitigation measures – operational phase

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Employment and Accomodation	Minor Positive	The PV will seek to employ local workers where they are willing and available, and where appropriate. All non-specialist job opportunities will be offered to the local residents prior to hiring of employees from other areas. The employment of women and vulnerable groups will be specifically targeted when possible and monitored if possible.	O&M	Planning and throughout the operational period.	Moderate Positive
		Establish and implement a recruiting policy and ensure that the necessary measures to mitigate negative impacts associated to labour and working conditions are implemented (e.g. child and forced labour, exploitation, excessive overtime, insufficient wages, harassment, unsafe/unhygienic living and working conditions, etc.). Labour and working conditions will be aligned with IFC standards.	O&M	Planning and throughout the operational period.	
Purchases	Negligible Positive	The O&M will only engage with reputable suppliers that do not use force or child labour and are capable to comply with the environmental and social standards established by the IFC for suppliers.	O&M	Planning and throughout the operational period.	Negligible Positive
		The O&M will only engage with reputable subcontractors that do not use force or child labour and are capable to implement the applicable with environmental and social measures established in the OESMP and other documents applicable to the construction of the project.			
		Purchase of goods and services by the workforce and of construction materials within the local/regional will be prioritized	O&M	Planning and throughout the operational period.	
Dissemination of Skills	Minor Postiive	Local employees will receive E&S and OHS training to enhance the development of skills. A certificate outlining the contents of the training and signed by the management of the PV plant will be provided.	O&M	Throughout the operational period.	Minor Positive

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Conflict – workforce / local residents	Minor Negative	Training for foreign workers will include information on the cultural background of the population.	O&M	Throughout the operational period.	Negligible Negative
Security Provisions	Minor Negative	Develop and implement a Security Policy and a Code of Conduct for Security Personnel.	O&M	Planning and throughout the operational period.	Negligible Negative
		The security provider and personnel will adhere to international human right code of conduct. Only security personnel and companies with no human right violations will be employed.	O&M	Planning and throughout the operational period.	
		Security personnel will undergo a dedicated training program which will include, as a minimum, information on how to exercise practices following GIIP (UN Voluntary Principles on Security and Human Rights), cultural background of the area and the workforce (main groups), the way they should interact with local communities and workers.	O&M	Planning and throughout the operational period.	
Spread of Diseases	Negligible to Minor Negative	Prevention of diseases (including STDs) will be included in the training programme.	O&M	Throughout the operational period.	Negligible Negative
E&S and OHS Risks	Minor Negative	Address potential E&S and H&S risks to the communities and workers		Throughout the operational period.	Negligible Negative
		The site will be fenced and access to the construction site will be controlled by the security staff		Planning and throughout the operational period.	

8.3 Construction Phase – 225kV Power Line

This section outlines the mitigation measures for the potential environmental and social impacts of the power line during the construction phase identified through the SESIA process (SESIA Vol2).

8.3.1 Air Quality

Table 8-8 Air quality Mitigation Measures – Construction Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Dust from Transportation <500m from Site	Negligible to Moderate	Powdery materials (e.g. cements) will be transported in sealed containers	EPC Contractors	As soon as the works start and throughout construction period.	Negligible to Minor
		The PL corridor will be sprayed with water to minimise the dust from vehicles movements if the dust levels (visual inspection) are considered high.	EPC Contractors	As soon as the works start and throughout construction period.	
Gaseous and Particulate emissions from Transportation	Negligible to Moderate	Vehicles and machinery will be periodically inspected for their worthiness and where necessary will not be permitted to enter the PL corridor.	EPC Contractors	As soon as the works start and throughout construction period.	Negligible to Minor
		Efficiently manage deliveries of equipment to reduce the number of trips.	EPC Contractors	As soon as the works start and throughout construction period.	
		Designated tracks/roads will include signage for directions and speed limits.	EPC Contractors	As soon as the works start and throughout construction period.	
		Vehicles will be turned off while waiting to minimise gas emissions.	EPC Contractors	As soon as the works start and throughout construction period.	

8.3.2 Noise and Vibration

Table 8-9 Noise and Vibration Mitigation Measures – Construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Construction Noise/Vibration	Major	All activities with highest noise emissions at the interconnection point (ONEE substation) will be undertaken during daytime in the working week and not on official holidays.	EPC Contractors	As soon as the works start and throughout construction period.	Minor
		Diesel compression equipment or generators will be equipped with effective silencers when necessary	EPC	As soon as the works start and throughout construction period.	
		Electrically powered equipment will be preferred, where practical, to mechanically powered alternatives. All mechanically powered equipment will also be fitted with suitable silencers when necessary.	EPC	As soon as the works start and throughout construction period. Cost should be integrated into the budget.	
		Plant equipment on the PL corridor operating intermittently will be shut down in the intervening periods between uses.	EPC	As soon as the works start and throughout construction period.	
		Construction employees will, at all times, carry out all work in such a manner as to keep any disturbance from noise and vibration to a minimum.	EPC	As soon as the works start and throughout construction period.	
		Where noise levels exceed 85dB(A) for an 8-hour time-weighted average, hearing protection devices shall be provided to workers. No unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C)	EPC	As soon as the works start and throughout construction period.	
Vehicle Noise	Minor	Vehicles will be equipped with effective silencers when necessary and switched off when are not in motion for more than 2 minutes	EPC Contractors	As soon as the works start and throughout construction period.	Negligible
		All vehicles will be adequately maintained in order to minimise sound emissions.	EPC Contractors	As soon as the works start and throughout construction period.	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Speed limits are included in the Traffic and Road Safety Section of this SESIA. Besides road safety, these limits will contribute to reduce noise levels resulting from traffic movements particularly in areas close to isolated houses and residential areas without bypass road.	EPC Contractors	As soon as the works start and throughout construction period.	

8.3.3 Soil and Groundwater Protection

Table 8-10 Soil Mitigation Measures – Construction Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Leaks and Spillage of Hazardous Materials	Moderate	Chemicals, fuels, lubricants and paints will be stored and transferred only in dedicated locations of the shared Laydown Area on impermeable surfaces to prevent leakage into the ground and contained inside a secondary bund (110% of largest container).	EPC	As soon as the works start and throughout construction period.	Negligible
		Storage areas will be designed and located considering potential ground contamination risks. Runoff will be prevented from entering areas where hazardous materials are stored, handled or transferred. If runoff can enter potentially contaminated areas, a dedicated drainage system will direct the run off to dedicated tanks to avoid impacts to soils and groundwater. The fluids in these tanks will be collected by licensed operators and managed as Hazardous wastewater.	EPC	As soon as the works start and throughout construction period.	
		Hazardous materials storage area will be positioned away from major transport corridors in the shared Laydown Area, in order to avoid potential collisions from vehicles or other machinery.	EPC	As soon as the works start and throughout construction period.	
		No refuelling of vehicles or equipment will be undertaken outside the dedicated location of the shared Laydown Area described in the previous corridor.	EPC	As soon as the works start and throughout construction period.	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		All chemicals will be handled in accordance with relevant instructions (MSDS)	EPC	As soon as the works start and throughout construction period.	
		Reduce quantity of chemicals and fuels to minimum practicable levels	EPC	As soon as the works start and throughout construction period.	
		Regularly inspect drip collectors and containers for spills and leaks.	EPC	As soon as the works start and throughout construction period.	
		Provide spill kits at all areas where hazardous liquids are stored.	EPC	As soon as the works start and throughout construction period.	
		Develop and implement an Emergency preparedness and Response Plan, to immediately remediate the affected area in the event of a spill or leakage of chemicals, fuels, paints, and any hazardous material.	EPC	As soon as the works start and throughout construction period.	
		Washing of equipment, machinery, and vehicles will not permitted and will only be carried out in adequate offsite premises.	EPC	As soon as the works start and throughout construction period.	
		Vehicle maintenance will not be undertaken in the Site and will be carried out only in offsite permitted premises	EPC	As soon as the works start and throughout construction period.	
		If vehicles and machinery are too large to be moved off site, or if it is not practicable to move the machinery for regular maintenance during the construction phase, then measures to protect the soils from spills and leaks during the cleaning/maintenance activity must be implemented (impermeable hard standing area with dedicated drainage system located).	EPC	As soon as the works start and throughout construction period.	
Erosion / Soil	Minor	Minimise disturbed areas.	EPC	As soon as the works start and throughout	Negligible

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Compaction				construction period.	
		Excavated materials will be kept in the stockpile for as short a time as possible and, once an area is back-filled with soil material, compacted in a short time.	EPC	As soon as the works start and throughout construction period.	
		Areas where vehicles are allowed to circulate will be minimized and located only inside the corridor.	EPC	As soon as the works start and throughout construction period.	

8.3.4 Biodiversity

Table 8-11 Biodiversity Mitigation Measures – Construction Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Habitat Loss	Minor to Moderate	*Ononis Hesperia and Sueda monodiana* was identified within rocky plateaus and/or depressions within the proposed survey area, and therefore are likely to be present within the project footprint. Avoidance of clearing any of these endemic species will be undertaken where possible. Appendix 2 includes a picture of each of these species. Adjustment of the proposed poles or tracks will be considered if any endemic species are to be affected by vegetation clearance.	EPC	As soon as the works start and throughout construction period.	Minor
		These endemic species will be planted, where practical, at the landscaping areas (within the PV site) at the end of construction, to maintain populations locally. Seeds will be collected from local sources for sowing onto areas of land which are not a fire risk to the PV Plant and suitable for the site landscaping. If agreed by the stakeholders, the project company will support	EPC	As soon as the works start and throughout construction period. Cost should be integrated into the budget.	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		habitat restoration efforts in the region (project area or nearby protected areas.			
		Training on nest / burrow conservation awareness will be included during the construction period.	EPC	As soon as the works start and throughout construction period	
		In order to avoid the affection over productive habitats and endemic flora species, the design of the proposed poles of the PL and temporary roads will avoid Graras habitats when possible.	EPC	As soon as the works start and throughout construction period.	
		The contractor will ensure that no encroachment to the nearby, adjacent land will occur.	EPC	As soon as the works start and throughout construction period.	
		All construction vehicles adhere to clearly defined transportation routes. Transport routes will be identified and training provided to emphasise the need to adhere to the designated routes in order to protect the existing vegetation and reduce encroachment on adjacent land, and reduce dust across the site.	EPC	As soon as the works start and throughout construction period.	
Poaching/Hunting/Trade	Minor to Moderate	Hunting, falconry and fauna/flora trade will be strictly forbidden on site. Warning signs will be placed around the site.	EPC	As soon as the works start and throughout construction period.	Minor
Direct mortality of fauna	Minor to Moderate	Speed limit will be imposed across the construction site in order to avoid direct mortality of fauna. Speed limits onsite are specified on the traffic chapter.	EPC	As soon as the works start and throughout construction period.	Minor
		Transportation within and to and from the site will be minimised through efficient transport management in order to minimise the risk of running animals over.	EPC	As soon as the works start and throughout construction period.	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Fires will be forbidden onsite or anywhere along the PL corridor.	EPC	As soon as the works start and throughout construction period.	
		Induction training for employees will include awareness of ecological management protocols including activities forbidden onsite, and protocols when fauna is encountered.	EPC	CESMP – Management and monitoring	
		In order to avoid destruction of nests / burrows, vegetation clearing will be scheduled before work begins.	EPC	CESMP – Management and monitoring	
		Workers will be trained and sensitized on site so as not to kill or harm birds or nests if they are on site. These birds or nests will be identified and reported to the HSE officer and will be moved out of the intervention corridor.	EPC	CESMP – Management and monitoring	
Human disturbance	Minor	No glare or light spill from floodlights will be directed to the natural environment around the Site or the 500m buffer.	EPC	As soon as the works start and throughout construction period.	Negligible
Direct mortality of avifauna due to electrocution	Minor Negative	The EPC will prepare a technical assessment of the PL design, to show compliance with international good practice for bird mortality management in the design of the line, as specified in the EU "*Bern Convention Group of Experts on Conservation of Birds*" and Birdlife "*Birds and Power Lines within the Rift Valley/ Red Sea Flyway*". Aspects to be included in the assessment will include, but not be limited to: • The installation of bird rejecters above non-suspended insulators; • Strain poles with power lines below the crossarm to have insulating chains of more than 60cm length • Avoidance of strain poles with one conductor above the crossarm • Avoidance of power poles with upright insulators	EPC	Design	Negligible

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		• Conductors of suspended insulators will be placed at least 140cm apart. • For poles with the middle suspended insulator in a triangle- or vault-shaped frame, the distance between the perching site and middle suspended insulator to be at least 200cm in order to avoid electrocution during perching. • Terminal Poles and Tower stations: over voltage reactors to be attached below the crossarm and all down leading wires will be insulated with tubing. • Switch towers to be designed to have their switches below the cross arm. For each of these design recommendations, the EPC will clearly state which have been incorporated into the design, and when any has not been incorporated, the technical reason why it is not applicable will be outlined. • The report will be submitted to the Project Company and reviewed by a qualified independent expert to ensure that the proposed detailed design is aligned with good international practice to minimise bird mortality.			

8.3.5 Non-hazardous Waste and Hazardous Materials

Table 8-6 Non-hazardous Waste and Hazardous Materials Mitigation Measures – Construction Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Solid waste volumes/quantities	Minor	100% waste metal will be recycled	EPC	As soon as the works start and throughout construction period.	Negligible

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Ordering materials that have reusable packaging and/or in bulk can significantly reduce waste generated	EPC	As soon as the works start and throughout construction period.	
		Request suppliers to use minimal packaging.	EPC	As soon as the works start and throughout construction period.	
		Chemicals should be ordered in returnable drums.	EPC	As soon as the works start and throughout construction period.	
		"Buy-back" arrangements should be made with key suppliers so that any surplus chemicals or materials can be returned	EPC	As soon as the works start and throughout construction period.	
		Refillable containers will be used, where possible, for collection of solid and liquid wastes	EPC	As soon as the works start and throughout construction period.	
Housekeeping	Negligible to Minor	Separate waste streams to facilitate recycling. All storage areas must be well organised and waste appropriately managed through segregation by type (paper, plastic, metal, masonry) and whether the material is reusable onsite, recyclable or non-recyclable.	EPC	As soon as the works start and throughout construction period.	Negligible
		A waste log will be kept onsite and will contain, at least, information about quantities, management solution (according to the waste management hierarchy described in the baseline section) types,	EPC	As soon as the works start and throughout	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		operator, final disposal/destination, etc.)		construction period.	
		Install adequate containers for non-hazardous waste in designated areas to prevent waste from dispersing throughout the PL alignment. All containers will be collected, segregated and emptied on a regular basis in the storage facilities located in the shared Laydown Area.	EPC	As soon as the works start and throughout construction period.	
		Include in the employees' inception training sections to increase their awareness of waste management protocols including proper handling and storage of waste, and emergency response and contingency plans.	EPC	As soon as the works start and throughout construction period.	
		Separate waste streams to facilitate recycling. All storage areas must be well organised and waste appropriately managed through segregation of hazardous and non-hazardous waste. Waste within each category will be further segregated by type (paper, plastic, metal, masonry) and whether the material is recyclable or non-recyclable.	EPC	As soon as the works start and throughout construction period.	
Waste Storage	Negligible to Minor	Food waste must be stored within a sealed metal or plastic skip or bin, in order to prevent vermin/pests gaining access	EPC	As soon as the works start and throughout construction period.	Negligible
		Lightweight waste e.g. paper, cardboard, plastics: Must be stored within a skip sealed with a secured tarpaulin/netting sufficient to prevent any material being dispersed.	EPC	As soon as the works start and throughout construction period.	
		Heavy waste must be contained within an open skip, providing that segregation occurs effectively enough to remove all lightweight material that could be blown away.	EPC	As soon as the works start and throughout construction period.	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		For litter (food waste, domestic waste), bins for separate categories will be placed throughout the Site at locations where construction workers and staff consume food. These will be regularly collected and taken to the laydown area. Portable separate bins will also be placed at areas where works will be undertaken (interconnection point, power line, access road, etc.)	EPC	As soon as the works start and throughout construction period.	
		No underground waste containers will be deployed and will be located in a fenced dedicated area in the shared Laydown Area. This waste storage area will be located considering potential risks (e.g. traffic accident).	EPC	As soon as the works start and throughout construction period.	
		Waste containers will be clearly marked with appropriate warning labels to accurately describe their contents and detailed safety precautions. Labels will be waterproof, and securely attached. Wherever possible, chemicals will be kept in their original container	EPC	As soon as the works start and throughout construction period.	
		Waste generated during construction and stored in the shared Laydown Area will only be transported off-Site for disposal by an appropriately licensed vendor. This service provider will follow the proper protocols to ensure that all waste handling and disposal from the Site is carried out according to accepted national/regional environmental regulations. A record for all streams of generated and collected waste will be kept onsite.	EPC	As soon as the works start and throughout construction period.	
		Regular training of Site personnel in proper waste management and chemical handling procedures will be conducted at regular intervals.	EPC	As soon as the works start and throughout construction period.	
		Incineration/burning of wastes will not be allowed	EPC	As soon as the works start and throughout construction period.	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Waste Facilities	Negligible to Minor	Only Waste management facilities approved by national/regional authorities shall be used for the disposal of non-hazardous and hazardous wastes, respectively.	EPC	As soon as the works start and throughout construction period.	Negligible

8.3.6 Wastewater Management

Table 8-12 Wastewater Mitigation Measures – Construction Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Domestic Wastewater	Negligble to Minor	Chemical toilets/ septic tanks will be available at appropriate locations in the PL corridor and in the shared Laydown Area in sufficient number to attend the number of employees expected.	EPC	As soon as the works start and throughout construction period.	Negligible
		No domestic wastewater will be discharged outside the chemical toilets / septic tanks	EPC	As soon as the works start and throughout construction period.	
		Licensed operators will collect wastewater from chemical toilets/ septic tanks. Each chemical toilets/ septic tank will generally be collected and emptied before its contents reaches 80% of its capacity.	EPC	As soon as the works start and throughout construction period.	
		Septic tanks must be completely emptied before demobilisation to avoid contamination to the ground. The demobilisation procedure will ensure that tanks are not destroyed or damaged during the removal process.	EPC	As soon as the works start and throughout construction period.	

8.3.7 Traffic and Road Safety

Table 8-7 Traffic and Road Safety mitigation measures – construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Increased traffic load along National Highway and other on Residential Areas	Negligible to Minor	Determine the designated access routes for delivery of equipment, road capacity, entrance/exit points, etc.	EPC	As soon as the works start and throughout construction period.	Negligible
		Determine requirements for regular maintenance of vehicles (currently implemented) and use of manufacturer approved parts	EPC	As soon as the works start and throughout construction period.	
		Identify areas/spots sensitive to road safety issues and implement the necessary road safety measures, including residential areas where construction-related vehicles will pass through. Sensitive area will be communicated in advance to all drivers who will be provided with maps to ensure awareness. Special measures will need to be implemented if deemed necessary and appropriately communicated to drivers (e.g. lowers speed at a specific vulnerable spot in the route).	EPC	As soon as the works start and throughout construction period.	
		Manage delivery times of construction materials and equipment outside of peak hours.	EPC	As soon as the works start and throughout construction period.	
		Stagger key deliveries or periods of high vehicle movements to the laydown area and reduce waiting times for drivers and over demand on receiving staff at the laydown area.	EPC	As soon as the works start and throughout construction period.	
		Engines will be turned off while waiting in or outside the site.	EPC	As soon as the works start and throughout construction period.	
		Staff will not be allowed to rest in vehicles to prevent excessive fuel wastage through the need to use air conditioning. Appropriate resting facilities will be provided at the landing for the drivers at the laydown area.	EPC	As soon as the works start and throughout construction period.	
		Drivers should be fully competent and authorised to drive HGVs	EPC	As soon as the works start and	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		and should receive specific road safety training		throughout construction period.	
		All vehicles dedicated full time for the project and circulating on roads outside the site (owned or used by the Project Company, EPC or subcontractors) will have a clearly visible unique identification number and a sign with a telephone number for any road user that identifies reckless driving behaviour to be able to report it. Reports will be documented as grievances and investigated.	EPC	As soon as the works start and throughout construction period.	
Movement of vehicles alongside the corridor	Minor to Moderate	Temporary construction roads will be clearly signalled. Dust suppression measures will be conducted where and when required.	EPC	As soon as the works start and throughout construction period.	Negligible
		Determine the designated access routes for delivery of equipment, corridor entrance points.	EPC	As soon as the works start and throughout construction period.	
		A 30km/h speed limit will be imposed across the construction site in order to avoid direct mortality of fauna. Vehicle speeds will be restricted to 20Km/h on unpaved areas.	EPC	As soon as the works start and throughout construction period.	
		Post designated routes and signs for directions and speed limits along the site.	EPC	As soon as the works start and throughout construction period.	
		Specific waiting areas will be designated in suitable locations. No waiting areas will be designate in proximity to residential units or settlements.	EPC	As soon as the works start and throughout construction period.	

8.3.8 Archaeology and Heritage

Table 8-8 Archaeology and Heritage Mitigation Measures – Construction Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Destruction of unknown archaeological remains	Minor	Implement a Chance Find Procedure	EPC	As soon as the works start and throughout construction period.	Negligible

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8.3.9 Landscape and Visual

Table 8-9 Landscape and Visual Mitigation Measures – Construction Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Light Pollution	Minor	Any flood lights required during night time construction activities will be directed onto the PL corridor, with a maximum position angle of 30° from vertical, therefore minimising any potential light leakage and impacts at night.	EPC	As soon as the works start and throughout construction period	Negligible to Minor

8.3.10 Socio-economic

Table 8-10 Socio-economic Mitigation Measures – Construction Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Employment and Accommodation	Minor Positive	The project will seek to employ local workers where they are willing and available and have the skills required for the task. Non-specialist job opportunities will be offered to the local residents prior to hiring of employees from other areas when possible. The employment of women and vulnerable groups will be specifically targeted when possible.	EPC	As soon as the works start and throughout construction period	Moderate Positive
		Establish and implement a recruiting policy and ensure that the necessary measures to mitigate negative impacts associated with labour and working conditions are implemented (e.g. child and forced labour, exploitation, excessive overtime, insufficient wages, harassment, unsafe/unhygienic living and working conditions, etc.). Labour and working conditions will be aligned with IFC standards.	EPC	As soon as the works start and throughout construction period	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Workers' accommodation (if required, as it is not envisaged at this stage) will comply with IFC standards.	EPC	As soon as the works start and throughout construction period Cost should be integrated into the budget.	
		Strict controls over the provision of housing shall prevent any unplanned settlements from developing.	EPC	As soon as the works start and throughout construction period	
		A Retrenchment Plan will be prepared for moving from construction to operation.	EPC & Project Company	As soon as the works start and throughout construction period	
Purchases	Minor Positive				Minor Positive
		The EPC will only engage with reputable subcontractors that do not use force or child labour and are capable to implement the applicable with environmental and social measures established in the CESMP and other documents applicable to the construction of the project.	EPC	As soon as the works start and throughout construction period	
		Purchase of goods and services within the local/regional area will be prioritized.	EPC	As soon as the works start and throughout construction period	
E&S and Health and Safety Risks	Minor Negative	If any activities that have not been assessed on the SESIA are proposed, potential E&S and HS risks to the communities will	EPC	As soon as the works start and	Minor Negative

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		be assessed prior to their implementation or development.		throughout construction period	
Dissemination of Skills	Minor Positive	Local employees will receive E&S and OHS training to enhance the development of skills. A certificate outlining the contents of the training and signed by the management of the PL will be provided to employees upon finalisation of the employment contract.	EPC	As soon as the works start and throughout construction period	Minor Positive
Conflict – workforce	Negligible to Minor Negative	Training for foreign employees will include information on the cultural background of the local population.	EPC	As soon as the works start and throughout construction period	Negligible to Minor Negative
Security Provisions	Minor Negative	Develop and implement a Policy on Security and a Code of Conduct for Security Personnel.	EPC	As soon as the works start and throughout construction period	Minor Negative
		The security provider and personnel will adhere to international human right code of conduct. Only security personnel and companies with no human right violations will be employed.	EPC	As soon as the works start and throughout construction period	
		Security personnel will undergo a dedicated training program which will include, as a minimum, information on how to exercise practices following GIIP (UN Voluntary Principles on Security and Human Rights), cultural background of the area and the workforce (main groups), and the way they should interact with local communities and workers.	EPC	As soon as the works start and throughout construction period	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Spread of Diseases	Negligible to minor Negative	Prevention of diseases (including STDs) will be included in the training programme through toolbox talks or separate training sessions.	EPC	As soon as the works start and throughout construction period	Negligible to minor Negative
Informal Settlements / Encroachment	Minor Negative	Unplanned settlements will be monitored by onsite security personnel and reported to the authorities.	EPC	As soon as the works start and throughout construction period	Negligible
		The local public security forces will be required to deal with encroachers as per national requirements.	EPC	As soon as the works start and throughout construction period	

8.4 Operational Phase – 225kV Power Line

The following tables provide mitigation measures for potential negative environmental and social impacts resulting from the operation of the Power line.

8.4.1 Biodiversity

Table 8-13 Ecology and Biodiversity mitigation measures – operational phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Direct mortality of avifauna due to electrocution	Minor Negative	The EPC will prepare a technical assessment of the PL design, to show compliance with international good practice for bird mortality management in the design of the line, as specified in the EU "*Bern Convention Group of Experts on Conservation of Birds*" and Birdlife "*Birds and Power Lines within the Rift Valley/ Red Sea Flyway*". Aspects to be included in the assessment will include, but not be limited to: • The installation of bird rejecters above non-suspended insulators; • Strain poles with power lines below the crossarm to have insulating chains of more than 60cm length • Avoidance of strain poles with one conductor above the crossarm • Avoidance of power poles with upright insulators • Conductors of suspended insulators will be placed at least 140cm apart. • For poles with the middle suspended insulator in a triangle- or vault-shaped frame, the distance between the perching site and middle suspended insulator to be at least 200cm in order to avoid electrocution during perching. • Terminal Poles and Tower stations: over voltage reactors to be attached below the crossarm and all down leading wires will be insulated with tubing. • Switch towers to be designed to have their switches below the cross arm. For each of these design recommendations, the EPC will clearly state which have been incorporated into the design, and when any has not been incorporated, the technical reason why it is not applicable will be outlined. • The report will be submitted to the Project Company and reviewed by a qualified independent expert to ensure that the proposed detailed design is aligned with good international practice to minimise bird mortality.	EPC	Design	Negligible
Direct mortality of	Moderate Negativ	Multi-level arrangements of the power line cables and with neutral cable high above the conductor cables will be avoided if possible, as there pose higher risks for birds. A single-level arrangement is preferred.			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
avifauna due to collision	e	Where possible, use of neutral cable will be avoided. If the avoidance of the neutral cable is not possible, the cable could be required to be made clearly visible by suitable marker balls. Marker balls can reduce collision accidents by 50 to 85%. In order to determine if collision rates justify the installation of marker balls, bird mortality monitoring will be undertaken for the first two years of operation of the Power Line, as detailed in the monitoring chapter. If identified mortality during a single migratory season exceeds 3 carcasses of threatened species (VU, CR or EN as per IUCN) or 10 carcasses in total, ball markers will be installed. If there is a clear geographical pattern of bird mortality, the markers could be installed only in the areas with significantly higher mortality rates.	EPC (Design) O&M (monitoring) EPC (if installation of marker balls is required during the first two years of operation)	As soon as the operation start and during the fist two years of operation	Negligible

9 ENVIRONMENTAL & SOCIAL MONITORING PLAN

9.1 Laayoune 80MW Photovoltaic Plant

The following table outlines the parameters that, as a minimum, need to be monitored for the Power Plant.

Table 9-1 Framework Monitoring Plan – Power Plant

MONITORING PLAN – POWER PLANT						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
Construction						
Air quality - PM_{10} $PM_{2.5}$	Site boundary and at Sensitive Receptors	Air filters or dust collectors	Weekly during site preparation activities	Dust from vehicles and earthworks	To be determined by the EPC	EPC
Air Quality - Exhausts	Equipment exhausts	Visual inspection of the smoke (follow testing equipment specifications for use)	Daily Inspections	If there is visible dark smoke, the equipment will be sent for maintenance or replaced	Not applicable	EPC
Air Quality – Exhausts	Vehicles entering to the site	Visual inspection of the smoke (follow testing equipment specifications for use)	Always	If there is visible dark smoke, the vehicles will not enter the site	Not applicable	EPC/ Subcontractors

MONITORING PLAN – POWER PLANT						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
Noise	Inside the Project Site and at Sensitive Receptors	Standard noise monitoring methodology, as described in the baseline monitoring survey.	Weekly during site preparation and construction of foundations. Monthly during the rest of construction.	Construction activities increase noise levels (nuisance, disturb fauna, work hazard)	To be covered by the EPC (indicative cost noise meter 2000-5000 MD)	EPC
Waste management -	-	Waste log quantities and types of solid waste reuse, recycling and disposal. Include an indication if solid waste disposal has met intended construction phase recycling, recovery or reuse targets	Bi-weekly	Monitor compliance with waste management targets	Not applicable	EPC / subcontractors
Waste management	-	Waste log- quantities and types of solid waste taken off site, the approved handler, and where the waste was disposed. Special attention will be given to hazardous waste.	Every time waste is taken offsite. Statistics compiled monthly.	Monitor compliance with off-site disposal by approved subcontractors	Not applicable	EPC / subcontractors

MONITORING PLAN – POWER PLANT						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
Wastewater management -	-	Waste log quantities and types septic tanks taken off site, the approved handler, and where the waste was disposed;	Every time sewage is taken offsite. Statistics compiled monthly.	Monitor compliance with off-site disposal by approved subcontractors	Not applicable	EPC / subcontractors
Underground Septic Tanks, identification of leakage –;	-	Waste log quantities of sewage flowing into underground septic tank compared to sewage being tankered off	Calculations undertaken monthly.	Potential leakage from underground septic tanks.	Not applicable	EPC / subcontractors
Waste Management -	Solid Waste Storage Areas	Visual inspection non-hazardous solid waste storage collection, storage and transfer areas or evidence of accidental releases and to verify that wastes are properly labelled and stored	Daily	Monitor compliance with waste storage targets	Not applicable	EPC
Hazardous Materials -	Hazardous Materials storage collection,	Visual inspection	Daily	Monitor compliance with hazardous materials storage	Not applicable	EPC

MONITORING PLAN – POWER PLANT						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
	storage and transfer areas			targets		
Runoff system - blockages	Runoff system	Visual inspection	Weekly and in prevision of rain	Monitor compliance with overflowing	Not applicable	EPC
Runoff system - erosion prevention	Runoff system discharge points	Visual inspection	Weekly and following intense rain events	Monitor compliance with erosion objectives	Not applicable	EPC
Soil Quality	Hazardous materials and liquid and solid waste storage areas as a minimum	Sampling methodology as described in SESIA – Soil Quality section	Soil samples will be analysed following the release of hazardous substances onto the soil and the required restoration	Monitor compliance with ground pollution targets	Quotations to be obtained by the EPC.	EPC
Ecological status – presence of fauna.	Along fence line boundary and buffer zone outside of PV site.	Visual inspection of habitat around the boundary of the site and photograph of any changes	Monthly	To ensure that there is no loss of habitat or fauna outside of the plant boundary fence.	Not applicable	EPC
Ecological status - Additionally, detect	Onsite	Visit trenches and other risk areas as part of the daily inspections to record	Daily	To avoid mortality of reptiles or small	Not applicable	EPC

MONITORING PLAN – POWER PLANT						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
caught/trapped fauna. Specialist is not required.		any trapped animals		mammals		
Traffic and Transportation	Within the site and in the access road	Speed meter device	Weekly	Monitor compliance with speed limits	Cost of speed meter	EPC
Housekeeping	Site and access roads	Visual Inspection and collection	Onsite: Daily Access roads: Weekly	Monitor good construction housekeeping practices onsite and at access roads	Not applicable	EPC
Lighting	Boundaries of the site and at Sensitive Receptors	Visual assessment of directional lighting	Quarterly	Minimise light spill glare and sky-glow.	Not applicable.	EPC
Recruitment policy	Not applicable	Ratio local, regional, national and international employees. Rations of women employees.	Monthly	Provide employment for local population, minimize impact immigrant labour	Not applicable	EPC

MONITORING PLAN – POWER PLANT						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
Complaints register	Point of contact to be posted at the site entrance	Register complaints and how they are addressed	Every time there is a complaint	Record, address and follow up complaints	Not applicable	EPC
Community Grievances	Isolated households and Edchera	HSE team members from the EPC and Project Company to visit the isolated houses in the area and the village of Edchera to capture potential grievances.	Monthly	Capture grievances from potentially vulnerable social receptors	Not applicable	Project Company and EPC
Emergency monitoring	Not applicable	Register emergencies and follow-up-remediation	Every time there is an emergency	Register emergencies and follow-up-remediation	To be covered by the EPC.	EPC
Operation						
Waste management -	-	Waste log estimated of quantities and types of solid waste reuse, recycling and disposal. Include an indication if	Quarterly	Monitor compliance with waste management targets	Not applicable	O&M / subcontractors

MONITORING PLAN – POWER PLANT						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
		solid waste disposal has met intended recycling, recovery or reuse targets				
Waste management -	-	Waste log quantities and types of solid waste taken off site, the approved handler, and where the waste was disposed. Special attention will be given to hazardous waste.	Every time waste leaves the site. Statistics to be compiled quarterly.	Monitor compliance with off-site disposal by approved subcontractors	Not applicable	O&M / subcontractors
Waste management -	-	Waste log quantities and types septic tanks taken off site, the approved handler, and where the waste was disposed;	Monthly	Monitor compliance with off-site disposal by approved subcontractors	Not applicable	O&M / subcontractors
Waste Management -	Waste storage collection, storage and transfer areas	Visual inspection evidence of accidental releases and to verify that wastes are properly labelled and stored	Weekly	Monitor compliance with waste storage requirements	Not applicable	O&M
Hazardous Materials -	Hazardous Materials	Visual inspection	Weekly	Monitor compliance with	Not applicable	O&M

MONITORING PLAN – POWER PLANT						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
	storage collection, storage and transfer areas			hazardous materials storage requirements		
Runoff system - blockages	Runoff system	Visual inspection	Monthly and in prevision of rain	Monitor compliance with overflowing	Not applicable	O&M
Runoff system - erosion prevention mitigation measures	Runoff system discharge points	Visual inspection	Monthly	Monitor compliance with erosion objectives	Not applicable	O&M
Soil Quality	Hazardous materials and liquid and solid waste storage areas as a minimum	Sampling methodology as described in SESIA Soil Contamination chapter	If major accidental releases of pollutants take place, following remediation.	Monitor compliance with ground pollution targets	To be covered by the O&M or responsible subcontractor.	O&M / subcontractor
Ecological status – Presence of fauna onsite and nesting onsite. Specialist is not required.	Onsite, adjacent area (~200 m buffer)	Count of fauna species	Monthly	Monitor ecology around the site	Not Applicable	O&M

MONITORING PLAN – POWER PLANT						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
Ecological status – Identify bird or other fauna mortality,	Onsite	Identification and count of fauna species	Daily inspections All O&M workers to be trained to report carcasses onsite.	Monitor ecology around the site	Not Applicable	O&M
Lighting	Boundaries of the site	Visual assessment of directional lighting	Quarterly	Minimise light spill glare and sky-glow.	Not Applicable	O&M
Recruitment policy	Not applicable	Ratio local, regional, and Moroccan to expatriate labour and women to men	Quarterly	Provide employment for local population, minimize impact immigrant labour	Not Applicable	O&M
Complaints register	Point of contact to be posted at the site entrance	Register complaints and how they are addressed	Every time there is a complaint	Record, address and follow up complaints	Not Applicable	O&M
Community Grievances	Isolated households and Edchera	HSE team members from the O&M to visit the isolated houses in the area and the village of Edchera to capture potential grievances.	Quarterly	Capture grievances from potentially vulnerable social receptors	Not applicable	O&M

MONITORING PLAN – POWER PLANT						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
Emergency monitoring	Not applicable	Register emergencies and follow-up-remediation	Every time there is an emergency	Register emergencies and follow-up-remediation	To be covered by the O&M .	O&M
Supervision (during the construction and operation phases)						
Independent Environmental Audits – Documentation	-	The auditors will review the environmental and social documentation kept at the facility, check the adequate implementation of the environmental procedures established in the ESMP (CESMP/OESMP) and documentary evidence of the application of the mitigation and monitoring measures stated in the SESIA, including the monitoring results	Quarterly (construction) Quarterly (operation – first two years) Yearly (remaining operational phase)	Independent environmental audits provide assurance of compliance with the measures included in the SESIA and the ESMP.	Project Company to hire independent external auditors.	NOOR Laayoune Project Company The auditors will be required to have auditing experience in Morocco in renewable projects and auditing experience in projects aligned with IFC

MONITORING PLAN – POWER PLANT						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
						requirements
Independent Environmental Audits — Site inspection	-	The auditors will visit the plant, to ensure that the environmental and social procedures are being adequately applied onsite.	Quarterly (construction) Quarterly (operation – first two years) Yearly (remaining operational phase)	Independent environmental audits provide assurance of compliance with the measures included in the SESIA and the ESMP.	Project Company to hire independent external auditors.	NOOR Laayoune Project Company The Consultancy will be required to have auditing experience in Morocco in renewable projects and auditing experience in projects aligned with IFC requirements

9.2 225kV Power Line

The following table outlines the parameters that, as a minimum, need to be monitored for the Power Line.

Table 9-2 Framework Monitoring Plan

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
Construction						
Air quality - Dust	Site boundary and at Sensitive Receptors	Visual Inspection of dust particles	Weekly during site preparation activities	Dust from vehicles and earthworks	To be determined by the EPC	EPC
Noise	Inside the Project Site and at Sensitive Receptors	Standard noise monitoring methodology, as described in the baseline monitoring survey.	Weekly during site preparation and construction of pylons. Monthly during the rest of construction.	Construction activities increase noise levels (nuisance, disturb fauna, work hazard)	To be covered by the EPC (indicative cost noise meter 2000-5000 MD)	EPC
Ecological status – presence of fauna.	Along fence line boundary and buffer zone outside of PV site.	Visual inspection of habitat around the boundary of the site and photograph of any changes	Monthly	To ensure that there is no loss of habitat or fauna outside of the plant boundary fence.	Not applicable	EPC
Waste management -	Not applicable	Waste-log quantities and types of solid waste reuse, recycling and disposal.	Bi-weekly	Monitor compliance with waste	Not applicable	EPC / subcontractors

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
		Include an indication if solid waste disposal has met intended construction phase recycling, recovery or reuse targets		management targets		
Waste management	Not applicable	Waste log- quantities and types of solid waste taken off site, the approved handler, and where the waste was disposed. Special attention will be given to hazardous waste.	Every time waste is taken offsite. Statistics compiled monthly.	Monitor compliance with off-site disposal by approved subcontractors	Not applicable	EPC / subcontractors
Wastewater management -	Not applicable	Waste log quantities and types septic tanks taken off site, the approved handler, and where the waste was disposed;	Every time sewage is taken offsite. Statistics compiled monthly.	Monitor compliance with off-site disposal by approved subcontractors	Not applicable	EPC / subcontractors
Waste Management -	Solid Waste Storage Areas	Visual inspection non-hazardous solid waste storage collection, storage and transfer areas or evidence of accidental	Daily	Monitor compliance with waste storage targets	Not applicable	EPC

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
		releases and to verify that wastes are properly labelled and stored				
Hazardous Materials -	Hazardous Materials storage collection, storage and transfer areas	Visual inspection	Daily	Monitor compliance with hazardous materials storage targets	Not applicable	EPC
Soil Quality	Hazardous materials and liquid and solid waste storage areas as a minimum	Sampling methodology as described in SESIA – Soil Quality section	Soil samples will be analysed following the release of hazardous substances onto the soil and the required restoration	Monitor compliance with ground pollution targets	Quotations to be obtained by the EPC.	EPC
Traffic and Transportation	Within the site and in the access road	Speed meter device	Weekly	Monitor compliance with speed limits	Cost of speed meter	EPC
Housekeeping	Site and access roads	Visual Inspection and collection	Onsite: Daily Access roads: Weekly	Monitor good construction housekeeping practices onsite	Not applicable	EPC

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
				and at access roads		
Lighting	Boundaries of the site	Visual assessment of directional lighting	Quarterly	Minimise light spill glare and sky-glow.	Not applicable.	EPC
Recruitment policy	Not applicable	Ratio local, regional, national and international employees. Rations of women employees.	Monthly	Provide employment for local population, minimize impact immigrant labour	Not applicable	EPC
Complaints register	Point of contact to be posted at the site entrance	Register complaints and how they are addressed	Every time there is a complaint	Record, address and follow up complaints	Not applicable	EPC
Emergency monitoring	Not applicable	Register emergencies and follow-up-remediation	Every time there is an emergency	Register emergencies and follow-up-remediation	To be covered by the EPC.	EPC
Operation						
Ecological status – Presence of fauna	Onsite, adjacent area	Count of fauna species	Monthly	Monitor ecology around the site	Not Applicable	O&M

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
onsite and nesting onsite. Specialist is not required.	(~200 m buffer)					
Ecological status – Bird Mortality Monitoring	PL alignment and poles See Section 6.1.1	Bird mortality identification, count of carcasses, species identification and carcass removal trials. All O&M workers to be trained to report carcasses onsite. See Section 6.1.1	Monthly during bird migration periods (end of August to November and March to mid May) for the first two years of operation of the power line. See Section 6.1.1	Monitor Bird Mortallity within the alignment. See Section 6.1.1	To be covered by the O&M.	O&M
Supervision (during the construction and operation phases)						
Independent Environmental Audits – Documentation	Not applicable	The auditors will review the environmental and social documentation kept at the facility, check the adequate implementation of the environmental procedures established in the ESMP (CESMP/OESMP) and documentary	Quarterly (construction) Quarterly (operation – first two years) Yearly (remaining operational phase)	Independent environmental audits provide assurance of compliance with the measures included in the SESIA and the ESMP.	Project Company to hire independent external auditors.	Project Company The auditors will be required to have previous auditing experience in Morocco and in projects aligned

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
		evidence of the application of the mitigation and monitoring measures stated in the SESIA, including the monitoring results				with IFC requirements.
Independent Environmental Audits — Site inspection	Not applicable	The auditors will visit the plant, to ensure that the environmental and social procedures are being adequately applied onsite.	Quarterly (construction) Quarterly (operation – first two years) Yearly (remaining operational phase)	Independent environmental audits provide assurance of compliance with the measures included in the SESIA and the ESMP.	Project Company to hire independent external auditors.	Project Company The auditors will be required to have previous auditing experience in Morocco and in projects aligned with IFC requirements.