



DEWA SOLAR PHOTOVOLTAIC (PV) IPP PHASE VI PROJECT

ESIA NON-TECHNICAL SUMMARY

NOVEMBER 2023



Prepared by:
Dome HSE Consulting
A Division of
**Dome International Safety & Environmental
Consultants LLC**



DOMES HSE CONSULTING
 A Division of
 Dome International Safety &
 Environmental Consultants L.L.C
 Qataiyat Road, PO Box 24652
 Dubai, United Arab Emirates
 Tel.: + 971 4 3366 144
 Fax: + 971 4 3359 434
 Email: dome@domeint.com
 Web site: www.domeint.com

Client: 			Project No: ED23.67		
Report Summary: ESIA for DEWA Solar Photovoltaic (PV) IPP Phase VI Project – Non-Technical Summary			Date: 07 th November 2023		
			Document No: ED23.67_ESIA NTS		
0	Issued for Review	RB	NR	HA	07-Nov-23
Revision	Description	Originator	Reviewed	Approved	Date
<p><i>The preparation of this report by Dome has been undertaken within terms of the Brief using all reasonable skills and care. The report has been prepared in accordance with the relevant UAE laws and regulations for review by the appropriate designated authorities. Dome accepts no responsibility for data provided by other bodies and no legal liability arising from the use by other persons of data or opinions contained in this report.</i></p>			Distribution <input checked="" type="checkbox"/> Official <input type="checkbox"/> Public <input checked="" type="checkbox"/> Confidential		

NON-TECHNICAL SUMMARY

E.1 PROJECT DESCRIPTION

Background

The Government of Dubai, through Dubai Electricity & Water Authority (DEWA), is implementing the Mohammed Bin Rashid Al Maktoum Solar Park Project (MBR Solar Park). The Park is the largest single-site solar park in the world based on the Independent Power Producer (IPP) model and has a planned production capacity of 5,000 MW by 2030. The development of the park is being implemented in several phases and DEWA has selected Abu Dhabi Future Energy Company (Masdar) to build and operate the 1,800-megawatt (MW) sixth phase [i.e., Solar Photovoltaic (PV) IPP Phase VI, the Project]. It should be noted that MBR Solar Park currently has an installed capacity of 2,427 MW and the implementation of Phase VI will increase the total production capacity to 4,660MW.

The MBR Solar Park Project is in support of the Dubai Clean Energy Strategy 2050, which aims to diversify the emirate’s sources of energy and to make Dubai a global center of clean energy and green economy. Based on the current strategy of the Emirate, it aims to have 7% of Dubai’s energy from clean energy sources by 2020, 25% by 2030 and 75% by 2050. Once completed, it is expected to save over 6.5 million tons of carbon emissions annually.

Project Components

A photovoltaic (PV) power plant is a large-scale PV system designed for the supply of power into the electricity grid. The solar arrays are the subsystems which convert incoming light into electrical energy. They comprise a multitude of solar modules, mounted on support structures and interconnected to deliver a power output to electronic power conditioning subsystems. Table 1.1 lists the main components and design details of the proposed PV power plant (PV IPP Phase VI). The generated power of the plant (1,800 MWac) will be exported to the Offtaker electrical transmission system (to be constructed separately).

Table 1.1 – Main Components and Design Details of the Phase VI

Component	Design Details
Capacity	
AC Power (MWac)	1,800 (Phase A – 600 MW by 2024, Phase B – 400 MW by 2025 and Phase C – 800 MW by 2027)
Maximum DC Voltage Level	1,500
Solar Modules	
Type	Mono or polycrystalline with P-type/N-type substrate, mono-facial or bi-facial modules
Inverter	
Type	Commercial large multi-string inverters
Mounting Structure / Tracker	
Type	Single Axis Tracker, 1 module in portrait

The PV modules are the main electrical equipment of the whole plant, and they are connected in series to form array strings. The design requirement for the plant is to select modules with advantages of high battery conversion efficiency, good stability, and small size for equal capacity. The PV technology to be employed for the Project will involve either mono-crystalline or polycrystalline silicon, as follows:

- Monocrystalline silicon: generally considered to be the most efficient to date of the mass-produced PV modules, however, they are also the most expensive ones. Their PV cells are made from single crystals of silicon sliced from single-crystal ingots grown by slowly pulling a seed crystal from molten silicon.
- Polycrystalline silicon: Polycrystalline PV is based on silicon wafers being cut from an ingot of melted and re-crystallized silicon. Sliced from blocks of cast silicon, these wafers/cells are both less expensive to manufacture and less efficient than single-crystal silicon cells.

The actual PV module to be utilized will be defined during detailed design subject to the following specifications:

- All PV modules shall be preferably manufactured at the same production facility which shall be checked and certified by a third party to be selected by the Offtaker/DEWA before the module production for the Plant starts.
- It shall be ensured that the supplied PV modules have positive power tolerance and shall be current sorted.
- The PV module type and series foreseen for each phase shall have been deployed and in operation on the field for at least 12 months prior to the Deadline for Submission of Proposals in commercial financed non-recourse projects; in this respect it is also allowed to supply modules with reasonably higher power (bin) classes as long as the manufacturer, technology, type, and series remain the same.
- DC connectors of the same brand and type used by the PV module manufacturer shall be selected. DC Connectors of different brands shall not be used in the same connection (male- female).

E.2 ESIA PROCESS

The Government of Dubai launched the MBR Solar Park in January 2012, in accordance with the Dubai Integrated Energy Strategy 2030. The local EIA process for the solar park were undertaken as follows:

- An EIA study was carried out for Phase I and was approved by DM on 2nd August 2012 (Environmental Clearance No.: EC/MP/INF-2012/07).
- A separate EIA study was conducted in 2013 for the full development of MBR Solar Park considering the formerly planned capacity of 1,000 MW. Based on this EIA study, DM had issued an Environmental Clearance (EC) for Mohammed Bin Rashid Al Maktoum Solar Park (EC No.: 013/2013, dated 5th November 2013).
- In the EIA study for 1,000 MW MBR Solar Park, the Phase II component was initially planned as a 100 MW PV plant. However, the Phase II capacity was increased to 200 MW and thus, a separate EIA study was undertaken. The EC for the 200 MW PV Solar Power Plant, i.e. Phase II was issued in July 2015 (EC No. 037/2015).
- The overall capacity of the Project increased from 1,000 MW to 3,000 MW, resulting in an increase in the total land requirements from approximately 40.45 km² to 76.6 km². In accordance with the conditions of EC No. 013/2013, an EIA update has been undertaken and DM subsequently issued a new EC for the 3,000 MW PV and CSP Mohammed Bin Rashid Al Maktoum Solar Park, i.e. EC No. 179/2016, issued on 27th November 2016.

- The Phase IV and Phase V components of the MBR Solar Park were afterwards implemented, but no EIA update has been requested by DM. The Environmental Clearance (EC) for the entire MBR Solar Park (Ref., No.: EPBI-150222-0045) was last renewed on 2nd March 2022 and is valid until 1st March 2024.

In line with the requirements of international lenders, the Environmental and Social Impact Assessment (ESIA) was undertaken to demonstrate the commitment of Masdar to implement the Project in compliance with local regulations, IFC PS and EP based on final design details of the facilities. This ESIA Report has been prepared to satisfy the following objectives:

- Identify and assess all potential environmental (including adverse, positive and cumulative impacts) and social impacts within the Projects area of influence (Aoi).
- Identify opportunities to avoid, or if not possible, define measures to minimize, mitigate, or compensate for potential adverse impacts on sensitive environmental and social receptors during Project implementation.
- Demonstrate, if required, how stakeholder engagement processes have been undertaken to keep any affected local community informed of all aspects of the Project implementation, and to integrate any feedback to develop more effective management measures.
- Demonstrate improved overall environmental and social performance through the effective use of natural resources, social networks and management systems through the development and effective implementation of an Environmental and Social Management Plan (ESMP) based on the results of the ESIA.
- Demonstrate compliance with the requirements of the local UAE and Abu Dhabi legal requirements and relevant international standards (IFC PS and EP)

In terms of environmental and social categorization, the proposed Project is categorized as a “Category A” project, which are “projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented”. This categorization is primarily based on the fact that the proposed Project is located in a locally declared desert conservation reserve and due to the nature of a solar park development that generally results in significant land-uptake.

E.3 SUMMARY OF FINDINGS

Environmental Baseline Conditions

The MBR Solar Park is located in Seih Al Dahl area in the Emirate of Dubai, about 55 km south of Dubai City (see Figure 1.1). The proposed Phase VI component will cover an area of about 20 km² (about 15% of the total land area of the park) of a greenfield site within the park that is located adjacent to the east of the Phase V site.

The proposed location for the Project is within the existing allotted and approved site for the MBR Solar Park. The site is largely undeveloped, except for a feeding area for Arabian Oryx, which part of the activities of the Al Marmoum Conservation Reserve. It should be noted that the entirety of the park is within the conservation reserve.

In terms of residential area, the nearest to the proposed site is Al Faqa, which is a farming community that is located at about 12 km east (see Figure 1.1). In addition, it should be noted that there are a number of livestock farms within the general area of the site and in the areas adjacent to the E14 highway. The nearest livestock farm to the proposed site is located about 2.3 km east of the site (see Figure 1.1). Furthermore, it should be noted that a strip of farm areas in Sweihan (an area within the Emirate of Abu Dhabi), is located about 9.5 km south of the proposed Project site (see Figure 1.1).

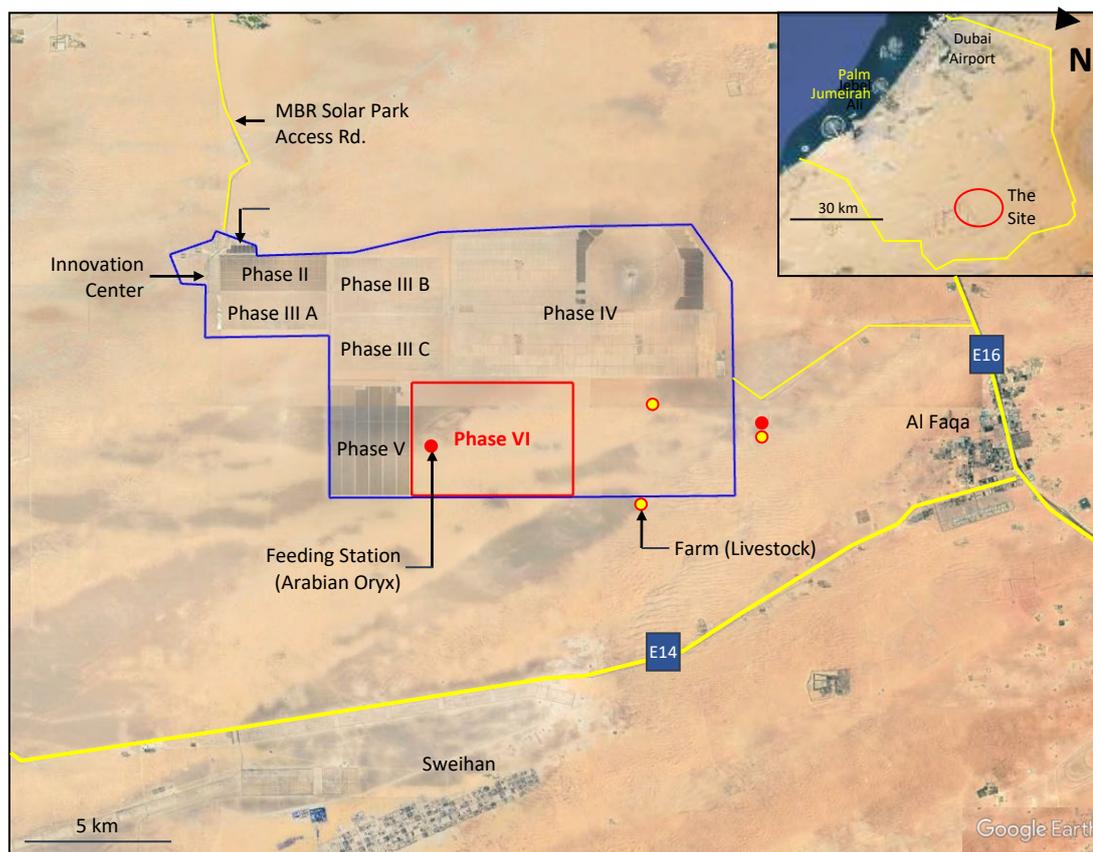


Figure 1.1 – Location of the DEWA Solar PV IPP Phase VI Project

Considering the nature of the proposed Project, the primary environmental baseline aspect that needs to be defined is the terrestrial ecological conditions within and in the immediate surrounding areas of the proposed Project site. As previously noted, the entire MBR Solar Park is located within the Al Marmoum Desert Conservation Reserve (see Figure 1.2). This protected area is the largest protected area in the Emirate of Dubai, covering an area of 949.35 km² or almost 23% of Dubai. The reserve supports various wild animals including the Arabian Oryx, Sand Gazelle (Reem), Arabian Gazelle (Aldmani) and diverse species of birds, reptile, and invertebrate species. The key terrestrial habitats in the reserve include Sand sheets with *Panicum*, *Prosopis cineraria* (Ghaf) Woodland, Dunes, Aeolianite, Sabkhas – interdunal plains, Gravel plains and Artificial lakes. The Al Marmoum Desert Conservation Reserve is classified as a Category II (National Parks) Protected Area under the IUCN Protected Areas System and is one of the first unfenced desert sanctuaries in the country open to the public for sustainable recreation.

It should be noted that one of the wildlife feeding stations of the conservation reserve is located within the proposed Project site. The feeding station is fenced with surrounding tree plantation (forestry belt, primarily Ghaf). There are more or less fifty feeding stations within the conservation reserve, and most are located at the northern part (away from the solar park).

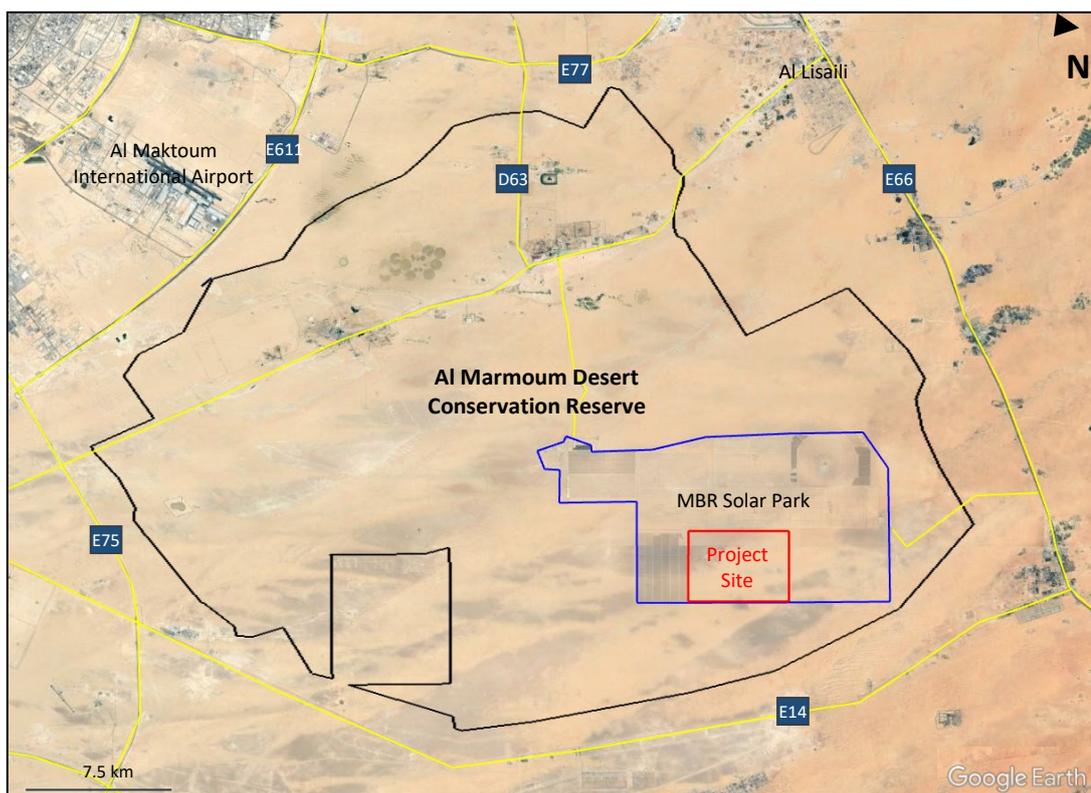


Figure 1.2 – Location of the MBR Solar Park within Al Marmoum Desert Conservation Reserve

Aol and Social Baseline Conditions

During construction phase, the primary impact of the Project is the land-uptake, which means that all existing land-uses within the Project would have to be removed and/or relocated. As previously noted, the facilities will be located within the approved boundary of the MBR Solar Park and thus, there will be no direct impact to any communities or areas with civilian population. The only existing land-use within the site is a feeding station for Arabian Oryx and gazelles, which has to be relocated prior to any site activities. It should be noted, however, that the relocation of this feeding station was already foreseen during the allocation of the area for the solar park and similar to other previous land-uses, relocation only take place prior to actual development

In terms of construction related environmental releases (such as noise, dust emissions, etc.), a maximum distance of 500 m from construction sites within proposed site can be considered as potential area of influence. It should be noted that based on site visits undertaken, there are no existing land-uses in the areas within 500 m of the Project site. Nonetheless, the existing Phase III, Phase IV, and Phase V PV plants are located directly adjacent to the northern (see Figure 3.3) and western boundary of the Project and could be directly affected by the construction releases (particularly dust).

During operation, the power plant will not involve any activities that would extend its outside the Project boundary (i.e., electricity transmission is not part of eth scope of this study). The primary factors that would influence the Aol during this phase are the noise from the operation of plant equipment and potential visual impacts (particularly glare. For noise, it should be noted that the plant will not have any high noise generating equipment during operation. Electrical equipment generally generates humming noise, which is not considered an issue considering the absence of sensitive receptors in the vicinity of the solar park.

During operation, glare is also a potential issue for air traffic that would be passing above the area. The nearest airport to the solar park is the Al Maktoum International Airport, which is located about 30 km northwest of the Project site. It is to be noted that although the park is relatively far, it falls within the landing path for the airport. It should be noted that in previous noise studies undertaken in the solar park area (i.e., EIA Report, 2018), aircraft noise was audible.

Key Environmental Issues

Electricity generation through solar power is generally regarded as a positive development, in particular due to its environmental benefits. If the potential emissions generated during the production of solar power plant components are to be excluded (i.e. solar modules, inverters, etc.), the actual operation of a solar power plant has negligible to zero carbon emissions (or generally called as neutral carbon emissions). Considering the prevailing arid conditions in the UAE (i.e. with very limited natural vegetation that could offset any carbon emissions), development of low carbon energy sources is a very important step towards sustainable development of the country.

During construction, potential impacts will include dust and gaseous emissions, noise generation and waste generation, etc., which are typical and can be managed through standard measures and best site practices. The key environmental concern associated with the development is its potential ecological impact, particularly habitat loss, disturbance to terrestrial fauna, etc. It is to be noted that ecological impacts, in particular due to land uptake, are generally regarded as the key impact of solar plant development (i.e. the capacity of plant is directly proportional to the area to be covered).

The primary ecological concern is the loss of habitat considering the site location within the Al Marmoum Desert Conservation Reserve. As previously noted, there is currently a feeding station within the Project site, which is part of the Arabian Oryx and gazelle's re-introduction program within the reserve. Both gazelles and Arabian Oryx are classified as Vulnerable species under the IUCN Red List. The Dhub species *Uromastix aegyptia leptieni*, a regional endemic species of the UAE that has a relatively limited distribution area, and Keyserling's Wonder Gecko (*Teratoscincus keyserlingii*) were also known to be present in the area from previous studies carried out. In addition to faunal species, a considerable number of Ghaf trees are also present within the Project area. Although the Ghaf tree is not a protected floral species, it is of national importance in the UAE. Considering the very limited natural vegetation in Dubai and in the UAE, conservation of this floral species is essential.

It should be noted, nonetheless, that the loss of habitat as part of the Project has already been assessed as part of the overall EIA study for the solar park. Furthermore, the development of the park itself is being promoted by the government as part of the overall sustainability initiative for the reserve. Nevertheless, in line with the requirements of DM (the management entity of the conservation reserve), Masdar will carry out relocation of the feeding station and translocation of the naturally occurring native trees within the Project. The faunal species present in the area (both mammals and reptiles) will also be translocated prior to any site activities. In line with this and in concurrence with the development of this EIA Report, Masdar has commissioned the development faunal and floral translocation plans in coordination with DM.

During operations, bird mortality has also been identified as a potential issue. Bird mortality during the operation of the plant will be mainly related to direct collision with the structures to be built (i.e., PV modules, etc.) and because of the concentrated heat to be generated in the area. It should be noted that the Al Marmoum Desert Conservation Reserve is classified nationally and internationally as an Important Bird Area (IBA). The development of artificial lakes within the reserve might also result in increased bird activities in the area.

Based on the above, bird mortality is a potential issue during the operation of the PV plant. Thus and considering that PV plant operation is relatively new and that the actual studies on related bird mortality is limited, it is essential for the operator to develop and implement a bird mortality monitoring program during the operation of the plant. This is particularly due to the development of artificial lakes within the desert conservation reserve, which could eventually attract birds to the area (a potential future bird habitat). The trend of bird mortality should be appropriately recorded and analyzed and coordination with relevant government agencies should be undertaken.

The potential issue in relation to glare created by the solar farm has also been identified as a potential issue during the plant operation. The potential impacts of the PV plant on air traffic during its operation are mainly related to safety, which include glint and glare visual impact, thermal impacts, and building/structure height. Thus, it is recommended that the Project proponent should undertake appropriate consultations with Dubai and UAE General Civil Aviation Authorities in order to understand their specific requirement for this aspect. It should be noted that aviation authorities could sometime requires specific tests or studies to be undertaken to ensure that any impacts are appropriately quantified (i.e. risk assessment or glare assessment). Considering that the Project is a part of the MBR Solar Park, this study should be undertaken covering the entire park operation in coordination with other operators and with DEWA

Key Social Issues

In general, the overall socio-economic impact of the Project is expected to be positive, particularly in the aspect of job generation (both during construction and operation) and on the overall energy source diversification and sustainability initiatives of the Dubai Government. As previously noted, the solar park once fully completed is expected to save over 6.5 million tons of carbon emissions annually. This is a socially important initiative considering the current reliance of the country in fossil fuel-based energy generation.

The proposed Project will not directly impact any civilian population or any other civilian related socio-economic activities. Any impact during construction is temporary and would be reversible. Land use is also not a concern since the plant will be in an area allocated for the MBR Solar Park development. During operation, the facilities will not have any direct interaction with any civilian infrastructure and thus, no negative socio-economic impacts are expected.

Land-uptake and land-use alteration is the key impact associated with the development of the PV plant considering the relatively large area required per unit of electricity produced. For this Project, a total area of 20 km² will be utilized, which means only about 11,000 m² per MW of electricity. It should be noted, however, that as discussed in the preceding sections, the site is located within the approved site for the MBR Solar Park. The site is currently not used for any purpose (i.e. uninhabited and barren and there are no civilian population in the general surrounding area). However, as previously discussed, a feeding station for Arabian Oryx and gazelles is still present in the area. The relocation of this feeding station, however, was already identified in previous EIA studies and that the actual relocation is just being conducted progressively in concurrence with actual developments within the park. As previously noted, Masdar and its designated consultants are concurrently in coordination with DM for the development of translocation plans and eventually the actual translocation activities.

The results of social baseline data gathering showed that the implementation of the proposed Project will not directly affect any communities or livelihood/socio-economic activities and thus, detailed external stakeholder engagement is not required during the Project implementation.

Nonetheless, consultations, information dissemination and acquisitions of NOCs are required to ensure that the implementation of the construction works will not result in negative social effects and will not affect any other developments that are planned within the general area of the Project sites. Consultations and acquisition of permits, on the other hand, are important in relation to DM, who manages the activities within the desert conservation reserve.

ESIA Action Plan

Table 1.2 – ESIA Action Plan

No.	Action to be taken	Action By	Timetable
ESIA-1	The flora and fauna translocation programs shall be approved and completed prior to any site activities.	Masdar	Prior to any site activities
ESIA-2	Develop a Construction Environmental Management Plan (CEMP) based on the recommendations and mitigations measures outlined in this ESIA Report.	Masdar	Prior to any site activities
ESIA-3	Develop an Operation Environmental Management Plan (OEMP) based on the recommendations and mitigations measures outlined in this ESIA Report.	Masdar	Prior to operation
ESIA-4	BMP should be developed in line with IFC requirements.	Masdar	Prior to the translocation activities
ESIA-5	Ensure timely implementation of the stakeholder Consultation Program (see Table 1.3).	Masdar	As per defined schedule

Table 1.3 – Stakeholder Consultation Program for the Project

S. No.	Stakeholder Groups / Location	Entities /Parties	Classification	Communication Tool	Implementation Phase	Status
Residential Areas						
ESC.1	Residential houses in Al Faqa, Al Lisaili, Al Muqarab and Qraitisin	<ul style="list-style-type: none"> ▪ Private/individual owners ▪ Dubai Municipality 	Non-municipal (Private)	Low influence – low interest	Construction and Operation	Not started, to commence during EPC phase.
Industrial and Commercial						
ESC.2	Other solar power plant facilities within the solar park	<ul style="list-style-type: none"> ▪ DEWA ▪ ACWA Power and TSK ▪ EDF ▪ Noor Energy ▪ ACWA Power and Gulf Investment Corporation 	Non-municipal (Private)	High influence – high interest	Construction and Operation	Initial consultation completed during Project inception. Coordination to continue during EPC and Operation phases.
ESC.3	Operators / owners of horse stables and hotels in area	<ul style="list-style-type: none"> ▪ Private/individual owners ▪ Bab AL Shams Resort 	Non-municipal (Private)	Low influence – high interest	Construction	Not started, to commence during EPC phase.
Agriculture Sector						
ESC.4	Farms (livestock)	<ul style="list-style-type: none"> ▪ Individual farm owners ▪ Dubai Municipality 	Non-municipal (Private)	Low influence – low interest	Construction and Operation	Not started, to commence during EPC phase.

S. No.	Stakeholder Groups / Location	Entities /Parties	Classification	Communication Tool	Implementation Phase	Status
		(Agriculture Department)				
Protected Areas						
ESC.5	Al Marmoum Desert Conservation Reserve	<ul style="list-style-type: none"> ▪ Dubai Municipality (NRS and other relevant departments) ▪ Private entities managing the tourism and recreational activities in the area. 	Municipal (Government)	High influence – high interest	Pre-construction / Construction and Operation	Permitting process completed. Coordination to continue for the planned translocation program and during operation
ESC.6	Archaeological sites	<ul style="list-style-type: none"> ▪ Dubai Culture 	Municipal (Government)	Low influence – low interest	Pre-construction	Not started, to commence during EPC phase.
Government / Services Providers Companies						
ESC.7	Police and Military (Security)	<ul style="list-style-type: none"> ▪ Dubai Police ▪ UAE Armed Forces GHQ 	Municipal (Government)	Low influence – low interest	Pre-construction / Construction	Not started, to commence during EPC phase.
ESC.8	Civil Aviation Authority	<ul style="list-style-type: none"> ▪ Dubai Civil Aviation Authority (DCAA) 	Non-municipal (Private)	Low influence – high interest	Construction	Not started, to commence during EPC phase.
ESC.9	Utility infrastructure and services providers	<ul style="list-style-type: none"> ▪ DEWA ▪ DM Public Utilities Department ▪ Emirates Telecommunication Group Company PJSC (Etisalat) ▪ Emirates Integrated Telecommunications Company PJSC (“du”) 	Non-municipal (Private) / Municipal (Government)	High influence – low interest	Pre-construction	Not started, to commence during EPC phase.