Enhancing Climate Change Adaptation in the North Coast and Nile Delta Regions in Egypt

Environmental and Social Management Framework

31 August 2017
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**EXECUTIVE SUMMARY**

This Environmental and Social Management Framework (ESMF) is prepared in support of a project proposal entitled “Enhancing Climate Change Adaptation in the North Coast and Nile Delta Regions in Egypt”. The project is submitted by the Shore Protection Authority (SPA) under the Ministry of Water Resources and Irrigation (MWRI) to the Green Climate Fund (GCF). This project is supported by the United Nations Development Programme (UNDP) in its role as a GCF Accredited Entity. The project has been screened against the UNDP’s Social and Environmental Standards Procedure and deemed a Moderate Risk (World Bank/International Finance Corporation Category B) project. As such, an ESMF has been prepared for the project. Chapter Five of the ESMF provides the Environmental and Social Management Plan for the project.

The MWRI is the National Designated Authority, with the SPA being the executing agency. A Project Management Unit (PMU) will be established for the implementation of the project and to manage compliance with this ESMF.

The project will target farmers and fisher-folk people directly (768,164 people, of which 377,189 are women) affected by the impacts of climate change; and people in urban/rural communities indirectly (a total of 16.9 million people) along the Mediterranean coastline of Egypt. The project involves two outputs; the installation of coastal protection structures at five (5) locations that are extremely vulnerable to sea level rise (SLR - a total of 69 km in the Nile Delta); and, the development of an Integrated Coastal Zone Management Plan (ICZM Plan) for the entire north coast of Egypt. The five vulnerable hotspots are located within the Nile Delta, and were identified during a scoping assessment. The locations include the Port Said, Damietta, Beheira, Dakahlia, and Kafr El-Sheikh governorates. The interventions at the five vulnerable hotspots have been designed to mirror natural coastal features and/or sand dunes and will transform the areas from high risk zones to low risk zones for coastal flooding. Some of the areas will be stabilised with a combination of rocks and local vegetation species to encourage dune growth by trapping and stabilising blown sand to manage long-term climate change risks and provide Egypt with adaptability to impending flood risks.

Material will be utilised based on beneficial reuse from existing dredging undertaken at a range of locations near the five hotspot locations. No additional dredging will be undertaken under the project. An assessment including due diligence has been undertaken of the primary dredge locations as part of this ESMF.

The development of the ICZM Plan will provide the necessary management framework to support/allow the development of effective climate change adaptation measures in the long term and will cover all stages of the ICZM planning cycle.

The project is fully aligned with Egypt’s priorities as outlined in its Nationally Determined Contribution to the Paris Agreement and Egypt’s Country Work Programme as submitted to the GCF. The project is also part of UNDP’s Work Programme to the GCF and is aligned with Government priorities for UNDP.

The project has the potential to cause moderate environmental and social impacts. Impacts include potential reduced accessibility to the beach although these can be mitigated through the design and construction of the interventions and the provision of temporary access points. There is also limited potential for soil, surface water and groundwater impacts, but again these can be mitigated through appropriate management measures. Appropriate and relevant avoidance and mitigation options have been proposed in the ESMF, which if put in place, will significantly reduce the potential impacts of the project to an acceptable level. Actions include the development of site-specific erosion, drainage and sediment control plans that will be developed and implemented as a mitigation measure. The plans will include disposal plans for contaminated soil and silt removed during earthworks to restore wetlands, ensuring that the surrounding communities and environment are not adversely impacted by contaminants in the soil and silt. Moreover, the project will have significant environmental and social benefits that will be achieved more generally.

The project does not require any land acquisition and/or resettlement. None of the interventions will require the displacement of people or will be conducted in protected areas or sensitive locations.
A two tier Grievance Redress Mechanism structure was developed to address all complaints and/or grievances in the project. The first tier redress mechanism involves the receipt of a complaint and/or grievance at the village/town and/or Markaz level. The resolution at the first tier will normally be completed within 15 working days and the complaint and/or grievance will be notified of the proposed response through a disclosure form. Should the grievance be not resolved within this period to the satisfaction of the complainant, the grievance will be referred to the next level of Grievance Redress Mechanism.

Budgeting for environmental interventions and the application of mitigation measures to enhance positive impacts for the north coast of Egypt is an investment in the future as it will reduce the environmental and social liability at local, regional and national levels.
1 INTRODUCTION

1. This Environmental and Social Management Framework (ESMF) has been prepared in support of a project proposal for “Enhancing Climate Change Adaptation in the North Coast and Nile Delta Regions in Egypt” by the Government of Egypt to the Green Climate Fund (GCF). As this project is supported by UNDP in its role as a GCF accredited Entity, the project has been screened against UNDP’s Social and Environmental Standards Procedure and deemed a Moderate Risk (World Bank/International Finance Corporation Category B) project. As such, an Environmental and Social Management Framework has been prepared for the project. Chapter Five of the ESMF provides the Environmental and Social Management Plan for the project.

1.1 BACKGROUND

2. The Nile Delta in Egypt is one of the most vulnerable deltas in the world to the impacts of climate change. In its Fourth Assessment Report, the IPCC\(^1\) identified the Nile Delta as one the world’s three “extreme” vulnerability hotspots under climate change conditions (IPCC, 2007). This region accounts for more than 50% of Egypt’s economic activity through agriculture, industry and fisheries. The Nile Delta contribute about 20% of Egypt’s agricultural GDP and account for the largest source of employment, around 30% of the labour force. As Egypt does not produce enough food to feed its current population, any loss of prime agricultural land in due to coastal flooding from sea level rise (SLR) will have a direct adverse impact on the livelihoods of millions of people and lead to hardship throughout the entire economy.

3. The IPCC concluded that global mean sea level (MSL) has risen between 2.8 and 3.6mm/year over the period 1993 to 2010. During that same period, local land subsidence has been evident across the entire Delta, with actual rates ranging from about 0.4mm/year in Alexandria to the west to around 3mm/year in Port Said to the east.\(^2\) The rate of sea level for the Nile Delta ranges between 3.2 - 6.6mm/year and is due to a number of major factors; sea level rise (SLR); locally sinking land due to compaction of sediments; and the loss of annual replenishment of sediments.

4. The southern Mediterranean has already seen increases in the number of natural disasters. Since 1980, there has been an increase in natural disasters from three /year in 1980; to more than 15 events/year in 2006.\(^3\) Coastal areas in the Nile Delta are especially vulnerable to climate variability and changes in sea level.\(^4\) Extreme sea level events, driven by the combination of high tides and storm surges, have resulted in devastating coastal flooding and many millions of dollars in damages. An increase in frequency and severity of storm surges is already evident over the past seven years with three extreme storms most commonly associated with 1-in-50 year storm events. The continuation of rising seas, sinking lands, and more frequent and intense storms is a necessary inference from the review of recent trends and future climate change forecasts. The coastal floods in Alexandria in 2015 resulted in the loss of lives with flood waters reaching and damaging portions of the international road located hundreds of metres inland.

5. Economic damages from climate change induced SLR on the north coast of Egypt will be direct and far-reaching. Today, much of Egypt’s population, industry, agriculture, private sector and tourism infrastructure and development along the northern low coastal lands and the reliance on the Nile delta for prime agricultural land. Studies on the vulnerability of Alexandria indicated that SLR of 0.3m

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\(^1\) Intergovernmental Panel on Climate Change
I would lead to infrastructure damage worth billions of dollars, displacement of over half a million inhabitants, and a loss of about 70,000 jobs (Firhy et al., 1997, El-Raey et al., 1999, El-Raey, 2004).

1.2 OVERVIEW OF THE PROJECT

6. Historically, protecting coastal areas in Egypt has typically meant structures such as seawalls, groins, rip-rap, and levees. As Egypt's understanding of natural shoreline function improves, there is growing acceptance that “hard” shoreline protections are expensive, can cause unexpected downstream erosion to beaches and dunes, require costly ongoing maintenance, adversely affect adjacent areas/properties, and disrupt natural water flows. While “hard” structures continue to be used for shoreline defence, "soft" stabilisation methods such the ones proposed are becoming more prevalent in coastal areas, either as the sole method of protection or in conjunction with "hard" stabilisation practices.

7. The Government of Egypt through the Shore Protection Authority (SPA) with the support from UNDP undertook a pilot project in 2016 along a stretch of approximately 250m along Egypt's northern Mediterranean coastline using low cost technologies to protect the coastal zone from flooding caused by extreme storms. These included artificial sand dunes built by means of sand traps made of natural bamboo fences fixed to the ground, or based on a clay or geotextile core. The purpose of this pilot project was to study the impact of the traps on coastal flooding following an extreme weather event. It yielded promising results on the short term.

8. Based on the pilot project results, the Government of Egypt propose to extend the pilot to five (5) locations identified as climate change hotspots. The extension will involve the construction of 69 km of sand dune dikes at the five (5) vulnerable hotspots within the Nile Delta. These “soft” coastal protection measures are proposed in the Port Said, Damietta, Beheira5, Dakahlia, and Kafr El-Sheikh governorates. The activities are designed to mirror natural coastal features and/or sand dunes and will assist in providing resilience to the areas from high risks zones for coastal flooding to low risk zones for coastal flooding. The five vulnerable hotspots will be stabilised with a combination of rocks and local vegetation species to encourage dune growth by trapping and stabilising blown sand. Figure 1 presents the five vulnerable hotspots on the map.

9. The project has been designed to mirror natural coastal features and/or sand dunes and will transform the areas from high risk zones to low risk zones for coastal flooding. The five vulnerable hotspots will be stabilised with a combination of rocks and local vegetation species to encourage dune growth by trapping and stabilising blown sand (i.e., ecosystem-based measures.

10. The proposed project includes the development an Integrated Coastal Zone Management Plan (ICZM Plan) for the entire north coast of Egypt for the entire North Coast to manage long-term climate change risks and provide Egypt with adaptability to impending flood risks. The ICZM Plan will provide the necessary management framework to support/allow the development of effective climate change adaptation measures in the long term and will cover all stages of the ICZM planning cycle, namely high resolution diagnosis, new regulatory and institutional structures, stakeholder engagement, capacity building, and the implementation of a national observation system.

11. The project aims to enhance the resilience of the Northern coast and Nile Delta in Egypt due to the combination of SLR and more frequent extreme storm events through scaling up the use of soft engineering solutions and ecosystem-based adaptation measures.

5 The Beheira design is the only design that includes some rock protection within the structure
Figure 1: The Five Vulnerable Hotspots on a Map

1.2.1 Summary of Activities

12. The proposed project is structured across two outputs:

Output 1: Installation of soft coastal protection structures at five (5) SLR vulnerable hotspots across 69 km in the Nile Delta.

The proposed GCF project will reduce the vulnerability of assets and populations through promoting and scaling up a set of “soft engineering solutions” and ecosystem-based coastal protection measures that can sustain proper ecosystem functioning and productivity in each of the coastal lagoons such as the conservation of existing wetlands and enhancement of their functionality. A UNDP-GEF-SCCF Climate Change Adaptation in the Nile Delta Project has tested the design and feasibility of several soft engineering solutions for coastal protection (namely beach nourishment and using of geotubes and low cost soft dikes to alleviate impacts of extreme weather events on infrastructure and human settlements) per the geomorphologic, climatic, and development characteristics of the Nile Delta area. The proposed interventions will be undertaken at the following locations:

(i) Port Said which is located west of new Ashtom Elgamil Boughaz. Port Said is characterised by low-lying, highly subsiding land (the natural ground level is 0.8 to 2m above MSL). The range in land subsidence rate is estimated to be between 3 to 5mm/year while the rate of SLR is estimated to be around 2mm/year. Total protected area is 12 km;

(ii) Damietta is located east of new Damietta city. Damietta is characterised by low-lying, moderately subsiding land (the natural ground level is 1.2 to 1.8m above MSL). The area is extremely exposed to SLR. The range in land subsidence rate is estimated to be between 1 to 2mm/year while the rate of SLR is estimated to be around 2.3 mm/year. Total protected area is 12 km;

(iii) Beheir is located near the West Rosetta estuary. Beheir is characterised by low-lying, highly subsiding land (the natural ground level is 0.3 to 1.3m above MSL). The range of in land
Annex VI (b) – Environmental and Social Management Framework

Green Climate Fund Funding Proposal

Subsidence rate is estimated to be between 3 to 4mm/year while the rate of SLR is estimated to be around 1.6 mm/year. Total protected area is 6 km;

(iv) Dakahlia is located west of new Gamasa city. Dakahlia is characterised by low-lying, moderately subsiding land (the natural ground level is 0.5 to 1m above MSL). The area is exposed to SLR without protection. The range in land subsidence rate is estimated to be between 0.5 to 1mm/year while the rate of SLR is estimated to be around 1mm/year. Total protected area is 12 km; and

(v) Kafr El-Sheikh is located near the West Burullus inlet. Kafr El-Sheikh is characterised by low-lying, weakly subsiding land (the natural ground level is 0.25 to 1.2m above MSL). The area is exposed to SLR without protection. The range in land subsidence rate is estimated up to 1mm/year while the rate of SLR is also estimated at 1mm/year. Total protected area is 27 km.

13. There are four (4) types of coastal protection designs, or models (for example, Models 1, 2, 3, and 4). The model designs are primarily differentiated relative to the elevation of the low-lying areas they are designed to protect. The choice of which model to construct at a given hotspot site depends on several other factors, including SLR projections, anticipated height of storm surge above mean high tide during extreme events, site geomorphological characteristics, nearby bathymetry, etc.

14. The cross sections of Model 1 designs are presented in Figure 2. This design will be constructed in areas where the adjacent land elevations are up to 1.5m above MSL. Within the Model 1 design, there are three different sub-designs, A, B, and C. Each of the designs will use sand from site excavation activities as fill material. There will be no large stone face coverings included in any of the Model 1 sub-designs. The sub-designs are distinguished by the quantities of fill material being extracted from existing activities at Lake Burullus. Sub-design A requires the least amount of fill material while sub-design B requires the largest amount of material. All three sub-designs require the use of geotextiles as a barrier between sand fill and the substratum.

15. The cross sections associated with the design of Models 2, 3, and 4 are shown in Figure 3.

a. Model 2:
   (i) the design consists entirely of materials extracted from the nearest lake;
   (ii) will be constructed in areas where the adjacent land elevation is higher than 1.5m above MSL;
   (iii) will be restricted to areas in the front of beach cities and villages;
   (iv) approximately 10km will be constructed using this design;
   (v) no excavation or de-watering activities involved in the works; and
   (vi) this model is suitable for recreational areas to minimise beach accessibility issues.

b. Model 3:
   (i) the design will be constructed in areas where the adjacent land elevations are less than 1.0m above MSL;
   (ii) the design will use sand from site excavation activities as fill material as well as large dolomite stone (up to 100kg stones) covering the slope on the seaside of the structure;
   (iii) approximately 6 km will be constructed this design. This design is specific for Burullus. The shoreline is North-South oriented at this location and accordingly, dunes are not expected to naturally form like the rest of the locations. Accordingly, a more solid structure was proposed for this location; and
   (iv) model 3 is the only design utilising stone face coverings.
c. Model 4:

(i) the design will be constructed in areas where the adjacent land elevations are higher than 1.5ms above MSL;

(ii) The design involves the construction of interlocking wooden fence that will serve to capture shifting sand in the coastal areas;

(iii) With time (1-2 years), based on past experience, enough sand will be accumulated within the interlocking fence that it will resemble natural sand dune. At that point, the structure will be stabilised with local vegetative species to thwart future shifting of the sand; and

(iv) approximately 20 km will be constructed using this design.
16. There are major activities associated with the construction of the soft coastal protection as well as numerous sub-activities include:
   a. site preparation including clearing, grubbing, stripping, dewatering;
   b. Constructing location-specific coastal soft protection structures; and
   c. implementing an operations & maintenance programme for the installed soft protection structures.

17. Table 1 presents the five hotspot locations and provides the start and end point of each soft protection structure. Table 1 also presents the expected protection designs for the different locations.
## Table 1: Proposed hotspot areas and protection type for the GCF proposal

<table>
<thead>
<tr>
<th>Governorate</th>
<th>Location Description</th>
<th>Vulnerability criteria</th>
<th>Land subsidence (mm/y)</th>
<th>Natural ground level / m</th>
<th>* SLR rate (mm/y)</th>
<th>Land use of hinterland</th>
<th>Propose d dike initial design model(s)</th>
<th>Length of protection / km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kafr Elshikh</td>
<td>West Burullus inlet</td>
<td>Low-lying, weakly subsiding, exposed without protection</td>
<td>0.0-1.0</td>
<td>0.25 : 1.20</td>
<td>1 - Estimated from Al-Burullus</td>
<td>Beaches, narrow Burullus lake low-lying barrier, International Road, there are 2 proposals: fish farms &amp; urban development</td>
<td>1a, 1b and 4</td>
<td>27</td>
</tr>
<tr>
<td>Port Said</td>
<td>West new Ashtom Elgamil Boughaz</td>
<td>Low-lying, highly subsiding, exposed without protection</td>
<td>3.0-5.0</td>
<td>0.80 : 2.00</td>
<td>2.3</td>
<td>Resort beaches, narrow Manzala lake low-lying barrier, International Road &amp; petroleum industries</td>
<td>1b and 2</td>
<td>12</td>
</tr>
<tr>
<td>Behira</td>
<td>West Rosetta estuary, downcoast of the 9 groins</td>
<td>Low-lying, highly subsiding, experiencing down drift local erosion due to groin construction</td>
<td>3.0-4.0</td>
<td>0.30 : 1.30</td>
<td>1.6 - Estimated from Alexandria</td>
<td>Beaches and cultivated fields.</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Damietta</td>
<td>East of new Damietta city</td>
<td>Low-lying, moderately subsiding, exposed with limited protection</td>
<td>1.0-2.0</td>
<td>1.20 : 1.80</td>
<td>2.3 - Estimated from Port Said</td>
<td>Resort beaches and cultivated area</td>
<td>1a and 2</td>
<td>12</td>
</tr>
<tr>
<td>Dakahlia</td>
<td>West of new Gamasa city</td>
<td>Low-lying, moderately subsiding, exposed without protection</td>
<td>0.5-1.0</td>
<td>1.00 : 2.00</td>
<td>1 - Estimated from Al-Burullus</td>
<td>Resort beaches and cultivated fields &amp; International Road</td>
<td>2 and 4</td>
<td>12</td>
</tr>
</tbody>
</table>
Output 2: Development of an ICZM Plan for the entire North Coast of Egypt

18. The Government of Egypt has completed initiation steps on the development of an ICZM Strategy with the preparation of local ICZM Plans in Marsa Matruh and Alexandria and the development of the ICZM Scoping Study. The “ICZM Plan” stage will be carried out through the preparation of a comprehensive ICZM Plan that (i) defines the necessary engineering and management measures for climate change adaptation; (ii) establishes the necessary management framework to ensure the effective and sustainable implementation of that measures; and (iii) sets up the procurement and installation of a national observation system to track unfolding climatic changes in coastal zones. The last two stages of the ICZM, “Implementation” and “Monitoring and Evaluation” are beyond the scope of the proposed project and will be taken up by the SPA upon conclusion of the project.

19. Upon full completion of the diagnosis stage, the planning stage will focus on the preparation of the ICZM plan itself. The plan will define strategic and operational objectives to be achieved through a set of actions; and its implementation strategy (roadmaps, budget, and monitoring system).

20. There are four major activities associated with the development of the ICZM plan for the North Coast as well as numerous sub-activities include.
   a. hazard, vulnerability and risk high resolution assessments of erosion and flooding under climate change scenarios;
   b. development of the ICZM plan to include a shoreline master plan and a regulatory/legislative framework;
   c. development of a capacity building program for institutions involved in the management of the north coast; and
   d. the implementation of specific components of a national observation system.

1.2.2 Construction Material

21. The project will utilise existing dredge material from ongoing long term operations from a range of northern lake locations including but limited to Lake Burullus, Lake Manzala, Late Edku, Damietta Port, other aquatic environments and land based sources.

22. The northern coastal area of Egypt, stretching from Alexandria to Port Said, comprises a network of large, shallow lakes that sustain a vast array of wildlife habitat and support a fishing industry dominated by family groups that use traditional hand or sail-powered vessels.

23. As an example of the lakes within the northern coastal area, Lake Burullus is a shallow, saline lagoon, about 65km in length, varying in width from 6km to 16km, and containing about 50 islands and islets. Water depth ranges between 0.42m and 2.07m (average depth = 0.8m); the eastern part being the shallowest. A narrow sandbar separates the lake from the Mediterranean Sea.

24. The area of Lake Burullus over the past 10-15 years has reduced by 30%. This decrease is due to continuous land reclamation projects along the southern and eastern shores of the lake and sediments filling the lakes (Masoud et al, 2010). Prior to the construction of the Aswan High Dam, the lake received the Nile floods in late summer and autumn; however these changes and reduced flows which therefore stop the movement of sediment out of the lake. The lakes have accordingly, become inundated with silt from construction runoff, and the quality of the system have deteriorated further due to lack of proper channel flow, natural vegetation decay and the effects of anthropogenic-induced drainage. The lakes have been overrun with reed growth, which further chokes the lakes’ ecological balance, essentially turning the lakes into bogs. These conditions render the lake system unsustainable for the fishing industry.

25. Lake Burullus includes a number of environments, with swamps and sand plains prevailing, and constitutes an ideal habitat for 135 land and water plant species as well as an important stop-over point for migrating birds. Water quality problems have combined with increasing levels of commercial fishing activity, resulting in major declines in fish production. The area is densely populated, with approximately one million people living around the lake. Social studies revealed that approximately
185,000 people interact with the lake on a daily basis. Specific information about the relevant aspects of the Lakes is included in Chapter Five of the ESMF.

26. The General Authority for Fish Resources Development (GAFRD) is responsible for Egypt’s fisheries management; and water quality of wetland lakes in the Nile Delta and a saline lagoon in Sinai. Lakes Al Burullus, Al Manzalah and Al Edku are economically important to the country, supporting a large fishery and fish farming sector.

27. The GAFRD has been undertaking dredging in these lakes over a significant period to help alleviate these issues. In order to restore the water system’s natural habitat and reinvigorate the existing dwindling fishing industry, the GAFRD is utilising cutter suction dredges to remove sediment from the lakes. The dredges are operating in Lakes Al Burullus (in Kafr ELSheikh) near Alexandria and Al Manzalah near Port Said. The dredging helps maintain water passages and channels by removing silt, pollutants and sedimentation, allowing more seawater to flow into the different areas of the lakes to improve water quality and increase nutrition. Dewatering of dredged fill material occurs at the lake(s) location, as per the current practice. Overflow water will be released back to the lake(s).

1.3 ENVIRONMENTAL AND SOCIAL RISK ASSESSMENT

28. As this project is supported by UNDP in its role as a GCF Accredited Entity, the project has been screened against UNDP’s Social and Environmental Standards Procedure. The Social and Environmental Screening Template was prepared and the project deemed to be a moderate risk (Category B) project. Discussions on the impact assessment are provided in the Social and Environmental Screening Template, which provided the rationale for the project being classified as a moderate risk. This ESMF provides further discussion below.

29. An impact risk assessment was undertaken using the UNDP Social and Environmental Screening Procedure to assess the probability (expected, highly likely, moderately likely, not likely) and the impact of the risk (critical, severe, moderate, minor, negligible). From this, a significance value was attributed to the potential impact (negligible, low, medium, high and extreme).

<table>
<thead>
<tr>
<th>Score</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Expected</td>
</tr>
<tr>
<td>4</td>
<td>Highly Likely</td>
</tr>
<tr>
<td>3</td>
<td>Moderately likely</td>
</tr>
<tr>
<td>2</td>
<td>Not Likely</td>
</tr>
<tr>
<td>1</td>
<td>Slight</td>
</tr>
</tbody>
</table>
### Table 3: Rating of Impact of Risk

<table>
<thead>
<tr>
<th>Score</th>
<th>Rating</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Critical</td>
<td>Significant adverse impacts on human populations and/or environment. Adverse impacts high in magnitude and/or spatial extent (e.g. large geographic area, large number of people, transboundary impacts, cumulative impacts) and duration (e.g. long-term, permanent and/or irreversible); areas impacted include areas of high value and sensitivity (e.g. valuable ecosystems, critical habitats); adverse impacts to rights, lands, resources and territories of indigenous peoples; involve significant displacement or resettlement; generates significant quantities of greenhouse gas emissions; impacts may give rise to significant social conflict</td>
</tr>
<tr>
<td>4</td>
<td>Severe</td>
<td>Adverse impacts on people and/or environment of medium to large magnitude, spatial extent and duration more limited than critical (e.g. predictable, mostly temporary, reversible). The potential risk impacts of projects that may affect the human rights, lands, natural resources, territories, and traditional livelihoods of indigenous peoples are to be considered at a minimum potentially severe.</td>
</tr>
<tr>
<td>3</td>
<td>Moderate</td>
<td>Impacts of low magnitude, limited in scale (site-specific) and duration (temporary), can be avoided, managed and/or mitigated with relatively uncomplicated accepted measures</td>
</tr>
<tr>
<td>2</td>
<td>Minor</td>
<td>Very limited impacts in terms of magnitude (e.g. small affected area, very low number of people affected) and duration (short), may be easily avoided, managed, mitigated</td>
</tr>
<tr>
<td>1</td>
<td>Negligible</td>
<td>Negligible or no adverse impacts on communities, individuals, and/or environment</td>
</tr>
</tbody>
</table>

### Table 4: UNDP Risk matrix

<table>
<thead>
<tr>
<th>Impact</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Green = Low, Yellow = Moderate, Red = High</td>
</tr>
<tr>
<td>4</td>
<td>Green = Low, Yellow = Moderate, Red = High</td>
</tr>
<tr>
<td>3</td>
<td>Green = Low, Yellow = Moderate, Red = High</td>
</tr>
<tr>
<td>2</td>
<td>Green = Low, Yellow = Moderate, Red = High</td>
</tr>
<tr>
<td>1</td>
<td>Green = Low, Yellow = Moderate, Red = High</td>
</tr>
</tbody>
</table>
### Activity
The construction of coastal protection measures can have numerous environmental and social impacts. All locations have been anthropogenically and naturally impacts in the past and as such, are not pristine locations.

This activity may potentially require specific road closures at times during construction. This might also require the relocation of services.

Environmentally, construction is likely to result in the movement of sediment into the marine environment which could result in smothering of any seagrasses and corals, potential additional erosion is the area is disturbed and a storm event occurs, impacts on water quality as a result of the movement of sediment, air and noise impacts associated with construction and the potential impacts of the release of fuel and other chemicals as a result of an incident with either heavy machinery and trucks. There are unlikely to be changes in hydrodynamics and coastal processes; however, there is the potential for hydrological changes onshore should the infrastructure not be correctly aligned. There is also the potential for indirect impacts associated with the construction works including impacts at the end of the construction areas.

Based on previous studies including those undertaken by the IUCN (Sea turtles in the Mediterranean, Distribution, threats and

<table>
<thead>
<tr>
<th>Activity</th>
<th>Unmitigated Impacts</th>
<th>Probability and of Impact and Impact</th>
<th>Avoidance and Mitigation Measures</th>
<th>Probability of Impact and Impact post mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction of 69km of soft protection infrastructure across the five (5) hotspot vulnerable coastlines</td>
<td>The construction of coastal protection measures can have numerous environmental and social impacts. All locations have been anthropogenically and naturally impacts in the past and as such, are not pristine locations. This activity may potentially require specific road closures at times during construction. This might also require the relocation of services. Environmentally, construction is likely to result in the movement of sediment into the marine environment which could result in smothering of any seagrasses and corals, potential additional erosion is the area is disturbed and a storm event occurs, impacts on water quality as a result of the movement of sediment, air and noise impacts associated with construction and the potential impacts of the release of fuel and other chemicals as a result of an incident with either heavy machinery and trucks. There are unlikely to be changes in hydrodynamics and coastal processes; however, there is the potential for hydrological changes onshore should the infrastructure not be correctly aligned. There is also the potential for indirect impacts associated with the construction works including impacts at the end of the construction areas. Based on previous studies including those undertaken by the IUCN (Sea turtles in the Mediterranean, Distribution, threats and</td>
<td>Probability: 5  Impact: 3  Risk Level: Moderate</td>
<td>The ESMF sets out appropriate mitigation measures for the impacts of the construction of the coastal protection. The most appropriate mitigation measure is to ensure activities do not occur during periods of rainfall which could significantly increase sediment discharges and erosion. An Erosion, Drainage and Sediment Control Plan (EDSCP) will be established to ensure sediment does not move into the marine and/or groundwater and/or surface water environment result in smothering and/or water quality changes. All areas should be revegetated as soon as possible to reduce erosion and sediment loss. Prior to the use of any material, samples should be taken and tested for any contaminants. Where any sediment is found to contain any contaminants, work should stop and appropriate remediation should be undertaken to reduce the release of contaminants into the environment. Specific contaminated soil/silt disposal management plans (CSDMP) should be prepared for any contaminated soil and silt that might be removed during earthworks to restore wetlands to ensure that the surrounding communities and environment are not adversely impacted by contaminants in the soil and silt. Any additional sediment should be made available to the community. All refuelling and maintenance should be</td>
<td>Probability: 4  Impact: 2  Risk Level: Moderate</td>
</tr>
</tbody>
</table>
conservation priorities (2010), turtles have been observed as nesting in areas where the infrastructure may be constructed. Based on the outputs of that study, no nesting has occurred in the specific area. Notwithstanding, there is the limited potential for disturbance to current and future nesting.

Social impacts include the potential loss of access which restrict people's ability to move within the region and a loss of access for recreational and commercial activities. It is critical that due diligence be properly undertaken prior to the undertaking the activity along with ongoing stakeholder engagement.

undertaken away from the site. Prior to construction, site specific assessments will be undertaken to ensure the final design does not result in changes to hydrological changes.

Given the location and distance inshore where the proposed infrastructure will be constructed, it is unlikely that there will be impacts on nesting turtles. However, should turtles be observed nesting within the areas proposed for the interventions, a biodiversity management plan will be developed. If turtles be observed during site assessments, no construction should be undertaken in proximity to the specific area during both nesting and hatching. No lights should be used during hatching times to ensure juveniles are not impacted/disorientated as a result of any works.

There will not be any economic displacement, either temporary or permanent, is expected during the implementation of the project. All the land utilised in the project are within the 200m SPA setback area, as per Law 48 for 1982. As such, there is no requirement for any compulsory land acquisition and/or compensation to be paid. Current uses of the lands are mainly for beach accessibility by fishermen, while beaches are also accessible for recreational activities will be maintained. Stakeholder engagement will be undertaken during the design and construction of the interventions to ensure ongoing access. The project should ensure access is maintained appropriately during construction.
Development of an ICZM Plan

This activity is essentially the collection of existing data and new data for the development of the ICZM Plan. This activity will then be two-fold, the preparation of the ICZM Plan and consultation with stakeholders including user groups to ensure that the ICZM Plan is developed effectively. The likely impacts of this are that stakeholders are not effectively engaged during the consultation process and/or do not provide information necessary for the ICZM Plan to be effective once implemented. As such, there are unlikely to be any significant or even negligible impacts.

Probability: 2
Impact: 2
Risk Level: Low

To ensure the output is effective, there should be extensive consultation on the Table of Contents, draft ICZM Plan and final ICZM Plan.

Probability: 1
Impact: 2
Risk Level: Low
1.3.1 Assumptions underpinning the Development of the Environmental and Social Management Framework

30. The following assumptions have been made in the preparation of this ESMF:
   a. none of the interventions will require the displacement of people (including economic), either temporary or permanent;
   b. there will be no resettlement or land acquisition;
   c. the interventions that are to be conducted in protected areas or sensitive locations will be undertaken in full consideration of the need to ensure full protection. As such, a higher environmental standard will be followed;
   d. appropriate erosion and sediment control will be undertaken during all stages of the projects;
   e. there will be no release of pollution and/or chemicals as a result of the projects;
   f. no contaminated material will be used during the construction of the interventions;
   g. no additional dredging above that currently undertaken by GAFRD will be undertaken; and
   h. any fill material acquired from “other” locations will be previously dewatered at the location of extraction.

1.3.2 Purpose and Objectives of the Environmental and Social Management Framework

31. An ESMF is a management tool used to assist in minimising social and environmental impacts; and establish a set of environmental and social objectives. To ensure the environmental and social objectives of the projects are met, this ESMF will be used by the project implementers to structure and control the environmental and social management safeguards that are required to avoid or mitigate adverse effects on the environment and communities.

32. The environmental and social objectives of the projects are to:
   a. reduce coastal flooding risks in Egypt’s North Coast due to the combination of SLR and more frequent extreme storm events;
   b. address the broader climate change adaptation challenges impacting in the area through the introduction of an integrated coastal zone management planning process;
   c. encourage good management practices through planning, commitment and continuous improvement of environmental practices and the impacts of climate change;
   d. strengthen the capacity of the Egyptian Government and communities to manage the flooding impacts of climate change-induced SLR on coastal communities in the Nile Delta; and
   e. align with Egypt’s priorities as outlined in its Nationally Determined Contribution to the Paris Agreement, as well as with Egypt’s Country Work Programme as submitted to the GCF.

33. The environmental and social objectives of the ESMF are to:
   a. encourage good management practices through planning, commitment and continuous improvement of environmental practices;
   b. minimise or prevent the pollution of land, air and water;
   c. protect existing flora, fauna and important ecosystems from additional impacts;
   d. provide for the development of monitoring programs to assess any changes in environmental and social matters including protected areas, water quality etc;
   e. comply with applicable laws, regulations and standards for the protection of the environment;
   f. adopt the best practicable means available to prevent or minimise environmental impact;
   g. identify key environmental and social indicators;
34. The ESMF will be updated from time to time by the implementing Project Management Unit (PMU)/contractor in consultation with the project board to incorporate changes in the detailed design phase of the projects.

1.3.3 Economic Displacement and Livelihood Restoration

35. No economic displacement, either temporary or permanent, is expected during the implementation of the project.

36. Given the project activities, it is unlikely that livelihood restoration will be required. This assumption has been made based on current experiences and best practices developed during the implementation of previous works undertaken. However, where necessary based on stakeholder engagement and observations, the project will develop a Livelihood Restoration and Improvement Plan. Provision within the Plan will be made for diversification of livelihoods, and for a specific focus on developing different livelihood options, particularly for women. An investigation of establishing vocational training programmes and skills development and small business management should be included. The plan will investigate how those trained may also be used or employed during the pre-construction, construction and operation of the project.

37. The Livelihood Restoration and Improvement Plan will also include targeted interventions that incorporate specific development goals/objectives that are designed to not only manage the impacts from the project, but provide meaningfully improvements to the lives of affected communities. The Plan should assess potential interventions including but are not limited to include community managed fisheries (both in the form of new ponds as well as targeted conservations/cultivation areas in river systems) and other relevant activities suggested by community.

38. The plan will demonstrate how the development and subsequent implementation of the Livelihoods Restoration and Improvement Plan has undertaken extensive consultation with all affected communities to understand their wishes and needs. The consultation should be undertaken in small focus group discussions on the detailed requirements may be more effective than large community meetings. The proponent must demonstrate how the Livelihoods Restoration and Improvement Plan will be continuously monitored against the achievement of the development targets and indicators selected. A great deal of care should be exercised when fixing these targets and indicators; household income is but one of a number of potential indicators. A draft outline of the Livelihood Restoration Plan is included as Annexure One.

1.3.4 Land Issues

39. The lands utilised in the project are within the 200m SPA setback area, as per Law 48 for 1982. As such, there is no requirement for any compulsory land acquisition and/or compensation to be paid. Current uses of the lands are mainly for beach accessibility by fishermen, while beaches are also accessible for recreational activities at three of the target locations.

1.3.5 Indigenous Peoples

40. As part of due diligence, an analysis and consultation is undertaken as to the Probability of any of the project’s activities involving indigenous people and/or ethnic minorities. No indigenous people and/or ethnic minorities are known to live in any of the proposed locations.
1.4 OVERVIEW OF INSTITUTIONAL ARRANGEMENTS FOR THE ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK PLAN

41. The ESMF will be assessed by the SPA and UNDP prior to any works being undertaken. The ESMF identifies potential risks to the environment and social matters from the projects and outlines strategies for managing those risks and minimising undesirable environmental and social impacts. Further, the ESMF provides a Grievance Redress Mechanism for those that may be impacted by the projects that do not consider their views have been heard.

42. The SPA will be responsible for the supervision of the ESMF. The UNDP will gain the endorsement of the SPA and will ensure the ESMF is adequate and followed. The PMU will ensure timely remedial actions are taken by the contractor where necessary.

1.4.1 Administration

43. The SPA will be responsible for the revision or updates of this document during the course of work. It is the responsibility of the person to whom the document is issued to ensure it is updated.

44. The SPA manager will be responsible for daily environmental inspections of the construction site. The SPA will cross check these inspections by undertaking monthly audits.

45. The contractor will maintain and keep all administrative and environmental records which would include a log of complaints together with records of any measures taken to mitigate the cause of the complaints. The contractor will be responsible for the day to day compliance of the ESMF.

46. The SPA will be the implementing agency and will be responsible for the implementation and compliance with the ESMF via the collaborating partners and contractors. The ESMF will be part of any tender documentation.

47. The SPA Project Manager will supervise the contractor, while the SPA will be responsible for environment and social issues.
2 LEGAL AND INSTITUTIONAL FRAMEWORK FOR ENVIRONMENTAL AND SOCIAL MATTERS

2.1 LEGISLATION, POLICIES AND REGULATIONS

48. The following legislation is relevant to the project:

2.1.1 Environment Law No. 4/1994 amended by Law No. 9/2009

49. Egypt has experienced fast economic and population growth bringing new environmental and socio-economic challenges. To protect the environment, a series of reforms have been taken by the Government of Egypt since the early 1980s. The endorsement of the first National Environmental Action (NEAP) in 1992 marked a turning point. As a result, an Environment Protection Law was enacted in 1994. The Egyptian Environmental Affairs Agency (EEAA) was established and has gradually expanded its functions and responsibilities in all fields of environmental management. However, responsibilities for environmental protection in Egypt are distributed, among a number of Ministries and Governorates and can be classified in the following three categories:

50. Article 69 prohibits any establishment to throw any substance that is untreated into the environment that may in turn cause the pollution of sea shores or neighbouring waters. Article 74 forbids any action that may affect the natural coast line or modify its configuration unless agreed with the EEAA and the competent authority. The executive regulations of the Law (Prime Minister’s Decree 338/1995 as amended) details a number of issues relevant to coastal protection, development and management.

51. The Law, as amended, includes articles defining the coastal zones (art.1, item 39) as

   "the area extending from the coasts of Arab Republic of Egypt which encompasses the territorial sea, exclusive economic zone and continental shelf, and extending landward to areas of active interactions with the marine environment for that not exceeding 30km in the desert areas, unless major topographical features interrupt this stretch, while in Nile Delta would extend up at contour (+3m). Each of the coastal governorates shall define their coastal zone according to its physical conditions and environmental resources, not in any case less than "10km" landward from coast line".

52. The Law also includes the setback line form the coast, as it states that

   "It shall be prohibited to issue permits for the construction of any installations on the sea shores of the Arab Republic of Egypt up to a distance of two hundred meters inwards from the shoreline, except after obtaining the approval of the Shores Protection Authority and EEAA approval (Article 59)” and that “It is prohibited to license any work that may affect the natural shoreline or modify its configuration either inwards or outwards or carry out related works, except after obtaining the approval of the Shores Protection Authority and EEAA approval (Article 60).”

2.1.2 Water Drainage and Irrigation Law No. 12/1984

53. Article 86 stated that “the construction of any structures on the country’s northern coast overlooking the Mediterranean sea along its length from the republic western borders to its eastern ones for 200 metres inside the coastal water line is prohibited”. Under article 87, the responsibility for determining the final prohibition line has been assigned to SPA. Based on its investigation, the setback area could be modified and has to be informed to all concerned authorities. Article 88 highlights that approving certain establishments with special features are allowed under specific cases and upon prior approval from SPA as to include clear actions towards protecting the coasts.
2.1.3 Natural Protectorates Law No. 102 of 1983

54. According to this law, the Nature Conservation Sector within EEAA is the governmental body responsible for nature conservation in Egypt, entrusted with managing the National Protected Areas Network and coordinating management activities inside them. The law provides the legislative framework for establishing and managing Protected Areas within the different geographical regions of Egypt including coastal zones. This Law has clearly stipulated under article 1 the definition of protected area as, “any area of Land, or coastal or inland water characterised by flora, fauna, and natural features having cultural, scientific, touristic or aesthetic value. These areas will be designated and delineated by Prime Minister Decree upon the recommendation of the EEAA. In addition, Article 2 prohibits the undertaking actions (deeds or activities or undertakings) which will lead to the destruction or deterioration of the natural environment or harm the biota (terrestrial, marine or fresh water), or which will detract from the aesthetic standards within protected areas.

55. The EEAA as the legal entity for applying such law is responsible for managing nearly 30 Protected Areas among which a number of coastal protectorates with different natural resources, where business and management plans are prepared and implemented.

56. Two project areas are located close to Ashoum el Gamil and El-Burullus including:
   a. Regarding the establishment of a natural reserve in the area of Ashoum El-Gamil in Port Said governorate. The natural reserve is completely outside the project area, with the closest point above 1km away; and
   b. Establishes a natural reserve in the area of El-Burullus Lake in the governorate of Kafr El Sheikh. The natural reserve is completely outside the project boundaries, separated by the coastal international road.

2.1.4 Law No. 48/1982 on Protection of the Nile River and Waterways from Pollution

57. The MWRI has sole legal responsibility for the planning and management of water resources in Egypt. Law No. 48/1982 has defined the waterways as spatial zone for application to include (Nile River, drains, lakes, ponds, ground water). In addition, MWRI is responsible to control the discharge of wastes and wastewatter into the Nile and waterways and sets standards for the quality of these discharge effluents. The Law prohibits discharges to the Nile, canals, lakes, drains, and ground waters without a license issued by the Ministry. Licenses are issued to factories, sanitary sewage treatment plants, and river boats, upon application, as long as the effluents meet certain standards and other conditions. Discharging without a license or discharging in amounts or concentrations that exceed license limits is punishable by fine, jail sentence, or both. This licensing procedure is conditioned according to criteria and cases set by MWRI based upon recommendation from the Minister of Health (MOH).

2.1.5 Law No. 124/1983 on Fishing, Aquaculture and Regulate Fish Farms

58. This law regulates fishing, aquatic organisms harvest and the establishment of fish farms. According to the law, the official responsible governmental entity in charge for implementing this law is GAFRD affiliated to Ministry of Agriculture and Land Reclamation (MALR). Article 15 of the Law which deals with the water pollution and fishing constraints clearly prohibits any actions that could pollute the water where it states "without prejudice, as required under any other law, it is not allowed to throw or discharge industrial waste and pesticides used in combating agricultural pests and similar toxic or radioactive materials in the Egyptian waters. The Law defined "marine waters" as the territorial waters of the Arab Republic of Egypt. Accordingly, GAFRD has the legal power and responsibility of preserving and protecting the coastal water and marine resources.

2.1.6 Law No. 106/2012 on amending some provisions of Law No. 38/1967 for General Public Cleaning

59. Under the Law, any person who throw construction wastes on beaches may be liable to penalties imposed by other laws by not less than 20.000 (twenty thousand) Egyptian Pounds and not more than 100.000 (one hundred thousand) Egyptian Pounds, or one of either above mentioned penalties, any person who throw wastes construction or demolition or excavation in public places, squares,
tunnels, places other than those allocated by the local authorities, bridges, railways, archaeological sites, River Nile, canals, drains, beaches or their adjacent waters.

2.1.7 Law No. 43/1979 on local administration system

60. Egypt is divided into local administration units are (Governorates, Markaz, Cities, Districts, Villages) each of them working on provision and management of all public utilities within the framework of national policy. These exclude national facilities or special nature projects which establishment is by republican decree.

61. The governors are appointed by decree of the President of the Republic and represent the executive power to oversee the implementation of the national policy, provide services and utilities and ensure food security, and are responsible for raising agricultural and industrial productivity and have to take all procedures in these respects within the applicable laws and regulations.

62. The Executive Council of Governorate, meeting on a monthly basis, is headed by the governor, and the membership of the secretary-general, aides of the governor, heads of Markaz, Cities and Districts, and the heads of public authorities. There are also executive councils at each Markaz, City and Village. These are the main vehicles to ensure coordinated actions at each of these administrative levels.

2.1.8 Relevant Presidential and Ministerial decrees:

63. Prime Ministerial Decree No. 1095/2011, along with the amending provisions of the Executive Regulation of Law 4, was issued by the prime ministerial decree no. 338/1995. The executive regulations specify that the Minister for Environmental Affairs shall, after consulting the competent authorities, issue the environmental rules regulating the development of the coastal zone. The rules shall be updated periodically. It also stated that a local committee shall be formed by a decree of the Minister of Environmental Affairs and under the chairmanship of the Governor for the integrated management of coastal areas in each coastal governorate.

64. Ministerial Decree No. 758/1972, promulgating the Executive Regulations of Law No. 66/1953 concerning mines and quarries (petroleum resources), is issued by the Minister of Commerce and Industry. The Decree forbids discharging any oil polluting substances on the shores of the sea nor in public roads and water, taking into consideration that the seawater should not be polluted, and the Ministry of Industry is the body entrusted with the implementation of this decree.

65. Ministerial Decree No. 447/1988 regulates the establishment of tourism projects in the north coast region of Egypt. The decree provides rates and standards to be applied for tourist projects established at the north coast region. These include footprint, height, building density of buildings as well as population density. Its most relevant provision to the coastal land use is the following provision specifying a minimum setback of 100 m from the shore line.

66. Prime Ministerial Decree no. 1599/2006, is concerned with the protection of Egyptian seashores that refers to "the Supreme Committee for Licenses on the Coastal area. The seashores of the Arab Republic of Egypt at a distance of two hundred meters inwards from the shoreline are deemed vital areas for biodiversity. The Egyptian General Shore Protection Authority shall, in coordination with EEAA, exert supervision over coastal areas. It is prohibited to license the construction of any facility on the seashores except after obtaining the approval of the Egyptian General Authority for the Protection of Shores, in coordination with EEAA. Licenses and approvals must be obtained for any activity/ construction that might affect the shoreline (seawalls and offshore breakwaters, headlands, ports, marines) application shall be submitted in writing to the Ministry of irrigation and water resources, indicating the type of establishment to be constructed, attached with all requirement studies, designs and maps.

2.1.9 Prime Minister Decree No.1599/2006 and its amendment by Prime Minister Decree No. 2299/2016.

67. Decree No.1599 in 2006 provides for the establishment and the structure of the Supreme Licensing Committee (LSC) which is responsible for discussing and deciding about submitted projects, within the marine environment or that located inside the 200m from the shore line. In 2006 the Minister
Decree No. 2299 was issued in order to amend it and the committee to be enlarged so that it includes further members from other concerned authorities. The new structure of the LSC with the ministerial level of representation is supported by technical secretariat chaired by SPA / chief with membership of 2 representatives from each ministry included in the LSC but at lower level of representation. The technical secretariat will be in charge for examining the projects, preparing the necessary reports and giving its recommendation as to be presented to LSC.

68. Decree of the Minister of Housing, Utilities and Urban Development no. 144/2009 is the executive regulation of Unified Building Law issued by the law no. 119/2008 states, land subdivision projects which are related to the lands with a special nature such as lands which are located by the waterfronts of rivers, seas, lakes or water streams must have supplementary rules for its subdivision process. The rules are being set through coordination with the related authorities such as EEAA. Accordingly, the rules include;

a. Performing lowlands backfilling and soil sampling analysis, choosing an adequate backfilling material and grading procedures;
b. Surface water disposal mechanism;
c. Providing access paths to the waterfront for landowners, publics, and rear lands owners;
d. Providing data for water's levels and depths and the slopes of the shore area;
e. Determining the specifications of water blocks, bridges, and dams which are used to prevent beaches erosion;
f. Determining all necessary markings and signs which indicate to prohibited areas for sportive activities; and

g. States the special requirements which have been issued by the responsible agencies for water resources protection.

69. Presidential Decree No. 108/2000 relates to State-owned lands which lie within the Nile Valley and Delta, as a designated area for the establishment of new urban communities. State-owned lands which lie within the Nile Valley and Delta, as a designated area for the establishment of new urban communities in accordance with Law no. 59/1979, 7/1991. This area extends from a distance of 5km south the international road to the cost of the Mediterranean Sea at the north, with the exception of lands lie within existing lands.

70. Prime Ministerial Decree no. 206/1997, on the area in Gamsa city, south of the coastal international highway in Dakahlia, establishes an industrial zone in accordance with the provisions of the Investment Guarantees and Incentives law. The area in Gamsa city, which has an area of 727 acres and 14 carat, south of the coastal international highway in Dakahleya, as an industrial zone in accordance with the provisions of the Investment Guarantees and Incentives law no. 230/1989.

2.1.10 Sustainable development strategy 2030

71. The “Egypt’s Sustainable Development Strategy 2030” was developed by the Ministry of Planning in January 2014 and launched in 2016. The aim of the strategy is to create a plan that would help optimise the benefits from sustainable resource management and improving the life of Egyptians. The strategy was developed through a participatory approach which includes ministers, experts, private parties and researchers as well as a number of international organisations.

72. It assessed the current situation in Egypt in terms of economy and environment such as water, air, biodiversity, minerals, coastal ecosystem, wastes and international conventions Egypt participated in. In addition, challenges such as poor protection of the coast against climate change threats are noted. Projects in the document related to the North Coast clearly reflect the aim to develop and protect. These include:

a. Coastal protection tools to preserve the Northern lakes and prevent erosion of the beach due to the increase of sea level; and
b. Enhancing coastal and marine zones is a project to face challenges affecting coastal and marine areas such as oil exploration, urban, industrial, agricultural, and touristic expansion through developing plans for sustainable tourism and through developing strict management. The strategy suggests a program to adapt to threats by climate change, and especially in densely populated areas, promote sustainable fishing, and sustainable tourism etc. in cooperation with the private sector and civil society.

2.1.11 National strategy for adaptation to climate change and disaster risk reduction

73. The Egyptian strategy for adaptation to climate change and disaster risk reduction was prepared by Egypt’s Cabinet Information and Decision Support Centre (IDSC) and the UNDP (2011). The strategy described the effects of climate change on water resources, agricultural sector, health sector, urbanization, coastal zones and tourism. The strategy aims to protect from and adapt to Climate Change as a defence mechanism against global warming with pre-fixed plans in order to be prepared for any natural catastrophe that might affect coastal areas. The plans will be set based on anticipation and meteorological scenarios.

74. Suggested strategies to tackle climate change and SLR effects on vulnerable coastal areas include:
   a. Constructing sustainable protection bodies and strengthening previous ones such as shore coating, barriers to protect coastal cities and roads from sea water penetration;
   b. Use artificial nourishment with sand to replace eroded beach zones; and
   c. Maintaining natural barriers such as coastal dunes and coral reefs.

2.1.12 National Strategy for Integrated Coastal Zone Management

75. In 2009, EEAA prepared in cooperation with the Priority Actions Programme Regional Activity Centre (PAP/RAC) of the Mediterranean Action Plan (MAP) a National Strategy for Integrated Coastal Zone Management (ICZM) in Egypt. The strategy presented major challenges facing the country such as the impact of climate change (erosion, seawater intrusion, flooding), destruction of coastal habitats, degraded fishing resources, irrational land use, and the deterioration of water quality.

76. The strategy proposed three strategic objectives to overcome the previous challenges:
   a. Strengthening ICZM policy by better coordination;
   b. Planning a sustainable use of coastal resources; and
   c. Promoting stakeholders’ awareness.

2.1.13 The National Integrated Coastal Zone Management Plan Framework

77. The 1996 framework program for National Integrated Coastal Zone Management Plan (NICZMP) was the first comprehensive document prepared by the national committee of ICZM discussing ICZM in Egypt at national level. It highlighted important characteristics of the coastal zone and provided an overview of challenging problems and issues.


78. EEAA prepared an updated National Environmental Action Plan (NEAP) in 2001 employing a participatory and consultative planning modality to reach consensus on issues and priorities, and directions for future actions. Six main issues were highlighted (Water, Air, Land, Waste, Global Environmental Issues, Supportive Measures). Programs and projects proposed to address these issues included preventive and/or corrective measures and supportive measures. The NEAP includes a program for managing national marine and coastal zones.
2.2 ENVIRONMENTAL IMPACT ASSESSMENT IN EGYPT

79. According to Law 4/1994, Law of the Environment, and its executive regulations (ERs), a project proponent must prepare an Environmental Impact Assessment (EIA) with the application for license of new projects and/or extension of existing facilities. Accordingly, environmental requirements are integrated into the existing licensing system.

2.2.1 Environmental Impact Assessment Process

80. According to the law, an EIA must be submitted to the Competent Administrative Authority (CAA), under which jurisdiction the project falls. The CAA should assess the environmental impacts of the project and send the EIA to EEAA to issue its response within 30 days. If no response is received beyond this period, the study is automatically approved. The proponent is informed of the decision and, in the event of an approval, the requiring conditions for both construction and operation phases. The proponent has the right to issue an appeal within 30 days from the receipt of the decision.

81. According to the Egyptian Guidelines for ESIA (EEAA, 2009), proposed developments are classified to four categories according to the severity of potential impacts. They reflect the increasing level of environmental impact assessment. The three categories are:

a. Category A: projects with minor environmental impacts;

b. Category B Scope: projects with substantial impacts with focus on specific project activities/components;

c. Category B: projects with substantial impacts; and

d. Category C: projects with high potential impacts requiring full ESIA.

82. The current project does not fall under the lists prepared by the EEAA. In such cases, a preliminary meeting takes place with the EEAA to agree the categorisation. However, it is expected that projects of this nature would be a category B scope project and as such, no ESIA is required and the development of this ESMF will provide the relevant information needed by both the GCF and Government of Egypt.

2.3 MULTILATERAL AGREEMENTS AND BIODIVERSITY PROTOCOLS

83. Egypt is a signatory to a number of international and regional agreements and conventions, which are related to the environment. They include:

e. The Paris Agreement was prepared to strengthen global response to climate change threats. The Paris Agreement was signed in April 2016. This Paris Agreement brings together nations to fight climate change and adapt to it while helping developing countries to do so without ignoring their national objectives. It globally aims to keep an overall temperature rise of less than 2°C this year and to pursue more efforts to lower the increase of rise even further by 1.5°C. The agreement provides appropriate financial help, an innovative technology framework and capacity building;

f. The Conservation of Small Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area 1996 (ACCOBAMS). Egypt ratified the agreement on 4 March 2010 and it was put into force on 1 July 2010. ACCOBAMS is the first consensus that integrated those regions to work on one common goal. The agreement recognises that cetaceans are a crucial part of the marine environment and that it is necessary to conserve them and maintain their ecological benefits. Their conservation is a common concern and thus the agreement recognises the importance of integrating management activities related socio-economic progresses such as fishing, marine activities etc.

\[6\] The IFC World Bank ESIA categorization is in a reverse order as it considers Category A projects have the most significant and Category C projects have the least significant impacts.
g. The London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 and Protocol 1996, The Protocol was ratified by Egypt and entered into force on 24 March 2006. The main goal of the Protocol is to protect the marine ecosystem and improve sustainable resource usage. In this regard, both the convention and the protocol aimed to manage and restrict any marine pollution source through the provision of two waste lists; grey and black. The black list includes all the prohibited materials and the grey list includes the materials that can be dumped into the sea but requires following specific guidelines and obtaining a special permission from statutory bodies. Dumping any materials that are not on the list needs a general permission. In addition to this common goal, the newly formed protocol is sterner than the convention in terms of requiring a general precautionary approach, a reverse list approach that forbids all waste with an exception of obtaining a clearly stated permission, waste incineration/combustion treatment by the sea is forbidden. Technical guidelines and procedures are provided for the newly involved stakeholders.

h. Stockholm Convention on Persistent Organic Pollutants (POPs) 2000 was signed by Egypt on 17 May 2002, ratified it on 2 May 2003 and it was put into force in the country on 17 May 2004. The Convention was adopted at the meeting of the intergovernmental negotiating committee for an international legally binding instrument for implementing international action on certain persistent organic pollutants in Johannesburg (December 2000). It recognises that POPs are easily transported through evaporation and deposition. It also recognises that many countries use a high amount of POPs. For instance, the African Sahel countries apply a high amount of pesticides that are later on deposited in further away areas such as the Caribbean Sea and in turn causes its pollution of their sea. The objective of this Convention is to protect human health and the environment from persistent organic pollutants. The selected list of POPs is of direct relevance to the UNEP assessment of Persistent Toxic Substances.

i. The Conservation of African-Eurasian Migratory Water birds (AEWA) 1995 - Egypt ratified the Convention on 1 January 1999. A regional agreement part of the Bonn convention which entered into force on that aims to conserve migratory waterbirds and their habitats in many regions; Africa, Europe, the Middle East, Canadian Archipelago, Central Asia and Greenland but targets also international conservation efforts. It includes 225 birds that depend on wetlands.

j. The United Nations Framework Convention on Climate Change (UNFCCC) 1992 - Egypt signed this Convention on 9 June 1992 and it was ratified on 5 December 1994. The UNFCCC entered into force on 5 March 1995. It provides an intergovernmental framework to face climate change issues. Recognizing that the climate is a common shared resource affected by anthropogenic human emissions. It recognises the importance of marine environments as well as terrestrial ones in acting as reservoirs for carbon and greenhouse gases. It also emphasises the importance of scientific, economic and practical sectors in tackling climate change problems and the importance of continuous monitoring and assessment.

k. Kyoto Protocol setting internationally binding emission reduction targets, ratified in December 2005. The protocol aims to commit its joined parties to specific international emission targets and aims to strengthen the global response to temperature rise. It recognises that currently developed countries are the main cause of the presently high emissions of GHG in the atmosphere a result of 150 industrial years. It provides flexibility on how the countries reach their target (eg: increase in forests to compensate their emissions).

l. Global Convention on the Protection of Biological Diversity, 1992 - Egypt ratified the Convention on 31 August 1994. The Convention recognises the importance of biological diversity in offering ecosystem services such as re-creational, ecological, economic, educational services etc. and its importance in maintaining life. The convention emphasises that countries and states are responsible to preserve their biological diversity and that specific human activities negatively affects their presence. It also recognises the challenge in lack of information and studies. It as well emphasises the importance of in-situ conservation to maintain biodiversity and notes that ex-situ conservation also has a role in its preservation. It recognises as well that the priority of developing countries include social and economic progress and lowering poverty. It highlights the importance of sustainable use as the answer to poverty elimination and development.
m. Vienna Convention on the protection of the ozone layer, ratified in May 1988. The Convention’s objective is to protect human health and the environment from anthropological effects that could modify the ozone layer. It encourages international cooperation and exchange in knowledge between countries. The most important aspect is that signatory countries agreed to act upon future environmental problems before its effects were observed or proven. The protocol mainly focuses on the reduction in production and consumption of ozone depleting substances (ODS) listed in four annexes.

n. Montreal Protocol on substances that deplete the ozone layer, ratified in February 1988. The protocol aims to gradually diminish the use (production and consumption) of ozone depleting substances in order to avoid damaging the ozone layer. It provides an obligatory time-table for the involved parties to stop using those substances. The phase out date is reviewed and modified based on scientific advances. Multilateral Fund is created to aid developing countries to reach their phase out goals. It was amended multiple times and the amendments included more ozone depleting substances. The latest amendment was the Beijing 1999.

o. RAMSAR Convention on Wetlands of International Importance Especially as Waterfowl Habitat, 1971 Egypt ratified the convention on 9 September 1988 and it was put into force on the same date. The agreement recognises the inter-dependence of humans and the ecosystem. It also recognises the importance of wetlands in regulating water flow as well as associated animals and plants such as waterfowl. It emphasises as well the economic, social, recreational and scientific importance of wetlands.

p. The Law of the Sea, 1982. Egypt was one of the first countries who ratified it on 26 August 1983. The Law of the Sea Convention defines the rights and responsibilities of nations with respect to their use of the world’s oceans, establishing guidelines for businesses, the environment, and the management of marine resources. It also recognises that marine problems are inter-related and emphasises on the need for an integrated management. Under the United Nations Convention on the Law of the Sea “States have the obligation to protect and preserve the marine environment” (Art. 192) taking measures “necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life” (Art. 194, para. 5).

q. The Bonn Convention on the Conservation of Migratory Species of Wild Animals, 1979 Egypt ratified the convention on 11 February 1982 and it was put into effect on 1 November 1983. Aims to globally conserve aquatic, terrestrial and avian migratory animals and it recognises their crucial role in the stability of the ecosystem It recognises that all boundaries where the species occur or pass through needs to be managed.

r. The Barcelona Convention, 1976 Egypt first signed the Barcelona convention on the 16 February 1976. Shortly after, it ratified and approved the Barcelona convention on 24 August 1978 and accepted its amendment on 11 February 2000 which entered to force on 9 July 2004. Aims to protect the Mediterranean sea from pollution.. Since 1995, several components of the Barcelona system have undergone important changes. The objective of the revision was to modernise the Convention to bring it in line with the principles of the Rio Declaration, the philosophy of the new Convention on the Law of the Sea (see section 1.2 below) and the progress achieved in international environmental law in order to make it an instrument of sustainable development. The revised Convention also aimed to progress from an essentially proclamatory form of law to a more prescriptive law setting out obligations. The scope of its protocols was extended and new protocols were adopted either to replace the existing ones or to cover new fields of cooperation. In addition, in order to ensure the effectiveness of the new provisions, the need for new capacities as well as public participation and access to information including the adoption of a reporting procedure was part of the revision process.

s. The present Barcelona structure includes the following related instruments;

(ii) The Protocol Concerning Specially Protected Areas Egypt has signed the replacement protocol on 10 June 1995 and ratified it on 11 February 2000. The protocol entered into force on 12 March 2000
The protocol Concerning Mediterranean specially protected areas (Geneva, 1 April 1982; in force since 23 March 1986), was signed by Egypt on 16 February 1983 and ratified on 8 July 1983 and entered into force on 23 March 1986. It was replaced by the Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean "the SPA and Biodiversity Protocol", signed in Barcelona on 10 June 1995, (in force since 12 December 1999).

The Land Based Sources Protocol - Egypt ratified the protocol on 18 May 1983; however, it did not sign the amendment yet.

For the protection of the Mediterranean Sea against pollution from land-based sources (Athens, 17 May 1980; in force since 17 June 1983). The protocol was amended in Syracuse on 7 March 1996, changes its name to the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and Activities, “the LBS Protocol” (in force since 11 May 2008). LBS applies to discharges originating from land based point and diffuse sources and activities in the Mediterranean, such discharges reach the sea through coastal disposals, rivers, outfalls, canals or other watercourses, including ground water flow, or through run-off and disposal under the seabed with access from land;

t. World Heritage Convention, 1972, Egypt ratified the convention on 7 February 1974. Sets guidelines for parties to help them identify locations that can be world heritage sites and means to conserve them. Every state is required to protect the natural heritage. Regional frameworks, scientific research, and giving the heritage a cultural function for the community are encouraged. The convention provides managing guidelines and possibly financial assistance. Moreover, raising awareness and education is also encouraged in order to improve the protection of those sites.
3 IMPLEMENTATION AND OPERATION

3.1 GENERAL MANAGEMENT STRUCTURE AND RESPONSIBILITIES

84. The proposed project's implementation arrangements will be designed consistent with lessons learned in the several successfully-implemented climate change projects in Egypt. The project will be implemented following UNDP’s NIM, according to the Standard Basic Assistance Agreement (SBAA) between UNDP and the Government of Egypt and as policies and procedures outlined in the UNDP POPP.

85. The National Implementing Partner/Executing Entity for this project is the SPA which is accountable to UNDP for managing the project, including the monitoring and evaluation of project interventions, achieving project outcomes, and for the effective use of resources made available by UNDP.

86. The SPA is responsible for managing the shoreline in coastal areas that have socioeconomic value or natural resource value that are threatened by erosion. It develops coastal zone management plans, designs projects for shore protection, and issues license for projects located in the coastal zone area in collaboration with the EEAA. The organisation is a key player in the implementation of project activities because its experience in coastal protection structures and planning activities in the North Coast. SPA falls directly under the MWRI and was established in 1981 by Presidential Decree N. 261. SPA has two branches: i) Research & Development and ii) Execution.

87. SPA has seven administrations, four of them located at the north coast of Egypt near some of the hotspot sites. About 400 people work in SPA, 100 of them correspond to engineers who are actively engaged in monitoring conditions along the Mediterranean coast. SPA is responsible for the erosion control throughout the north coast of Egypt. The main responsibility of SPA is to manage the shoreline in those coastal areas, which have socioeconomic value or natural resource value that are threatened by erosion. The activities performed by SPA focus on designing projects and studies for shore protection, monitoring coastal processes, and issuing license for projects located in the coastal zone areas, in collaboration with EEAA. Additionally, SPA participates in the development of coastal management plans.

88. The duration of the proposed project is 7 years. The management arrangements for this project are summarised below:

3.1.1 Project Board

89. The project will be governed by a Project Board/steering committee. The Board will consist of a group of representatives responsible for making consensus-based strategic and management decisions for the project. It will oversee the project implementation; review compliance with Government of Egypt, UNDP and GCF requirements; and ensure implementation of the management plan for the risks identified. The Board will be comprised of:

a. An Executive (role represented by National Implementing Partner) that holds the project ownership and chairs the Board. The Executive will be the Minister of the SPA;

b. A Senior Supplier representative providing guidance regarding the technical feasibility of the project, compliance with donor requirements, and rules pertaining to use of project resources. This role will be fulfilled by UNDP in its capacity as GCF IA;

c. Senior Beneficiary representatives who ensures the realization of project benefits from the perspective of project beneficiaries; and,

d. The National Project Director, Assistant Chief Executive Officer (ACEO) of CRICU, who is responsible for overall direction, strategic guidance, and timely delivery of project outputs.

90. The Board will also include additional membership including representatives from relevant Government of Egypt ministries, Development Partners, NGOs and the Egyptian NDA for the GCF. The Board will meet once every six months and/or upon a call by the National Project Director.
91. Specific responsibilities of the Project Board include:
   a. Provide overall guidance and direction to the project, ensuring it remains within any specified constraints;
   b. Address project issues as raised by the project manager;
   c. Provide guidance on new project risks, and agree on possible countermeasures and management actions to address specific risks;
   d. Review the project progress, and provide direction and recommendations to ensure that the agreed deliverables are produced satisfactorily per plans;
   e. Appraise the annual project implementation report, including the quality assessment rating report; make recommendations for the work plan;
   f. Provide ad hoc direction and advice for exceptional situations when the project manager’s tolerances are exceeded; and,
   g. Assess and decide to proceed on project changes through appropriate revisions.

3.1.2 Shore Protection Authority

92. SPA was established in 1981 and since then, SPA has implemented many coastal protection projects valued at almost $500 million. SPA staff is well connected with the local communities along the north coast of Egypt and they have regional offices in the project locations.
93. The SPA has recently completed a pilot project in Kafr El Sheikh and is leading both the project engineering design as well as environmental and social considerations. SPA was directly involved in the community meetings that were held during the ESMF preparation.

94. SPA field engineers will be responsible for implementing the ESMF by the AE.

3.1.3 Project Management Unit (PMU)

95. The PMU is composed of the National Project Manager, Finance and Administrative Associate, a Monitoring, Evaluation and Reporting Officer. The PMU is responsible for the day to day management of the project activities and is accountable to the Project Board. The Project Management Unit’s overall role will be to ensure comprehensive technical and management support is provided to project activities and local beneficiaries, such as overseeing knowledge management and Monitoring and Evaluation. The PMU must have adequate multi-disciplinary technical capacity to be able to support technical, financial and climate change adaptation-related activities. Thus, the PMU team must be able to work with a large range of natural resources, economic, policy and organisational issues, and can ensure that activities are designed and implemented in-line with national and international best practices.

96. Using established practice under NIM, the Government of Egypt will designate a National Project Director (NPD) who will be the ACEO of CRICU. The NPD will provide up to 50% of his/her time, and be responsible for the overall direction, strategic guidance, and timely delivery of project outputs. This position is not remunerated by GCF resources but it is a Governmental financed position.

3.1.4 Technical Advisory Team

97. The Technical Advisory Team (TAT) consists of technical level staff from all Ministries and NGOs, represented on the Project Board. It will provide the platform for debate and contributions across the project outputs at a more technical and working level.

3.1.5 Project Team

98. SPA will recruit a state Project Manager (PM) who will be responsible for day-to-day operations and the management of a team of professionals and technical staff (who will also be recruited by UNDP to implement the project).

99. The PM will be supported by a core team of technical and support staff forming the Project Implementation Unit (PIU) located at the MWRI to execute project activities, including day-to-day operations of the project, and the overall operational and financial management and reporting.

3.1.6 Project Assurance

100. UNDP provides a three – tier oversight and quality assurance role involving UNDP staff in Country Offices and at regional and headquarters levels. The quality assurance role supports the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. Project Assurance must be independent of the Project Management function; the Project Board cannot delegate any of its quality assurance responsibilities to the Project Manager. The project assurance role is covered by the accredited entity fee provided by the GCF.

101. As an Accredited Entity to the GCF, UNDP is required to deliver GCF-specific oversight and quality assurance services including: (i) Day-to-day oversight supervision, (ii) Oversight of project completion, (iii) Oversight of project reporting. The 'senior supplier' role of UNDP is to represent the interests of the parties, which provide funding and/or technical expertise to the project (designing, developing, facilitating, procuring, implementing). The senior supplier’s primary function within the Board is to provide guidance regarding the technical feasibility of the project.
3.2 PROJECT DELIVERY AND ADMINISTRATION

3.2.1 Project Delivery

102. The project will be delivered on the ground via the SPA through its subsidiary departments. In addition, collaboration with atoll councils, existing NGOs and local communities is expected.

3.2.2 Administration of Environmental and Social Management Framework

103. As the implementing agency, SPA will be responsible for the implementation of the ESMF with the EEAA via the delivery organisations.

104. The ESMF will be part of any tender documentation. The SPA will be responsible for the revision or updates of this document during the course of work. It is the responsibility of the person to whom the document is issued to ensure it is the most up to date version.

105. The UNDP and SPA are accountable for the provision of specialist advice on environmental and social issues to the delivery organisations (e.g., contractors and/or NGOs) and for environmental and social monitoring and reporting. SPA or its delegate will assess the environmental and social performance of the delivery organisations (e.g., contractors) in charge of delivering each component throughout the project and ensure compliance with the ESMF. During operations, the delivery organisations will be accountable for implementation of the ESMF. Personnel working on the projects have accountability for preventing or minimising environmental and social impacts.

106. The Field Officer will be responsible for daily environmental inspections of the project/construction site. The SPA or its delegate will cross check these inspections by undertaking monthly audits.

107. The delivery organisation (e.g., contractor) will maintain and keep all administrative and environmental records, which would include a log of complaints together with records of any measures taken to mitigate the cause of the complaints.

108. The delivery organisation will be responsible for the day to day compliance of the ESMF.

3.2.3 Environmental procedures, site and activity-specific work plans/instructions

109. Environmental procedures provide a written method describing how the management objectives for a particular environmental element are to be obtained. They contain the necessary detail to be site or activity-specific and are required to be followed for all construction works. Site and activity-specific work plans and instructions are to be issued and will follow the previously successful work undertaken similar projects by the UNDP.

3.2.4 Environmental incident reporting

110. Any incidents, including non-conformances to the procedures of the ESMF are to be recorded using an Incident Record and the details used in a register. For any incident that causes or has the potential to cause serious environmental harm, the contractor shall notify the Project Manager as soon as possible. The delivery organisation/contractor must cease work until remediation has been completed as per the approval of SPA.

3.2.5 Daily and weekly environmental inspection checklists

111. A daily environmental checklist is to be completed at each work site by the relevant state project manager and maintained within a register. A weekly environmental checklist is to be completed and will include reference to any issues identified in the daily checklists completed by the field officers. The completed checklist is to be forwarded to SPA for review and follow-up if any issues are identified.

3.2.6 Corrective Actions

112. Any non-conformances to the ESMF are to be noted in weekly environmental inspections and logged into the register. Depending on the severity of the non-conformance, the camp officer may specify a corrective action on the weekly site inspection report. The progress of all corrective actions will be
3.2.7 Review and auditing

113. The project will be audited in accordance with UNDP policies and procedures on audits, informed by and together with any specific requirements agreed in the AMA. Per the current audit policies, UNDP will be appointing the auditors. In UNDP scheduled audits are performed during the programme cycle as per UNDP assurance/audit plans, based on the implementing partner's risk rating and UNDP's guidelines. A scheduled audit is used to determine whether the funds transferred to the implementing partner were used for the appropriate purpose and in accordance with the work plan. A scheduled audit can consist of a financial audit or an internal control audit.

114. The ESMF and its procedures are to be reviewed at least every two months by UNDP staff and SPA. The objective of the review is to update the document to reflect knowledge gained during the course of project delivery/construction and to reflect new knowledge and changed community standards (values).

115. The ESMF will be reviewed and amendments made if:
   a. There are relevant changes to environmental conditions or generally accepted environmental practices; or
   b. New or previously unidentified environmental risks are identified; or
   c. Information from the project monitoring and surveillance methods indicate that current control measures require amendment to be effective; or
   d. There are changes to environmental legislation that are relevant to the project; or
   e. There is a request made by a relevant regulatory authority.

116. Any changes are to be developed and implemented in consultation with UNDP Staff and SPA. When an update is made, all site personnel are to be made aware of the revision as soon as possible eg through a tool box meeting or written notification.

3.3 TRAINING

3.3.1 General Training

117. Delivery organisations have the responsibility for ensuring systems are in place so that relevant employees, contractors and other workers are aware of the environmental and social requirements for construction, including the ESMF.

118. All project personnel will attend an induction that covers health, safety, environment and cultural requirements.

3.3.2 Specialised Training

119. All workers engaged in any activity with the potential to cause serious environmental harm (e.g. handling of hazardous materials) will receive task specific environmental training.

120. Training to build capacity in the application of high resolution modelling techniques, maintenance of soft coastal protection structures, and maintenance of all coastal monitoring equipment

121. Design and implementation of modular training program for MWRI/SPA and EEAA to build skills for professional development of coastal management practitioners, in a diversity of capacities (e.g. policy positions or day-to-day management).

122. Design and implementation of the modular training program for other stakeholders to be able to collaborate and actively participate in the implementation of the ICZM Plan.
4 COMMUNICATION

4.1 PUBLIC CONSULTATION AND ENVIRONMENTAL AND SOCIAL DISCLOSURE

Consultations were conducted as part of the stakeholder engagement plan. A meeting took place on 25 May 2017 (see Table 5) with the Representative of the MIWR, relevant members of the Parliament, Secretariats of the relevant governorates to the project location(s), representatives of the SPA and the project development team. The purpose of this meeting was to introduce the project and define high-level concerns. The meeting also aimed at agreeing and refining a stakeholder list to be consulted during the scope of the current study. A preliminary list of stakeholders was prepared and discussed. Details of Stakeholder Engagement are presented in Annexure Two.

Table 5: Preliminary list of Stakeholders

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Reason</th>
<th>Port Said</th>
<th>Damietta</th>
<th>Dakahlia</th>
<th>Kafr El Skeikh</th>
<th>El Beheira</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishermen Community</td>
<td>Sea Accessibility</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Bird Poachers</td>
<td>Shore Accessibility</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Farmers</td>
<td>Protecting and increasing agricultural areas via minimising climate change impacts</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Utilisation of materials from lakes</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Fish Farms</td>
<td>Protecting and increasing fish farm areas via minimising climate change impacts</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>National Company for Fish Farming</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>General Authority for fisheries</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Resources Development</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Resorts and Recreational Beaches</td>
<td>Beach Accessibility</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban Areas near the Sea</td>
<td>Beach Accessibility</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Protecting and increasing urban areas via minimising climate change impacts</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Work Opportunities</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Areas</td>
<td>Protecting and increasing industrial areas via minimising climate change impacts</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Plant</td>
<td>Sensitivity to climate change impacts</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Governmental Organisations</td>
<td>Provision of trained labour</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
### Scientific Communities
<table>
<thead>
<tr>
<th>Interested parties</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coast Guards</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Environment and Surface Water Police</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Marginalised Groups</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

124. The SPA will arrange further meetings with focus groups from the relevant governorates to include fishermen, community members and representatives of NGOs, as available. It is expected that consultation with any affected communities will continue through the course of the project. It is anticipated that based on the communities’ needs, the projects’ will be fully accepted.

125. The UNDP and SPA will develop and release updates on the project on a regular basis to provide interested stakeholders with information on project status. Updates may be via a range of media eg print, radio, social media or formal reports. A publicised telephone number will be maintained throughout the project to serve as a point of contact for enquiries, concern, complaints and/or grievances. All enquiries, concern, complaints and/or grievances will be recorded on a register and the appropriate manager will be informed. All material will be published in English and Arabic as appropriate.

### 4.2 Complaints Register and Grievance Redress Mechanism

126. During the construction and implementation phases of any project, a person or group of people can be adversely affected, directly or indirectly due to the project activities. The grievances that may arise can be related to social issues such as eligibility criteria and entitlements, disruption of services, temporary or permanent loss of livelihoods and other social and cultural issues. Grievances may also be related to environmental issues such as excessive dust generation, damages to infrastructure due to construction related vibrations or transportation of raw material, noise, traffic congestions, decrease in quality or quantity of private/public surface/ground water resources, loss of access etc.

127. Should such a situation arise, there must be a mechanism through which affected parties can resolve such issues in a cordial manner with the project personnel in an efficient, unbiased, transparent, timely and cost-effective manner. To achieve this objective, a grievance redress mechanism has been included in ESMF for this project.

128. Where there is a community issue raised, the following information will be recorded:

a. time, date and nature of enquiry, concern, complaints and/or grievances;
b. type of communication (e.g. telephone, letter, personal contact);
c. name, contact address and contact number;
d. response and investigation undertaken as a result of the enquiry, concern, complaints and/or grievances; and
e. actions taken and name of the person taking action.

129. Some enquiries, concerns, complaints and/or grievances may require an extended period to address. The complainant(s) will be kept informed of progress towards rectifying the concern. All enquiries, concerns, complaints and/or grievances will be investigated and a response given to the complainant in a timely manner. A grievance redress mechanism has been included in the ESMF to address any complaints that may not be able to be resolved quickly.
130. Nominated PMU/contractor staff will be responsible for undertaking a review of all enquiries, concern, complaints and/or grievances and ensuring progress toward resolution of each matter.

131. The project allows those that have a complaint or that feel aggrieved by the project to be able to communicate their concern, complaints and/or grievances through an appropriate process. The Complaints Register and Grievance Redress Mechanism set out in this ESMF are to be used as part of the project and will provide an accessible, rapid, fair and effective response to concerned stakeholders, especially any vulnerable group who often lack access to formal legal regimes.

132. While recognising that many complaints may be resolved immediately, the Complaints Register and Grievance Redress Mechanism set out in this ESMF encourages mutually acceptable resolution of issues as they arise. The Complaints Register and Grievance Redress Mechanism set out in this ESMF has been designed to:

   a. be a legitimate process that allows for trust to be built between stakeholder groups and assures stakeholders that their concerns will be assessed in a fair and transparent manner;
   b. allow simple and streamlined access to the Complaints Register and Grievance Redress Mechanism for all stakeholders and provide adequate assistance for those that may have faced barriers in the past to be able to raise their concerns;
   c. provide clear and known procedures for each stage of the Grievance Redress Mechanism process, and provides clarity on the types of outcomes available to individuals and groups;
   d. ensure equitable treatment to all concerned and aggrieved individuals and groups through a consistent, formal approach that is fair, informed and respectful to a concern, complaints and/or grievances;
   e. to provide a transparent approach, by keeping any aggrieved individual/group informed of the progress of their complaint, the information that was used when assessing their complaint and information about the mechanisms that will be used to address it; and,
   f. enable continuous learning and improvements to the Grievance Redress Mechanism. Through continued assessment, the learnings may reduce potential complaints and grievances.

133. Eligibility criteria for the Grievance Redress Mechanism include:

   a. Perceived negative economic, social or environmental impact on an individual and/or group, or concern about the potential to cause an impact;
   b. clearly specified kind of impact that has occurred or has the potential to occur; and explanation of how the project caused or may cause such impact; and,
   c. individual and/or group filing of a complaint and/or grievance is impacted, or at risk of being impacted; or the individual and/or group filing a complaint and/or grievance demonstrates that it has authority from an individual and or group that have been or may potentially be impacted on to represent their interest.

134. Local communities and other interested stakeholders may raise a grievance/complaint at all times to the SPA. Affected local communities should be informed about the ESMF provisions, including its grievance mechanism and how to make a complaint.

4.2.1 Complaints Register

135. Where there is a community issue raised, the following information will be recorded:

   a. A complaints register will be established as part of the project to record any concerns raised by the community during construction. Any complaint will be advised to the UNDP and SPA within 24 hours of receiving the complaint. The complaint will be screened. Following the screening, complaints regarding corrupt practices will be referred to the UNDP for commentary and/or advice along with the SPA.
b. Wherever possible, the project team will seek to resolve the complaint as soon as possible, and thus avoid escalation of issues. However, where a complaint cannot be readily resolved, then it must be escalated.

c. A summary list of complaints received and their disposition must be published in a report produced every six months.

4.2.2 Grievance Redress Mechanism

136. The Grievance Redress Mechanism has been designed to be problem-solving mechanism with voluntary good-faith efforts. The Grievance Redress Mechanism is not a substitute for the legal process. The Grievance Redress Mechanism will as far as practicable, try to resolve complaints and/or grievances on terms that are mutually acceptable to all parties. When making a complaint and/or grievance, all parties must act at all times, in good faith and should not attempt to delay and or hinder any mutually acceptable resolution.

137. In order to ensure smooth implementation of the Project and timely and effectively addressing of problems that may be encountered during implementation, a robust Grievance Redress Mechanism, which will enable to the Project Authorities to address the grievances of the stakeholders of the Project has been established.

138. All complaints and/or grievances regarding social and environmental issues can be received either orally (to the field staff), by phone, in complaints box or in writing to the UNDP, SPA or the Construction Contractor. A key part of the grievance redress mechanism is the requirement for the SPA/PMU and construction contractor to maintain a register of complaints and/or grievances received at the respective project site offices. All complainants shall be treated respectfully, politely and with sensitivity. Every possible effort should be made by the SPA/PMU and construction contractor to resolve the issues referred to in the complaint and/or grievance within their purview. However, there may be certain problems that are more complex and cannot be solved through project-level mechanisms. Such grievances will be referred to the Grievance Redress Committee. It would be responsibility of the SPA to solve these issues through a sound / robust process.

139. The Grievance Redress Mechanism has been designed to ensure that an individual and/or group are not financially impacted by the process of making a complaint and/or grievance. The Grievance Redress Mechanism will cover any reasonable costs in engaging a suitably qualified person to assist in the preparation of a legitimate complaint and/or grievance. Where a complaint and/or grievance is seen to be ineligible, the Grievance Redress Mechanism will not cover these costs.

140. Information about the Grievance Redress Mechanism and how to make a complaint and/or grievance must be placed at prominent places for the information of the key stakeholders.

141. The Safeguards officer in the PMU will be designated as the key officer in charge of the Grievance Redress Mechanism. The Terms of Reference for these positions (as amended from time to time) will have the following key responsibilities:

a. coordinate formation of Grievance Redress Committees before the commencement of constructions to resolve issues;

b. act as the focal point at the PMU on Grievance Redress issues and facilitate the resolution of issues within the PMU;

c. create awareness of the Grievance Redress Mechanism amongst all the stakeholders through public awareness campaigns;

d. assist in redress of all grievances by coordinating with the concerned parties;

e. maintain information on grievances and redress;

f. monitor the activities of SPA on grievances issues; and

g. prepare the progress for monthly/quarterly reports.
142. A two tier Grievance Redress Mechanism structure has been developed to address all complaints and/or grievances in the project. The first trier redress mechanism involves the receipt of a complaint and/or grievance at the village/town and/or Markaz level. The stakeholders are informed of various points of making a complaint and/or grievance (if any) and the PMU collect the complaints and/or grievances from these points on a regular basis and record them. This is followed by coordinating with the concerned people to redress the grievances. The Safeguards Officer of the PMU will coordinate the activities at the respective District level to address the grievances and would act as the focal point in this regard. The Community Development Officer of the Local Authority or in the absence of the Community Development Officer, any officer given the responsibility of this would coordinate with the Safeguards and Gender Manager of the PMU and SPA in redressing the grievances. The designated officer of the Local Authorities is provided with sufficient training in the procedure of redress to continue such systems in future.

143. The grievance can be made orally (to the field staff), by phone, in complaints box or in writing to the UNDP, SPA or the Construction Contractor. Complainants may specifically contact the Safeguards Officer and request confidentiality if they have concerns about retaliation. In cases where confidentiality is requested (i.e. not revealing the complainant’s identity to UNDP, SPA and/or the Construction Contractor). In these cases, the Safeguards Officer will review the complaint and/or grievance, discuss it with the complainant, and determine how best to engage project executing entities while preserving confidentiality for the complainant.

144. As soon as a complaint and/or grievance is received, the Safeguards Officer would issue an acknowledgement. The Community Development Officer receiving the complaint and/or grievance should try to obtain relevant basic information regarding the grievance and the complainant and will immediately inform the Safeguards Officer in the PMU.

145. The PMU will maintain a Complaint / Grievance Redress register at the Markaz Level. Keeping records collected from relevant bodies is the responsibility of PMU.

146. After registering the complaint and/or grievance, the Safeguards Officer will study the complaint and/or grievance made in detail and forward the complaint and/or grievance to the concerned officer with specific dates for replying and redressing the same. The Safeguards Officer will hold meetings with the affected persons / complainant and then attempt to find a solution to the complaint and/or grievance received. If necessary, meetings will be held with the concerned affected persons / complainant and the concerned officer to find a solution to the problem and develop plans to redress the grievance. The deliberations of the meetings and decisions taken are recorded. All meetings in connection with the Grievance Redress Mechanism, including the meetings of the Grievance Redress Committee, must be recorded. The Safeguards Officer for the Grievances Redress Mechanism will be actively involved in all activities.

147. A Community Project Implementation Committee would be formed (from the different governorates) to oversee the first tier of the Grievance Redress Mechanism. The Community Project Implementation Committee would include:
   a. Representatives of the City Councils;
   b. Women representatives;
   c. Youth representatives;
   d. Other local organisations
   e. Project Manager; and,
   f. Safeguards Officer PMU.

148. The resolution at the first tier will normally be completed within 15 working days and the complaint and/or grievance will be notified of the proposed response through a disclosure form. The resolution process should comply with the requirements of the Grievance Redress Mechanism in that it should, as far as practicable, be informal with all parties acting in good faith. Further, the Grievance Redress Mechanism should, as far as practicable, achieve mutually acceptable outcomes for all parties.
149. Should the grievance be not resolved within this period to the satisfaction of the complainant, the grievance will be referred to the next level of Grievance Redress Mechanism. If the social safeguard and gender officer feels that adequate solutions can be established within the next five working days, the officer can decide on retaining the issue at the first level by informing the complainant accordingly. However, if the complainant requests for an immediate transfer to the next level, the matter must be referred to the next tier. In any case, where the issue is not addressed within 20 working days, the matter is referred to the next level.

150. Any grievance related to corruption or any unethical practice should be referred immediately to the Egypt Office of the Attorney General and the Office of Audit and Investigation within the UNDP in New York.

151. The Grievance Redress Committee formed at every sub-Markaz level would address the grievance in the second tier. A Grievance Redress Committee will be constituted for every sub-Markaz by the circulars issued by the legal representative of Local Governorate(s), who would also be the Chairman of the Committee.

152. The Structure of the committee would be:
   a. Chairman (TBA);
   b. Representative of the Coast Guards;
   c. EEAA representative;
   d. GAFRAD representative;
   e. Other national organisations; and
   f. Project manager.

153. The Safeguard Officer from the PMU will coordinate with the respective Commissioner of Local Government in getting these Committees constituted for each Province and get the necessary circulars issued in this regard so that they can be convened whenever required.

154. The Terms of Reference for the Grievance Redress Committee are:
   a. providing support to the affected persons in solving their problems;
   b. prioritise grievances and resolve them at the earliest;
   c. provide information to the PMU and SPA on serious cases at the earliest opportunity;
   d. Coordinate with the aggrieved person/group and obtain proper and timely information on the solution worked out for his/her grievance; and
   e. study the normally occurring grievances and advise PMU, National and District Steering Committee on remedial actions to avoid further occurrences.

155. The Grievance Redress Committee will hold the necessary meetings with the aggrieved party/complainant and the concerned officer and attempt to find a solution acceptable at all levels. The Grievance Redress Committee would record the minutes of the meeting.

156. Grievance Redress Committee will communicate proposed responses to the complainant formally. If the proposed response satisfies the complainant, the response will be implemented and the complaint and/or grievance closed. In cases where a proposed response is unsatisfactory to the complainant, the Grievance Redress Committee may choose to revise the proposed response to meet the complainant’s remaining concerns, or to indicate to the complainant that no other response appears feasible to the Grievance Redress Committee. The complainant may decide to take a legal or any other recourse if s/he is not satisfied with the resolutions due to the deliberations of the three tiers of the grievance redress mechanism.

157. In addition to the project-level and national grievance redress mechanisms, complainants have the option to access UNDP’s Accountability Mechanism, with both compliance and grievance functions. The Social and Environmental Compliance Unit investigates allegations that UNDP’s Standards,
screening procedure or other UNDP social and environmental commitments are not being implemented adequately, and that harm may result to people or the environment. The Social and Environmental Compliance Unit is housed in the Office of Audit and Investigations, and managed by a Lead Compliance Officer. A compliance review is available to any community or individual with concerns about the impacts of a UNDP programme or project. The Social and Environmental Compliance Unit is mandated to independently and impartially investigate valid requests from locally impacted people, and to report its findings and recommendations publicly.

158. The Stakeholder Response Mechanism offers locally affected people an opportunity to work with other stakeholders to resolve concerns, complaints and/or grievances about the social and environmental impacts of a UNDP project. Stakeholder Response Mechanism is intended to supplement the proactive stakeholder engagement that is required of UNDP and its Implementing Partners throughout the project cycle. Communities and individuals may request a Stakeholder Response Mechanism process when they have used standard channels for project management and quality assurance, and are not satisfied with the response (in this case the project level grievance redress mechanism). When a valid Stakeholder Response Mechanism request is submitted, UNDP focal points at country, regional and headquarters levels will work with concerned stakeholders and Implementing Partners to address and resolve the concerns. Visit www.undp.org/secu-srm for more details. The relevant form is attached at Annexure Three of the ESMF.
5 KEY ENVIRONMENTAL AND SOCIAL INDICATORS

159. This section identifies the key environmental and social indicators identified for the project and outlines respective management objectives, potential impacts, control activities and the environmental performance criteria against which these indicators will be judged (e.g., audited).

160. This section further addresses the need for monitoring and reporting of environmental performance with the aim of communicating the success and failures of control procedures, distinguish issues that require rectification and identify measures that will allow continuous improvement in the processes by which the projects are managed.

5.1 CLIMATE

161. Egypt is generally characterised as a semi-desert climate, with hot dry summers, moderate winters, and very little rainfall. The Mediterranean coasts have stronger winds with an annual average wind speed of about 6.0-6.5m/sec (Agrawala et al., 2004). Cumulative data of the northern coastal climate of Egypt was obtained in order to make comparisons between the targeted sites.

162. Temperature data was obtained from the Seawind II temperature database through the period 1989-2015. The database consists of monthly data of air temperature with a spatial resolution of 0.125° for the whole Northern Egyptian coast (Donlon et al., 2012). The mean monthly data is presented in Table 6, Figure 5, Figure 6 and Figure 7. Air Temperatures are, more or less, similar along the five hotspots with insignificant variations, reflecting a similar dominant climate along the Egyptian Mediterranean coast.

163. The annual and seasonal precipitation was measured by Sea Wind II data base for the period 1989-2015, (Spatial resolution 0.125°). The rainfall is almost the same in all sites, except for Port Said which had the lowest rate of annual rainfall, while Beheira had the highest rate of rate rainfall in comparison to the rest of the sites. During the dry season the rainfall is almost negligible in all sites, as presented in Table 7, Figure 8, Figure 9 and Figure 10.

<table>
<thead>
<tr>
<th>Hot Spot</th>
<th>Beheira</th>
<th>Kafr El Sheikh</th>
<th>Dakahlia</th>
<th>Damietta</th>
<th>Port Said</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean 19°C</td>
<td>15°C</td>
<td>15°C</td>
<td>15.5</td>
<td>15 °C</td>
<td>15°C</td>
</tr>
<tr>
<td>Maximum 19°C</td>
<td>19°C</td>
<td>19°C</td>
<td>18°C</td>
<td>18.5°C</td>
<td>19°C</td>
</tr>
<tr>
<td>Minimum 11°C</td>
<td>11°C</td>
<td>11°C</td>
<td>11.5</td>
<td>11°C</td>
<td>11°C</td>
</tr>
</tbody>
</table>

Figure 5: Mean value of the monthly minimum air temperature (°C) for the period 1989-2015
Figure 6: Mean value of the monthly mean air temperature (°C) for the period 1989-2015

Figure 7: Mean value of the monthly maximum air temperature (°C) for the period 1989-2015

Table 7: Annual mean precipitation at the hot-spots

<table>
<thead>
<tr>
<th></th>
<th>Beheira</th>
<th>Kafr El Sheikh</th>
<th>Dakahlia</th>
<th>Damietta</th>
<th>Port Said</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual mean</td>
<td>330mm</td>
<td>300mm</td>
<td>280mm</td>
<td>320mm</td>
<td>125mm</td>
</tr>
<tr>
<td>Wet season (monthly mean)</td>
<td>53mm</td>
<td>41.6mm</td>
<td>50mm</td>
<td>50mm</td>
<td>18mm</td>
</tr>
<tr>
<td>Dry season (monthly mean)</td>
<td>2mm</td>
<td>2mm</td>
<td>2mm</td>
<td>2mm</td>
<td>2mm</td>
</tr>
</tbody>
</table>

Figure 8: Mean value of the annual precipitation (mm) for the period 1989-2015
Figure 9: Monthly mean value of precipitation (mm) during wet season (October to March) for the period 1989-2015

Figure 10: Monthly mean value of precipitation (mm) during dry season (April to September) for the period 1989-2015

164. Annual wind data from 2009 to 2017 was obtained from windfinder database and is represented in Table 8 covering wind speed and direction. The data was acquired from the three closest meteorological stations to the five project hotspot locations.

165. The prevailing wind direction is north west (NW), with an average wind speed of (8, 5, 9) knots in Alexandria, Baltim and Port Said respectively, while the prevailing wind direction in Port Said shifts toward the north (NNW), as presented in Table 8, Figure 11, Figure 12 and Figure 13.

Table 8: Mean wind data from three stations

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Stations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind speed (Kts)</td>
<td>Alexandria</td>
</tr>
<tr>
<td></td>
<td>Baltim</td>
</tr>
<tr>
<td></td>
<td>Port Said</td>
</tr>
<tr>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>NNW</td>
</tr>
</tbody>
</table>

| Wind direction     | Alexandria      |
|--------------------| Baltim          |
| NW                 | WNW,NNW         |
|                   | NNW             |
Figure 11: Alexandria station windrose (annual)

Figure 12: Baltim station windrose (annual)
166. Sea surface temperature was measured during the entire Period 1985-2015, (Robert-Jones et al., 2012) (Spatial resolution 0.05°). The sea water temperature in the five hot spots is the same as described in Table 9, Figure 14, Figure 15 and Figure 16. The sea surface Temperature showed insignificant variation along the hotspots, reflecting a similar dominant climate along the Egyptian Mediterranean coast.

Table 9: Mean sea surface temperature of the hot-spots

<table>
<thead>
<tr>
<th></th>
<th>Beheira</th>
<th>Kafr El Sheikh</th>
<th>Dakahlia</th>
<th>Damietta</th>
<th>Port Said</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>21.5 °C</td>
<td>21.5 °C</td>
<td>21.5 °C</td>
<td>21.5 °C</td>
<td>21.5 °C</td>
</tr>
<tr>
<td>Maximum</td>
<td>28° C</td>
<td>28° C</td>
<td>28° C</td>
<td>28° C</td>
<td>28° C</td>
</tr>
<tr>
<td>Minimum</td>
<td>15° C</td>
<td>15° C</td>
<td>15° C</td>
<td>15° C</td>
<td>15° C</td>
</tr>
</tbody>
</table>
167. The hourly mean significant wave height was measured by “Global Ocean Waves” (GOW) database for the period 1979-2015, (Reguero et al., 2012) (Spatial resolution 0.125°) with Beheira having the highest wave height as presented in Table 10, Figure 17 and Figure 18. Significant wave height showed highest values in Beheira, while the lowest values were in Dakahlia.

Table 10: Mean significant wave height of the hot-spots

<table>
<thead>
<tr>
<th></th>
<th>Beheira</th>
<th>Kafr El Sheikh</th>
<th>Dakahlia</th>
<th>Damietta</th>
<th>Port Said</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.9-1 m</td>
<td>0.87 m</td>
<td>0.75 m</td>
<td>0.8 m</td>
<td>0.75-0.8 m</td>
</tr>
<tr>
<td>Maximum</td>
<td>6.5 m</td>
<td>4.75 m</td>
<td>4.5 m</td>
<td>5 m</td>
<td>4.5 m</td>
</tr>
</tbody>
</table>
The mean Wave Energy Flux during the entire Period 1979-2015, (Reguero et al., 2012) (Spatial resolution 0.125°) with Beheira having the highest wave flux is represented in Table 11 and Figure 19. The wave energy flux showed highest values in Beheira, while it was lowest in Dakahlia.

Table 11: Mean wave energy flux of the hot-spots

<table>
<thead>
<tr>
<th></th>
<th>Beheira</th>
<th>Kafr El Sheikh</th>
<th>Dakahlia</th>
<th>Damietta</th>
<th>Port Said</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.3 kW/m</td>
<td>0.197 kW/m</td>
<td>0.17 kW/m</td>
<td>0.2 kW/m</td>
<td>0.19 kW/m</td>
</tr>
</tbody>
</table>

Figure 18: Maximum value of the hourly mean significant wave height (m) for the period 1979-2015

Figure 19: Mean value of the wave energy flux (kW/m) for the period 1979-2015
5.2 ECOLOGY

5.2.1 Background

169. From a bio-geographical perspective, the northern Nile Delta represents a unique meeting point for biological elements from three bio-geographical regions: the Mediterranean (extending along the coastal zone), the Saharo-Sindian (relicts isolated in the sand dunes) and the Afro-tropical (extending northwards along the Nile Valley) (Environics, 2016).

170. The project is located in the middle and eastern parts of the Mediterranean coast of the Nile Delta. The Deltaic coastal part includes some of the few remaining fragments of wilderness observed in Egypt. The eastern part contain sparse vegetation while very little protected flora and fauna exist are found in proximity to Damietta due to extensive urbanisation and industrial activities. Some parts of the coast include man-made habitat including factories, resorts and urban settlements.

171. The following sections present a description of the ecological characteristics of the wider area in relation to the five hotspot sites and in proximity to the areas where construction material might be obtained. The common habitats in proximity to the hotspots are presented in Table 12.

172. The CITES appendices and the Red List issued by the International Union for the Conservation of Nature (IUCN) were used to determine the international status of species. The local status was based on Shaltout and Khalil (2005) for flora, Baha El Din (2006) for amphibians and reptiles, Tharwat (1997) for avifauna and Basuony et al. (2010) for mammals.

Table 12: Natural habitats of the five hotspots

<table>
<thead>
<tr>
<th>Natural Habitats</th>
<th>Hot-spots</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beheira</td>
</tr>
<tr>
<td>Sandy beaches</td>
<td>✓</td>
</tr>
<tr>
<td>Sand dunes</td>
<td>✓</td>
</tr>
<tr>
<td>Salt Marshes</td>
<td>✓</td>
</tr>
<tr>
<td>Sabkha</td>
<td>✓</td>
</tr>
</tbody>
</table>

5.2.1.1 Terrestrial Flora

173. The coastal belt of the northern coast of Egypt consists primarily of sandy beaches, sometimes lined by Sabkha, saltmarshes and sand dunes with a sparse vegetation cover composed mostly of coastal, obligate and halophytic shrubs. The latter are mostly found in sand hammocks scattered on the backshore sabkha flats. This shrub-vegetation-cover traps wind-drifting sands and acts as a barrier.

174. About 197 species of desert plants have been recorded in the Burullus region (Shaltout & Sodany, 2008). Several plants of the area have some commercial and social applications. Moreover, vegetation has important ecological functions that benefit man and animals such as natural water purification, soil stabilisation, nitrogen fixation and in providing food and shelter for wildlife. Twenty-nine species in the study area have at least one environmental importance aspect. Thirty species have at least one aspect of the potential or actual economic uses. Based on studies by Zahran et al. (1990) and Environics (2012), the following plant species have been observed in the Deltaic and Eastern Mediterranean coast:

a. in sandy hillocks, Tamarix nilotica, the endemic Zygophyllum album and Arthrocenmum strobilaceum have been observed
b. sand bars include Ephedra alata, Salsola kali, Zygophyllum album and Arthrocenmum macrostachyum, Chenopodium murale, Rumex pectus, Senecio glaucus subsp. coronopifolius, Polygonum equisetiforme, Cutandia memphitica, Amaranthus viridis, Anchusa humilis, Calendula arvensis, Emex spinose, Mellilotus messanensis, Tamarix nilotica, Cressa cretica and Phragmites australis;

c. in coastal dunes, the common species include Elymus fractus, Alhagi graecorum, Cynodon dactylon, Heliotropium curassavicum, Thymelaea hirsute, Asparagus stipularis, Pancratium maritimum, Zygophyllum album, Calligonum comosum, Salsola kali and Tamarix tetragyna;

d. Zygophyllum album, Zygophyllum aegyptium, Sarcocornia fruticose, Nitraria retusa, Inula crithmoides, Arthrocenmum macrostachyum, Halocnemum strobilaceum and Juncus acutus are found in salt marshes. The associated species include Ephedra alata, Senecio glaucus subsp. Coronopifolius and Reichardia tingitana; and

e. sandy sheets include Chenopodium murale, Rumex pectus, Senecio glaucus subsp. coronopifolius, Polygonum equisetiforme, Cutandia memphitica, Amaranthus viridis, Anchusa humilis, Calendula arvensis, Emex spinosa and Mellilotus messanensis were recorded.

175. A list of known plant species is shown in Table 13

<table>
<thead>
<tr>
<th>Species</th>
<th>Environmental importance</th>
<th>Economic importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anabasis articulata</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Arthrocenmum macrostachyum</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Asine indica</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Cakile maritima</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Calluna palustris</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Cistus albidus</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Cyperus alopecuroides</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Ephedra elata</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Halocnemum strobilaceum</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Halimium orientale</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Impatiens corymbosa</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Juncus acutus</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Juncus rigidos</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Laurel tea</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Lobelia glabrescens</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Poa pratensis</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Phragmites australis</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Reichardia tingitana</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Rumex pictus</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Salsola kali</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Sarcocornia fruticosa</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Senecio glaucus subsp. coronopifolius</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Senecio vulgaris</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Sporobolus munroanus</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Tamarix nilotica</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Zygophyllum album</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

5.2.1.2 Terrestrial Amphibians and Reptiles

176. Amphibians and reptiles that occur in this area based on similar nearby sites and type of habitats include the Green Toad (Bufo viridis) which occurs in Mediterranean coastal deserts and the African Common Toad (Sclerophrys regularis) (which was documented in dunes near Baltim). Bosc’s Lizard (Acanthodactylus boskianus) is a common species in desert areas, Desert Monitor (Varanus griseus) which is a nearly threatened species, the Oscillated Skink (Chalcides ocellatus) is found in coastal deserts. Montpellier Snake (Malpolon monspessalanus) is found in sandy areas of the northern Delta around vegetated saltmarshes and in cultivated lands (Saleh, 1997). The Javelin Sand Boa (Eryx jaculus) which is on the Egyptian Red List is known from the Burullus area and is distributed in Mediterranean coastal deserts. Other possibly occurring species are the Egyptian Cobra (Naja, haje haje) found in vegetated coastal deserts. The Montpellier Snake (Malpolon monspessalanus) occurs in vegetated salt marshes (Shaltout & Khalil, 2005; Bahaa El-Din. S 2013).

5.2.1.3 Avian Fauna

177. The North Delta coast is an important migratory and breeding area for birds, particularly during the autumn migration season.

178. Bahaa El-Din (2013) conducted a survey on birds in Burullus and observed the following species in different habitats:

a. marine sandy beaches include the Common Kestrel (Falco tinnunculus) the Kentish Plover (Charadrius alexandrinus), the Little Tern (Sterna albifrons), the Night-Heron (Nycticorax nycticorax), the White Wagtail (Motacilla alba) and some gull species;

b. salt marshes include Marsh Harrier (Circus aeruginosus), the Spotted Redshank (Tringa erythropus), the Black-winged Stilt (Himantopus himantopus), The Spur-winged Plover (Vanellus spinosus), Crested Lark (Galerida cristata), the Hooded Crow (Corvus cronix), the Barn Swallow (Hirundo rustica), the White Wagtail (Motacilla alba), the Cattle Egret (Bubulcus ibis), the Red-backed Shrike (Lanius collurio), the Slender-billed Gull (Larus genei), the Yellow-legged Gull (Larus cachinnans), the Redshank (Tringa totanus), the Kentish Plover (Charadrius alexandrinus), the Water Pipit (Anthus spinoletta), the House Sparrow (Passer domesticus), the Great Spotted Cuckoo (Clamator glandarius),and the Cream-coloured courser (Cursorius cursor);

c. in sand/sabkha habitats the Barn Swallow (Hirundo rustica), the Red-backed Shrike (Lanius collurio), the Willow Warbler (Phylloscopus trochilus), The Spur-winged Plover (Vanellus spinosus), the Stone Curlew (Burhinus oedicnemus), Blue-cheeked Bee-eater (Merops persicus),Swift, the Crested Lark (Galerida cristata), the Tawny Pipit (Anthus campestris), the Black-eared Wheatear (Oenanthe Hispanica), the Common Kestrel (Falco tinnunculus) the Collard Pratincole (Glareola pratincola) and the Cream-coloured courser (Cursorius cursor);

d. Other likely occurring breeding species include the Egyptian Nightjar (Caprimulgus aegyptius), the Short-toed Lark (Calandrella rufescens), the Hoopoe (Upupa epops), the Graceful Warbler (Prinia gracilis), and the Little Owl (Athene noctua). The Palm Dove (Spilopelia senegalensis) and the Collard Dove (Streptopelia decaocto) were recorded at sand bars; and

e. Other bird species recorded nearby include the Common Cuckoo (Cuculus canorus), the Sand Martin (Riparia riparia), the Red-throated Pipit (Anthus cervinus) the European Stonechat (Sisyicola rubilca) and the House Sparrow (Passer domesticus) (Bahaa-Eldin, 2013).

5.2.1.4 Terrestrial Mammals

179. Based on Shaltout and Khalil (2005), mammals occurring in coastal salt marshes and/or coastal sand dunes include the Long-eared Hedgehog (Hemiechinus auritus); Anderson’s Gerbil (Gerbillus andersonii), Pale Gerbil (Gerbillus perpallidus) the introduced Brown rat (Rattus norvegicus) and the Fat Sand Rat (Psammomys obesus) which is locally endangered according to IUCN regional criteria, the Norway Rat (Rattus norvegicus) and the House Mouse (Mus musculus).
180. Carnivores species recorded in the Burullus/ Motubas area are the following; the Wild Cat (*Felis silvestris*), the Jungle Cat (*Felis chaus*), the Golden Jackal (*Canis aureus*), the Red Fox (*Vulpes vulpes*) and possibly the Egyptian mongoose (*Herpestes ichneumon*).

5.2.1.5  **Coastal Lagoons**

181. The Nile Delta lagoons (coastal lagoons), including Lake Maryut, Lake Edku, Lake Burullus, Lake Manzala, and the Nile River are important aquatic and brackish habitats, predominantly for inland fisheries in Egypt. According to the EEAA (2008), 33 species of fish, 23 species of reptiles, 112 species of birds, and 18 species of mammals live in and around the lakes.

182. Twenty commercial freshwater species belonging to seven families inhabit the Nile and its tributaries, and are observed in the coastal lagoons. Eleven commercial marine species belonging to seven families also inhabit the coastal lagoons. The annual fish production from natural fisheries has been stable at about 300,000 to 400,000 mt during the past two decades, notwithstanding that the diversity of fish species has declined from 52 recorded species at the beginning of the 20th Century, mostly as a result of the inflow of agricultural drainage into the lake resulting in lower salinity. Different fishing gears, including gill nets, trammel nets, cast nets, surrounding seines, drift nets, and traps, are widely used in Nile Delta lakes and inland waters. Other methods, such as Tara, Hosha, Doura, Shelp, eel nets, mullet nets, Lokkafa, and Kerba, are also used in the coastal lagoons. On the other hand, aquaculture has been sharply expanding during the same period, contributing 75% to total fish production in Egypt in 2013.

183. Agriculture drainage water accounts for 97% of the total inflow to the lake (3.9 billion m3 per year), followed by rain water (2%) and groundwater (1%). About 16% of the lake's water evaporates and 84% flows to the sea.

184. Semi-intensive aquaculture in earthen ponds is the most important farming system in the Nile Delta region. Intensive culture in floating cages, earthen ponds, and concrete tanks is also widely spreading. Nile tilapia (*Oreochromis niloticus*) is the most important farmed fish species, followed by mullets and carps. The major challenges and threats facing Nile Delta fisheries are land runoffs with heavy pollution, anthropogenic activities, invasive species, and illegal fishing practices. Management plans and necessary measures have been suggested.

185. Lake Burullus is considered to be a lake and wetlands site of International importance for birds under the Ramsar Convention. Lake Burullus was added to the "Montreux Record" of sites likely to undergo change in ecological character. A preliminary application of the Ramsar Monitoring Procedure was carried out in 1991. The report of this preliminary mission recommended that the Government of Egypt should submit an application to the Ramsar Wetland Conservation Fund to facilitate the initiation of a number of urgently required surveys and management actions.

186. Waterfowl hunting is very common in Egypt. People used waterfowl for food, decoration, medicine, education, domestication, sport and religion. Wild birds are still shot and trapped throughout Egypt's wetlands and deserts. There are two types of waterfowl hunting: commercial and sport hunting. Many locals, mostly fishermen, hunt waterfowl during the winter months especially, when birds are abundant around the lake. They either kill the fowl or trap them alive and sell them to middlemen either locally or in city markets. Sport hunting is practiced for pleasure and the hunted birds are consumed by the hunter's family and friends. This activity is organised by shooting clubs based in Cairo and Alexandria that hire lakes from the local governorates and use them as hunting reserves during the winter months. Table 14 shows bird species recorded at Lake Burullus.
### Table 14: Bird species recorded in Lake Burullus (data obtained from Younis and Nafea, 2012)

<table>
<thead>
<tr>
<th>Species</th>
<th>Recorded in 2001</th>
<th>Recorded in 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taeniopygia nigricollis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Podiceps cristatus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Podiceps nigriceps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phalacrocorax carbo assimilis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ardea cinerea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ardea ralloides</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nycticorax nycticorax</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issoria lutea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Egretta alba alba</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Egretta ibis ibis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Egretta garzetta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phoenicopterus ruberucesius</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tadorna tadorna</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ana phrygana</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ana crotos</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ana crecca</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ana stagna</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ana penelope</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ana clypeus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ana quercus</td>
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</tr>
<tr>
<td>Netta rufina</td>
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</tr>
<tr>
<td>Athene ferox</td>
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<tr>
<td>Athene nyroca</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Athene fulgens</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elanus caeruleus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circus cyaneus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circus pygargus</td>
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<td></td>
</tr>
<tr>
<td>Circus aerogallus</td>
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<td></td>
</tr>
<tr>
<td>Falco rusticolus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Falco subbuteo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rollulus aquatilis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rallus palustris</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gallinula chloropus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gallinula pella</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fregata religiosa</td>
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<td></td>
</tr>
<tr>
<td>Falco rusticolus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Falco tinnunculus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rocinella seeoidea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Himantopus himantopus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquila clanga</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glareola pratincola</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlidonias reginula</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlidonias hybridus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlidonias lessonae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sturnus vulgaris</td>
<td></td>
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<td>Aaccus vapor</td>
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<td>Ophiotrochus sylvestris</td>
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<td>Cypseloides passerinii</td>
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<td>Chlidonias virdis</td>
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<td>Chlidonias melanorhina</td>
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<td>Chlidonias reginula</td>
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<td>Chlidonias lessonae</td>
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<td>Sturnus vulgaris</td>
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</tbody>
</table>
Table 15 shows the fauna species of concern observed in Burullus Protected Area.
### Table 15 Fauna species of concern in Burullus Protected Area (data obtained from Younis and Nafea, 2012)

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Habitat</th>
<th>Status in Egypt</th>
<th>Global Status</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amphibians</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nile Delta Toad</td>
<td><em>Ameinophrymus haimasi</em></td>
<td>An adaptable species, living in cropland, including rice fields, swampy areas and floating vegetation.</td>
<td>LC</td>
<td>LC</td>
<td>NL</td>
</tr>
<tr>
<td>Loggerhead Turtle</td>
<td><em>Caretta caretta</em></td>
<td>Mediterranean and Red Sea. Territorial nest sites.</td>
<td>Uncommon, declining, but still widespread</td>
<td>VU</td>
<td>App. I</td>
</tr>
<tr>
<td>Green Turtle</td>
<td><em>Chelonia mydas</em></td>
<td>Mediterranean and Red Sea. Use a wide range of broadly separated localities and habitats during their lifetimes.</td>
<td>Uncommon, localized and declining</td>
<td>EN</td>
<td>App. I</td>
</tr>
<tr>
<td>Desert Monitor</td>
<td><em>Varanus griseus</em></td>
<td>Mostly found in desert plains and large wads with some vegetation cover but also in regions almost completely devoid of vegetation, in fairly humid coastal salt marshes and dry cultivated areas.</td>
<td>NT</td>
<td>NE</td>
<td>App. I</td>
</tr>
<tr>
<td>Eastern Montpellier Snake</td>
<td><em>Magoanoestes illyricus</em></td>
<td>Mediterranean littoral scrub and sub-desert. Found in slightly vegetated steppe-like habitats, marginal cultivated lands, wetlands and sandy areas around vegetated salt marshes. Mostly recorded within 50 km from the Mediterranean coast.</td>
<td>NE</td>
<td>NE</td>
<td>NL</td>
</tr>
<tr>
<td>Javelin Sand Boa</td>
<td><em>Euph. fasciata</em></td>
<td>Inhabits margins of the Delta. Found in sandy areas near cultivated land under Mediterranean influence. Recorded from isolated sandy pockets within the Delta.</td>
<td>CR</td>
<td>NE</td>
<td>App. II</td>
</tr>
</tbody>
</table>

| **Birds**            |                         |                                                                         |                 |               |                                                                          |
| African Chameleon    | *Chamaeleo africana*    | Cultivated areas, orchards, often near or at the margin of wetlands. Seems to prefer short dense trees and grass. | VU              | LC            | App. II | Threatened due to commercial over-exploitation                              |
| Bos’s Lizard         | *Acanthodactylus boskianus* | Sandy areas in coastal regions and among cultivations. Intolerant of semi-arid habitats than any other *Acanthodactylus* found in Egypt. Often associated with shrub and grass vegetation. | LC              | LC            | NL | Species of the Burullus sandy biotope represent a select population of widespread Saharan species. Possibly a local undescribed subspecies. |
| Noda Lizard          | *Acanthodactylus crassipes* | A variety of sandy biotopes. Also found in areas of fairly hard gravelly substrates but usually in close proximity to more favoured sandy habitats. | LC              | LC            | NL |                                                                         |
| Cormorant            | *Cormorant*             | Meadows, grasslands, cultivated fields and marshlands with plenty of plants. | VU              | NT            | NL | Scarcely passer                                                          |
| Andean’s Gull        | *Larus andinus*         | Inland and rocky maintained coast. | Rare            | NT            | NL | Rare and irregular passer. Endemic to the Mediterranean                    |
| Little Owl           | *Athene noctua*         | Open areas, lowlands and recent region. | LC              | LC            | App. II | Fairly common resident                                                   |
| Barn Owl             | *Tyto alba*             | Fields, woods, rocky areas, old buildings, and towers. | LC              | LC            | App. II | Fairly common resident                                                   |
| Black-headed Kite    | *Euphrasius rueppelli*  | Open terrain with sparse trees, savannas and semideserts. | LC              | LC            | App. II | Common resident                                                          |
| Black Kite           | *Milvus migrans*        | Wooded areas, lowlands, and cultivated areas with trees. | LC              | LC            | App. II | Scarcely resident. Fairly common passer                                  |
5.2.1.6 Marine Ecology

188. Sarwat (1999) observed two endangered sea turtle species, the Loggerhead (*Caretta caretta*) and the Green Turtle (*Chelonia mydas*) with both being expected to be present in coastal waters. There is no known use by sea turtles of the specific areas where construction will occur for the soft coastal interventions. Moreover, previous interviews with fish vendors at the Alexandria Fish Market revealed that many marine turtles are caught (illegally). See details on turtle protection below.

190. European Squid (*Loligo vulgaris*), Common Octopus (*Octopus vulgaris*) and cuttlefish (*Sepia officinalis*, *Sepia pharaoni* and *Sepia prashadi*) are all caught offshore of Ras El Barr (ERM/Environics 2015).

191. The Deltaic Mediterranean coast scavenging species such as the Angular Crab (*Goneplax rhomboïds*) and the Green Crab (*Carcinus mediterraneus*) are reported common along the foreshore of the Deltaic Mediterranean Coast (Egyptian LNG, 2002).

192. Other recorded communities are Copepods, Ostracoda, Protozoa, Appendicularia, Cnidaria, Polychaeta, Molluscs and Chaetognatha (Environics, 2015).

193. Sea grass meadows were not observed during previous surveys (NIOF, 2009; ERM/Environics 2015; Al Amar, 2015).

194. According the past surveys many diatom species and dinoflagellate were recorded such as *Skeletonema costatum*, *Chaetoceros ruvisetus*, *Chaetoceros affinis*, *Chaetoceros sociales*, *Chaetoceros curvisetus* and *Ceratium falcatum* (Al Amar, 2015).

### 5.2.1.7 Introduced species:

195. The Norway Rat (*R. norvegicus*) was introduced to Egypt from south-east Siberia, north-east China and parts of Japan.

196. It is now known that more than 300 invertebrate species (Ahyong and Galil, 2006) and 55 indo-pacific fish species have succeeded in crossing the Suez Canal from the Red Sea and establishing themselves in the east Mediterranean Sea where the salinity and temperature conditions are nearest to their original environment, Known as (Lessepsian Migration) (Edelist el al. 2013) (ENVIRONICS, 2015).

### 5.2.2 Performance Criteria

197. The following performance criteria are set for the construction of the projects:

a. locations will be surveyed for sensitive or critical habitats prior to the works;
b. no clearance of vegetation outside of the designated clearing boundaries;
c. no death to native fauna as a result of clearing activities;
d. no deleterious impacts on marine environments and terrestrial habitats;
e. no turtles, adult or juvenile will be impacted as part of the construction activities;
f. no lights to be used near turtle nesting and hatching beaches during breeding season;
g. no impacts on avian species within protected areas;
h. no introduction of new weed species as a result of construction activities;
i. no increase in existing weed proliferation within or outside of any project footprint as a result of construction activities;
j. in dewatering activities, suction shall be from surface to minimise marine sedimentation at the discharge locations. Marine discharge locations will be selected to avoid marine-sensitive and/or shallow areas through carrying out limited marine surveys;
k. fill material from all locations will be chemically and biologically analysed to minimise introduction of alien species; and
l. A flora and fauna management program will be implemented (Table 16).
198. Given the location and distance inshore where the proposed infrastructure will be constructed, it is unlikely that there will be impacts on nesting turtles. However, should turtles be observed nesting within the areas proposed for the interventions, a biodiversity management plan will be developed. If turtles be observed during site assessments, no construction should be undertaken in the specific area during both nesting and hatching. No lights should be used during hatching times to ensure juveniles are not impacted/disorientated as a result of any works.

5.2.3 Monitoring

199. Weed monitoring will be undertaken and appropriate action taken in the event of alien or noxious species being identified.

200. Seasonal checks of critical habitats (sabkha flats, sand dunes and salt marshes), if identified in the pre-construction survey, will be conducted for comparison with baseline conditions.

201. Seasonal monitoring of existing surrounding flora and fauna (birds, reptiles, mammals and marine life) for identification of any trends that may be related to introduction of the project structures.

202. The delivery organisation will, when undertaking works, compile a weekly report to the steering committee outlining:
   a. any non-conformances to this ESMF;
   b. the areas that have been rehabilitated during the preceding week; and
   c. details of the corrective action undertaken.

5.2.4 Reporting

203. All flora and fauna monitoring results and/or incidents will be tabulated and reported as outlined in the ESMF. The SPA must be notified in the event of any suspected instances of death to native fauna and where vegetation if detrimentally impacted.
### Table 16 Flora and Fauna Management Measures

<table>
<thead>
<tr>
<th>Issue</th>
<th>Control Activity (and Source)</th>
<th>Action Timing</th>
<th>Responsibility</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>FF1. Habitat loss and disturbance of flora and fauna</td>
<td><strong>FF1.1</strong> Survey the five locations for critical habitats</td>
<td>Pre-construction</td>
<td>SPA</td>
<td>Once, prior to construction</td>
</tr>
<tr>
<td></td>
<td><strong>FF1.2</strong> Limit vegetation clearing and minimise habitat disturbance through adequate protection and management of retained vegetation.</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td><strong>FF1.3</strong>: Minimise noise levels and lighting intrusion throughout construction and operation in the vicinity of any sensitive locations.</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td><strong>FF1.4</strong>: Ensure that all site personnel are made aware of sensitive fauna/habitat areas and the requirements for the protection of these areas.</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td><strong>FF1.5</strong> Minimise disturbance to on-site fauna and recover and rescue any injured or orphaned fauna during construction and operation.</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily and maintain records, report</td>
</tr>
<tr>
<td></td>
<td><strong>FF1.6</strong> Planning of dewatering activities to minimise impacts to marine receptor locations; minimise suction of sediments and select discharge locations based on survey.</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily and maintain records, report</td>
</tr>
<tr>
<td></td>
<td><strong>FF1.7</strong> Checks of critical habitats (sabkha flats, sand dunes and salt marshes), if identified in the pre-construction survey.</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily and maintain records, report</td>
</tr>
<tr>
<td></td>
<td><strong>FF1.8</strong> Monitoring of existing surrounding flora and fauna (birds, reptiles, mammals and marine life) for identification of any trends that may be related to introduction of the project structures</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily and maintain records, report</td>
</tr>
<tr>
<td></td>
<td><strong>FF1.9</strong> Ensure no impacts on marine turtle species during breeding season</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily and maintain records, report</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
<td>Timeframe</td>
<td>Responsible Party</td>
<td>Notes</td>
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<td>------</td>
<td>------------------------------------------------------------------------------------------------</td>
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<tr>
<td>FF2.1</td>
<td>Revegetate disturbed areas using native and locally endemic species that have high habitat value.</td>
<td>During construction</td>
<td>SPA</td>
<td>As required and maintain records</td>
</tr>
<tr>
<td>FF2.2</td>
<td>Seed is to be weed free</td>
<td>During construction and operation</td>
<td>SPA</td>
<td>Maintain records</td>
</tr>
<tr>
<td>FF2.3</td>
<td>Biological analysis of fill material</td>
<td>During construction and operation</td>
<td>SPA</td>
<td>Check prior to any fill activities</td>
</tr>
<tr>
<td>FF2.4</td>
<td>Visual observation of alien species and manual removal and disposal, if found.</td>
<td>During construction and operation</td>
<td>SPA</td>
<td>Maintain records</td>
</tr>
</tbody>
</table>
5.3 GROUNDWATER

204. Fossil groundwater is hosted in deep aquifers as non-renewable water resources. Aquifers in Egypt can be divided as follows:

205. Aquifers of Nile River Basin and Delta: Considered one of the renewable aquifers as it draws its water from leakages of Nile River, canals network and irrigation water; this resource is used to provide cities and villages with clean drinking water after purification, because of its low treatment costs.

206. Aquifers of Western Desert (Nubian Sandstone Aquifers): One of the non-renewable aquifers, estimated at 200000 billion cubic meters. Due to the depth of this aquifer, extraction is very costly and only little amounts of this water is utilised. The Nubian Sandstone Aquifer is considered the largest groundwater reservoirs in the world, and both of Sudan, Libya and part of Chad share this huge aquifer with Egypt.

207. Aquifers of the Eastern Desert and Red Sea coast: Considered a non-renewable aquifer because it is fed by winter’s rainfall, the possibility of water extraction is very low due to its existence at far depth, with high cost of extraction.

208. Aquifers of the Sinai Peninsula: There are three ground aquifers in Sinai Peninsula:

   a. Shallow aquifer located in North Sinai;
   b. Average depth aquifer located in valley’s area at central of Sinai; and
   c. Far deep aquifer.

209. Fossil water exploitation is estimated at a rate of 1.65 Billion m³/yr mainly concentrated at the oases of the Western Desert. Groundwater in the Nile aquifer system and desert fringes is not a resource in itself as it is replenished from the river Nile by seepage from canals and deep percolation from irrigation application. The annual groundwater abstraction in the Nile aquifer system and fringes is about 4.6 billion m³. Another 0.5 billion m³ is abstracted from the desert aquifers and the coastal areas. The water sources in Egypt are presented in Figure 20.

210. According to The Research Institute for Groundwater (RIGW) in 1992; the five project hotspots are located at a generally moderately productive quaternary aquifer with a depth between 0-5m as presented in Figure 21. Mean extraction rates are less than 1 mm/year, due to its high salinity as presented in Figure 22.

---

7 Egypt State of the Environment Report, EEAA 2009
5.3.1 Performance Criteria

211. The following performance criteria are set for the project:

a. no significant decrease in the quality and quantity of groundwater is expected as a result of construction and operational activities in proximity to the projects;

b. effective implementation of site-specific EDSCP, CSDMP and other measures to protect groundwater;
c. Development and implementation of a waste management plan that covers collection, storage and disposal;

d. Development of spill response procedure, kits and training on site;

e. Development of equipment refuelling procedure;

f. Secondary containment of fuel storage tanks;

g. Proper selection of geotextile material suitable for seawater; i.e. propylene geotextile is more tolerable to pH variations;

h. Analysis of material for chemical contamination; and

i. Chemical and biological analysis of water used for compaction.

212. By following the management measures set out in the ESMF the project will not have a significant impact on groundwater quality across the broader area.

5.3.2 Monitoring

213. Groundwater quality should be assessed initially and then at least every six months. Initial assessment should cover a wide range of parameters (eg depth to water, pH, DO, conductivity, nitrates, phosphates, faecal coliforms, heavy metals, turbidity, hydrocarbons) to provide a baseline and to confirm suitability for intended use. Subsequent monitoring parameters will be determined on need.

214. Chemical and biological analysis of water used for compaction and for dust suppression. It is preferable to use seawater for this purpose to match the salty nature of the area. The land-sea relation and transfer of properties is a result of tides and storm water surge.

215. Chemical analysis of the material, to be used as a fill, will be conducted with a specific schedule before being transported to the site, in order to decide if material is suitable to be used or rejected.

5.3.3 Reporting

216. All water quality monitoring results and/or incidents will be tabulated and reported as outlined in the ESMF. The SPA must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to water quality is exceeded.
### Table 17 Groundwater management measures

<table>
<thead>
<tr>
<th>Issue</th>
<th>Control activity (and source)</th>
<th>Action timing</th>
<th>Responsibility</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>GW 1: Increase of gross pollutants, hydrocarbons, metals and other chemical pollutants into the groundwater environment.</td>
<td>GW1.1: Conduct regular groundwater quality monitoring in locations where the groundwater is likely to be impacted.</td>
<td>Construction and operation phase</td>
<td>SPA</td>
<td>Every six months and as required, with reporting to SPA and UNDP</td>
</tr>
<tr>
<td></td>
<td>GW1.2: Designated areas for storage of fuels, oils, chemicals or other hazardous liquids should have compacted impermeable bases and be surrounded by a bund to contain any spillage. Refuelling to be undertaken in areas away from water systems.</td>
<td>Entire construction and operation phase</td>
<td>SPA</td>
<td>Weekly with reporting to SPA and UNDP</td>
</tr>
<tr>
<td></td>
<td>GW1.3: Check all vehicles, equipment (pumps, generators, etc.) and material storage areas daily for possible fuel, oil and chemical leaks. Undertake refuelling at designated places away from water systems.</td>
<td>All phases</td>
<td>All Personnel</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>GW1.4 Chemical analysis of material</td>
<td>Construction phase</td>
<td>SPA</td>
<td>Every utilised batch of fill material</td>
</tr>
<tr>
<td></td>
<td>GW1.5 Chemical and biological analysis of water used for compaction. Preferable to use seawater.</td>
<td>Construction phase</td>
<td>SPA</td>
<td>Monthly</td>
</tr>
</tbody>
</table>
5.4 Marine and Surface Water Quality

5.4.1 Background

217. The five hotspot project locations lie within the setback distance (up to 200m) from the Mediterranean coastline. The project activities have no direct contact with marine water except for dewatering activities expected at the Kafr El Sheikh, Port Said and Damietta locations. Water will potentially be sucked out of the excavations and discharged to the sea. The discharged water is expected to have very similar quality to the seawater based on the proximity of the locations to the coastline.

5.4.2 Marine Waters

218. According to the EEAA (2015a) annual report, marine waters show:

   a. pH ranges between 8.18 – 7.86 along the coastline, which indicate that the water is closer to basic levels;
   b. pH ranges between 8.18 – 7.86 along the coastline, which indicate that the water is closer to basic levels;
   c. salinity ranges between 34 – 37 g/L, showing lowest concentrations in Port Said and Beheira hot-spots due to the presence of drains close to their boundaries;
   d. turbidity is relatively high due to sediment transport from the freshwater outlets;
   e. Biological Oxygen Demand (BOD) was recorded to be the highest in the delta region relative to the rest of the Egyptian Mediterranean coast, while the overall Egyptian Mediterranean coast mean figure was 6.9 mg/L;
   f. the mean Chemical Oxygen Demand (COD) recorded level is 10.1 mg/L along the Egyptian Mediterranean coast. The highest values were recorded near Alexandria;
   g. the concentration of Ammonia and Nitrate were highest in Port Said (0.016 mg/L), (0.06 mg/L), while the lowest concentrations were recorded in Kafr El Sheikh with (0.09 mg/L), (0.03 mg/L) respectively; and
   h. the concentration of total Phosphates was highest in Port Said (0.065 mg/L), while it was the lowest in Kafr El Sheikh (0.03 mg/L).
   i. effective implementation of site-specific EDSCP, CSDMP and other measures to protect groundwater.

5.4.3 Surface Waters at Construction Locations

219. The locations include no rivers or lakes, with the closest surface water body being at El-Gameel located to the east of the Port Said hotspot. The Rosetta branch is located at 2.3km at the eastern side of the Beheira site. Canals/Drains located in proximity to the sites include:

   a. Ashtum El Gamel outlet (Bughaz) located to the east of the Port Said hotspot outside its boundaries;
   b. Nile River: Discharges to the Mediterranean Sea via the Rosetta branch, located 2.3 km away the eastern side of the Beheira site;
   c. Damietta Branch: Discharges to the Mediterranean through the Navigational canal in Damietta port, located 4.5 km away from the eastern side of Damietta site;
   d. Pumping station at the west boundaries of the Dakahlia site, which discharges the el Salam Canal into the Mediterranean; and
   e. Lake Manzala which is located south of Port Said Site, outside its boundaries. It is considered as the largest of Egyptian wetlands; the most productive for fisheries and most important Egyptian wetland for wintering water birds.
5.4.4 Water Quality at Coastal Lagoons

220. According to the annual report from the EEAA (2015b), the water quality within Lake Manzala had:
   a. pH of 8.37;
   b. dissolved oxygen was 5.40 mg/l, except for two locations (Bahr El Bakr drain and W Elbashter), where DO levels were: 1.38; and
   c. The Mean Biological Oxygen Demand value was 36.63 mg/L, while the Chemical Oxygen Demand was 46.38 mg/L in El Gamel Boughaz, with an average of 128.56 mg/L for the whole lake.

221. The coastal lagoons are separated from the Mediterranean along most of their lengths by for example, a long sand dune bar. However, as an example, Lake Burullus is connected with the open sea by a narrow channel (about 50m wide) near the village of El Burge. As a result, there is a strong salinity gradient from east to west, with the western part of the lagoon containing relatively fresh water.

222. According to the annual report from the EEAA (2015c), the water quality of Lake Burullus:
   a. the pH was 8.56;
   b. Dissolved Oxygen was 7.67 mg/L, while the value was as low as 0.9 mg/L at Hoksa Drain; and
   c. The Biological Oxygen Demand (mean value) was 24.29 mg/L, while Chemical Oxygen Demand (mean value) was 89.78 mg/L.

223. El-Asmas et al (2013) assessed six satellite images acquired between 1973 and 2011 was employed to map the change of the surface area of the Lake Burullus in the Nile Delta using the water indices approach. El-Asmas et al (2013) applied the non-traditional normalised difference water index and the modified normalised difference water index to quantify the change in the water body area of the lagoon during the study period. The results showed that the lagoon has lost 42.8% of its open water area due to the severe anthropogenic activities, such as the reclaiming of its southern margins for agricultural purposes and the filling caused by the discharge of agricultural wastes.

224. El-Asmas et al (2013) stated that floating plants showed a lower index value and are considered non-water body as they grow and form islands capturing sediments from the lake. Areas with submerged plants, such as the western side of the lake are treated as turbid water since results showed that normalised difference water index and modified normalised difference water index values are high. The threshold value of water obtained from the normalised difference water index image of 1973 is 0.18. By contrast, the threshold values of water obtained from the modified normalised difference water index were 0.43, 0.67, 0.64, 0.63 and 0.71 for the years 1984, 1990, 1999, 2005 and 2011 respectively.

225. El-Asmas et al (2013) estimated the significant change in the lagoon surface area during the 38 years of investigation. In 1973, the lagoon area was 430km² and in 1984 it was 385km². The lagoon area continued shrinking to 330 km² in 1990, 280 km² in 1999 and 260 km² in 2005. Finally, the lagoon approached only 246 km² in 2011 with a total loss of 184 km² (42.8%) of its area between 1973 and 2011.

226. Younes and Nafea (2012) suggest that the eutrophication in Lake Burullus is associated with growth of the different hydrophytes which have direct effects on Euro-Asian Palaearctic migrants passing Egypt. Younes and Nafea (2012) stated that the water properties of Lake Burullus were evaluated based on one year monitoring seasonally during 2011 for 15 stations representing the eastern, middle and western sectors of the lake. Younes and Nafea (2012) surveys showed that the contents of dissolved salts in the water of Lake Burullus have the following sequence: SiO₂ > NO₃ > PO₄ > NO₂ and high level of dissolved salts was found in the middle basin compared with that reported for the eastern and western basins. Younes and Nafea (2012) stated that Lake Burullus was characterised by having an extensive growth of hydrophytes, particularly along its southern shores beside the
5.4.6 Monitoring

228. Marine and surface water samples will be collected from a range of locations for analysis of turbidity, suspended sediments and relevant parameters. A water quality sampling and analysis program will be prepared prior to the construction activities.

5.4.7 Reporting

229. All water quality monitoring results and/or incidents will be tabulated and reported as outlined in the ESPM. The SPA must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to water quality is exceeded.
## Annex VI (b) – Environmental and Social Management Framework

### Green Climate Fund Funding Proposal

#### Table 19 Water Quality Management Measures

<table>
<thead>
<tr>
<th>Issue</th>
<th>Control activity (and source)</th>
<th>Action timing</th>
<th>Responsibility</th>
<th>Monitoring &amp; reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1: Elevated suspended solids and other contaminants in surface and marine water systems.</td>
<td>W1.1: Develop and implement a site specific EDSCP and CSDMP to address drainage control, sediment and erosion controls and stockpiling of materials including soil during construction of all components of the projects. EDSCP and CSDMP measures to be inspected regularly to ensure all devices are functioning effectively.</td>
<td>Pre Earthworks</td>
<td>SPA</td>
<td>Initial set up and then as required with reporting to SPA and UNDP</td>
</tr>
<tr>
<td></td>
<td>W1.2: Designated areas for storage of fuels, oils, chemicals or other hazardous liquids should have compacted impermeable bases and be surrounded by a bund to contain any spillage. Refuelling to be undertaken in areas away from water systems.</td>
<td>All phases</td>
<td>All Personnel</td>
<td>Weekly with reporting to SPA and UNDP</td>
</tr>
<tr>
<td></td>
<td>W1.3: Conduct regular surface water quality monitoring in location where the surface water is likely to be impacted including assessing the changes to surface water quality.</td>
<td>All phases</td>
<td>SPA</td>
<td>Weekly and as required with reporting to SPA and UNDP</td>
</tr>
<tr>
<td></td>
<td>W1.4: Schedule works in stages to ensure that disturbed areas are revegetated and stabilised progressively and as soon as practicable after completion of works.</td>
<td>Avoid undertaking bulk earthworks during wet season</td>
<td>SPA</td>
<td>Maintain records</td>
</tr>
<tr>
<td></td>
<td>W1.5: Construction materials will not be stockpiled in proximity to aquatic environment that may allow for release into the environment. Construction equipment will be removed from in proximity to the aquatic and marine environments at the end of each working day or if heavy rainfall is predicted</td>
<td>All phases</td>
<td>SPA</td>
<td>Maintain daily records</td>
</tr>
<tr>
<td></td>
<td>W1.6: Ensure all residual contaminated sediment is not released into the environment.</td>
<td>All phases</td>
<td>SPA</td>
<td>Maintain daily records</td>
</tr>
</tbody>
</table>
5.5 **AIR QUALITY**

5.5.1 **Background**

230. All construction activities have the potential to cause air quality impacts.

231. The specific project areas are predominantly unoccupied, with some recreational and fishing uses. The areas south of the project locations include the coastal highway, farms, fish farms, industrial and residential areas. These are more described in the “socio-economic” section below.

232. Existing air quality reflects those environments, with dust being the main air quality concern.

233. Workers involved in construction and operation activities should be familiar with methods for minimising the impacts of deleterious air quality and alternative construction procedures.

234. As part of the national ambient air quality monitoring program conducted by EEAA, there are 87 stations currently affiliated to the National Network for Monitoring Air Pollutants in Egypt. The nearest stations to the project hotspots have been identified as presented in Figure 23.

![Figure 23: The nearest air quality monitoring stations for the project’s sites](image)

235. The air quality information for these stations was extracted from the monthly reports for Air quality monitoring of Egypt for year 2015. Table 20,
236. Table 21 and Table 22 illustrate the monthly average for air pollutant concentrations of Sulphur Dioxide SO\(_2\), Nitrogen Dioxide NO\(_2\) and Particulate Matter PM\(^{10}\) which are measured in μg/m\(^3\).

237. The recorded values of SO\(_2\) are well below the law limits (when compared with the SO\(_2\) one year limit of 50 and 60 μg/m\(^3\) for urban and rural areas, respectively). However, Damanhour measured high levels during the month of May (no specific reason mentioned in the EEAA report). The same trend applies to the NO\(_2\) levels, with high levels recorded during few months in Mansoura. PM\(^{10}\) recorded values exceeded these limits in some months, especially in El Mahalla and El Mansoura.

### Table 20: Monthly Average SO\(_2\) Concentrations

<table>
<thead>
<tr>
<th>Month</th>
<th>Damietta</th>
<th>Port Said</th>
<th>El Mansoura</th>
<th>Alexandria (El Asafra)</th>
<th>Damanhour</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>13</td>
<td>26</td>
<td>20</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>February</td>
<td>10</td>
<td>5</td>
<td>12</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>March</td>
<td>12</td>
<td>10</td>
<td>22</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>April</td>
<td>33</td>
<td>6</td>
<td>21</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>May</td>
<td>6</td>
<td>10</td>
<td>35</td>
<td>7</td>
<td>153</td>
</tr>
<tr>
<td>June</td>
<td>13</td>
<td>8</td>
<td>24</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>July</td>
<td>9</td>
<td>9</td>
<td>22</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>August</td>
<td>13</td>
<td>___</td>
<td>26</td>
<td>___</td>
<td>___</td>
</tr>
<tr>
<td>September</td>
<td>13</td>
<td>6</td>
<td>___</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>October</td>
<td>___</td>
<td>4</td>
<td>7</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>November</td>
<td>15</td>
<td>5</td>
<td>6</td>
<td>1</td>
<td>43</td>
</tr>
<tr>
<td>December</td>
<td>16</td>
<td>7</td>
<td>10</td>
<td>2</td>
<td>7</td>
</tr>
</tbody>
</table>

Source: Monthly Air Quality Report in Egypt for the year 2015, EEAA
Table 21: Monthly Average NO₂ Concentrations

<table>
<thead>
<tr>
<th>Month</th>
<th>Damietta</th>
<th>Port Said</th>
<th>El Mansoura</th>
<th>Alexandria (El Asafra)</th>
<th>Damanhour</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>18</td>
<td>18</td>
<td>74</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>February</td>
<td>18</td>
<td>2</td>
<td>68</td>
<td>58</td>
<td>8</td>
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<tr>
<td>March</td>
<td>20</td>
<td></td>
<td>48</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>April</td>
<td>36</td>
<td>20</td>
<td>42</td>
<td>4</td>
<td>6</td>
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<tr>
<td>May</td>
<td>14</td>
<td>3</td>
<td>41</td>
<td>62</td>
<td>27</td>
</tr>
<tr>
<td>June</td>
<td>67</td>
<td>13</td>
<td>30</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>July</td>
<td>63</td>
<td>5</td>
<td>22</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>August</td>
<td>63</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>September</td>
<td>67</td>
<td>10</td>
<td>30</td>
<td>41</td>
<td>23</td>
</tr>
<tr>
<td>October</td>
<td></td>
<td>9</td>
<td>39</td>
<td>24</td>
<td>16</td>
</tr>
<tr>
<td>November</td>
<td></td>
<td>36</td>
<td>34</td>
<td>2</td>
<td>47</td>
</tr>
<tr>
<td>December</td>
<td>25</td>
<td>11</td>
<td></td>
<td>5</td>
<td>38</td>
</tr>
</tbody>
</table>

Source: Monthly Air Quality Report in Egypt for the year 2015, EEAA

5.5.2 Performance Criteria

238. The following performance criteria are set for the construction of the projects:
   a. corrective action to respond to complaints and/or grievances is to occur within 48 hours;
   b. inspect and approve efficient equipment only;
   c. minimise equipment movements through proper planning of activities;
   d. apply dust suppression; and
   e. apply vehicle speed limit, particularly on unpaved roads.

5.5.3 Monitoring

239. A standardised air monitoring program has been developed for the projects.
   a. the requirement for dust suppression will be visually observed by site personnel daily and by SPA and UNDP staff when undertaking routine site inspections;
   b. vehicles and machinery emissions – visual monitoring, measurements to be carried out when deemed excessive.
### Table 22: Monthly Average PM10 Concentrations

<table>
<thead>
<tr>
<th>Month</th>
<th>Damietta (μg/m³)</th>
<th>El Mansoura (μg/m³)</th>
<th>El Mahalla (μg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>32</td>
<td>180</td>
<td>220</td>
</tr>
<tr>
<td>February</td>
<td>80</td>
<td>187</td>
<td>310</td>
</tr>
<tr>
<td>March</td>
<td>115</td>
<td>97</td>
<td>__</td>
</tr>
<tr>
<td>April</td>
<td>97</td>
<td>102</td>
<td>__</td>
</tr>
<tr>
<td>May</td>
<td>99</td>
<td>98</td>
<td>148</td>
</tr>
<tr>
<td>June</td>
<td>82</td>
<td>69</td>
<td>134</td>
</tr>
<tr>
<td>July</td>
<td>76</td>
<td>66</td>
<td>121</td>
</tr>
<tr>
<td>August</td>
<td>__</td>
<td>80</td>
<td>143</td>
</tr>
<tr>
<td>September</td>
<td>88</td>
<td>87</td>
<td>162</td>
</tr>
<tr>
<td>October</td>
<td>__</td>
<td>95</td>
<td>175</td>
</tr>
<tr>
<td>November</td>
<td>129</td>
<td>116</td>
<td>204</td>
</tr>
<tr>
<td>December</td>
<td>111</td>
<td>77</td>
<td>172</td>
</tr>
</tbody>
</table>

Source: Monthly Air Quality Report in Egypt for the year 2015, EEAA

#### 5.5.4 Reporting

All air quality monitoring results and/or incidents will be tabulated and reported as outlined in the ESMF. The SPA must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to air quality is exceeded.
Table 23 Air Quality Management Measures

<table>
<thead>
<tr>
<th>Issue</th>
<th>Control activity (and source)</th>
<th>Action timing</th>
<th>Responsibility</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.1 Increase in dust levels at sensitive receptors</td>
<td>A1.1: Implement effective dust management measures in all areas during design, construction and operation.</td>
<td>Pre and during construction</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>A1.2: Restrict Speed on roads and access tracks</td>
<td>During Construction</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>A1.3: Manage dust /particulate matter generating activities to ensure that emissions do not cause an environmental concern at sensitive receptors.</td>
<td>During Construction</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>A1.4: Construction activities should minimise risks associated with climatic events (check forecasts).</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>A1.5: Implement scheduling/staging of proposed works to ensure major vegetation disturbance and earthworks are minimised.</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>A1.6: Locate material stockpile areas and Rubbish as far as practicable from sensitive receptors. Cover if appropriate.</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>A1.7: Source sufficient water of a suitable quality for dust suppression activities complying with any water restrictions.</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>A1.8: Schedule revegetation activities to ensure optimum survival of vegetation species.</td>
<td>During construction</td>
<td>SPA</td>
<td>Maintain records</td>
</tr>
<tr>
<td>Issue</td>
<td>Control activity (and source)</td>
<td>Action timing</td>
<td>Responsibility</td>
<td>Frequency</td>
</tr>
<tr>
<td>-------</td>
<td>------------------------------</td>
<td>---------------</td>
<td>----------------</td>
<td>-----------</td>
</tr>
<tr>
<td>A2. Increase in vehicle / machinery emissions</td>
<td>A2.1: Ensure vehicles/machines are maintained, switched off when not in use and only required vehicles are operated onsite.</td>
<td>During construction and operation</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>A2.2: Ensure all construction vehicles and machinery are properly maintained and operated in accordance with design standards and manufacturers maintenance manuals.</td>
<td>During construction and operation</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>A2.3: Develop and implement an induction program for all site personnel, which include as a minimum an outline of the minimum requirements for environmental management relating to the site.</td>
<td>Pre and during construction</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>A2.4 Locate vehicles/equipment storage areas as far as practicable from sensitive locations.</td>
<td>During construction and operation</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
</tbody>
</table>
5.6 Noise and Vibration

5.6.1 Background

241. There is no available data for continuous noise and vibration monitoring in the deltaic Mediterranean coast.

242. Existing sources of ambient noise may include: roads, power station, resorts and general urban noise. The expected ambient noise levels at the five hotspots are:

a. Beheira hotspot: expected to have the lowest ambient noise level since the only noise source close to the project location is the international coastal road.

b. Kafr El-Sheikh hotspot: Noise sources impacting the ambient levels at the hotspot location include the Burullus power station, Motobas industrial zone and the international coastal road.

c. Dakahlia hotspot: Ambient noise levels are greatly affected by the existence of two urban cities and New Mansoura city “under construction” beside the coastal road.

d. Damietta hotspot: Sources of ambient noise include the nearby resort activities, Damietta power station, New Damietta city and the international coastal road.

e. Port Said hotspot: Ambient noise levels are affected by the existence of many industrial activities, including power generation, oil industry, pipe industry, in addition to two villages and the international coastal road.

243. The use of machinery or introduction of noise/vibration generating facilities could have an adverse effect on the environment and residents if not appropriately managed. Blasting is not required to be undertaken as part of this project.

244. Contractors involved in construction activities should be familiar with methods of controlling noisy machines and alternative construction procedures as contained within specific Egyptian legislation.

245. Potential noise sources during construction may include:

a. heavy construction machinery/vehicles, including soil compactors;

b. power tools, generators and pumps; and

c. dredges and trucks when collecting construction material.

5.6.2 Performance Criteria

246. The following performance criteria are set for the construction of the projects:

a. selection of efficient equipment and maintenance in accordance with manufacturers manuals;

b. as possible, small compactor units shall be used instead of heavy compactors;

c. ear protection PPE to be used by workers near noise/vibration generating equipment;

d. no noisy equipment or machines are to be used during night hours; and

e. corrective action to respond to complaints and/or grievances is to occur within 48 hours

5.6.3 Monitoring

247. Ambient noise levels will be carried out at the nearest sensitive locations to each “hotspot” location. The measurement frequency will be every two months during the construction phase.

5.6.4 Reporting

248. All noise monitoring results and/or incidents will be tabulated and reported as outlined in the ESMF. The SPA must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to noise is exceeded.
Table 24 Noise and Vibration Management Measures

<table>
<thead>
<tr>
<th>Issue</th>
<th>Control activity (and source)</th>
<th>Action timing</th>
<th>Responsibility</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1: Increased noise levels</td>
<td>N1.1: Select plant and equipment and specific design work practices (e.g. worker’s training) to ensure that noise emissions are minimised during construction and operation including all compaction and pumping equipment and using different strategies/alternatives to limit noise pollution.</td>
<td>All phases</td>
<td>SPA</td>
<td>Maintain records</td>
</tr>
<tr>
<td></td>
<td>N1.2: Utilise specific noise reduction devices such as silencers and mufflers.</td>
<td>All Phases</td>
<td>SPA</td>
<td>Maintain records</td>
</tr>
<tr>
<td></td>
<td>N1.3: Restrict noise generating activities to daytime hours, as possible</td>
<td>All Phases</td>
<td>SPA</td>
<td>Maintain Records</td>
</tr>
<tr>
<td></td>
<td>N1.4: Consultation with nearby residents in advance of construction activities particularly if noise generating construction activities are to be carried out outside of ‘daytime’ hours: 7am-5.30pm.</td>
<td>Construction phase</td>
<td>All Personnel</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>N1.5 Provide temporary construction noise barriers in the form of solid hoardings where there may be an impact on specific residents.</td>
<td>Construction phase</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>N1.6 All incidents complaints and non-compliances related to noise shall be reported in accordance with the site incident reporting procedures and summarised in the register.</td>
<td>Construction phase</td>
<td>SPA</td>
<td>Maintain records</td>
</tr>
<tr>
<td></td>
<td>N1.7: The contractor shall conduct employee and operator training to improve awareness of the need to minimise excessive noise in work practices</td>
<td>Construction Phase</td>
<td>SPA</td>
<td>Maintain Records</td>
</tr>
<tr>
<td>N2. Vibration due to construction</td>
<td>N2.1: Identify properties, structures, underground services and habitat locations that will be sensitive to vibration impacts resulting from construction and operation of the project.</td>
<td>Pre and during construction</td>
<td>SPA</td>
<td>Maintain records</td>
</tr>
<tr>
<td>N2.2: Design to give due regard to temporary and permanent mitigation measures for noise and vibration from construction and operational vibration impacts.</td>
<td>Pre-construction</td>
<td>SPA</td>
<td>Maintain records</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>N2.3: All incidents, complaints and non-compliances related to vibration shall be reported in accordance with the site incident reporting procedures and summarised in the register.</td>
<td>Construction phase</td>
<td>SPA</td>
<td>Maintain records</td>
<td></td>
</tr>
</tbody>
</table>
5.7 EROSION, DRAINAGE AND SEDIMENT CONTROL

249. There are two main geological units in the Nile Delta region. These are the Quaternary deposits and the Tertiary deposits. The Quaternary deposits include the Holocene and Pleistocene sediments. The Holocene comprises sand dunes, coastal deposits, sabkha deposits and silty clay sediments capping the flood plain. This is where the five hotspots are found (The Research Institute for Groundwater (RIGW) in 1992).

250. The main geomorphologic features of the hotspot areas are shown in Figure 24, and are, more or less, similar. These are:
   a. Offshore Submerged Plain: The offshore submerged plain is characterised by the occurrence of a number of limestone ridges. It is also known as the continental shelf until it reaches the outer shelf slope of depth 200 metres; and
   b. Foreshore Plain: The foreshore plain occupies the area determined by the coastal lakes and their inland extension into the brackish water lagoons. The landforms that exist in this plain include wetland areas of the main lakes and the “sabkha” deposits. Irrigation canals and drains break through these plains to serve the agricultural activities.

251. Bkhit and Esmail (2016) stated that the El Burullus area had several geomorphological units as the coastal sand dune, the coastal plain, the beach and cultivated lands. The sediments of the area exhibit total heavy minerals content reach up to 3.7 %. The sediments contain low radioactivity; Eu (8ppm) and Th (17ppm). Bkhit and Esmail (2016) stated that zircon was recorded in sediments. Bkhit and Esmail (2016) samples suggested a potential sink for accessory minerals such as Fe, Ti minerals (magnetite, ilmenite, rutile and sphene) which represented 0.8 %, 1.3 %, 0.4 % and 0.02 % respectively. Garnet and cassiterite were also recorded and displayed by Bkhit and Esmail (2016) with quantities of 3.0 % and 0.03 % respectively. In addition, Bkhit and Esmail (2016) stated that the concerned sediments exhibit enrichment of trace elements, as; Zr, Y, Nb, Ba, Sr, Zn and V. Zirconium was found to have contents from 226 ppm to >10000 ppm. Bkhit and Esmail (2016) found yttrium contents reaching up to 3498 ppm; while niobium content ranges from 10 ppm to 2050 ppm. Ba and Sr are more abundant in concentrate sediments than row sand samples; > 10000 and 3875 ppm respectively. Eventually V reaches up 3646 ppm.

252. The hotspot locations also include sandy seashores with few shells and scattered algae; while shells and shell fragments increase landwards. Southwards, the landscape is characterised, in some areas, by the presence of numerous vegetated small sand dunes and sand mounds.

5.7.1 Coastline Characterisation

253. The coastline characteristics are reliant on factors such as: sediment transport, erosion or flooding, geomorphology (e.g. changes in orientation of the coastline), type of beaches (rocky, sandy) and on the degree of anthropogenic impact (presence, absence of coastal structures).

254. The following sections provide a description of the hotspot locations based on the following:
   a. an indicator of the type of coastline (the Coastal Type Indicator, CTI), to compute indicators of flooding and erosion.
   b. the CTI depends on the beach type (Beach Type Indicator, BTI) and on the degree of anthropogenic change of the coastline (Human Disturbance Indicator, HDI) defined bellow.

5.7.1.1 Beach Type Indicator (BTI)

255. This indicator was designed specifically for the Egyptian Northern Coast based on the indicator of Gornitz et al., (1994) and later studies. Five types of beaches were identified, and ranked from 1 to 5, based on presence/lack of sandy beaches. The “1” value is assigned to the least vulnerable coasts to erosion and flooding, where beaches cannot be eroded, and “5”. As presented in Figure 25 below, the five hotspot areas exist in the most vulnerable zone (5 = Beaches).
5.7.1.2 Human Disturbance Indicator (HDI)

256. The Human Disturbance Indicator represents the degree of anthropogenic change of the coastline. As presented in Figure 26, a value of “1” corresponds to the least vulnerable coastlines (Coastline stretches with no coastal structures), while a value of “5” corresponds to the most vulnerable coastlines (highly anthropised). As presented in Figure 26, the most vulnerable hotspot areas are Port Said and Beheira followed by Damietta, whereas Kafr el Sheikh and Dakahlia were the least vulnerable.
5.7.1.3 Coastal Type Indicator (CTI)

257. The Coastal Type Indicator (CTI) is used for computation of erosion and flooding indicators, it depends on the beach type (Beach Type Indicator, BTI) and on the degree of anthropization of the coastline (Human Disturbance Indicator, HDI) from the following relation: \[ \text{CTI} = \frac{(\text{BTI} + \text{HDI})}{2} \]. As presented in Figure 27, the most vulnerable hotspots are Beheira followed by Port Said and Damietta (Level: 4-5 high), while the least vulnerable are Kafr el Sheikh and Dakahlia (level:3 medium).

5.7.2 Flooding

258. The coastal flooding in the different coastal stretches was presented in Annex 1 (Hazard characterisation and climate change) of the scoping study report of the integrated coastal zone management in the Northern Coast of Egypt. As presented in Figure 28, Beheira and Damietta have the highest flooding rate followed by Kafr el Sheikh and Dakahlia, while the lowest rate is at Port Said.

5.7.3 Erosion

259. The coastal erosion in the different coastal stretches was presented in Annex 1 (Hazard characterisation and climate change) of the scoping study report of the integrated coastal zone management in the Northern Coast of Egypt.
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260. An indicator was utilised to evaluate erosion impacts in the Egyptian coastline has been obtained from the CTI and the BEI) which allows the evaluation of erosion of sandy beaches, Poulos (2014).

261. The objective of such indicator definition is to evaluate the potential drivers (sediment transport) and the potential erosion of the 5 hot-spots.

262. Potential beach erosion is related to the sediment transport magnitude in each coastal area (Sediment Transport Indicator, STI), and to the longer term erosion (Long Term erosion Indicator, LTI) related to the observed mean shoreline retreat occurrence (past and, for future scenarios) due to SLR (Hereher, 2014).

263. The final erosion index was finally obtained for the historical and future characterisations, as presented in Figure 29. The results showed that Beheira had the highest erosion index, followed by Kafr el Sheikh, Damietta and Port Said, while Dakahlia had the lowest erosion threat.

![Figure 29: Erosion index along the Egyptian Northern coast. Historical characterisation. When a coastal point is assigned to multiple coastal](image)

5.7.4 Saltwater intrusion index

264. The saltwater intrusion index in the different coastal stretches was presented in Annex 1 (Hazard characterisation and climate change) of the scoping study report of the integrated coastal zone management in the Northern Coast of Egypt.

265. For the definition of the index over the historical period, 3 factors were taken into account: 1) information from stakeholders, 2) the coastal aquifer and 3) water bodies along the coastal stretch. For the evolution of saltwater intrusion across future scenarios, thresholds between low-medium and medium-high have been established as 10 cm and 20 cm of SLR, respectively, as presented in Figure 30, the saltwater threat is higher in Port Said and Damietta, medium in Kafr el Sheikh and Beheira, while it was low in Dakahlia.

![Figure 30: Saltwater intrusion index for the period 1989-2015](image)

5.7.5 Sediment Characteristics of Construction Material

266. The distribution of sediment composition depends on the equilibrium between gravity of sediments and water forces. It is one of the major controlling factors for the distribution of trace metals in the lake (El-Shabiny et al., 1996).
There have been a number of sediment characterisation assessments of Lake Burullus as an example over recent years. The following provides information on the current knowledge of lake sediment and potential contaminants etc.

Younes and Nafea (2012) found that the water content of Lake Burullus sediments during 2004 to 2005 ranged from 45.8% in the sandy sediments to 82.6% in the muddy sediment. Generally, the sandy sediments showed lower water content as compared with those of muddy sediment.

Masoud et al (2010) undertook sediment samples in Lake Burullus. Masoud et al (2010) found that sediments have been affected by the discharges of heavy metals through different drains. Masoud et al (2010) analysed the chemical speciation of Cd, Cu, Fe, Mn, Pb and Zn in sediments. Masoud et al (2010) found all the elements recorded highest concentrations in the area near the discharge point. Masoud et al (2010) data indicated that the sediments had a wide variety of environmental conditions ranging from oxic to fully anoxic conditions. Owing a wide variety of grain sizes and organic matter, Masoud et al (2011) results indicated that the most abundant metals were Fe > Mn > Zn > Cu > Cd > Pb respectively. Significant correlations were observed between iron with clay, organic carbon and manganese concentrations were observed.

Shreadah et al (2012) collected fifty-four sediment samples from the five Northern Egyptian lakes, (Mariout, Eedu, El-Burullus, El-Manzallah, and El-Bardaweel). The samples were analysed to investigate the pollution status of mercury (Hg). The total mercury (T-Hg) content in sediment samples ranged from 15.33 to 171.29 ng·g–1 dry wt). The results showed that T-Hg were lower than the back ground values reported and also lower than the ranges of uncontaminated sediments. Moreover, the T-Hg concentrations in all sediments were under the upper chemical Exceedance level (1 µg·g–1). The concentrations of Methyl mercury (MeHg) in surface sediments of the Northern lakes ranged from 0.002 - 0.023 ng·g–1 dry wt. The contribution of MeHg was less than 0.1% of total mercury concentration with index values from 0.08 - 1.37 ng·g–1; dry wt). MeHg showed insignificant correlation with T-Hg. This suggested that MeHg contents were not controlled by the T-Hg in sediments. The T-Hg and MeHg concentrations were insignificantly correlated with TOC content which indicates that the concentration of T-Hg and MeHg in sediments of Northern lakes were not influence by TOC. The average T-Hg concentration was found in the following order; Mariout > El-Manzallah > El-Burullus > Eedu > El-Bardaweel. MeHg was found in the order; El-Bardaweel > El-Burullus > El-Manzallah > Mariout > Eedu.

Khalil et al. (2013) measured the concentrations of Na, K, Mg, Li, Bi, Co, Se, B carbonates and organic carbon in Lake Eedu’s sediments. Li was used as a reference element (conservative element), which indicates whether there are anthropogenic factors affecting the sediment quality with respect to heavy metals through comparing their proportions with normal proportions, that are normally constant across the Earth crust. Surficial sediment samples were obtained from nine locations. Total boron concentration was determined by colorimetric Curcumin method, while Ca and Mg were determined volumetrically using EDTA standard solution Erio-Chrome T and Murexide indicator. Na, K and Li were measured using a flame photometer Metal concentrations varied from 0.30 to 1.19%, 0.13 to 0.38%, 4.9 to 16.8%, 1.8 to 7.9 % 21.95 to 66.22 µg/g, 61.00 to 145.94µg/g, 7.43 to 24.79 µg/g for 5.99 to 13.40 µg/g and 0.12 to 1.39µg/g for Na, K, Ca, Mg, B, Li, Co, Bi and Se, respectively.

Khalil et al. (2013)’s results revealed that all surface sediments (Co, Bi, Na, K and Ca) are originated predominantly from lithogenous sources confirming their natural origin. While, the sediment are contaminated with Se and B which might be affected by man’s activities (municipal discharges, industrial development, agricultural drainage, fish farms etc). Khalil et al. (2013) suggested that organic matter sources was possibly coming from the lake - sea connection due to discharges in West Northern part of the lake at Abu Qir Bay from the Racta and National Paper Mills.

El-Amier (2017) collected 37 sample from Lake Burullus in 2016 to assess the chemical, physical parameters and the heavy metals contamination of sediment from the four main ecological locations of the lake; these being open water, shores, drains and islets. The location of sampling is shown in Figure 31 while the results are shown in Table 26.
Table 25 Results of major and trace metals in sediment from Mariut and Edku Lake – data from Khalil et al. (2013)

<table>
<thead>
<tr>
<th>Station</th>
<th>Na</th>
<th>K</th>
<th>Ca</th>
<th>Mg</th>
<th>%</th>
<th>B</th>
<th>Li</th>
<th>Co</th>
<th>Bi</th>
<th>Se</th>
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</thead>
<tbody>
<tr>
<td>Mariut</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>2</td>
<td>83</td>
<td>8.4</td>
<td>3.2</td>
<td></td>
<td>58.2</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Edku</td>
<td>1</td>
<td>1.02</td>
<td>12.8</td>
<td>6.7</td>
<td>0.8</td>
<td>58.2</td>
<td></td>
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<tr>
<td></td>
<td>2</td>
<td>1.13</td>
<td>1.19</td>
<td>1.2</td>
<td>0.8</td>
<td>58.2</td>
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<td></td>
<td>3</td>
<td>1.19</td>
<td>1.19</td>
<td>1.2</td>
<td>0.8</td>
<td>58.2</td>
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<td></td>
<td>4</td>
<td>1.19</td>
<td>1.19</td>
<td>1.2</td>
<td>0.8</td>
<td>58.2</td>
<td></td>
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<tr>
<td></td>
<td>5</td>
<td>1.19</td>
<td>1.19</td>
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<td>9</td>
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<tr>
<td></td>
<td>10</td>
<td>1.19</td>
<td>1.19</td>
<td>1.2</td>
<td>0.8</td>
<td>58.2</td>
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</tbody>
</table>

Figure 31: Sampling locations for El-Amier (2017)
274. Based on the previous assessments, the sediment is likely to be contaminated; however, it is unlikely to exceed good international industry practice standards

5.7.6 Performance Criteria

275. The following performance criteria are set for the project:

a. no build-up of sediment in the aquatic environments and/or surface and/or groundwater as a result of construction and operation activities;

b. no extra excavation outside the sites’ boundaries

c. all water exiting the project site and/or into groundwater systems is to have passed through best practice erosion, drainage and sediment controls;

d. no contaminated sediment will be used in the construction works; and

e. effective implementation of site-specific EDSCP and CSDMP. That will be developed during implementation. A draft outline is included in Annexure 4.

276. By following the management measures set out in the ESMF, construction and operation activities of the projects will not have a significant impact as a result of sedimentation across the broader area.

5.7.7 Monitoring

277. A standardised sediment control monitoring program has been developed for the projects (Table 27). The program is subject to review and update at least every two months from the date of issue. The SPA will be required to:

a. conduct site inspections on a monthly basis or after rainfall events exceeding 20mm in a 24 hour period; and

b. observe changes using satellite mapping.

5.7.8 Reporting

278. All sediment and erosion control monitoring results and/or incidents will be tabulated and reported as outlined in the ESMF. The SPA must be notified immediately in the event of any suspected instances
279. Develop a site-specific checklist to document non-conformances to this ESMF or any applicable EDSCP and CSDMP; and

280. Communicate the results of inspections and/or water quality testing and ensure that any issues associated with control failures are rapidly rectified and processes are put in place to ensure that similar failures are not repeated.
## Table 27 Erosion, Drainage and Sediment Control Measures

<table>
<thead>
<tr>
<th>Issue</th>
<th>Control activity (and source)</th>
<th>Action timing</th>
<th>Responsibility</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1: Loss of soil material and sedimentation to the surface and/or groundwater systems from site due to earthwork activities</td>
<td><strong>E1.1:</strong> Develop and implement an EDSCP and CSDMP for any surface works, embankments and excavation work, water crossings.</td>
<td>Construction phase</td>
<td>All Personnel</td>
<td>Maintain records</td>
</tr>
<tr>
<td></td>
<td><strong>E1.2:</strong> Schedule/stage works to minimise cleared areas and exposed soils at all times and to ensure that major vegetation disturbance and earthworks are carried out during periods of lower rainfall and wind speeds.</td>
<td>Pre and during construction</td>
<td>SPA</td>
<td>Maintain records</td>
</tr>
<tr>
<td></td>
<td><strong>E1.3:</strong> Incorporate the design and location of temporary and permanent EDSC measures for all exposed areas and drainage lines. These shall be implemented prior to pre-construction activities and shall remain onsite during work</td>
<td>Pre and during construction</td>
<td>SPA</td>
<td>Maintain records</td>
</tr>
<tr>
<td></td>
<td><strong>E1.4:</strong> Schedule/stage works to minimise the duration of stockpiling topsoil material. Vegetate stockpiles if storage required for long periods.</td>
<td>During construction</td>
<td>All Personnel</td>
<td>Maintain records</td>
</tr>
<tr>
<td></td>
<td><strong>E1.5:</strong> Locate stockpile areas away from drainage pathways, waterways and sensitive locations.</td>
<td>Pre and during construction</td>
<td>SPA</td>
<td>Maintain records</td>
</tr>
<tr>
<td></td>
<td><strong>E1.6:</strong> Design stormwater management measures and to reduce flow velocities and avoid concentrating runoff and set up a Storm Water Pollution Prevention Plan (SWPPP)</td>
<td>Pre and during construction</td>
<td>SPA</td>
<td>Maintain records</td>
</tr>
<tr>
<td></td>
<td><strong>E1.7:</strong> Bunding shall be used either within watercourses or around sensitive/dangerous</td>
<td>During construction</td>
<td>All Personnel</td>
<td>Maintain records</td>
</tr>
</tbody>
</table>
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E2: Soil Contamination

E2.1: If contamination is uncovered or suspected (outside of the project footprints), undertake a Stage 1 preliminary site contamination investigation. The contractor should cease work if previously unidentified contamination is encountered and activate management procedures and obtain advice/permits/approval (as required).

E2.2: Adherence to best practice for the removal and disposal of contaminated soil/material from site (if required), including contaminated soil within the project footprints.

E2.3: Drainage control measures to ensure runoff does not contact contaminated areas (including contaminated material within the project footprints) and is directed/diverted to stable areas for release.

E2.4: Avoid importing fill that may result in site contamination and lacks accompanying certification/documentation. Where fill is not available through on site cut, it must be tested in accordance with geotechnical specifications.
5.8 WASTE MANAGEMENT

5.8.1 Background

281. The preferred waste management hierarchy and principles for achieving good waste management is as follows:
   a. waste avoidance (avoid using unnecessary material on the projects);
   b. waste re-use (re-use material and reduce disposing);
   c. waste recycling (recycle material such as cans, bottles, etc.); and
   d. waste disposal (all petrscible and/or contaminated waste to be dumped at approved landfills).

282. The key waste streams generated during construction are likely to include residual sediment and construction wastes such as:
   a. the excavation wastes unsuitable for reuse during earthworks;
   b. wastes from construction and drilling equipment maintenance. Various heavy vehicles and construction equipment will be utilised for the duration of the construction and drilling phase. Liquid hazardous wastes from cleaning, repairing and maintenance of this equipment may be generated. Likewise leakage or spillage of fuels/oils within the site needs to be managed and disposed of appropriately;
   c. Wood and reed leftovers from construction of fences and wood/bamboo protection components;
   d. non-hazardous liquid wastes will be generated through the use of workers' facilities such as toilets; and
   e. general wastes including scrap materials and biodegradable wastes.

283. Key waste streams generated during operation are likely to include:
   a. excavated sediment (primarily sand and coral, which can be used for concrete or spread on suitable areas);
   b. Wood and reed leftovers from construction of fences and wood/bamboo protection components; and,
   c. used oil and machinery parts.

5.8.2 Performance Criteria

284. The following performance criteria are set for the construction of the projects:
   a. waste generation is minimised through the implementation of the waste hierarchy (avoidance, reduce, reuse, recycle);
   b. no litter will be observed within the project area or surrounds as a result of activities by site personnel;
   c. no complaints received regarding waste generation and management;
   d. any waste from on-site portable sanitary facilities will be sent off site for disposal by a waste licensed contractor; and
   e. waste oils will be collected and disposed through Petrotrade company for recycling.
   f. Immediate response and reporting for any spill or leakage.
   g. Workers involved in construction and operational activities should be familiar with methods minimising the impacts of clearing vegetation to minimise the footprint to that essential for the
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works and rehabilitate disturbed areas. By doing these activities, the projects should minimise
the impact of waste generated by the project.

h. Prepare and maintain a waste management plan that takes into consideration all the points
mentioned above.

i. Wastes of hazardous nature to be disposed of through licenced contractors under a complete
chain-of-custody system.

j. Prepare waste and hazardous waste registers for all project activities, in accordance with the
requirements of law 4 for 1994.

5.8.3 Monitoring

285. Monitoring of waste volumes and ensuring that they match the chain-of-custody, particularly for
wastes of hazardous nature.

286. Monitoring/patrolling housekeeping, waste storage and handling on site.

5.8.4 Reporting

287. The EEAA must be notified immediately and SPA will take action in the event of any serious
environmental harm due to improper waste management.
### Table 28 Waste Management Measures

<table>
<thead>
<tr>
<th>Issue</th>
<th>Control activity (and source)</th>
<th>Action timing</th>
<th>Responsibility</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1:</td>
<td><em>Production of wastes and excessive use of resources</em></td>
<td></td>
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<tr>
<td></td>
<td>WT1.1: Preference shall be given to materials that can be used to construct the project that would reduce the direct and indirect waste generated.</td>
<td>Pre and during construction</td>
<td>SPA</td>
<td>Maintain records</td>
</tr>
<tr>
<td></td>
<td>WT1.2: The use of construction materials shall be optimised and where possible a recycling policy adopted.</td>
<td>During construction</td>
<td>SPA</td>
<td>Weekly and maintain records</td>
</tr>
<tr>
<td></td>
<td>WT1.3: Separate waste streams shall be maintained at all times i.e. general domestic waste, construction and contaminated waste. Specific areas on site shall be designated for the temporary management of the various waste streams.</td>
<td>During construction</td>
<td>SPA</td>
<td>Weekly and maintain records</td>
</tr>
<tr>
<td></td>
<td>WT1.4: Any contaminated waste shall be disposed of at an approved facility.</td>
<td>During construction</td>
<td>SPA</td>
<td>Weekly and maintain records</td>
</tr>
<tr>
<td></td>
<td>WT1.5: Recyclable waste (including oil and some construction waste) shall be collected separately and disposed of correctly (Recycled through Petrotrade).</td>
<td>During construction</td>
<td>SPA</td>
<td>Weekly and maintain records</td>
</tr>
<tr>
<td></td>
<td>WT1.6: Waste containers shall be sufficiently covered to ensure that wildlife does not have access.</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily</td>
</tr>
<tr>
<td></td>
<td>WT1.7: Disposal of waste shall be carried out in accordance with the Government of Egypt requirements.</td>
<td>During construction</td>
<td>SPA</td>
<td>Weekly and maintain records</td>
</tr>
<tr>
<td></td>
<td>WT1.8: Fuel and lubricant leakages from vehicles and plant shall be immediately rectified.</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>WT1.9: Major maintenance and repairs shall be carried out off-site whenever practicable.</td>
<td>During construction</td>
<td>SPA</td>
<td>Weekly and maintain records</td>
</tr>
</tbody>
</table>
WT1.10: Where possible, fuel and chemical storage and handling shall be undertaken at central fuel and chemical storage facilities, such as petrol stations.

WT1.11: Any dangerous goods stored on site shall be stored in accordance with Egypt regulations.
5.9 SOCIAL MANAGEMENT

5.9.1 Background

288. Population data for the relevant governorates was acquired from the Central Agency for Public Mobilization and Statistics (CAPMAS). Numbers are expressed in thousands of male and female for each age group by 5 years interval.

5.9.2 Demography

289. Beheira had a population of 4,747,283 in 2006 (males = 2,433,814 while females = 2,313,469), demonstrating a male/female ratio of 1.05:1. Population was highest in youth age groups (15-,20-), with the lowest number in age groups (70-,75+), as presented in Figure 32.

![Figure 32: Population Pyramid for Beheira in 2006](image)

290. Kafr El Sheikh recorded a population of 2,620,208 in 2006 (males = 1,324,211 while females = 1,295,997), showing a male/female ratio of 1.02:1. Population was highest in youth age groups (Less than 5, 10-, 15-, 20-), with the lowest number in age groups (70-,75+), as presented in Figure 33.

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8 Latest CAPMAS publication
Dakhalia recorded a population of 4,989,997 in 2006. The number of males was 2,534,118 while the number of females was 2,455,879, showing male/female ratio of 1.03:1. The number of populations showed the highest numbers in the youth age groups (15-, 20-), while it showed the lowest number in age groups (70-,75+), as presented in Figure 34.
292. Damietta recorded a population of 1,097,339 in 2006. The number of males was 561,100 while the number of females was 536,239, showing a male/female ratio of 1.03:1. The number of populations showed the highest numbers in the youth age groups (15-, 20-), while it showed the lowest number in age groups (70-,75+), as presented in Figure 35.
Figure 35: Population Pyramid for Damietta in 2006

Port Said recorded a population of 570,603 thousands in 2006. The number of males was 290,580 thousands, while the number of females was 280,023, showing a male/female ratio of 1.03:1. The number of populations showed the highest numbers in the youth age groups (15-,20-,25-), while it showed the lowest number in age groups (65-,70-,75+), as presented in Figure 36.
5.9.3 Land use

294. Beheira Hotspot includes the international coastal road runs south of the Beheira hotspot, in addition to the existence of agricultural lands.

295. At Kafr El-Sheikh Hotspot, land use includes Aquaculture, Burullus power station, Motobas Industrial zone, agricultural lands and two cultural heritage sites (Kom El Meqassabeh, Tell El Maqlowbeh – neither of these are in the project footprint); Burullus lake and the International coastal road.

296. At the Dakahlia Hotspot, land use includes urban centres and beach resorts along Gamasa city; a pumping station of irrigation water from ElSalam drain to the sea; New Mansoura city which is under construction, the international coastal road, Delta University and Gamasa industrial city.

297. At Damietta Hotspot, land use includes summer resorts, chalets and beach on the coast; West: Damietta power station; university, recreational areas, followed by the international coastal road and New Damietta city and agriculture.

Figure 37: Landuse Map of Beheira Hotspot
Figure 38: Landuse Map of Kafr El-Sheikh Hotspot
### Figure 39: Landuse Map of Dakahlia Hotspot

<table>
<thead>
<tr>
<th>Dakahlia Vulnerable Hotspot</th>
<th>Surrounded Land Use for Dakahlia Vulnerable Hotspot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Lands</td>
<td>200m SPA setback distance</td>
</tr>
<tr>
<td>New Mansoura City</td>
<td></td>
</tr>
<tr>
<td>International Coastal Road</td>
<td></td>
</tr>
<tr>
<td>Gamas Industrial City</td>
<td></td>
</tr>
<tr>
<td>Delta University for Science and Technology</td>
<td></td>
</tr>
<tr>
<td>Gamanass City</td>
<td></td>
</tr>
<tr>
<td>16th of May City</td>
<td></td>
</tr>
</tbody>
</table>
Figure 40: Landuse Map of Damietta Hotspot
299. The project has been designed with the assistance of stakeholders and aims to provide benefits to the broader community. It is important that potential areas of tension are recognised early and appropriate actions taken to avoid or minimise conflict.

300. The project and its sub-projects do not require involuntary resettlement or acquisition of land although they may impact on land during construction activities which will be temporary in nature.

301. Stakeholder meetings revealed that both male and female workers can be sourced from the different locations. Burullus Lake includes reeds that can be woven by women at their homes (after drying) and supplied to the project.

5.9.4 Performance Criteria

302. The following performance criteria are set for the project:
   a. Representation of all relevant stakeholders.
   b. Consultation activities in the different project phases.
   c. Avoid construction activities during summer time in areas known for beach accessibility for recreational activities, as possible.
   d. Provide temporary access points for fishermen during construction.
   e. Coordinate project implementation schedule with communities.
   f. Engagement and compensation of potentially impacted persons.
g. Minimise use of fill material and maximise sand use for construction of the dykes.

h. Monitor behaviour of responsible persons controlling access points to eliminate possibility of bullying.

i. Selection of easily accessible dykes in resort/recreational areas

j. Long-term social benefits are achieved.

k. complaint and grievance mechanisms are put in place and proactively managed;

l. Local stakeholders and community members have a key role to play in the implementation and monitoring of the project.

m. Consultation with stakeholders will continue. This will help ensure that stakeholders continue to be aware of the project, its progress and any changes in the project. It will also assist in identifying any issues as they arise.

n. SPA will be responsible for advisory support and extensions services to local beneficiaries along with being responsible for distributing material inputs and providing technical training and backstopping in the implementation of programme activities.

5.9.5 Reporting

303. Records of all consultations are to be kept and reported on monthly basis.

304. The SPA must be notified in the event of any individual or community complaint or dissatisfaction and ensure the Grievance Redress Mechanism is complied with.
## Table 29: Social Management Measures

<table>
<thead>
<tr>
<th>Issue</th>
<th>Control activity (and source)</th>
<th>Action timing</th>
<th>Responsibility</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>SM1: SM Land in use/ Public nuisance caused by construction/operation activities (eg noise, dust etc)</td>
<td>SM 1.1: Carry out community consultation on the purpose and benefits of making changes to land use</td>
<td>Pre-construction</td>
<td>SPA</td>
<td>Maintain records</td>
</tr>
<tr>
<td></td>
<td>SM 1.2: Get community buy-in on any change of land use</td>
<td>Pre-construction</td>
<td>SPA</td>
<td>Maintain records</td>
</tr>
<tr>
<td></td>
<td>SM 1.3: Ensure compliance with the Grievance Redress Mechanism process</td>
<td>Entire construction and operation phase</td>
<td>SPA</td>
<td>Maintain records</td>
</tr>
<tr>
<td></td>
<td>SM 1.4: Implement appropriate management plans (refer to Noise, Air, ESCP, and Waste sections of the ESMF)</td>
<td>Construction and operation</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
</tbody>
</table>
5.10 Archaeological and Cultural Heritage

5.10.1 Background

305. There are no known archaeological and cultural heritage sites within the specific hotspot locations or nearby them.

5.10.2 Performance Criteria

306. The following performance criteria are set for cultural heritage issues related to the project:

a. There will be no impact on any important Archaeological, Indigenous and/or Cultural Heritage sites.

b. Where there is a mix of modern development and traditional areas within villages, community engagement will be carried out to confirm options of enabling future development.

c. Should any important Archaeological, Indigenous and/or Cultural Heritage sites be found, immediately cease work within the area that the site has been observed and consult with the Egyptian Ministry of State of Antiquities and UNDP.

5.10.3 Monitoring

307. Observation during pre-construction and construction activities.

308. Local stakeholders and community members have a key role to play in the implementation and monitoring of the project.

309. Consultation with stakeholders will continue. This will help ensure that stakeholders continue to be aware of the project, its progress and any changes in the project. It will also assist in identifying any issues as they arise.

310. SPA will be responsible for advisory support and extensions services to local beneficiaries along with being responsible for distributing material inputs and providing technical training and backstopping in the implementation of programme activities.

5.10.4 Reporting

311. Notification to the Supreme Council of Antiquities in case of any find.
Table 30: Archaeological Management Measures

<table>
<thead>
<tr>
<th>Issue</th>
<th>Control activity (and source)</th>
<th>Action timing</th>
<th>Responsibility</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH1: Damage or disturbance to significant important Archaeological, Indigenous and/or Cultural Heritage during the earth disturbances and land clearing activities</td>
<td>CH1.1: Should any important Archaeological, Indigenous and/or Cultural Heritage sites be found, immediately cease work within the area that the site has been observed and consult with the Egyptian Ministry of State of Antiquities and UNDP.</td>
<td>Pre and during construction</td>
<td>SPA</td>
<td>Daily, maintain records and immediately notify UNDP and the Egyptian Ministry of State of Antiquities of any find.</td>
</tr>
</tbody>
</table>
5.11 EMERGENCY MANAGEMENT MEASURES

5.11.1 Background

312. In the event of actions occurring, which may result in serious health, safety and environmental (catastrophic) damage, emergency response or contingency actions will be implemented as soon as possible to limit the extent of environmental damage.

313. The delivery organisation will need to incorporate emergency responses into the project complying with the requirements under the Occupational, Health and Safety Policy of the delivery organisation and the relevant Egyptian legislation.

5.11.2 Performance Criteria

314. The following performance criteria are set for the construction of the projects:
   d. no incident of fire outbreak;
   e. no major fuel spills;
   f. no preventable work related accidents;
   g. provide an immediate and effective response to incidents that represent a risk to public health, safety or the environment; and
   h. minimise environmental harm due to unforeseen incidents.

5.11.3 Monitoring

315. An emergency response monitoring program will be developed for the project. The program is subject to review and update at least every two months from the date of issue. Importantly, visual inspections will be conducted by SPA daily with reporting to UNDP staff on a weekly basis (minimum) noting any non-conformances to this ESMF.

5.11.4 Reporting

316. The SPA and UNDP staff must be notified immediately in the event of any emergency, including fire or health related matter including those that have resulted in serious environmental harm.
### Table 31 Emergency Management Measures

<table>
<thead>
<tr>
<th>Issue</th>
<th>Control activity (and source)</th>
<th>Action timing</th>
<th>Responsibility</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1. Fire and Emergency management and prevention strategies implemented</td>
<td>E1.1: Flammable and combustible liquids bunding/storage areas to be designed in accordance with appropriate international standards</td>
<td>Pre and during construction</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>E1.2: Fire extinguishers are to be available on site</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>E1.3: No open fires are permitted within the project area</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>E1.4: Communication equipment, emergency protocols and Training provision to all staff on emergency preparedness. To be established prior to commencement of construction activities.</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>E1.5: Check and replenish First Aid Kits</td>
<td>During construction</td>
<td>SPA</td>
<td>Daily and maintain records</td>
</tr>
<tr>
<td></td>
<td>E1.6: Use of Personal Protection Equipment</td>
<td>During construction</td>
<td>All Personnel</td>
<td>Daily and maintain records</td>
</tr>
</tbody>
</table>
### 6 BUDGET FOR ESMF IMPLEMENTATION

A budget has been prepared for the implementation of the ESMF as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESMF Updating and Auditing</td>
<td>10,000</td>
</tr>
<tr>
<td>General ESMF Expenses</td>
<td>20,000</td>
</tr>
<tr>
<td>Ecological Monitoring (40 sites - two assessments/year over five years)</td>
<td>135,000</td>
</tr>
<tr>
<td>Water Quality Monitoring (monitoring to be undertaken over five years)</td>
<td>35,000</td>
</tr>
<tr>
<td>Water Quality Sample Laboratory Analysis (monitoring to be undertaken over five years)</td>
<td>30,000</td>
</tr>
<tr>
<td>Sediment Sample Field Testing (monitoring to be undertaken over five years)</td>
<td>25,000</td>
</tr>
<tr>
<td>Sediment Sample Laboratory Analysis (monitoring to be undertaken over five years)</td>
<td>40,000</td>
</tr>
<tr>
<td>Erosion, Drainage and Sediment Control</td>
<td>15,000</td>
</tr>
<tr>
<td>Stakeholder Engagement Workshop</td>
<td>140,000</td>
</tr>
<tr>
<td>Grievance Redress Mechanism</td>
<td>50,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>500,000</strong></td>
</tr>
</tbody>
</table>
7 REFERENCE LIST


Edelist, D., Rilov, G., Golani, D., Carlton, J.T., Spanier, E. (2013) Restructuring the Sea: profound shifts in the world’s most invaded marine ecosystem, Diversity and Distributions 19, 69-77


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Annex VI (b) – Environmental and Social Management Framework


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Annexure One: Fisheries Livelihood Restoration Plan Outline
Introduction

The section should include:

a. Brief project description;
b. Purpose of the Fisheries Livelihood Restoration Plan, and
c. Scope of the livelihood impact management plan.

Project Description

a. Provide a comprehensive description of the project;
b. Include an overview of the project and subsequently describe the pre-construction, construction, and operational phases of the project;
c. Key aspects relevant to fish resources, fishing based livelihoods restoration of project-affected communities should be described in detail.

Statutory and Regulatory Framework

Livelihood Systems of Project-Affected Communities

a. Describe the livelihood systems of project-affected fishing communities.

Fish Habitat and Resources

a. Describe fish habitat and resources that are both impacted by and at risk from project activities.

Fisheries Systems

a. Describe the range of fishing activities used by individuals, households, and communities impacted by the project. Include postharvest processing and sale, including the value chain of produce.

Identification of Stakeholders

a. Identify the various stakeholders who may be impacted or may be involved in the process of development, implementation, and monitoring of the programs.

Impact Assessment

a. Impact Assessment
b. Definition of Eligibility Criteria and Entitlement Matrix for Directly Affected Fishermen
c. Restoration Strategy Define the overall impact management strategy.

Program and Activity Description

a. Provide a description of program and component activities. Include key information pertaining to target group, implementation, human resources, timeline, budget, etc.

Project Implementation (human resources, partners, and organisational responsibilities)

a. Describe human resources for implementation of the plan and component programs/interventions.
b. Clearly define roles and responsibilities and organisational structure.
c. Describe potential partners (affected groups and communities, NGOs, government, etc.) and their respective roles and responsibilities.

**Schedule**

a. Multi-year schedule of implementation for the component programs/ interventions and the overall plan.

**Budget**

a. Budgets for the component programs/ interventions and the total cost of the plan.

**Monitoring and Evaluation**

a. Overall monitoring and evaluation framework that integrates the monitoring and evaluation requirements for the component programs/ interventions
Annexure Two: Community Consultation and Stakeholder Engagement Information
Enhancing Climate Change Adaptation in the North Coast and Nile Delta Regions in Egypt

Green Climate Fund Proposal, Preliminary Stakeholder Meeting;
Damietta, Egypt, Governorate Meeting Room

Thursday 8th June 2017

I. INTRODUCTION
An Environmental and Social Management Framework "ESMF" is being prepared for the proposed project "Enhancing Climate Change Adaptation in the North Coast and Nile Delta Regions in Egypt". As part of the ESMF requirements, an initial meeting took place on 25 May 2017 at the Ministry of Water Resources premises. The meeting was attended by parliament members of the relevant governorates as well as representatives of each governorate. It was agreed that the parliament members and governorate representatives, in liaison with the Shore Protection Authority (SPA), would arrange further meetings in the different governorates to include representatives of different stakeholders. Accordingly, this preliminary stakeholder meeting took place with relevant stakeholders from Damietta Governorate. A complete list of participants is attached in Appendix A of this report. The appendix also includes a list of stakeholders that were invited to the event.

The purpose of the meeting was to introduce the project details and benefits to stakeholders and receive feedback from stakeholders including their concerns (if any) and requirements to be taken into account within the next steps of the project. The meeting started with a brief presentation of the project followed by review and discussion of key issues including project design, environmental and social impacts and monitoring and evaluation.

II. MEETING SUMMARY

Opening Remarks:
The meeting commenced with opening remarks provided by Dr. Mohamed Ahmed Ali (Project Manager), who outlined the key objectives of the meeting. He emphasized that the meeting serves the purpose of introducing the project to ensure effective participation of relevant stakeholders, as well as to understand and identify their concerns and requirements.

Presentation of the proposed project:
The Green Climate Fund project proposal was presented by Dr. Mohamed Ahmed Ali, who emphasized that the main objective of the project is to utilize natural engineering solutions that are aligned with the existing environmental systems to protect the Delta area from flooding. Critical coastal areas with respect to impacts of climate change were presented during the meeting to include Damietta. Maps of the project location as well as the preliminary design of the proposed structures (three alternative designs) were presented in addition to a description of the pilot project that has already been carried out. The project benefits were presented in detail to include; protection of assets; employment opportunities; protection of infrastructure including the coastal international road; protection of agricultural lands from flooding; and, providing investment opportunities in the protected area(s).
A second presentation was provided by Eng. Yasser Sherif (Managing Director of Environics – Environmental consultancy firm) who provided a brief introduction on climate change and its potential impacts. He then moderated a discussion on the project benefits; relevant stakeholders; and, liaison with local communities to support the project. The discussions also covered the project potential impact on the economic activities of the local communities and the continuous stakeholder engagement and grievance mechanisms.

**Figure 1: Damietta Hotspot Location**
Key discussion points and comments:

- Baseline Information
  - Flooding:
    - Meeting attendees mentioned that areas with elevation of 0.7 to 0.8m above mean sea level are subject to flooding.
  - Dredged Material:
    - Port dredging materials include black sands that have proven economically feasible for extraction of minerals. Sedimentation basins are currently available for dewatering of port dredging materials.
    - Lake dredging cannot be used for soil enhancement of agricultural lands due to its high salinity. It is used by the Governorate for raising the level / protection from flooding.
    - There is a substantial demand for dredged material, mainly for raising levels of areas with potential for flooding. It is sold at 30 – 40 pounds per cubic meters (including transportation). However, the current plan of reviving the northern lakes might make the material more available.

- Collaboration
  - Collaboration is essential between the project (Shore Protection Authority) and the:
    - New Urban Communities Authority: General liaison was found necessary. In particular, there is a 5km width “Corniche” separating the new Damiatta “Chalet” area from the sea, which might also provide a certain level of protection from flooding, but could itself be threatened. Accordingly, it is highly recommended to coordinate efforts with the New Urban Communities Authority to achieve the most efficient protection scenario.
    - General Authority for Fish Resources Development: This authority is responsible for maintenance dredging of the Gamasa outlet. Dialog regarding the uses and availability of maintenance dredging material is necessary.
• Damietta Port Authority: The port maintenance dredging material used to be dumped to sea, but will currently be dewatered in sedimentation basins for use in raising beach levels in accordance with an SPA priority plan. Liaison should be maintained with the port to make use of the dredged material and to include the current project in the “priority” plan.

• Project Design:
  o The project design must take into consideration the line-of-sight and potential aesthetic impact of the project on resorts and residential areas.
  o It was requested to consider the area east of Ezbet El-Borg village in the project, which was considered vulnerable to flooding by the stakeholders.
  o Project design must consider potential impact on the resorts and residential areas due to wind-blown sand from the project dunes. It was advised to monitor the pilot project regarding this issue.

• Roles and Responsibilities:
  o The stakeholders raised the issue that the roles and responsibilities regarding the coastal area management are not clear, particularly with respect to port areas and some related port activities. It was responded that the second output of the GCF project “the development of an Integrated Coastal Zone Management (ICZM) plan”, will focus on re-defining these responsibilities to avoid overlaps or gaps.

• Stakeholder Information:
  o The neighboring power plant has its own protection fence and is built on highland. Accordingly, they do not consider themselves as one of the proposed project beneficiaries. The plant is currently based on gas turbines, but is in the process of upgrading to combined cycle.
  o The New Damietta Chalet areas are of 5 km length along the coast, on high lands, and are not currently impacted by flooding.
  o Residents are aware of sea level rise and already build their houses high to accommodate current and the future flooding cases.
  o Agriculture:
    ▪ Agricultural activities only take place south of the coastal international highway.
  o Fishing:
    ▪ Dumping of port dredging materials in the sea is said to have negatively affected fishing activities. It is best to use the dredged material for protection rather than dumping it in the sea.
    ▪ Fishing is mainly a winter activity. Fishermen do not need access to the sea from the beach in the Damietta project location since they have access the sea via boats from the Gamasa drain or Ezba El Borg Port.
  o Quail Catching:
    ▪ There are quail catchers in the area but this is a much lower economic activity than fishing.

• Employment and community benefits
  o Reed is manufactured in a village called Ghawwabeen (Fareskour Markaz). Both women and men are engaged in this activity. This village can greatly benefit through providing the project requirements of reed.

• Risk Assessment:
  o It was proposed that the project also considers additional risks such as potential friction resulting from annoyance of owners of houses in the resorts as well as any other persons fearing to lose their accessibility to the beach.
Further Consultation, Awareness and Potential Grievance:
- It was emphasized during the meeting that awareness must be provided to the local community regarding the climate change problem and how the project contributes to reducing its impact. Otherwise unaware persons may carry out activities such as penetrating the project structures for installation of pipelines to feed aquacultures with seawater. A number of communication channels have been suggested by the meeting participants, including:
  - Governorate representatives in the local council
  - Syndicates
  - Non-governmental organizations
- The attendees stated that there are no groups in the area that are unable to express their concerns.
- Potential grievance was proposed through the city council, city board of trustees and members of the Parliament, while engagement must include public and real estate investors.

Closing Remarks:
Closing remarks were provided by Eng. Yasser Sherif. He concluded that there is a necessity to establish dialog between the Shore Protection Authority, New Urban Communities Authority, General Authority for Fish Resources Development, and the Port Authority. He also concluded that it is clear that the community will benefit from the project through reducing the flooding risk, employment, and reed works. All the issues raised during this meeting will be subject to further study by the project. The attendees were thanked for their valuable contributions.

III. RECOMMENDATIONS and NEXT STEPS
- Develop project preliminary design, particularly for the Chalet area in New Damietta and discuss the proposal with the New Urban Communities Authority.
Appendix A
List of Participants

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Job</th>
<th>Telephone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gamal Zaatar</td>
<td>Manager of West Damietta power plant of</td>
<td>01062638017</td>
</tr>
<tr>
<td>2</td>
<td>Mahmoud Salem Ibrahim</td>
<td>Dean of the Faculty of Science, Damietta University</td>
<td>01097044692</td>
</tr>
<tr>
<td>3</td>
<td>Hossam El-Deen Khalil</td>
<td>*Vice President of General Authority For Fish Resources Development</td>
<td>01227429115</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Head of Fishermen Association</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Maha Metwaly Fayed</td>
<td>Environmental Affairs Manager – Damietta Governorate</td>
<td>01017748135</td>
</tr>
<tr>
<td>5</td>
<td>Samy Abdel Aziz</td>
<td>Damietta Governorate General Secretariat</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>El-Arabi Mohamed El-Qashqawy</td>
<td>General Manager – SPA</td>
<td>066 3510758 '01005360945</td>
</tr>
<tr>
<td>7</td>
<td>Helmi Mohamed Mohamed Abdo</td>
<td>General Manager of the Investment Plan - SPA</td>
<td>01010899944 '01006693196</td>
</tr>
<tr>
<td>8</td>
<td>Mohamed El-Sayed Ragab</td>
<td>New Damietta City Agency - Vice President</td>
<td>01004219756</td>
</tr>
<tr>
<td>9</td>
<td>Safaa Fathy Mohamed Dosoki</td>
<td>Head of Central Department for Water Resources and Irrigation MWRI</td>
<td>01002118638</td>
</tr>
<tr>
<td>10</td>
<td>Dr Mohamed Ahmed Ali</td>
<td>ACCNDP Project Manager</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Eng. Yasser Sherif</td>
<td>Managing Director – Environics</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Eng. Mohamed Taha</td>
<td>Environmental Consultant - Environics</td>
<td></td>
</tr>
</tbody>
</table>
List of Invitees

- Damietta Parliament Members
- Fishermen Association
- Urban Community Authority
- Faculty of Engineering and Science in the Governorate
- Western Damietta Power Plant
- Border Guard Forces - Military Forces
Enhancing Climate Change Adaptation in the North Coast and Nile Delta Regions in Egypt

Green Climate Fund Proposal, Preliminary Stakeholder Meeting; Kafr El Sheikh Governorate, Egypt, Mastaroh meeting venue (Kholafaa El Rashedin Mosque)

Saturday 10th June 2017

I. INTRODUCTION

An Environmental and Social Management Framework “ESMF” is being prepared for the proposed project “Enhancing Climate Change Adaptation in the North Coast and Nile Delta Regions in Egypt”. As part of the ESMF requirements, an initial meeting took place on 25 May 2017 at the Ministry of Water Resources premises. The meeting was attended by parliament members of the relevant governorates as well as representatives of each governorate. It was agreed that the parliament members and governorate representatives, in liaison with the Shore Protection Authority (SPA), would arrange further meetings in the different governorates to include representatives of different stakeholders. Accordingly, this preliminary stakeholder meeting took place with relevant stakeholders from Kafr El Sheikh Governorate. A complete list of participants is attached in Appendix A of this report.

The purpose of the meeting was to introduce the project details and benefits to stakeholders and receive feedback from stakeholders including their concerns (if any) and requirements to be taken into account within the next steps of the project. The meeting started by a brief presentation of the project followed by review and discussion of key issues including project design, environmental and social impacts and monitoring and evaluation.

II. MEETING SUMMARY

Opening Remarks:
The meeting commenced with opening remarks provided by Burulus Parliament Member (MP), followed by, an outline of the key objectives of the meeting presented by Dr. Mohamed Ahmed Ali (Project Manager). He emphasized that the meeting serves the purpose of introducing the project to ensure effective participation of relevant stakeholders, as well as to understand and identify their concerns and requirements.

Presentation of the proposed project:
The Green Climate Fund project proposal was presented by Dr. Mohamed Ahmed Ali (Project Manager). He emphasized that the main objective of the project is to utilize natural engineering solutions that are aligned with the existing environmental systems to protect the Delta area from flooding. Critical coastal areas with respect to impacts of climate change were presented during the meeting to include Kafr El Sheikh. Maps of the project location as well as the preliminary design of the proposed structures (three alternative designs) were presented in addition to a description of the pilot project, which has already been carried out in Kafr El Sheikh. The project returns were presented in detail to include; protection of assets; employment opportunities; protection of infrastructure including the coastal international road; protecting agricultural lands from flooding; and, providing opportunities for future development of the protected area(s).

A second presentation was provided by Eng. Yasser Sherif (Managing Director of Environics – Environmental consultancy firm) who provided a brief introduction on climate change and its potential impacts. He moderated a discussion on the project benefits; concerned stakeholders; and, liaison with local communities to support the project. The discussions also covered the project potential to impact the economic activities of the local communities and the continuous stakeholder engagement and grievance mechanisms.
Figure 1: Kafr El Sheikh Hotspot Location
Key discussion points and comments:

- **Baseline Information:**
  - The area included aquacultures prior to the construction of the Coastal International Highway. Following its construction, aquacultures ceased to exist, since the road disconnected the links between the aquacultures and the Burulus Lake, which was the source of water.
  - The Coastal International Highway also disconnected the Burulus Lake from the sea. Though the highway was designed with culverts to pass seawater underneath, the meeting attendees emphasized that the culverts are not properly functioning as they are blocked with sand. They related the reed issue in the lake with the alteration of its salinity due to its disconnection from the sea.
  - A length of approximately 1 km east of the power plant was previously flooded several times and the Governor was informed that it is a problematic area. The area west of the plant was also flooded, however, at the moment it is empty land and only the fishermen were impacted.
  - The lands are more-or-less leveled from the Ghalyon Lake to Burulus.
  - The attendees mentioned that the area did not suffer extreme weather events in the last 4-5 years, but it did earlier.

- **Collaboration:**
  - Collaboration is essential between the project (Shore Protection Authority) and the:
    - Coast Guards: Residents of the area used to, historically, construct structures similar to the proposed ones for protection against flooding. However, coast guards stopped allowing such constructions as they obstruct their view of the coast, which may result in security issues. It is important to keep communication with the coast guards to ensure that the proposed solutions are acceptable.
    - Fishermen: A large scale of fishing is done from the Burulus Lake. However, Fishermen who use the beaches requested a specific distance (not less than 100 m) from the shoreline for placement of the nets. This should take into consideration the seasonal variation of the shoreline as well as the potential future changes. It is also worth noting that fishing activities mainly take place during the winter, when the sea is high. Accordingly, the location of the proposed soft structures may greatly impact the fishermen who may not be able to place their nets, even though they were provided shore accessibility. This was experienced in one section of the ACCNDP pilot project, where there were locations where the distance between the structure and the actual shoreline becomes in the range of 30m in winter, which prevents the fishermen from placing their nets.
    - Residents of the area: Reed is available, and is sourced from the Burulus Lake. Residents of Mastaroh manufacture the reeds, both women and men.

- **Project Design:**
  - There was a request to consider the following:
- Closing the overall length of the protection structure (without leaving open access points) and providing ramps for crossing the structure for beach access. However, the discussion showed that openings are needed for several reasons such as vehicular access and that these openings are gated so they can be closed during storms and extreme weather events.
- Including design outlets that connect the sea with the lake for the purpose of; relieving pressure in case of an extreme weather event; and, for replenishment of the lake with seawater for adjusting its salinity.
- Lining the toe of the structure to provide protection from erosion by sea water.
  - It was proposed to widen the area between the reed sections of the design, to enhance sand capture for the development of the dunes.
  - It was recommended to construct several groins along the shoreline. However, the discussion revealed that this is a high cost solution and that it requires great attention because groins cause both erosion and sedimentation at different locations.
- Selection of the priority Hotspot location:
  - Local communities are aware of the pilot project that was constructed in the area by the SCCF Adaptation to Climate Change In the Nile Delta project (ACCNDP). They confirmed the project benefits to them and recommended extending it in the whole area.
  - It was emphasized that the project should consider including the area referred to as “El Hanafy”, east of the power plant. The stakeholders were concerned that it is as vulnerable as the area to the west of the plant as it is already frequently flooded. They also requested that the project be extended till Ghalyou Lake to the west.
- Land uses:
  - The specific project location is in a government-owned area (all within the 200m SPA setback distance), utilized only by fishermen and quail catchers.
  - The area east of the power plant (behind the 200m SPA setback distance) is privately owned.
  - The area west of the power plant is currently vacant but is planned for further development and investment.
- Rehabilitation:
  - It is necessary that the project levels the whole area back to its original level after completion of the construction activities. Otherwise, the fishermen become unable to collect their nets on the unlevelled land, which was experienced in one section of the ACCNDP pilot project.
- Further consultation and grievance
  - It was proposed to consider placing a grievance box at the office of the Burulus Parliament member (Dr Mohamed Ismail) for liaising with the project.
  - A follow up meeting is proposed to take place to present the proposed project design.

**Closing Remarks:**
Closing remarks were provided by Eng. Yasser Sherif. He concluded that there is a necessity to establish dialog between the Shore Protection Authority and the Coast Guards to ensure that the structures do not obstruct their line of site for security. Dialog is also important with fishermen to check that the project layout matches their requirements. Conversation is also necessary with residents, particularly those worried that the project may require utilizing parts of their lands, similar to their experience with the International Coastal Highway project.

The project will consider including “El Hanafy” area east of the power plant. Dr. Mohamed Ahmed Ali mentioned that the current project is a medium term, low cost project, whereas the potential long term sea rise will require other solutions. Another closing remark was related to leveling the lands after completion of the construction works.

The attendees were thanked for their valuable contributions by Dr Mohamed Ismail, the MP of the El-Burus.

**III. RECOMMENDATIONS and NEXT STEPS**
- Review project preliminary design with respect to:
  - Coverage location;
o Distance between reed sections; and,
o Sea/Lake connection.

• Further consultation with coast guards and fishermen.
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<td>Contractor</td>
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<tr>
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<td>Mohamed Ali Halawa</td>
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<td>33</td>
<td>Gomaa El-Shamee</td>
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<td>37</td>
<td>Dr Mohamed Ahmed Ali</td>
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<td>38</td>
<td>Eng. Yasser Sherif</td>
<td>Managing Director - Environics</td>
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Enhancing Climate Change Adaptation in the North Coast and Nile Delta Regions in Egypt

Green Climate Fund Proposal, Preliminary Stakeholder Meeting;
Port Said, Egypt, Resta Port Said Hotel

Wednesday 14th June 2017

I. INTRODUCTION

An Environmental and Social Management Framework “ESMF” is being prepared for the proposed project “Enhancing Climate Change Adaptation in the North Coast and Nile Delta Regions in Egypt”. As part of the ESMF requirements, an initial meeting took place on 25 May 2017 at the Ministry of Water Resources premises. The meeting was attended by parliament members of the relevant governorates as well as representatives of each governorate. It was agreed that the parliament members and governorate representatives, in liaison with the Shore Protection Authority (SPA), would arrange further meetings in the different governorates to include representatives of different stakeholders. Accordingly, this preliminary stakeholder meeting took place with relevant stakeholders from Port Said Governorate. A complete list of participants is attached in Appendix A of this report.

The purpose of the meeting was to introduce the project details and benefits to stakeholders and receive feedback from stakeholders including their concerns (if any) and requirements to be taken into account within the next steps of the project. The meeting started by a brief presentation of the project followed by review and discussion of key issues including project design, environmental and social impacts and monitoring and evaluation.

II. MEETING SUMMARY

Opening Remarks:

The meeting commenced with opening remarks provided by Eng. El Arabi Mohamed El-Quashawy (General Manager - Shore Protection Authority, Eastern Delta) who outlined the key objectives of the meeting. He emphasized that the meeting serves the purpose of introducing the project to ensure effective participation of relevant stakeholders, as well as to understand and identify their concerns and requirements.

Presentation of the proposed project:

The Green Climate Fund (GCF) project proposal was presented by Dr. Amr Abdel Hamid (GCF proposal coordinator). He emphasized that the main objective of the project is to utilize natural engineering solutions that are aligned with the existing environmental systems to protect the Delta area from flooding. Critical coastal areas with respect to impacts of climate change were presented during the meeting to include Port Said. Maps of the project location (See Figure 1) as well as the preliminary design of the proposed structures (three alternative designs) were presented in addition to a description of the pilot project that has already been carried out in Kafr El Sheikh. The project returns were presented in detail to include; protection of assets; employment opportunities; protection of infrastructure including the coastal international road; protecting agricultural lands from flooding; and, providing opportunities for future development of the protected area(s).
A second presentation was provided by Eng. Yasser Sherif (Managing Director of Environics – Environmental consultancy firm) who provided a brief introduction on climate change and its potential impacts. He moderated a discussion on the project benefits; relevant stakeholders; and, liaison with local communities to support the project. The discussions also covered the project potential impact on the economic activities of the local communities and the continuous stakeholder engagement and grievance mechanisms.

**Key discussion points and comments:**

- **Baseline Information:**
  - **Oil and Gas companies:**
    - The area includes several Oil and Gas companies, in locations that have already reached equilibrium with respect to sedimentation and erosion. One exception is the Pharoania Company, in an area that still suffers erosion.
  - **Dibba village:**
    - The village is quite vulnerable to flooding.
    - Fishing is the main activity at the Dibba village.
The only current protection for Dibba village is a road that circles the village and to-some-extent protects it from flooding and erosion. However, in some occasions, seawater finds its way into the village and causes flooding of its streets.

- **Biodiversity**: the area used to be rich on biodiversity before commencement of the oil and gas projects.
- **Fishing activities**:
  - These activities mainly currently take place in the 3km stretch between the oil and gas companies and Dibba Village.
  - Dibba village mostly relies on fishing. Upon construction of the oil and gas companies, other fishing villages (Garabaa and Manasra) lost their fishing grounds.
  - It is thought that fishing activities will be greatly negatively impacted, when Zohr field becomes active.
- **Quail Catching**
  - Quail catching activities rarely take place and are not expected to be impacted by the project.
- **Feeding channels to fish-farms and the lake**:
  - There are 22 openings/channels from the sea, west of Dibba village to feed fish-farms with sea water. These openings are distributed along approximately 20km of shoreline width and most of them have coast guard approval, but they lack other necessary approvals.
- **Groins/causeways**:
  - Fish farm owners build groins at the sea openings, which are thought to withhold sediments that could protect Dibba village from erosion.
  - Balaeim Company (Zohr field) is constructing two causeways\(^1\) for their flares.

- **Collaboration**:
  - Collaboration is essential between the project (Shore Protection Authority) and the:
    - Faculty of Science of Port Said University to make use of their experience in using *psammophytes* (sand-loving plants) as well as their previous work with the Desert Research Institute.
    - Pharoania Company that offered support and proposed to participate in technical workshops.
    - Syndicate of Engineers, which proposed to participate in technical workshops and offered the Syndicate meeting room for this purpose. It was also highly recommended to plan uses for the currently un-used lands that are expected to benefit from the project. The syndicate is already preparing a (Best Practice Guideline) for land uses and its representative requested the project to define the currently unused lands that will benefit from the project.
    - It is also important to maintain consultation with fishermen, who have already been impacted by other developments in the area. They should be involved in project design and consulted regarding project activities and schedule.
    - Further consultation with coast guards, particularly for acquiring approval for establishment of plantation in the area.

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\(^1\) Mound or bank in the sea for constructing the flare on top
• Project Design:
  o The Dean of the Faculty of Science – working on Shoreline protection since 2003-mentioned that; It is advised not to rely only on reed (Mechanical solution), but to apply a mix of mechanical and biological solutions. Biological solutions may rely on psammophytes (sand-loving plants, such as Tamarix and wetland plants) that can substitute reed and result in accumulation of dunes.
  o It was proposed to study the potential erosion impact of the current openings to the sea, as well as the groin system, as part of the wider project.
  o Project location:
    ▪ The current project is expected to provide soft protection in five hotspots, extending 69km along the northern Egyptian Coast. These locations were selected by the Shore Protection Authority (SPA), in liaison with a Spanish Institution and Enviroinics, based on topographic survey findings and Digital Elevation Models (DEM).
    ▪ It was proposed that the project studies additional 20km of coastline from Dibba Village to east of Borg Village to identify additional areas that could potentially be considered for the project protection activities.
• Employment ad community benefits:
  o Reed assembling is not an activity of Dibba village. Reed is either acquired from Gamasa or Matarya Dakahlya.
  o Land value is expected to greatly increase, following the flooding protection provided by the project.
• Further Consultation, Awareness and Potential Grievance:
  o The meeting attendees suggested holding periodic workshops every 2-3 months and providing awareness and information on the project schedule to the community prior to commencing the project. It was advised to involve representatives of the civil society in the process as well as in receiving potential complaints.
• Others:
  o A desalination plant is expected to be constructed in the area.
  o Co-Financing the project:
    ▪ Pharoania Company representative offered both technical and financial assistance to the project and mentioned that the company wishes to participate as part of their community development commitments to the Ministry of Petroleum.
  o Land Use and Relation to Wider ICZM Activities:
    ▪ The projects main priority, in accordance with ICZM concepts, should be protection of vulnerable lands that are currently being used (ex. Villages). The second priority should be protection of lands that are currently unused due to flooding issues, and which will eventually become of high value once protected. The project is to identify these lands and may liaise with the syndicate of engineers, which suggested that it; proposes land uses for these lands; and, liaise with various entities to reach an agreement on the future land uses with the Urban Planning Authority.

Closing Remarks:

Closing remarks were provided by Eng. Yasser Sherif. He expressed his satisfaction with the Port Said meeting, where all the contributing stakeholders showed an obvious desire to help and participate in the project.
It was concluded that; Dibba village and Pharoania Company are threatened by flooding and erosion for several reasons; and, that fishermen locations are rapidly shrinking. It was found necessary to take into consideration the fishing activities during project design and provide fishermen with proper access during project construction. The attendees did not expect any negative impacts of the project, subject that it takes place within the 200m SPA setback distance and that it avoids fishing grounds.

The discussions revealed the necessity that the project considers other efforts in the area, particularly the “groin” system project. The meeting attendees suggested holding periodic workshops every 2-3 months and providing awareness to the community prior to commencing the project. It was also highly recommended to commence development of a land use map for the “currently-unused” lands that may benefit from the project, to be approved and enforced by the Urban Planning Authority.

III. RECOMMENDATIONS and NEXT STEPS

- Develop project preliminary design, taking into consideration the possibility of including 20km of coastline from Dibba Village to east of Borg Village. The design would be prepared, based on discussion with:
  - Faculty of Science – Port Said University;
  - Pharoania Company;
  - Syndicate of Engineers in Port Said;
  - Fishermen; and,
  - Coast guards.
- Acquire more data on the groin system project to consider during GCF project design.
Appendix A
List of Participants

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<td>1</td>
<td>Mohamed Adel Mohamed Saleh</td>
<td>Environmental Engineer (Egyptian Propylene and Polypropylene company)</td>
<td>01002151161</td>
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<tr>
<td>2</td>
<td>Ihab Mohamed Magdy Kamal</td>
<td>Civil Engineer at Balaeim Petroleum Company</td>
<td>01005463573</td>
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<td>3</td>
<td>Mohamed Abdallah El-Gebally</td>
<td>Civil Engineer at Petrobel, Zohr Gaz field</td>
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<td>4</td>
<td>Mohamed Ahmed Mahmoud El-Refai</td>
<td>Public relations manager at Balaeim Petroleum Company</td>
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<td>5</td>
<td>Mahmoud El-Roudi</td>
<td>Mayor of El-Dibba Village</td>
<td>01069566530</td>
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<tr>
<td>6</td>
<td>El Arabi Mohamed El-Quashawy</td>
<td>General Manager - Shore Protection Authority, Eastern Delta</td>
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<td>7</td>
<td>Amr Ibrahim El-Roudi</td>
<td>Development Engineer</td>
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<td>8</td>
<td>Hisham Mohamed Mahgoub</td>
<td>Egyptian Engineers Syndicate</td>
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<td>10</td>
<td>Amr Abdel-Hamid</td>
<td>Adaptation to Climate change in the Nile Delta project (ACCNDP)</td>
<td>01223969429</td>
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<td>Hassan ElSayed Mahgoub</td>
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<td>13</td>
<td>Mohamed Ali Saleh</td>
<td>Head of Environmental Protection Department at Balaeim Petroleum Company</td>
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<td>Mohamed Ahmed El-Gohary</td>
<td>Engineering department in Port Said University. Member of the Supreme Council at the Engineers Syndicate</td>
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Guidance for Submitting a Request to the Social and Environmental Compliance Unit (SECU) and/or the Stakeholder Response Mechanism (SRM)

Purpose of this form
- If you use this form, please put your answers in bold writing to distinguish text
- The use of this form is recommended, but not required. It can also serve as a guide when drafting a request.

This form is intended to assist in:

(1) Submitting a request when you believe UNDP is not complying with its social or environmental policies or commitments and you are believe you are being harmed as a result. This request could initiate a ‘compliance review’, which is an independent investigation conducted by the Social and Environmental Compliance Unit (SECU), within UNDP’s Office of Audit and Investigations, to determine if UNDP policies or commitments have been violated and to identify measures to address these violations. SECU would interact with you during the compliance review to determine the facts of the situation. You would be kept informed about the results of the compliance review.

and/or

(2) Submitting a request for UNDP “Stakeholder Response” when you believe a UNDP project is having or may have an adverse social or environmental impact on you and you would like to initiate a process that brings together affected communities and other stakeholders (e.g., government representatives, UNDP, etc.) to jointly address your concerns. This Stakeholder Response process would be led by the UNDP Country Office or facilitated through UNDP headquarters. UNDP staff would communicate and interact with you as part of the response, both for fact-finding and for developing solutions. Other project stakeholders may also be involved if needed.

Please note that if you have not already made an effort to resolve your concern by communicating directly with the government representatives and UNDP staff responsible for this project, you should do so before making a request to UNDP’s Stakeholder Response Mechanism.

Confidentiality If you choose the Compliance Review process, you may keep your identity confidential (known only to the Compliance Review team). If you choose the Stakeholder Response Mechanism, you can choose to keep your identity confidential during the initial eligibility screening and
assessment of your case. If your request is eligible and the assessment indicates that a response is appropriate, UNDP staff will discuss the proposed response with you, and will also discuss whether and how to maintain confidentiality of your identity.

**Guidance**

When submitting a request please provide as much information as possible. If you accidentally email an incomplete form, or have additional information you would like to provide, simply send a follow-up email explaining any changes.

**Information about You**

Are you…

1. A person affected by a UNDP-supported project?
   
   Mark “X” next to the answer that applies to you: **Yes:** **No:**

2. An authorised representative of an affected person or group?
   
   Mark “X” next to the answer that applies to you: **Yes:** **No:**

   *If you are an authorised representative, please provide the names of all the people whom you are representing, and documentation of their authorization for you to act on their behalf, by attaching one or more files to this form.*

   1. First name:
   2. Last name:
   3. Any other identifying information:
   4. Mailing address:
   5. Email address:
   6. Telephone Number (with country code):
   7. Your address/location:
   8. Nearest city or town:
   9. Any additional instructions on how to contact you:
   10. Country:

**What you are seeking from UNDP: Compliance Review and/or Stakeholder Response**

You have four options:

- Submit a request for a Compliance Review;
- Submit a request for a Stakeholder Response;
- Submit a request for both a Compliance Review and a Stakeholder Response;
- State that you are unsure whether you would like Compliance Review or Stakeholder Response and that you desire both entities to review your case.

11. Are you concerned that UNDP’s failure to meet a UNDP social and/or environmental policy or commitment is harming, or could harm, you or your community? Mark “X” next to the answer that applies to you: **Yes:** **No:**

12. Would you like your name(s) to remain confidential throughout the Compliance Review process?

   Mark “X” next to the answer that applies to you: **Yes:** **No:**
13. Would you like to work with other stakeholders, e.g., the government, UNDP, etc. to jointly resolve a concern about social or environmental impacts or risks you believe you are experiencing because of a UNDP project?

Mark “X” next to the answer that applies to you: Yes: No:

14. Would you like your name(s) to remain confidential during the initial assessment of your request for a response?

Mark “X” next to the answer that applies to you: Yes: No:

If confidentiality is requested, please state why:

15. Requests for Stakeholder Response will be handled through UNDP Country Offices unless you indicate that you would like your request to be handled through UNDP Headquarters. Would you like UNDP Headquarters to handle your request?

Mark “X” next to the answer that applies to you: Yes: No:

If you have indicated yes, please indicate why your request should be handled through UNDP Headquarters:

16. Are you seeking both Compliance Review and Stakeholder Response?

Mark “X” next to the answer that applies to you: Yes: No:

17. Are you unsure whether you would like to request a Compliance Review or a Stakeholder Response? Mark “X” next to the answer that applies to you: Yes: No:

Information about the UNDP Project you are concerned about, and the nature of your concern:

18. Which UNDP-supported project are you concerned about? (if known):

19. Project name (if known):

20. Please provide a short description of your concerns about the project. If you have concerns about UNDP’s failure to comply with its social or environmental policies and commitments, and can identify these policies and commitments, please do (not required). Please describe, as well, the types of environmental and social impacts that may occur, or have occurred, as a result. If more space is required, please attach any documents. You may write in any language you choose

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21. Have you discussed your concerns with the government representatives and UNDP staff responsible for this project? Non-governmental organisations?

Mark “X” next to the answer that applies to you: Yes: No:

If you answered yes, please provide the name(s) of those you have discussed your concerns with

Name of Officials You have Already Contacted Regarding this Issue:

First Name Last Name Title/Affiliation Estimated Response from
22. Are there other individuals or groups that are adversely affected by the project?
Mark “X” next to the answer that applies to you: Yes: No:

23. Please provide the names and/or description of other individuals or groups that support the request:

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<thead>
<tr>
<th>First Name</th>
<th>Last Name</th>
<th>Title/Affiliation</th>
<th>Contact Information</th>
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Please attach to your email any documents you wish to send to SECU and/or the SRM. If all of your attachments do not fit in one email, please feel free to send multiple emails.

Submission and Support
To submit your request, or if you need assistance please email: project.concerns@undp.org
Annexure Four: Erosion, Drainage and Sediment Control Management Plan and Contaminated Soil Disposal Management Plan Outline
Project Description

a. Provide a comprehensive description of the project; and
b. Include an overview of the pre-construction, construction, and operational phases of the project.

Purpose, Scope and Objective

The section should include:

a. Scope of the Erosion, Drainage and Sediment Control Management Plan (EDSCP) and Contaminated Soil Disposal Management Plan (CSDMP);
b. Establish objectives for general EDSCP and CSDMP;
c. Establish specific objectives for site specific EDSCP and CSDMP;
d. Relationship to specific mitigation measures

Statutory and Regulatory Requirements

a. Legislative requirements as prescribed in the Project Environmental and Social Management Framework (ESMF) and Environmental and Social Management Plan (ESMP)

Potential Impacts

a. Overview of impacts identified in ESMF and ESMP;
<table>
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<tr>
<th>Source Impact of</th>
<th>Potential Impact and Relevant Management Plan Objective</th>
<th>Mitigation and Management (Design Feature/ Specific Measure)</th>
<th>Mitigation Measure</th>
<th>Activity/ Monitoring</th>
<th>Frequency</th>
<th>Duration</th>
<th>Responsibility</th>
<th>Evidence</th>
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**Project Implementation** (human resources, partners, and organisational responsibilities)

a. Describe human resources for implementation of the plan and component programs/interventions;
b. Clearly define roles and responsibilities and organisational structure;
c. Discuss training that will be provided; and
d. Describe potential partners (NGOs, government, etc.) and their respective roles and responsibilities.

**Resources**

a. Equipment requirements including erosion and sediment control devices (sediment fencing, silt curtains, etc) water quality monitoring equipment; and on-site weather monitoring station;
b. Staff involved including Construction Environmental Officer; Environmental Coordinator; Monitoring Officer; Environmental and Regulatory Manager; and
c. Registers including water quality monitoring record; and non-conformance register.

**Schedule**

a. Multi-year schedule of implementation for the component programs/ interventions and the overall plan.

**Monitoring and Evaluation**

a. Overall monitoring and evaluation framework that integrates the monitoring and evaluation requirements for the component programs/ interventions.

**Reporting and Notification**

a. Contractor's monthly report including results of the surveys and inspections; and number and results of verification inspections, including but not limited to landform stability inspections, sediment control structure and stockpile inspections and control measures implemented to manage failing sediment control structures and stockpiles.

**Budget**

a. Budgets for the component programs/ interventions and the total cost of the plan.