

**Access to Microfinance & Improved Implementation of Policy Reform  
(AMIR Program)**

Funded By U.S. Agency for International Development

**SCOPING STATEMENT**

ENVIRONMENTAL ASSESSMENT  
LIGHT INDUSTRIAL ESTATE

AQABA, JORDAN

**Final Report**

Deliverable for IIPR Components, Task No. 4.1.25.3  
Contract No. 278-C-00-98-00029-00

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# Scoping Statement

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# **1. Project Brief**

A brief description of the proposed project and its alternatives in addition to the methodology used for the EA and Scoping are presented in this section.

## **1.1. Introduction**

Through the AMIR project, USAID is supporting Jordan's ongoing economic reform process, including specific efforts aimed at attracting foreign investment. One of the constraints to increasing the role of foreign investment in the Jordanian economy is a lack of serviced commercial and industrial land. Government or parastatal entities control most available serviced plots, and private sector development of industrial real estate remains extremely limited.

In addition to the limited quantity and public sector management of industrial real estate, available land is heavily concentrated in the north of Jordan. The southern port city of Aqaba, in particular, lacks modern, well-developed sites of the size and quality that international investors expect. This constraint exists despite the fact that Aqaba is southern Jordan's most promising investment location, given its strategic regional location and well-developed transportation infrastructure.

In light of the above, USAID is interested in fostering the development of a privately developed and serviced industrial property in Aqaba as a mechanism to increase private sector-led investment and economic growth. Suitable land has been identified in Aqaba, and a preliminary study indicates that the property may be suitable for the development of a light industry industrial estate, possibly with Qualified Industrial Zone (QIZ) status.

USAID has retained The Services Group (TSG), EnviroConsult Office, and CDG/Al-Jidara to conduct an industrial estate feasibility study, physical master plan design, and the Environmental Assessment (EA) of the proposed industrial Estate. The EA should describe the existing environmental conditions, potential impacts of the development, and mitigation measures required to minimize the environmental impact of the development.

Scoping is a process through which significant and insignificant environmental issues are identified for the purpose of consideration in an EA. Addressing every conceivable environmental issue in an environmental assessment is difficult and impractical. Therefore, significant issues must be identified early in the process to focus the subsequent work in the assessment. This Scoping Statement presents a preliminary description of the proposed development and the results of the Scoping process.

## **1.2. Project Description**

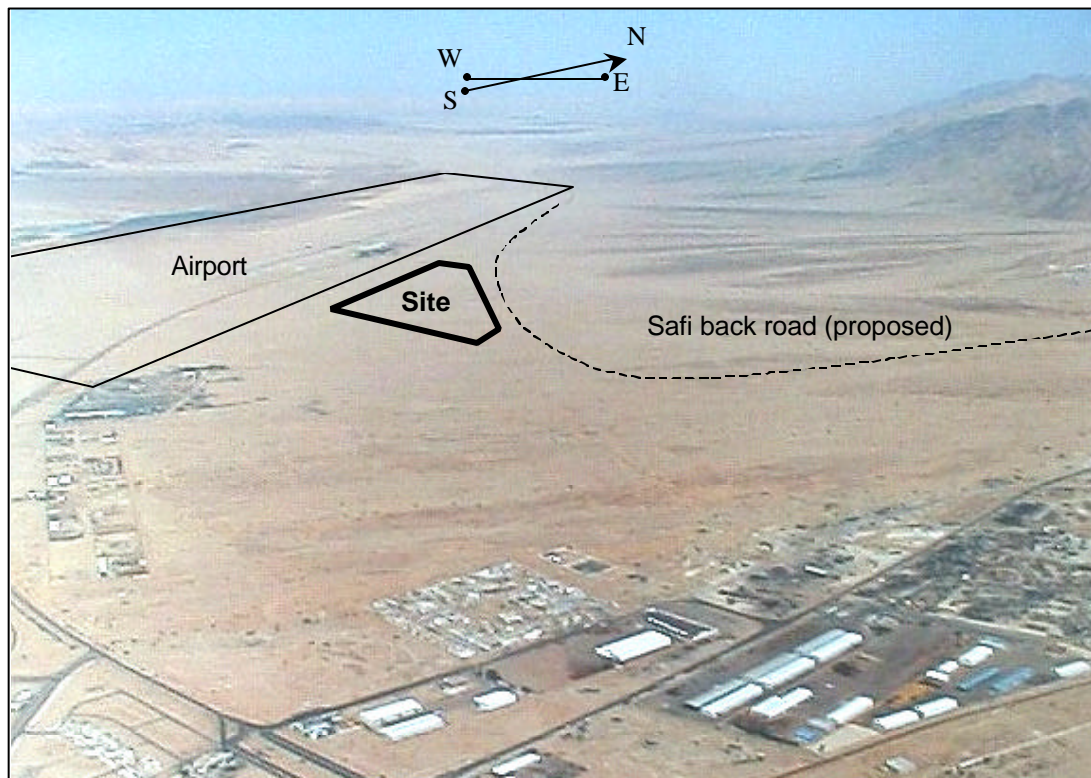
This section provides a preliminary description of the project that includes the proposed site and location, demands for space and types of industries, the expected economic benefits and the utility and infrastructure requirements of successful development of the proposed Estate.

### ***1.2.a. The Site***

The site that has been identified is currently in the ownership of Jordan Industrial Estate Corporation (JIEC), located approximately 1 km east of Aqaba Airport and the Dead Sea Highway. A study on industrial estates by Japanese International Cooperation Agency (JICA) in 1997 identified the 200 hectare site as the most suitable site for industrial development in the area. JIEC purchased the site from the Aqaba Region Authority (ARA) in 1997 based on the results of the JICA study.

The site is open and clear, ready for industrial development. It is located in an area that is accepted by ARA as being suitable for industrial development, and is relatively close to existing services in Aqaba. Conditions on site are suitable for the development of industrial buildings. Figure 1 shows the location of the selected site, Aqaba International Airport (Civil Aviation Authority Property), and the newly proposed Safi Back Road.

**Figure 1: Location of the Proposed Industrial Site**



### ***1.2.b. Demand for Industrial Space***

Preliminary indications are that the demand for land for light manufacturing in Aqaba will range between 15 ha and 45 ha over the next 10 years, depending on the regime adopted. The most likely demand scenario for the identified land is that it will service projected demand for light Qualified Industrial Zone (QIZ) industrial space in the apparel, electronics, footwear and other sectors. Under the current developmental conditions (i.e. without the QIZ and the free port added statuses), up to 10 ha of this land could be developed in phase 1, to service demand likely to arise in the next 5 years

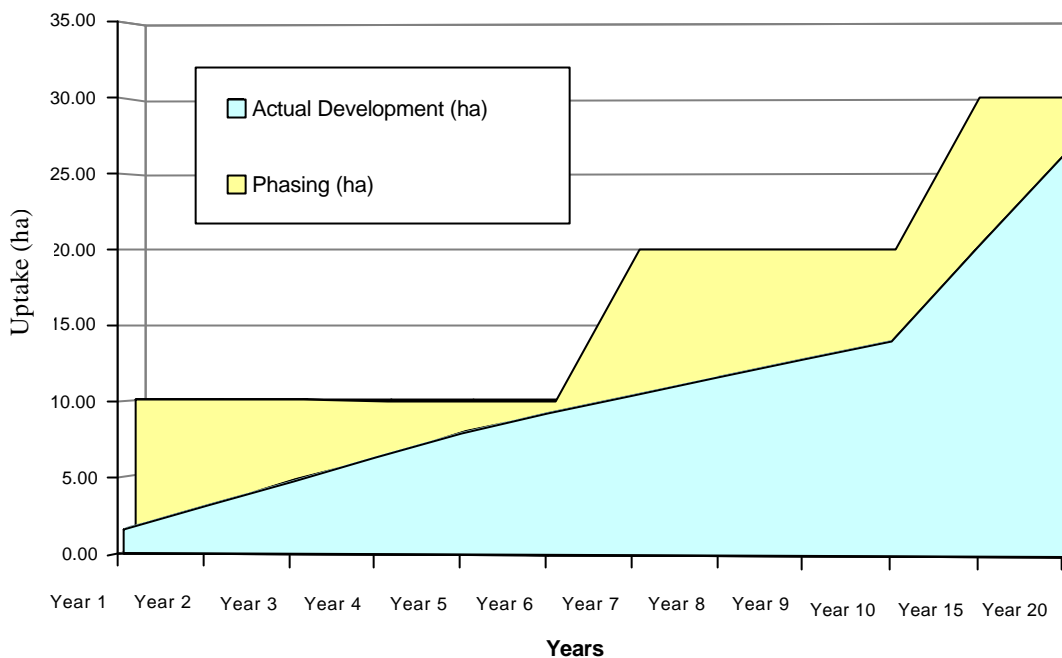
that may reach approximately to 8 ha. Phase 2 (years 6-10) will have an additional 10 hectares developed, and the actual development within this phase is expected to reach to 14 ha. The 3<sup>rd</sup> phase of the Industrial Estate development (years 11-20) will have an additional 10 ha developed and the expected actual development reaching to approximately 26 ha. It is expected that within Phase 1, six local manufacturing industries would be established within the Aqaba Industrial Estate, and ten services industries. Table 1 provides the expected number of manufacturing and service industries to be established within Phases 1-3 of the project.

**Table 1: Number and Types of Factories to Be Established**

Function	Number of Factories			
	Phase 1	Phase 2	Phase 3	Total
Local Manufacturing Industries	6	4	8	18
Service Industries	10	6	20	36
Total	16	10	28	54

Figure 2 illustrates the phasing (hectares) versus the expected actual development within the Industrial Estate under the current developmental conditions.

**Figure 2: Land Uptake at the Proposed Industrial Estate**



Preliminary demand analysis has shown that a variety of light to medium industries could develop in the proposed Estate. The following is a preliminary list of potential industries:

- 
- Sewn Goods:  
Production of apparel, luggage, leather goods, and sewn toys and sporting goods from imported raw and intermediate materials;
  - Spinning and Weaving:  
Production of fabrics from imported intermediate yarns (will not entail dyeing);
  - Electronics and Assembly:  
Production of consumer electronics, PC boards, and intermediate assemblies from imported components (may involve some bonding and soldering);
  - Electrical Goods:  
Assembly of white goods for the regional market;
  - Logistics, Warehousing / Distribution:  
Storage, bulkbreaking, and distribution of imported goods; inventory management; and export staging (may entail some repackaging activities);
  - Metal Working:  
Relocation of medium-sized workshops currently located in smaller facilities near the town entrance. Activities include truck repair and trailer fittings, engine and transmission rebuilding, and electrical and mechanical repairs. May also include port-related equipment repair and maintenance; and
  - Construction Materials:  
Relocation / expansion of stone product manufacturers now located in the unserved light industrial area east of the proposed site. Should include only high value-added polishing / processing, not bulk tile production, or other activities generating high levels of noise or dust.

### ***1.2.c. Utilities Overview***

The utilities and infrastructure requirements of the proposed Estate include the provision of water supply, electricity, telecommunications, roads and parking as well as a wastewater system. The demand estimates for utility requirements are not yet complete, however, a general idea of what is required is known.

Preliminary estimates indicate that the total water demand will not exceed 1.5 MCM/year during the first 5-10 years. Aqaba's main water supply source is the Disi Aquifer, which is also being utilized at full capacity. The Ministry of Water and Irrigation has put a cap on the amount of water abstracted from Disi aquifer for Aqaba use, and priority for water supply would be given to municipal, commercial, and tourist sectors. Therefore, industrial and other large scale commercial demands will have to provide their own water.

The nearest water supply main is 7.2 km away from site. There is also evidence of a brackish groundwater aquifer in the area. Therefore, the options available for supplying the proposed Estate with water include, a short-term and limited supply from the municipal network, on-site brackish water desalination or either, on-site or off-site, sea water desalination. The options of desalination will be looked into in more detail to determine costs and environmental impacts.

The wastewater system required, according to preliminary industrial demand analyses, will only entail domestic-type wastewater. If any industries produce non-domestic-type wastewater, individual pre-treatment will be required. The wastewater generated will either be treated on-site or conveyed to the Aqaba WWTP according to Jordanian Standards. Reuse of treated wastewater effluent, for landscape irrigation and perhaps other purposes, still needs to be investigated. The municipal wastewater treatment plant in Aqaba is being studied for upgrade and expansion by Montgomery Watson-Arabtech Jardaneh. The wastewater generated by the proposed Aqaba Industrial Estate is being considered in their study.

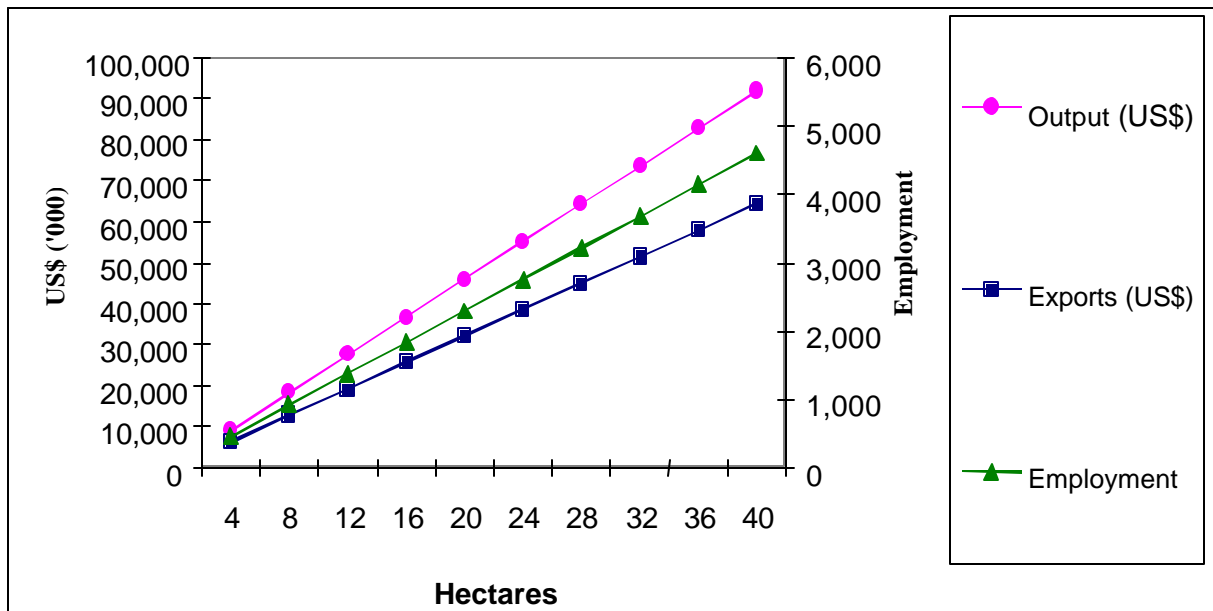
Electricity requirements, according to previous studies amount to 52 MW, these estimates still need refining. However, it has been determined that high voltage overhead power lines will need to be extended from approximately 6 km south of the proposed site. The power will be provided by the Aqaba Electricity Distribution Authority supplied by the thermal power plant located in the south of Aqaba. Step down transformers will be required on site and will likely be installed on a piecemeal demand basis. On-site electrical distribution will likely be through subsurface conduits.

Telecommunication infrastructure required for Phase 1 of the Industrial Estate development will be provided by the Jordan Telecommunications Company. A communications port is likely to be incorporated into the proposed Estate.

**1.2.d. Potential Economic Impact**

Figure 3 illustrates the estimated economic impact of such an industrial estate developing along various assumptions.

**Figure 3: Estimated Economic Impact of the Proposed Industrial Estate**





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### **1.3. Proposed Environmental Assessment**

This section describes the proposed EA, which included the regulations to be followed, a brief description of the proposed methodology for Scoping as well as that proposed for the EA.

Draft Jordanian Environmental Impact Assessment regulations are being separately prepared by both the General Corporation for Environmental Protection and the Aqaba Region Authority, but neither have been approved thus far. The EA will therefore, be prepared to meet the requirements of USAID Handbook 3, Appendix 2D, Part 216 with the following components discussed in more detail in the sections that follow:

- Scoping and subsequent Scoping Statement (this report);
- Comprehensive environmental assessment as related to the significant environmental issues; and
- A description of mitigating measures for inclusion into the physical development.

#### ***1.3.a. Scoping and Scoping Statement***

The first element of the EA is a preliminary identification of significant issues related to the proposed project and preparation of the Scoping Statement outline. These provide the basis for Scoping, Scoping Statement, and how issues will be addressed during the EA. Persons having expertise or interest related to the environmental aspects of the proposed industrial estate have participated in Scoping. A Pre-scoping Brief, prepared in Arabic and English, was distributed prior to the Scoping Session (Annex C & D). A list of the persons with whom meetings were held with on one-on-one basis, as well as those who have participated in a Scoping Session held in Aqaba on the 13<sup>th</sup> of March 2000 are presented in Annex A of this report.

In order to arrive at a preliminary identification of the potentially significant issues during the Scoping, three environmental categories have been identified:

1. Socio-economic Conditions;
2. Atmospheric Resources; and
3. Natural Environment;

A breakdown of the issues under the above categories is presented in Section 2.1 in no particular order. Scoping has further refined these items, added to them where other issues of concern were raised, and helped to determine the level of significance related to each.

Scoping Participants were requested to fill out Significant Environmental Issues Form (Annex E), these forms were statistically analyzed and combined with other comments and feedback to provide the main results of scoping. The results of Scoping, a relative significance rating for each environmental issue along with the reasoning behind the ratings, are presented in Section 2.2 of this report.

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## ***Preliminary Scoping Statement Outline***

The following outline has been used for this Scoping Statement and is based on USAID Handbook 3, Appendix 2D, Part 216.3 (a) (4) (i):

### ***1. Project Brief***

A brief description of the proposed project and its alternatives in addition to the methodology used for the EA and Scoping.

### ***2. Issues Scoping***

This section provides a determination of the scope and significance of issues to be analyzed in the EA including direct and indirect effects of the proposed project on the environment. Preliminary environmental issues that provide a basis for doing so are provided in Section 2.1 of this report. This section also identifies the significance of issues and the reasons for doing so.

### ***3. Proposed Methodology***

The timing of the EA preparation, the format of the EA, the tentative planning and decision making schedule, and a description of how assessments and analyses will be conducted and the disciplines participating.

#### ***1.3.b. Environmental Assessment***

The EA will provide a full discussion of the significant environmental effects of the proposed industrial Estate. The EA will include alternatives that would avoid or minimize adverse effects or enhance the quality of the environment so that the expected benefits of the industrial Estate can be weighed against potential adverse impact on the environment or any irreversible or irretrievable commitment of resources. The EA will be based on the issues as they are outlined in the Scoping Statement and knowledge of the construction and operation expected.

#### ***1.3.c. Mitigating Measures***

A final itemized list and phasing schedule of required mitigating measures will be prepared. This will serve as an input to the phased development cost schedule being prepared under the parallel master planning and feasibility studies.

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## 2. Issues Scoping

Section 2.2 provides a determination of the scope and significance of issues to be analyzed in the EA including direct and indirect effects of the proposed project on the environment. Preliminary environmental issues that were deemed significant by the Scoping Session participants are listed in section 2.3, while issues that were deemed to be not significant are listed in section 2.4. Section 2.5 discusses issue that relate to the EA process, environmental monitoring and permitting, and site selection. The preliminary environmental issues that provide the basis for doing so in Scoping are presented in Section 2.1 below. These were included along with a brief project description and proposed methodology in the Pre-scoping Brief, prepared in Arabic and English that was distributed prior to the Scoping Session (Annex C & D). A significance rating assigned to each issue will determine the level of assessment detail and analyses required for the impacts associated with each issue.

### 2.1. Preliminary Environmental Issues

The preliminary environmental issues presented below are those discussed during Scoping and presented on the Significant Environmental Issues Form. These Scoping discussions and evaluation forms provide the basis for the detailed EA. The following are the preliminary environmental issues:

#### 2.1.a. *Socio-Economic Conditions*

- ***Employment & Economy***  
Employment generation is expected during both construction and operation of the proposed project. The impact on local employment may differ from that on employment in general. As a result of employment and other economic benefits expected from the project, the standards of living and property values are likely to be affected. An influx of people resulting from the establishment of an industrial estate may provide indirect benefits as well as indirectly place additional pressure on local utilities and services as a result of the proposed project.
- ***Traffic Disruptions***  
Disruptions in traffic flow, especially during construction, may result from the movement of heavy machinery, transportation of construction materials and labor, and any excavations that cross roads. Traffic congestion, safety risks, and potential obstruction of airport and industrial traffic as well as highway emergency services may result.
- ***Health and Safety***  
Excessive noise, dust, vibration levels, and disposal of wastes can pose an occupational health and safety hazard. There is also the risk of injury and accidents to the public as well as to workers during construction and operation as a result of operating heavy machinery and transportation among others.

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- ***Aesthetics***

As one of Jordan's major tourist destinations (approximately 60% of all tourists visit Aqaba), Aqaba's aesthetic value should be an important factor to consider. Noise, odors, dust, and visual intrusion resulting from the construction and establishment of the proposed Estate may affect the aesthetic value of the immediate area, which includes Aqaba International Airport. Odors and dust may also affect Aqaba Town, which is predominately down wind of the selected site.

- ***Archaeology***

Numerous archaeological sites have been recorded in the Jordan Antiquities Database and Information System (JADIS) located in and around Aqaba. These sites date back to a number of periods starting from the Epipaleolithic and Pre-pottery Neolithic periods, to the Umayyad-Fatimid, and Ottoman periods.

The proposed project may damage or destroy known archaeological sites and/or new, undiscovered sites during construction, especially during drilling and excavation work. There is no JADIS record of archaeological sites in or immediately around the selected project site; therefore, the main concern is related to those that are undiscovered/unrecorded and those that are still under the surface.

### ***2.1.b. Atmospheric Resources***

- ***Dust***

Dust generated mainly during construction from excavations, transportation, loading and unloading of construction materials, and movement of heavy machinery is expected due to the open desert-type nature of the selected site. Dust generated and transported by winds may temporarily affect visibility, substantially affecting landing airplanes and road traffic. Winds may also carry dust to Aqaba Town affecting tourism as well as the every day life of local residents. Winds carrying dust to the site may affect workers and general operating conditions at the Estate.

- ***Emissions***

Emissions generated from heavy machinery, transportation and operation of generators/compressors/boilers are expected and may reduce air quality as well as contribute, although not very significantly, to global greenhouse gases.

### ***2.1.c. Natural Environment***

- ***Disposal of Wastes***

Disposal of wastes generated during construction and operation, including solid wastes, liquid wastes, construction materials, chemicals, and lubricants may affect natural habitats as well as pose a threat to worker and public health.

- ***Disposal of Wastewater***

Disposal of wastewater and liquid wastes generated during construction and operation may affect flora and fauna habitats, and endanger occupational and public health. The option of wastewater pre-treatment, wastewater quality, and

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the capacity of the municipal treatment plant should also be considered given the quality of wastewater generated. The municipal wastewater treatment plant in Aqaba is being studied for upgrade and expansion: the wastewater generated from this Industrial Estate is being considered in the study.

- ***Soil Disturbance***

Potential soil disturbances that may result from construction activities include reduced soil stability, loss of soil structure, and soil erosion. Chemical disturbance or pollution of soils during operation may be related to inappropriate solid and liquid waste disposal and handling.

- ***Marine Ecology and Coral Reefs***

The proposed project is not expected to directly affect marine ecology and coral reefs, however, this environmental component is being considered due to the associated high value and existing preservation efforts in the region. Indirect impacts may result from shipping and other related off-site activities.

- ***Fauna, Flora and Habitats***

Aqaba is located along a major migratory bird route. Construction activities may affect natural habitats and associated species. The selected site and potential infrastructure right-of-ways, however, are not expected to contain rich floral and faunal diversity.

- ***Water Resources***

Groundwater resources may be contaminated from wastewater, solid wastes, chemicals, and lubricants. Surface water flows may be altered, causing soil erosion and should be considered in the physical design for drainage purposes. Water consumption should be considered in terms of the scarcity of freshwater resources in the area and the possibility of water reclamation and reuse. Scoping separated this environmental issue into Water Consumption, Groundwater, and Floodwater.

## **2.2. Determination of Issue Significance**

Scoping Participants (Annex A) were requested to fill out a Significant Environmental Issues Form (Annex E), which presented the Preliminary Significant Environmental Issues discussed in the previous section. These forms were subsequently statistically analyzed. The statistical methodology is outlined in Annex B.

Each issue is given a significance rating on a scale of one (1) through four (4) based on Scoping discussions, statistical analysis of the Significant Environmental Issues Forms, preliminary research and data collection. A (1) indicates low significance and a (4) indicates high significance. The significance ratings assigned are intended to determine the level of effort and focus required during the EA on each issue: issues rated (4) will be studied in detail and treated with extreme care, while issues rated (1) will be briefly touched upon. These significance ratings do not necessarily indicate the level of impact expected nor mitigation requirements; these will be determined during the EA.

The ratings indicate the significance of each issue with respect to this project, in terms of location, knowledge of the proposed activities, surrounding environment, and expected spatial and temporal extents of impacts as discussed in the sections that

follow. Each issue was rated for significance during the construction and operation phase of the proposed project. In general, the significance of environmental issues is usually greater during operation than during construction since the duration of construction activities is short-lived. Tables 2 and 3 below summarize the relative significance level ultimately assigned to each of the environmental issues: the main results of scoping.

**Table 2: Significance of Environmental Issues - Construction**

Environmental Issue		Significance Rating			
		1	2	3	4
<b>Socio-Economic Conditions</b>	Employment & Economy		✓		
	Traffic Disruptions	✓			
	Health and Safety		✓		
	Aesthetics		✓		
	Archaeology				✓
<b>Atmospheric Resources</b>	Dust				✓
	Emissions		✓		
	Noise*		✓		
<b>Natural Environment</b>	Earthquake Risks*	✓			
	Wastewater (Disposal of Wastes)*			✓	
	Solid Wastes (Disposal of Wastes)*			✓	
	Marine Ecology and Coral Reefs	✓			
	Soil Disturbance		✓		
	Fauna, Flora and Habitats		✓		
	Water Consumption (Water Resources)*	✓			
	Groundwater (Water Resources)*		✓		
	Flood Water (Water Resources)*	✓			

**Table 3: Significance of Environmental Issues - Operation**

Environmental Issue		Significance Rating			
		1	2	3	4
<b>Socio-Economic Conditions</b>	Employment & Economy				✓
	Traffic Disruptions		✓		
	Health and Safety				✓
	Aesthetics			✓	
	Archaeology	✓			
<b>Atmospheric Resources</b>	Dust		✓		
	Emissions				✓
	Noise*		✓		
<b>Natural Environment</b>	Earthquake Risks*		✓		
	Wastewater (Disposal of Wastes)*				✓
	Solid Wastes (Disposal of Wastes)*				✓
	Marine Ecology and Coral Reefs		✓		
	Soil Disturbance			✓	
	Fauna, Flora and Habitats	✓			
	Water Consumption (Water Resources)*				✓
	Groundwater (Water Resources)*			✓	
	Flood Water (Water Resources)*			✓	

\* Indicates refinement to the preliminary environmental issues during scoping.

\*\* 4 = Highly Significant, 3 = Moderately-Highly Significant, 2 = Moderate-Low Significance & 1 = Low Significance.

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## 2.3. Significant Issues

### 2.3.a. Socio-Economic Conditions

- **Employment & Economy**

*Significance: Construction (2) / Operation (4)*

Impacts of the proposed project are expected to be positive on employment and on the economy in general. However some concerns were raised with regards to the protection of local small-scale industry and preferences for local labor, with the aim of maximizing expected benefits both during construction and operation. Coordination with the Labor Office of the Ministry of Labor was suggested.

The investment potential and land value of the surrounding area would be very dependent on the outcome of this project (during operation) since it is the first development in the area other than the airport. During operation, the proposed project is also likely to add directly and indirectly to demands on public services and other related services, such as ports, transportation/roads, and commerce. The direct economic benefits as well as the potentially induced economic benefits or indirect benefits should be identified as clearly as possible and weighed against the inevitable environmental impacts.

- **Health and Safety**

*Significance: Construction (2) / Operation (4)*

As long as appropriate measures and standards are followed, occupational health and safety should not be a major concern. Public health and safety is not a major concern since public access and use of the area is limited. Worker safety during operation is a concern when operating heavy machinery and during transportation. Public and occupational health is closely related to transportation, dust, air emissions, noise and the treatment and disposal of solid wastes and wastewater.

A newly drafted law, that has not yet been approved, requires that developments such as the proposed project contain their own emergency center for fire and medical emergencies. The National Civil Defense headquarters for the Aqaba Region is located within a ten-minute-response time from the selected site. The final design of the Estate will require approval from the National Civil Defense Headquarters in Amman.

- **Aesthetics**

*Significance: Construction (2) / Operation (3)*

The close proximity to Aqaba International Airport and its location on one of the main entrances to Aqaba make aesthetics a significant issue. This is a result of the high tourism potential of Aqaba and commercial potential of the area around the proposed Estate. Attention to pleasing aesthetics, such as a pleasant facade and green areas, would increase the direct and indirect benefits of the project. On the other hand, a disregard for aesthetics would only negatively affect the area in terms of lost potential value.

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- **Archaeology**

*Significance: Construction (4) / Operation (1)*

Archaeological surveys have never been conducted on the selected property. During a brief reconnaissance visit to the site, a few small archaeological remains were identified. The Department of Antiquities visited these sites upon request and determined that a full and detailed survey would be required to determine what has been found and the importance of what may be found elsewhere on the selected site.

In general, Aqaba has a long history and several sites in other areas have been found that are currently being excavated and studied. Therefore, there is a potential for finding related archaeological remains on the selected property or along access and infrastructure extension routes. The importance of such archaeological sites, if any would be determined pending a survey. Such sites, if found, are likely to be damaged or destroyed during construction and should therefore be identified beforehand in order to design appropriate mitigation measures which may vary from simple documentation prior to destruction/damage or relocation if found to be of high importance.

### **2.3.b. Atmospheric Resources**

- **Dust**

*Significance: Construction (4) / Operation (2)*

Dust generated, mainly during construction, would be short lived however, it could affect Aqaba Town residents and tourists located downwind of the selected site. The town however is relatively far and the residents of the area are accustomed to high dust levels. The Airport is in close proximity to the site and may be affected by elevated dust levels, however easterly winds, traveling in that direction, are not common.

- **Emissions**

*Significance: Construction (2) / Operation (4)*

Emissions generated during construction are minimal and short-lived. A high level of concern was raised however, as to industries that may generate air pollution during operation, especially since Aqaba residents live predominantly downwind. Restrictions on air pollution emitting industries and enforcement of strict air emissions standards should minimize such impacts.

### **2.3.c. Natural Environment**

- **Wastewater**

*Significance: Construction (3) / Operation (4)*

Generation and management of wastewater, including collection, treatment, disposal and potential reuse must be carefully considered during construction and operation. Current loads to the existing wastewater treatment plant are approaching the design capacity of 9,000 m<sup>3</sup>/day. New plans are being considered for the expansion and upgrading of wastewater facilities in Aqaba.



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The quality of wastewater generated should comply with existing Jordanian standards. The potential for wastewater reuse for irrigation of landscaping on site and/or at the airport should be considered. The quantities expected need to be carefully determined to design appropriate collection, treatment and disposal systems. The wastewater generated will also depend highly on the types of industrial activities expected. Industrial-type wastewater would require pre-treatment prior to disposal to municipal treatment facilities.

- **Solid Waste**

*Significance: Construction (3) / Operation (4)*

The collection and disposal of non-hazardous solid wastes needs to be considered during construction and operation. A second, non-hazardous, solid waste dump should become operational in Aqaba within the near future. Hazardous solid wastes would require appropriate on-site treatment and/or storage since there are no hazardous waste dumpsites in Jordan that are currently in operation. The option of separating solid wastes (paper/plastic/glass etc.) should also be looked into as a potential source of revenue during operation.

- **Soil Disturbance**

*Significance: Construction (2) / Operation (3)*

Soils in the area are composed of colluvial and alluvial deposits that are natively low in fertility and coarse textured. The vegetation cover is not very dense and soils are poorly structured. Therefore, the impacts associated with physical or chemical disturbance, within reasonable limits, to the soils could be considered relatively insignificant. However, disposal of solid wastes and wastewater may affect soils.

- **Water Consumption**

*Significance: Construction (1) / Operation (4)*

The quantities of water required depend on the type of industries and number of employees in the proposed Estate, both of which still need to be determined. The ability of the Aqaba Water Authority to satisfy requirements depends on these quantities and expected growth rates. Supplies in Aqaba are of concern since it is the policy of the Ministry of Water and Irrigation to cap the quantity of water abstracted from the Disi aquifer for Aqaba use. Therefore, any additional water demand will have to be satisfied through desalination schemes.

Reuse of wastewater, either from the municipal treatment plant or the Estate's treatment plant should be considered in light of the scarcity of water resources. Municipal water supplies in Aqaba are also under high demand; therefore, an independent source of water supply may prove feasible in the long run, especially when considering increasing tourist and residential demands.

- **Groundwater**

*Significance: Construction (2) / Operation (3)*

Groundwater in the area is reportedly saline and found at shallow depths. There do not seem to have been any bore-holes or wells drilled in the

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immediate area, which would better the understanding of hydro-geology in the area. When considering appropriate wastewater and solid waste disposal, along with the light industrial-nature of the Estate, groundwater may only be a concern when considering the long-term potential to utilize such reportedly saline resources. Transport of groundwater contamination may also present a means of marine pollution.

## 2.4. Not Significant Issues

- ***Traffic Disruptions***

*Significance: Construction (1) / Operation (2)*

Traffic disruptions can be expected if any roadwork is required across the Dead Sea Highway for the provision of utilities and infrastructure during construction. Congestion may also result from transportation of goods and labor to and from the Estate during both operation and construction. Transportation also has impacts on environmental issues other than traffic disruption; these impacts should be addressed.

Traffic issues however, are moderate in significance since impacts can be easily mitigated and traffic volumes are expected to be relatively low. However, the adjacent highway is the only route connecting the Airport and the Southern Dead Sea with Aqaba without having to climb via Karak or Tafileh up to the desert highway.

- ***Seismic Risks***

*Significance: Construction (1) / Operation (2)*

Seismic risk is an issue raised during the Scoping Session that was not identified earlier as a Preliminary SEI. The seismic characteristics of the region, being part of the great African Rift Valley should be looked into given the history of seismic events in Aqaba.

- ***Floodwater***

*Significance: Construction (1) / Operation (3)*

The airport has installed large capacity surface water drainage system to protect it's property from surface flooding. According to Airport officials, these large diversion gullies have never been filled. Rainfall in Aqaba is also very low and the predominantly rough-textured soils of the selected property and upstream areas tend to soak up most of surface water flows and rainfall. Even though this issue scored a (3) during the operation phase of the project, it will not be discussed in detail in the EA since preventive measures against flash floods have been incorporated into the design of the industrial estate.

- ***Noise***

*Significance: Construction (2) / Operation (2)*

This is an issue raised during the Scoping Session that was not identified earlier as a Preliminary Significant Environmental Issue (SEI). Noise from

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construction and operational activities pose an occupational health hazard and can affect the aesthetic value of the area.

However, in close proximity to the proposed Estate, there are no residents, only the Airport which by itself is noisy. Although statistical analysis of the forms (Annex B) rated noise at (3) and (4) during construction and operation respectively, the significance was toned down to (2) for both construction and operation in light of the above.

- ***Marine Ecology and Coral Reefs***  
*Significance: Construction (1) / Operation (2)*

Even though the marine environment is highly valued in the Gulf of Aqaba, the direct impacts from the proposed project on this environmental component are not expected to be very significant. However, activities or impacts that extend spatially so as to potentially affect the marine environment may occur. An increase in shipping traffic at the port as a result of the proposed project is likely to be minimal and other off-site activities that may affect the marine environment, either directly or indirectly are also not expected to be significant.

- ***Fauna, Flora and Habitats***  
*Significance: Construction (2) / Operation (1)*

Although Aqaba and its surrounding area are considered important, especially for migratory birds, the selected site is not unique to the area and comprises a minor portion of the area that is considered important. Vegetal density and indicators of faunal activity on the selected property are both low. Special attention should be given to migratory birds and the effects that construction and operation may have on them.

## **2.5. Other Issues of Concern**

Other issues were raised during the scoping process. These issues should also be dealt with during the EA. These issues are related to the environmental assessment process, monitoring and permitting procedures, and to the selection of the proposed site.

### ***2.5.a. Site Selection***

The proposed site has been pre-selected during previous studies. However, an environmental assessment should be one of the tools used in site selection. In this project, the EA is not looking at alternative sites in order to choose the most appropriate alternative. The original site selection process needs to be re-examined in terms of environmental soundness for the designated purpose.

The proposed site, although selected in accordance with official land-use plans, is in close proximity to the only residential expansion zone in Aqaba Town. The predominance of northerly winds throws doubt on to the site selection process, since the proposed project is considering light-medium industries, that may produce air emissions as well as odors and dust, that may affect the down-wind touristic town of Aqaba. Based on the predetermined location and lack of alternative sites it is expected

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that industries that emit odors or air emissions will not be considered. ARA Master Plan and the Free Zone Study identified the Northern Zone for light industry whereas the Southern Zone (south of the port) was designated for heavy industry.

### ***2.5.b. Environmental Assessment Process***

Some of the scoping participants felt that local public and NGO participation was insufficient. Therefore, holding of a second Scoping Session, geared towards public and NGO participation should be considered. It was pointed out that the EA and the Scoping Statement will be reviewed by all concerned parties.

This EA is mainly focusing on the first phase of the Estate's development (40 hectares). According to preliminary demand studies, after 15 years, the Estate is expected to begin expansion into the remaining 175 hectares. This EA should consider the proposed project beyond the first phase. In addition, it should pay strong attention to secondary or spin-off developments that are very likely to occur in the area since this project is one of the first major economy-driving developments in the area. Nevertheless, subsequent EAs should ensue upon second phase expansion in addition to individual EAs required for each industry as it enters the proposed Estate (discussed further under Environmental Monitoring and Permitting Procedures below).

It was also recommended that any biological/ecological reconnaissance of the proposed site be carried out as soon as possible. This recommendation stems from the fact that biological activity varies seasonally, and that now (Spring time) is ideal for obtaining the most biological observations.

### ***2.5.c. Environmental Monitoring and Permitting Procedures***

The issue of environmental monitoring and permitting was given strong attention. This EA may mitigate impacts related to the establishment of the Estate. However, once in operation, strict guidelines and permitting procedures should be designed and implemented so that the Estate will not develop in an environmentally unfriendly manner.

Many participants expressed the need to establish environmental permitting procedures for admitting industries into the proposed Estate. The environmental permitting procedures should be clear, concise, and should screen industries according to their potential environmental impact, and need for an environmental impact assessment performed for the individual industry. Furthermore, sufficient information should be provided by the proponents of industrial projects to allow proper judgement of its environmental impacts during operation and decommissioning phases. The permitting decision makers should take into consideration the types of materials used, processes, machinery, fire and incidental releases risks, and hazards associated with the specific types of industries.

Furthermore, environmental monitoring schedules should be established to monitor individual industries, as well as the environmental impacts of the industrial Estate as a whole. Parameters to be monitored, frequency of monitoring and reporting, and the relevant authority that is to receive periodical monitoring reports should be outlined for each industry.

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Based on the results of the environmental monitoring, permitting procedures should be updated and refined, to establish guidelines and strategies to guide the possible subsequent expansion of the proposed Industrial Estate.

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### **3. Proposed EA Methodology**

The timing of the EA preparation, the required format of the EA, the tentative planning and decision making schedule, and a description of how analyses will be conducted and the disciplines participating are presented herein.

#### **3.1. Data Collection**

Information on the study area's environmental attributes, infrastructure, planning guidelines, transportation links, and utilities have been well-documented through various reports including the 1997 JICA Study and the 1999 Aqaba Freeport Feasibility Study and Implementation Plan among others. Therefore, data collection requirements for the EA may be confined to collecting missing information and/or updating old or incomplete information, if any.

Data on water resources, including groundwater, surface water flows and water supplies will be collected from the Ministry of Water and Irrigation as well as from various other reports addressing these issues. An archaeological survey is required and will provide information on the location and existence of any archaeological sites on the chosen property as well as on or around potential access routes and/or utility lines.

A brief botanical and zoological survey will also be conducted to gather data on the flora, fauna, and habitats of the area for documentation purposes. This survey may result in requiring additional efforts, contrary to preliminary significance assigned, in the assessment of the fauna, flora and habitat environmental issue.

Data regarding water requirements, wastewater quantities and qualities, and economic benefits will be taken from the feasibility study being executed in parallel. Any areas where data are insufficient to base analyses and assessment, estimates by experienced professionals in the respective fields will be solicited.

#### **3.2. Assessment and Analyses**

Pending the archaeological survey, analyses of pottery, flint or other artifacts as well as the sites where such items are found may be required to determine the age and significance of the site. Furthermore, as required by Jordanian Law, any archaeological sites must be properly documented prior to their destruction or relocation. This documentation will commence during the survey as seen fit by the archaeologist leading the survey.

Other analyses may be required pending collection of available data. If data is not seen fit, sampling and analyses of groundwater, for example, may be required. Other analyses that will be conducted will be more qualitative in nature, depending on the professional judgment of experts in their respective fields. Surface water flows, for example may need to be roughly estimated using contour maps.

Various alternatives will be assessed, such as how to treat wastewater or collect it and deliver it to a wastewater treatment plant, separating solid waste for recycling or simple

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bulk collection and disposal, how to extend and provide infrastructure (water, electricity and telecommunications), and various other alternatives. These alternatives will be determined in close cooperation with relevant authorities and interested parties as well as with the design and feasibility study teams. However, in general, a subjective approach that utilizes the professional judgment and opinions of experts will form the majority of the assessment and analyses required.

### **3.3. Disciplines Required**

- EA Specialist / Project Manager
- Socio-Economist
- Ecologist (with pertinent knowledge in zoology botany and marine biology)
- Archeologist and Survey Team
- Assistants / Environmental Scientists

### **3.4. Proposed EA Report Outline**

The following is a preliminary outline of the EA that will be produced, according USAID Handbook 3, Appendix 2D, Part 216.6 (c):

#### **1. *Executive Summary***

This summary shall stress the major conclusions, areas of controversy (if any), and issues still to be resolved.

#### **2. *Purpose***

The EA will briefly specify the underlying purpose and need to which the proposed project and alternatives are responding to.

#### **3. *Alternatives including the Proposed Action***

The environmental impacts of the proposal and alternatives, including the No-Action Alternative will be presented in detail and comparative form. Reasonable alternatives will be briefly explored and reasons for their exclusion from the detailed assessment will be provided. The preferred alternative will be identified in addition to any mitigation measures not already included in the proposed alternative.

#### **4. *Affected Environment***

This section will concisely describe the environment(s) to be affected by the alternatives under consideration in order to provide the basis for understanding the effects of the alternatives. Any effects that the environment may have on the proposed project will also be identified.

#### **5. *Environmental Consequences***

This section forms the analytic basis for the comparison made under Section 3. Impacts of the proposed project and its alternatives will be discussed including: any adverse effects that are unavoidable; the relationship between long-term and short-term effects; direct effects and their significance; indirect effects and their significance; the temporal and spatial extents of impacts; possible conflicts

between the proposed action and any other land-use plans, policies or controls over the area; energy and water requirements; the conservation potential of various alternatives and mitigation measures; socio-economic impacts; and means to mitigate any adverse environmental impacts.

**6. List of Preparers**

A list of the names and qualifications of the persons responsible for the preparation of the EA.

**7. Appendix**

The appendix will contain detailed data, less important material and references used in the assessment.

**3.5. Schedule**

Activity Description	Week							
	1	2	3	4	5	6	7	8
Description of the Proposed Project and Existing Environment	■	■	■	■	■			
Determination of Potential Impacts of the Proposed Project			■	■	■	■		
Analysis of Alternatives					■	■	■	
Develop a Mitigation & Monitoring Plan						■	■	
Identification of Institutional Requirements							■	
Inter-Agency Coordination / Consultations	■	■	■	■	■	■	■	■
Preparation of Deliverables			■	■	■	■	■	■



## Annex A: Scoping Participants

<b>Institution</b>	<b>Name</b>
Aqaba Civil Defense Authority	1. <i>Mahmoud Al-Mattar</i> 2. <i>Omar Al-Tarawneh</i>
Aqaba International Airport	3. <i>Omar Manha</i> 4. <i>Nadi Mahareeq</i> 5. <i>Ahmad Said Elqaq</i> 6. <i>Adnan Rawajdeh*</i>
Aqaba Municipality / ARA	7. <i>Issam Jaradat</i>
Aqaba Police Department	8. <i>Moh'd Mikdadi</i> 9. <i>Hmoud Al-Kharabsheh</i>
Aqaba Ports Corporation	10. <i>Eid Abu El-Eaz</i>
Aqaba Regional Authority (ARA)	11. <i>Sawsan Zuweiri</i>
Aqaba Regional Authority (ARA) / Global Environment Facility (GEF)	12. <i>Mazen Khalil</i> 13. <i>Khalid Abu Aeish</i> 14. <i>Samer Milkawi</i>
Aqaba Water Authority	15. <i>Imad Zreiqat</i> 16. <i>Jamal Al-Rabati</i>
Community Development Group (CDG)	17. <i>Ramzi Qawar</i>
Central Electricity Generating Company / Aqaba	18. <i>Fawzi Al-Hakeem</i> 19. <i>Bader Tashtoush</i>
Department of Antiquities (DoA)	20. <i>Sawsan Fakhiri</i>
Friends of the Earth Middle East (FoEME)	21. <i>Munqeth Mehyar</i>
Jordan Industrial Estate Corporation (JIEC)	22. <i>Hani Khatatbeh</i>
Jordan Royal Ecological Diving Society (JREDS)	23. <i>Nedal Al-Ouran</i>
Marine Science Station	24. <i>Moh'd Badran</i>
Montgomery Watson Arabtech Jardaneh (MWAJ)	25. <i>Frank Grant</i> 26. <i>Fawzi Abu Niaaj</i>
Royal Society for Conservation of Nature (RSCN)	27. <i>Maher Qishawi</i>
Traffic Control Department	28. <i>Major Khaled Sabti</i>
Water Authority of Jordan	29. <i>Edward Qunqur</i>
General Corporation for Environment Protection (GCEP)	30. <i>Yassin Zo'ubi</i>
United States Agency for International Development (USAID)	31. <i>Abdullah Ahmad</i> 32. <i>Amal Hijazi</i> 33. <i>Eric Peterson</i> 34. <i>Jamal Al-Jabiri</i>

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## Annex B: Statistical Analyses of SEI Forms

The following methodology (steps 1 through 6) was used to statistically analyze the Significant Environmental Issues Forms available in Annex E:

1. A summary table (Table B.1.) was prepared that shows the significance rating assigned for each issue by scoping participants who filled out the forms.
2. The following calculations were made on the data in Table B.1. to produce the first three columns in Table B.2.
  - Mean Significance Rating: (MSR) The mean of each issue's significance rating for all participants.
  - Total Significance Score: (TSS) The sum of each issue's significance rating for all participants.
  - Number of Participants: (NP) The number of scoping participants that filled a rating for each issue.
3. A weight was assigned to each of the above as follows:
  - Mean Significance Rating (MSR) = 40%
  - Total Significance Score (TSS) = 50%
  - Number of Participants (NP) = 10%
4. A Weighted Score (WS) was then calculated for each issue (fourth column of Table B.2.) according to:
$$WS = (MSR \times 0.4) + (TSS \times 0.5) + (NP \times 0.1)$$
5. The following was calculated from the Weighted Scores (WS) for all of the issues:
  - Mean Weighted Score: (MWS) The mean of all issues Weighted Scores (WS).
  - Standard Deviation: (SD) the standard deviation all issues Weighted Scores (WS).These were calculated to be the following:
  - MWS = 37.27
  - SD = 6.33
6. A Final Significance Rating (FSR) (last column in Table B.2.) was then assigned to each issue according to the following:
  - FSR = 1 if  $WS < 30.95 (MWS - SD)$
  - FSR = 2 if  $WS 30.95 (MWS - SD) > 37.27 (MWS)$
  - FSR = 3 if  $WS 37.27 (MWS) > 43.60 (MWS + SD)$
  - FSR = 4 if  $WS > 43.60 (MWS + SD)$

**Table B.1. Summary of Scoping Participants SEI Form Responses**

Phase	Environmental Issue	Scoping Participants No.																		
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
During Construction	Employment & Economy	4	3	3	4	3	5	2	2	3	3	4	5	3	1	2	4	5	5	3
	Traffic Disruptions	3	-	4	2	3	5	4	1	1	2	4	2	4	1	2	2	5	3	2
	Health & Safety	3	3	4	5	3	5	5	3	2	4	2	4	5	-	1	5	3	5	-
	Aesthetics	2	5	4	5	2	0	4	4	1	4	2	1	3	5	1	3	4	2	5
	Archaeology	4	5	3	5	5	5	5	5	5	3	3	5	5	-	5	4	5	5	4
	Dust	5	5	5	5	5	5	5	5	3	5	2	3	5	5	5	2	5	4	
	Emissions	3	5	5	5	1	5	1	4	3	5	1	2	5	5	4	5	2	2	4
	Disposal of Wastes	1	5	5	5	2	5	3	2	4	4	2	4	3	5	4	4	5	4	3
	Soil Disturbance	4	5	4	5	2	5	5	1	3	4	3	3	4	2	3	4	5	2	2
	Marine Ecology & Coral Reefs	1	4	-	5	-	5	2	0	2	3	2	1	5	5	1	5	3	2	3
	Fauna, Flora & Habitats	4	4	4	5	5	5	5	0	1	2	1	0	2	5	0	5	5	5	2
	Water Resources	1	-	5	5	2	5	1	1	4	4	2	2	5	5	2	5	4	5	4
During Operation	Employment & Economy	5	4	4	4	5	5	5	5	4	4	5	5	5	3	4	5	5	5	4
	Traffic Disruptions	3	-	4	5	1	5	5	4	3	4	2	3	5	5	4	4	5	2	3
	Health & Safety	2	5	5	4	5	5	5	5	4	5	1	4	5	5	5	3	5	5	
	Aesthetics	3	5	5	5	5	5	5	5	2	3	1	3	4	5	3	4	4	5	-
	Archaeology	0	5	4	-	3	0	2	-	5	3	0	1	3	-	4	5	5	5	2
	Dust	0	5	4	3	1	5	1	3	3	5	1	2	5	5	5	3	-	4	
	Emissions	4	5	4	5	5	5	5	5	3	5	1	5	5	5	4	5	3	5	5
	Disposal of Wastes	4	5	5	5	5	5	5	5	4	4	3	5	5	5	5	4	5	5	5
	Soil Disturbance	0	1	4	5	5	0	1	5	4	5	2	5	5	5	2	5	5	5	5
	Marine Ecology & Coral Reefs	4	4	5	5	2	5	4	4	3	3	0	1	4	5	1	4	3	5	3
	Fauna, Flora & Habitats	1	5	3	3	2	5	5	1	1	2	0	1	3	5	3	5	5	5	3
	Water Resources	5	-	5	5	5	5	5	5	4	4	0	3	5	5	4	5	4	5	4

**Table B.2. Significance of Issues Evaluation**

<b>Phase</b>	<b>Environmental Issue</b>	<b>Mean Significance Rating (MSR)</b>	<b>Total Significance Score (TSS)</b>	<b>Number of Participants (NP)</b>	<b>Weighted Score (WS)</b>	<b>Final Significance Rating (FSR)</b>
<b>Construction</b>	Employment & Economy	3.4	64	19	35.2	<b>2</b>
	Traffic Disruptions	2.8	50	18	27.9	<b>1</b>
	Health & Safety	3.6	62	17	34.2	<b>2</b>
	Aesthetics	3.0	57	19	31.6	<b>2</b>
	Archaeology	4.5	81	18	44.1	<b>4</b>
	Dust	4.4	84	19	45.7	<b>4</b>
	Emissions	3.5	67	19	36.8	<b>2</b>
	Disposal of Wastes	3.7	70	19	38.4	<b>3</b>
	Soil Disturbance	3.5	66	19	36.3	<b>2</b>
	Marine Ecology & Coral Reefs	2.9	49	17	27.4	<b>1</b>
	Fauna, Flora & Habitats	3.2	60	19	33.2	<b>2</b>
	Water Resources	3.4	62	18	34.2	<b>2</b>
<b>Operation</b>	Employment & Economy	4.5	86	19	46.7	<b>4</b>
	Traffic Disruptions	3.7	67	18	36.8	<b>2</b>
	Health & Safety	4.4	83	19	45.1	<b>4</b>
	Aesthetics	4.0	72	18	39.4	<b>3</b>
	Archaeology	2.9	47	16	26.3	<b>1</b>
	Dust	3.3	60	18	33.1	<b>2</b>
	Emissions	4.4	84	19	45.7	<b>4</b>
	Disposal of Wastes	4.7	89	19	48.3	<b>4</b>
	Soil Disturbance	3.6	69	19	37.9	<b>3</b>
	Marine Ecology & Coral Reefs	3.4	65	19	35.8	<b>2</b>
	Fauna, Flora & Habitats	3.1	58	19	32.1	<b>2</b>
	Water Resources	4.3	78	18	42.5	<b>3</b>

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## **Annex C Pre-Scoping Brief (English)**

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## **Annex D Pre-Scoping Brief (Arabic)**

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## **Annex E Significant Environmental Issues (SEI) Forms**





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## **Annex F Scoping Session Invitation Letter**