Arab Republic of Egypt
Cabinet of Ministers
Egyptian Environmental Affairs Agency (EEAA)
Environmental Management Sector

Environmental Impact Assessment

GUIDELINES FOR INDUSTRIAL ESTATES DEVELOPMENT

SEAM Project

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Prepared by

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1 INTRODUCTION

Law No. 4 of 1994 on the Environment and the Executive Regulations issued by Decree No. 338 of 1995 states that new establishments or projects as well as expansions of existing establishments must be subject to an Environmental Impact Assessment (EIA) before a permit is issued. For industrial development projects EIA may be needed:

- for the development of land as industrial estates on which services and infrastructure are provided in advance of the occupying industries being known,
- for specific industrial projects on existing serviced industrial land, and
- for specific industrial projects on stand alone sites.

The EIA report should be submitted via the Competent Administrative Authority to the Egyptian Environmental Affairs Agency (EEAA). The EEAA will review the study and prepare an opinion indicating if the project can be approved.

These guidelines identify the main factors to be considered when preparing EIAs for industrial development projects.

The guidelines do not cover every possibility; however they deal with the environmental issues which usually arise with industrial development. The EIA should be tailored to the potential environmental impacts and issues associated with the specific proposal.

In using these guidelines it is essential that reference is also made to all relevant laws - notably Law 4/1994 for the Environment; to other relevant EEAA Environmental Guidelines (particularly urban development and roads and highways); and to the EEAA Guidelines for Egyptian Environmental Impact Assessment. At the start of planning for a development, developers should be fully aware of their obligations under all laws and guidelines applicable to their proposals.

2 THE EIA PROCESS

2.1 Outline

The EIA process is not simply a matter of preparing an environmental impact assessment report and obtaining the necessary approval. EIA in its widest sense is the means by which environmental concerns can be taken into account throughout the life of a development from the initial concept through detailed design, construction and operation to eventual restoration and reuse of the land.

The EIA operates at two levels:

- the overall EIA philosophy which provides an assessment framework method, a structure for the EIA report and a means of co-ordinating the detailed technical contributions;
- detailed technical work undertaken by specialist contributors to the EIA.

To achieve good environmental design, the planners and designers of the proposed development must have sufficient facts to enable them to take account of environmental issues as the design evolves. This is true even where there is no need for a formal EIA. EIA should be viewed as helping the environmental design process. Ideally environmental information should flow freely between those responsible for EIA and the design team; this allows modifications to reduce potential environmental impacts to be introduced before completion of the final design.

The steps in the EIA process are broadly as follows:

1. ***Description of the Project***: What type of project is it? What environmental advice and information is needed in putting the project together?
2. ***Environmental appraisal***: What are the environmental issues posed by the development and what alternatives should be considered? This is the key EIA activity which assists the planning and design of the development.

3. ***Screening***: Is a formal EIA required?
4. ***Scoping***: What has to be covered in the formal EIA and in what detail?
5. ***Baseline***: What are the existing environmental conditions?
6. ***Prediction***: What environmental impacts will the development have?
7. ***Evaluation***: How will these impacts affect people and resources and how significant are the resulting effects?
8. ***Mitigation***: Can significant negative effects be avoided or made acceptable? Can benefits be enhanced?

Note that these steps do not necessarily follow in order. For example much baseline information will have to be collected for the early stages of planning and design for the development.

The formal EIA process may stop if at the screening stage it is decided that a formal EIA is not necessary. However, for all industrial developments, there will be a need to take the environment into account during design, construction and operation.

The aim of a formal EIA report is to enable the approving authority, local and central government, the local community, the general public and the developer to properly consider the potential environmental consequences of a proposal. It is important to provide enough information:

- to allow the approving authority to make a decision including deciding on what, if any, conditions are needed;
- to provide the basis for sound ongoing environmental management.

The information provided should be clear, concise, objective and be supported by maps or other illustrations as necessary. Irrelevant data should be excluded.

It is the developer responsibility to identify and properly address all matters relevant to the specific proposal and to comply with the statutory requirements for EIA preparation. The developer will need to seek the right professional advice to fulfil this responsibility.

Each step in the EIA process requires appropriate consultation with all those with an interest in the proposal, including the regulatory authorities and the wider community in the local area, to ensure that relevant views are taken into account. Consultation should be initiated at the scoping stage of the EIA.

2.2 What Kind of Industrial Development Project is Proposed?

The details of the proposed project will need to be put together in order to assess the potential impacts of the scheme. The basic minimum required to complete the initial environmental appraisal, screening and scoping is:

- the location of the development;
- the general layout of plots, buildings, land uses, roads and other infrastructure;
- the type of industry or specific industries proposed provide details of processes where possible;
- the anticipated size of the industrial development in terms of employment, inputs, outputs, physical infrastructure, capital investment, etc;
- any relationship to existing industries and other sectors, e.g. agriculture;
- activities during construction, including earthmoving, traffic, construction employment and services;
- any investments which need to be made elsewhere, e.g. an associated port development.

The objectives of the proposal should be set out showing:

- what needs are filled by the development, and
- how environmental considerations are dealt with.

More detailed information will be required as the EIA progresses.

2.3 Getting the Right Advice - Selection of Environmental Consultants

Appropriate environmental advice should be sought from the start of planning for a development. As planning proceeds it will generally be necessary to bring more specialised people in to deal with particular issues. The developer should check the competence of the firm recruited to provide environmental advice and/or prepare an EIA.

The EIA should be prepared by a team of consultants with sufficient expertise to cover all environmental aspects of the proposal for industrial development. The expertise required will depend on whether the proposal is for:

1. the development of an industrial estate with services and infrastructure in advance of the occupying industries being known,
2. a specific industrial project on existing serviced industrial land, and
3. a specific industrial project on a stand alone sites.

For developments within (1) the team may include, but not necessarily be limited to, the following:

- urban planner/designer
- sociologist
- economist
- water supply and waste water treatment engineer
- transport planner/engineer
- ecologist
- landscape architect
- ground engineer
- hydrologist/hydrogeologist
- antiquities expert.

For developments within (2), the EIA is likely to focus on the assessment of the industrial processes to be used. Where an EIA has previously been prepared for the development of the industrial estate on which the proposal is to be located, the team will include, but not necessarily be limited to, the following:

- noise specialist
- airborne emissions specialist
- waterborne emissions specialist
- landscape architect
- environmental risk assessment specialist.

For developments within (3) the team is likely to include people from both lists.

2.4 Identifying Issues through Environmental Appraisal

At the outset the developer should identify the key environmental issues likely to arise with the development. This can be done through a preliminary environmental appraisal. This can be a simple matrix of the form illustrated below with the people and resources on one axis and the potential impacts on the other. Note that if either the site or project changes the potential impacts may also change.

	Jobs	**Noise & Air Emissions**	**Solid & Liquid Waste**	**Land-take**
Local People	+	-	-	-
Wildlife Habitats	0	0	-	-
Agricultural Land	-	0	-	-
Land in Other Uses	+	-	-	-
Landscape Features	0	0	-	-
Air Quality	0	-		
Surface Water	0	0	-	-
Aquifers	0	0	-	0

\+ indicates a positive impact, - a negative impact, 0 is no noticeable impact.

The issues identified will depend on the proposal and its location. However it will always be helpful:

- to consult with stakeholders in the development;
- to use checklists to identify the people and resources which might be affected;
- to use checklists of potential impacts;
- to consult other sources of information such as EIAs for similar projects.

Checklist of People and Environmental Resources Potentially Sensitive to Impacts from Industrial Development

- People living or working next to the industrial development or on roads leading to or from the development.
- People living within the labour catchment of the industrial development.
- People in sensitive land uses, e.g. schools, in the local area which may be affected by the industrial development.
- Environmental resources on, over or under land taken by the industrial development including wildlife habitats, land in other uses notably agriculture, attractive landscape features, aquifers, surface waterbodies, rivers, canals, antiquities, etc.
- Environmental resources near the industrial development including wildlife habitats, land in other uses notably agriculture, attractive landscape features, aquifers, surface waterbodies, rivers, canals, antiquities, etc.
- Flora and fauna both on the site and nearby.

Checklist of Environmental Impacts for Industrial Development

- Landtake for the development.
- Impacts during construction works and as a result of built development, e.g. on landscape character and views.
- Economic impacts both during construction and operation.
- Noise during operation of the industrial development.
- Emissions to the atmosphere and water resources during operation of the industrial development including dust or particulates, gases and liquid wastes particularly those of a toxic or otherwise harmful nature.
- Solid wastes from the operation of the industries deposited on land, particularly those of a toxic or otherwise harmful nature.
- Traffic to and from the industrial development.
- Impacts on existing utilities.
- Hazards from the presence of explosive, flammable or toxic substances within the industrial development.

2.5 Considering Alternatives?

All EIAs should consider the alternatives that are available to the proposed development. Early appraisal of alternatives is essential, preferably from the start of planning the project. Alternatives which minimise environmental impacts should be identified and evaluated.

When evaluating alternatives consideration should be given to the costs and benefits for both people and the natural environment throughout the whole life cycle of the proposal. Careful selection of the preferred alternative can lessen community concerns and reduce the costs of the mitigation and management required to reduce environmental impacts.

Note that a preferred alternative will be selected on the basis of financial, economic, sustainability and other considerations as well as environmental criteria.

Evaluation of alternatives can be undertaken in a number of ways:

- Using a matrix in which alternatives are scored or ranked on the basis of a number of environmental criteria.
- By comparing pairs of alternatives on the basis each of a number of environmental criteria, e.g. area of agricultural land affected, number of local residents within 500 metres of the site, volume of effluent per annum to decide which alternative of the pair is preferred. By comparing all pairs a ranking can be developed for the set of alternatives.

2.6 Screening

This is the task of deciding whether or not a formal EIA is required for a particular project. Note that for all industrial development there is a need to address potential environmental issues irrespective of whether a formal EIA is needed. Screening should be based on the details of the proposed development and the issues likely to arise.

Relevant legislation and guidelines (Law 4/1994 on the Environment and the EEAA Guidelines on Egyptian Environmental Impact Assessment) identify the projects which must have an EIA and those where an EIA is discretionary or not required. Reference to the Competent Administrative Authority (CAA) may be necessary where the requirement for an EIA is not clear. For the development of specific industries the CAA will generally be the Ministry of Industry and Mineral Resources; for the development of industrial estates, the CAA will be the Ministry of Housing and Construction. The EEAA Guidelines classify projects into three groups to reflect the potential severity of environmental impacts:

- White list projects: those likely to have minor environmental impact. The developer applies to the CAA before construction works are initiated, with a letter of intent, accompanied by

  not required for these projects.
- Grey list projects: those which may result in significant environmental impact. The developer applies to the CAA before construction works are initiated, with a letter of intent accompanied

  EIA for such projects or for parts of such projects may be required at the discretion of the EEAA.
- Black list projects: those projects which require complete EIA due to their potential impacts. The developer applies to the CAA before construction works are initiated, with a letter of intent, accompanied by the scoped EIA. The EEAA Guidelines include in Annex 1 sectoral guidelines for establishments that need full EIA.

Further details regarding the procedures are given in the EEAA Guidelines.

2.7 Scoping

Scoping is the identification of those matters which need to be covered in the EIA. Not all issues will be equally important for all proposals and the EIA process must focus its attention on the key issues of concern.

Scoping should result in:

- a list of all issues with a preliminary estimate of the relative significance of their impacts,
- identification and prioritisation of the key issues and how these are to be assessed,
- an explanation as to why other issues are considered to be less important.

The EIA should address the key issues as fully as practicable. However the level of analysis should reflect the level of significance of the impacts. Less attention should be given to those issues of lower significance. For industrial developments the checklists in Section 2.4 will be useful in deciding which issues are important.

2.8 Prediction of Impacts and Evaluation of Mitigation

Discussion of potential impacts should include predictions of the nature and extent of impacts and the effectiveness of mitigation strategies. This information provides the basis for determining the environmental effects of the proposed development and hence its acceptability.

Impact prediction should consider:

- the scale of the impact,
- the duration of the impact,
- how wide the impact is spread,
- whether impacts are direct or indirect,
- both beneficial and adverse effects, and
- whether impacts are temporary, reversible or permanent.

The developer should identify any uncertainty associated with prediction of impacts and with the success of mitigation measures. Where possible the level of uncertainty should be predicted.

Mitigation measures must be evaluated for their effectiveness on individual impacts and collectively for all impacts. The mitigation strategy should set out the environmental management principles which should be followed in the planning, design, construction and operation of the industrial development.

The predictions made in the EIA should be monitored through an environmental management plan (EMP). It is not essential that a detailed EMP be prepared as part of the EIA; however an outline of the content and structure of the EMP and of the commitment needed to prepare an EMP is required.

2.9 Baseline Information

Baseline data collection should focus on the key issues that need to be examined for the EIA. Where fresh baseline data is to be collected, careful consideration must be given to the design of the survey to ensure that the data collected is reliable and relevant.

The need for long-term sampling, e.g. of water or air quality, should also be assessed as early as possible. This will maximise the time available for this to be carried out.

Where existing data is used, its adequacy and appropriateness for impact assessment of the proposal should be carefully reviewed. Additional work can then be carried out to fill the gaps.

3 GUIDELINES FOR THE EIA REPORT

These guidelines provide advice on the content of formal EIAs for developers, planners and consultants involved in industrial developments.

The guidelines are not exhaustive. They are intended to identify the main issues of concern related to the development of industrial estates and specific industries. Developers must carefully assess each individual proposal to ensure that all issues relevant to the site have been identified.

The non technical summary should be around 4 pages, and certainly no longer than 10 pages (excluding plans). The main text of the EIA report should be around 60-70 pages, and certainly no longer than 100 pages. For more technically complex projects, technical appendices can be used to achieve this. Any individual technical appendix should be no longer than 20 pages (excluding plans, photos, drawings). The non technical summary may be presented as a separate report.

The following list sets out the key chapters that are required in an EIA for industrial development.

Summary of Requirements (Table of contents)

A. Non Technical Executive Summary

B. Description of the Proposed Industrial Development

C. Background Information covering the Legislative Framework, Methodology, Consultation and Consideration of Alternatives

D. Description of the Existing Environment - the Baseline

E. Prediction of Impacts and Evaluation of Significant Environmental Effects

F. Mitigation including the Environmental Management Plan and Monitoring

G. Conclusions

A. NON TECHNICAL EXECUTIVE SUMMARY

The summary should give an overview of the proposal, the alternatives considered, the potential environmental impacts and their effects, and proposed mitigation measures. It will conclude by setting out the residual effects of the development after mitigation. It should be written in non-technical language to help all readers to understand it.

B. DESCRIPTION OF THE PROPOSED INDUSTRIAL DEVELOPMENT

B.1 Objectives and Scope of the Proposal

There should be a clear statement of the objectives and scope of the proposal including:

- a general description of the proposed built development or the land uses expected;
- the reason and/or need for the development;
- the proposed programme of construction works for the development;
- the expected project life;
- land ownership/tenure; and
- any designations such as zoning (including any marine zoning) which affect the site.

B.2 The Location

A site description and maps, plans or photographs should be provided clearly identifying the location of the proposed development relative to:

- land uses in the surrounding area, both urban and rural, e.g., housing, agriculture;
- waterbodies and surface water, e.g. rivers, lakes and canals and the use made of these, e.g. fishing, water supply, navigation, irrigation;
- habitats both natural and man-made for flora and fauna;
- infrastructure including transport and utilities;
- any local or regional strategy such as management plans for nature conservation areas;
- any historical sites or environmental protection areas.

B.3 Detailed Description and Layout of the Proposed Industrial Development and Associated Facilities

The following information should be provided:

- site plans which must show the maximum land area affected by the proposal;
- layout plan(s) of the development showing buildings, roads, parking, and infrastructure including all utilities;
- elevations, cross sections and plans of all built development supported by photomontages or similar to show the visual appearance proposed;
- a description of the extent and type of industrial development proposed including a description of the uses proposed and the processes to be used;
- power supply requirements and proposed energy conservation measures;
- proposed usage and sources of water supply including discharges from any desalination plants and options for water recycling and reuse;
- quantities of solid and liquid waste generated and the arrangements for collection, recycling, treatment and disposal;
- details of access, parking and loading/unloading arrangements;
- details of storage of any hazardous, toxic or inflammable substances;
- identification of the proposed means of surface water drainage;
- the anticipated employment in operation.

B.4 Site Preparation and Construction

Describe the construction works required prior to commencement of industrial operations, including:

- timing, staging and hours of construction work;
- proposed construction methods including temporary works, the equipment to be used and methods of transport of the equipment to the site;
- proposals for environmental management during construction, e.g. erosion and sediment control systems, waste water holding tanks, noise mitigation strategies;
- any land clearing and/or disposal of cleared material;
- any stabilisation structures or earthworks including the dredging, reclamation, excavation or landfill associated with these;
- quantities of material to be moved to or from the site, the method of disposal of excess material, and the sources of material to be brought to site;
- details of the construction workforce, including source, expected numbers and fluctuations throughout the construction period.

B.5 Existing Development in the Locality

Outline:

- the nature of any past or existing urban or other development on the proposed site;
- past environmental performance, including the impacts of existing development on the environment and the effectiveness of any impact mitigation which applied on the site;
- the relationship of the proposed development to any existing development in the neighbourhood.

C. BACKGROUND INFORMATION

C.1 Legislative Framework

This section should set out the laws considered during the planning of the project, e.g. Law No. 4/1994 on the Environment and its executive regulations, Governorate orders, land use, etc. A list of all approvals and licences required under any legislation should be included. This list should identify the relevant authorities involved in the assessment and regulation of all aspects of the proposal.

C.2 Methodology

The procedures or methodology used in the EIA should be outlined. The basic methodology of EIA is to:

- establish the baseline or existing situation and any changes anticipated without the development concerned;
- predict the impacts that will occur with the development;
- evaluate the effects of those impacts for people, flora and fauna and for things, i.e. environmental resources such as land, water and the atmosphere;
- evaluate how mitigation can be used to reduce the effects of a development;
- describe the residual effects after mitigation.

This chapter should include details of:

- how the impacts have been predicted;
- the criteria used for assessing the significance of effects for both people and environmental resources.

This should be supported where necessary with:

- relevant guidelines issued by government authorities, provisions of any relevant environmental protection legislation, and relevant strategic plans or policies;
- relevant research or reference material, meteorological data and relevant preliminary or pre-feasibility studies.

The outcome of the screening and scoping process should be summarised including:

- all issues identified;
- the key issues which will need a full analysis in the EIA;
- those issues which will not need a full analysis in the EIA but which still need to be addressed in a limited way.

C.3 Consultation

The EIA should list who has been consulted, how they have been consulted and what their views are. Consultees should include relevant government agencies, NGOs and the public. A brief description of the reason for consultation and the outcome should be included.

For industrial development, agencies with regulatory powers or responsibilities in relation to

planning control, roads and traffic, waste disposal, discharge limits to fresh waters, emissions to air, historic monuments, and conservation of natural resources must be consulted. These will include as a minimum the Egyptian Environmental Affairs Agency (EEAA), Governorate representatives, Ministry of Housing, Ministry of Reconstruction, Ministry of Transport, Ministry of Health, and relevant Community Development Associations (CDAs).

C.4 Consideration of Alternatives

The EIA should include a summary of alternatives to the development and the reasons why the proposed development is preferred. Alternatives will include:

- alternative locations;
- alternative schemes and layouts of the development and services (these may be further developed under mitigation);
- alternative management or operational practices (these may be further developed under mitigation); and
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D. DESCRIPTION OF THE EXISTING ENVIRONMENT - THE BASELINE

D.1 Overview

An overview of the existing environment should be provided in order to place the proposal in its local and regional context. More detailed baseline information is needed for those issues identified as potentially important in the EIA for industrial development proposals and this is likely to include:

- Land Characteristics and Use,
- Landscape Character and Existing Views,
- Habitats, Flora and Fauna,
- Water including Hydrology, Groundwater and Water Quality,
- Air Quality,
- Noise Levels,
- Antiquities and Other Sites of Historic and Cultural Significance,
- The Social and Economic Context,
- Traffic Flows and Transport Infrastructure,
- Utility Services.

Data must be relevant to the proposed development. The level of detail should match the level of importance of the issue in decision-making. To make the EIA report easier to read, it may be sensible to include the specialist detail for each of the following sections as a technical appendix to the report, with a summary of each section in the main EIA report.

D.2 Land Characteristics and Use

All industrial development involves taking land. The baseline includes:

- the existing surface characteristics are topography, soil characteristics, terrain stability and susceptibility to erosion or landslip;
- the existing land uses occupying the site;
- the existing surface characteristics of the surrounding area;
- the existing land uses occupying the surrounding area and particularly those land uses which would be sensitive to industrial development.

Note that the land characteristics and uses will also be relevant to other parts of the baseline, e.g. landscape and visual character.

D.3 Landscape Character and Existing Views

Landscape quality can be affected by intrusion by industrial development and by loss of attractive features such as vegetation and hills. The baseline needs to describe:

- the existing character of the landscape both on the site and in the surrounding area;
- views of the site from adjoining properties and public areas particularly where these are sensitive, e.g. residential, recreational or tourist areas.

D.4 Flora and Fauna

Flora and Fauna can be affected by emissions from industries and by loss of habitats such as vegetation and waterbodies. The baseline needs to describe:

- the existing habitats - terrestrial, aquatic or marine - both on site and in the surrounding area;
- the flora and fauna species present, their populations and their value which may reflect rarity, economic value and attractiveness.

D.5 Water including Hydrology, Groundwater and Water Quality

Industrial development may impact on the hydrology of an area and waterborne emissions may place the quality of both surface water and groundwater at risk. There is a need to understand the surface water drainage in the area even if this is very intermittent, e.g. flash floods every 50 years. Baseline data includes:

- Existing drainage. This includes the location and capacity of wadis, canals, drains and rivers; identification of areas prone to flash floods; depth to groundwater.
- Surface water and groundwater movement patterns. This includes groundwater hydrology, the range of water levels and daily flushing regime in canals, drains and rivers; tidal ranges and wave climate in coastal areas and sediment transport processes.

D.6 Air Quality

Baseline conditions include:

- meteorological data particularly prevailing wind direction and strength by season;
- existing air quality particularly dust loading and existing sources of air emissions in the area.

Existing air quality cannot be determined with any precision without sampling over an extended period. This is rarely practicable and a descriptive approach based on prevailing weather conditions and identification of the main local emission sources affecting air quality, e.g. road traffic, major heavy industries with stacks, is often a better approach. The most appropriate approach to atmospheric impacts is generally to prevent them at source.

D.7 Noise Levels

Noise levels are relatively easy to establish and this is best undertaken at the nearest sensitive receptor locations, e.g. residential areas or schools, to the industrial development. If noise measuring equipment is available noise can be monitored over a number of 15 minute periods during a typical working day. Ideally, 4 or 5 periods should be monitored at each sensitive receptor location. This will establish the background noise levels and the extent to which these are exceeded during the period monitored. Where noise monitoring equipment is not available a descriptive approach identifying the main sources of existing noise and the extent to which these cause nuisance may be adequate.

D.8 Antiquities and Other Sites of Historical and Cultural Importance

Existing sites may be directly disturbed by industrial development. Furthermore industrial development may affect the setting of antiquities or have adverse effects on them as a result of air or water pollution. The baseline will need to:

- identify any items of historical or cultural significance (both above and below water) on or in the area surrounding the site;
- indicate the vulnerability of these to impacts from industrial development;
- describe the use made of these sites, e.g. site frequented by tourists.

D.9 Social and Economic Context

Industrial development will generally impact on the local economy and may result in social change in areas which mainly depend on agriculture and other primary sectors. The baseline includes:

- the general economic context including employment levels, the presence of other industries, wage levels, existing industries in the local area, other proposed developments;
- the general social context including educational levels in the local population, participation in formal economic activities - particularly by women, local cultural values.

D.10 Existing Transport Infrastructure and Traffic Flows

Traffic is almost always an issue for industrial developments. The baseline includes:

- existing transport infrastructure including roads, railways, ports and canals;
- existing traffic flows on that infrastructure and anticipated changes which would take place even if the development did not proceed.

D.11 Existing Utilities Infrastructure and Usage

Industrial development will usually place demands on existing utility infrastructure notably water supply, sewerage and waste water treatment, and electricity. The baseline includes:

- existing utilities infrastructure including water supply, sewerage, waste water treatment works, power lines and transformer sub stations;
- existing demands on utilities infrastructure.

E. PREDICTION OF IMPACTS AND EVALUATION OF SIGNIFICANT ENVIRONMENTAL EFFECTS

E.1 Basic Methodology

This chapter should include a discussion of impacts both:

- during construction of any built or engineered development, and
- in operation of the proposed industry.

Examples of potential impacts of industrial developments and their significant effects include (but are not restricted to):

- landtake leading to the loss of ecological habitats with negative effects on flora and fauna populations;
- construction works which directly damage the existing the landform and add to the impacts by landtake;
- economic impacts during construction which may create job opportunities and increase local business;
- economic impacts during operation which may create longer term benefits, such as the creation of job and business opportunities, which have positive effects on the economic welfare of the local population;
- the provision of proper services and infrastructure with wider benefits to those living and working in the local area;
- dust generated during construction or operation which may affect human, plant and animal growth;
- gaseous emissions to air resulting in negative effects on the health of the local population;
- discharge of untreated or inadequately treated effluent to canals and drains with resulting effects on water quality and potential adverse effects on crops and health;
- disposal of waste, particularly that containing toxic or otherwise harmful compounds with resulting effects on amenity, water quality and land quality and potential adverse effects on crops and health;
- noise which may disturb people in their homes, schools and other sensitive uses;
- traffic which may increase delays and result in traffic related effects such as road accidents and traffic noise;
- impacts on existing utility infrastructure and possible benefits as a result of improved infrastructure;
- risks to local people as a result of the storage and use if inflammable or toxic substances.

There is a need to distinguish between impacts which are:

- positive or negative;
- reversible or irreversible;
- temporary or permanent;
- short term or long term;
- direct or indirect.

In assessing environmental impacts and the significance of their effects:

- who or what is affected must be identified;
- how they are affected must be described;
- these effects must be evaluated against a set of consistent assessment criteria.

Criteria for evaluating the significance of impacts and their effects should be set in advance. They should be based on local standards wherever possible. Where these are not available, acceptable international standards should be used (e.g. WHO, US EPA, etc. guidelines). In all cases the choice of the appropriate standard must be robust, defensible and relevant to the local situation. If no suitable existing standard is available, then the criteria developed and used must be clearly explained in the EIA.

The use of matrices can be very helpful in co-ordinating and summarising information for this section of the EIA report.

In this part of the report impacts should be considered before or without mitigation, except where the mitigation concerned is an integral part of the design and operation of the development.

E.2 Landtake

Industrial development almost always involves the development of land. Only where land has already been committed for the development of industry is landtake not an issue. This will occur where an

industry moves onto an industrial estate which has already been developed with services and possibly buildings.

Landtake may result in the partial or complete loss of:

- ecological habitats with negative effects on flora and fauna populations;
- attractive landscape with negative effects on landscape character and the views enjoyed by people;
- antiquities and sites of historical and cultural interest;
- land in other uses, e.g. agricultural land or community facilities, with resulting impacts on peoples livelihoods or social life.

Note that even where land is taken for industrial development careful design can reduce impacts by retaining residual areas in their natural or existing state.

Landtake is normally evaluated on the basis of the area of land lost and the suitability of that land for other uses, e.g. agriculture, urban development, recreation.

E.3 Construction Works

Construction works may directly damage the existing landform and add to the impacts by landtake. Even where the landtake for a development includes an environmental resource it is the actual construction works which impacts existing features. Key features which may be affected are:

- surface water features,
- landform,
- existing vegetation,
- antiquities.

The effects are similar to those noted for landtake and in some cases these two impacts may be better considered together.

Landscape quality can be affected by intrusion by construction of industrial development and by loss of attractive features such as vegetation and hills during construction.

Loss of features is likely to have a visual impact including changed or obstructed views. These could affect the views from adjoining properties and from surrounding land and water.

The impacts of construction works are generally identified on the basis of damage to existing environmental resources and the value of those resources.

E.4 Economic Impacts during Construction

All new industrial developments will involve some expenditure on construction. Where local contractors undertake this work there is an obvious benefit to the local economy; this is likely to be strengthened where the contractor makes purchases from other local businesses. In some cases contractors from outside the local area may win the construction contracts; while the benefit may be less, employment of local labour and purchases from local businesses will still benefit the local economy.

Estimates of benefits to the local economy can be based on an estimate of the number of local people employed during construction, the average duration of employment and the average rate of pay. Benefits to local businesses can be based on an estimate of the proportion of construction spending which is spent in the local economy.

E.5 Economic Impacts during Operation

In operation industrial developments generally result in:

- direct benefits the creation of job opportunities in the industries concerned;
- benefits to other local businesses in the locality as a result of multiplier effects;
- losses to other local businesses in the locality as a result of competition.

In general the economic impacts of industrial development can be argued to be positive for the local population; this depends on the number of jobs created, the quality of those jobs and the net effects on local businesses.

Where new industries are introduced to an area an estimate should be made of the annual purchases of goods and services from existing businesses.

Estimating the negative impacts on existing businesses is more difficult. Often the presence of a number of similar businesses in an area is beneficial in that the local area gains a reputation in that industrial sector; furthermore the presence of several firms in the same industry may encourage the development of a better skilled workforce.

E.6 Dust

Dust may be generated during construction of industrial development and in the operation of industries. During construction dust most often arises from vehicle movements on unsealed roads and from earthmoving operations using construction plant such as excavators. During operation dust particles may be emitted during processes involving cutting and grinding, e.g. marble processing, and from processes emitting via stacks, e.g. cement manufacture.

Dust may be deposited on crops and in waterbodies and watercourses; it may also reduce air quality with impacts on human health particularly where dust particles contain harmful matter, e.g. PCBs.

Existing dust levels in Egypt are strongly affected by weather and particularly the strength of winds from the desert areas to the east and west of the Nile Valley. At times the level of naturally occurring dust is such that dust arising from industrial development from whatever source is not likely to be noticed.

The accurate prediction of dust impacts is very difficult given the changing natural dust levels; an appropriate way of dealing with this subject is:

- to identify the main sources of dust attributable to the development and the scale on which dust may arise;
- to identify the people or resources that may be affected by this dust and the level of any nuisance caused; and
- to consider what measures should be taken to reduce dust from sources associated with the development to an acceptable level.

This approach is effectively based on reducing any emissions to a level which will not cause nuisance rather than attempting to predict impacts with precision.

E.7 Gaseous Emissions to Air

Gaseous emissions to the atmosphere may be generated both during construction of industrial development and in the operation of industries. Emissions to air may be gaseous or in the form of particles; the latter can be regarded as a constituent of dust which has been dealt with earlier. Gaseous emissions may reduce air quality with impacts on human health particularly where emissions are of harmful gases. The impacts can be extremely serious, e.g. where emissions contain harmful compounds such as dioxins.

Existing air quality in Egypt is strongly affected by weather and particularly the strength of winds from the desert areas to the east and west of the Nile Valley. At times the level of naturally occurring dust in such that gaseous emissions are likely to be masked by the dust loading.

The accurate prediction of air quality impacts is very difficult given the changing natural dust levels; an appropriate way of dealing with this subject is:

- to identify the main sources of gaseous emissions attributable to the development, the scale on which these may arise, the likely presence of harmful gases and the worst case concentrations likely to arise in the atmosphere given the dispersion characteristics of the site;
- to identify the people or resources that may be affected by these emissions and the level of any nuisance caused; and
- to consider what measures should be taken to reduce or avoid gaseous emissions from sources associated with the development to an acceptable level.

As with dust, this approach is effectively based on reducing any emissions to a level which will not cause nuisance rather than attempting to predict impacts with precision.

E.8 Emissions to Water

Emissions to surface water and groundwater may be generated both during construction of industrial development and in the operation of industries. Waterborne effluent may reduce water quality with impacts on:

- human health particularly where water is used for irrigation or public water supply,
- freshwater and marine flora and fauna.

Water quality impacts are easier to predict than air quality impacts. Existing water quality can be measured using a number of criteria such as the biological oxygen demand (BOD) level. Predictions of changes in water quality can be based on:

- anticipated effluent discharges including volume, the concentration of suspended solids, concentration of harmful substances, etc;
- baseline data for the recipient water resources both surface and underground.

The criteria for judging the significance of impacts will include the people or resources that may be affected by changes in water quality.

An alternative approach can be taken, based on improving effluent quality and reducing effluent volumes to levels which will not result in a significant impact on the water resources concerned.

E.9 Waste Disposal

Disposal of waste, particularly that containing toxic or otherwise harmful compounds, can potentially have adverse effects on amenity, water quality and

Issues to consider include:

- The existing condition of any waterbody or groundwater that may be changed as a result of waste disposal both during construction and in operation.
- Potential liquid and solid wastes to consider include:
  - → run-off from washdown areas, fuel storage facilities, roads and parking areas,
  - → waste disposal (litter or solid waste),
  - → toxic and hazardous wastes.

An approach based on the precautionary principle is appropriate.

E.10 Noise

The potential sources of noise associated with a development need to be identified; these are likely to include:

- construction noise (e.g. blasting, pile driving compressors, etc.);
- operation noise (e.g. vehicle movements, noise from machinery and plant both within and outside any factory).

If these are likely to be significant for particular receptors and resources, an assessment will need to be made of:

- baseline conditions (including relevant meteorological and topographical factors);
- proposed working hours during construction and operation;
- where these impacts will be most important (e.g. housing areas and sensitive natural areas).

E.11 Traffic

A traffic study may be required where vehicle movements, on-street parking, boat navigation, train movements, etc., may significantly affect the community. Issues to consider include:

- assessing the impact of traffic generated during construction and operation on the local and regional transport network: issues to consider include:
  - → vehicle, train or boat size and types,
  - → frequency of movements at various times of day and year (including the need for restrictions at night or peak periods),
  - → safety issues;
- estimating the average and peak parking demand including the adequacy of on-site facilities.

E.12 Services and Infrastructure

The provision of proper services and infrastructure for industrial development may have wider benefits for those living and working in the local area. However the reverse can be true where industrial development takes place without adequate investment in services and infrastructure and; existing services and infrastructure may become overloaded and the local community may be adversely affected.

In general the impact on services and infrastructure is likely to be fairly neutral; a significant benefit is only likely to occur where the industrial development enables a major improvement to local infrastructure, e.g. a water treatment works, which could not be funded by the existing level of development in the area.

These impacts are generally dealt with by:

- describing the anticipated changes in services and infrastructure provision,
- considering the demands placed on provision by incoming industrial development, and
- setting out how any changes in provision may benefit or disbenefit the local community.

E.13 Risk Assessment

Hazards can be assessed by:

- identifying all materials stored which are classified as hazardous, their quantities and proposed safe storage and handling;

- identifying potential hazards from fire, explosion or release of chemicals or polluted waters, natural occurrences such as floods, storms, landslip;
- identifying potential risks to local people and local resources in the event of an emergency.

F. MITIGATION

F.1 Mitigation Strategy

This section considers the mitigation strategy, including the consideration of alternative options, and the extent to which this will avoid or reduce significant effects. The evaluation of the strategy will take into account its:

- sustainability,
- integration,
- feasibility, and
- compliance with statutory obligations under other licences or approvals.

The mitigation strategy should outline the environmental management principles to be followed in the planning, design, establishment and operation of the proposed development. It should include specific locational, layout, design or technology features, and an outline of ongoing management and monitoring plans.

F.2 Specific Mitigation Measures

These include proposed mitigation and management measures to control impacts on:

- Land quality - measures include:
  - → stabilisation works for cuttings, embankments and open channels,
  - → erosion and sedimentation control structures,
  - → landscaping and revegetation proposals,
  - → control and disposal of solid waste.
- Water quality - measures include:
  - → control and treatment of liquid effluent,
  - → containment and recovery facilities,
  - → procedures for handling, storage, transport and disposal of waste for all hazardous and dangerous materials;
- Air quality - measures include:
  - → control of stack emissions,
  - → control in fuel inputs;
- Noise - measures include:
  - → control of noise from plant and machinery to ensure compliance with relevant standards,
  - → sound attenuation measures such as walls and banks;
- Habitats, Flora and Fauna - measures include:
  - → compensatory planting or restocking of indigenous species,
  - → provision of new appropriate habitat,
  - → opportunities for colonisation,
  - → careful timing of major disturbances;
  - → measures to control and prevent infestations at the site and to control spread into localities adjacent to the proposal.
- Historical and Cultural Features - measures proposed should mitigate impacts and conserve antiquities and areas of historical or heritage significance during all stages of the development.

All measures must be compatible with the provisions of all relevant acts and laws.

F.3 Environmental Management Plan

An environmental management plan (EMP) is a document designed to ensure that the commitments in the EIA and subsequent conditions of any approval or licence are fully implemented. The EMP should demonstrate that sound environmental practices will be followed during the establishment, operation, rehabilitation and afteruse of the development. It should cover the following:

- management of construction impacts (e.g. landscape management plans);
- management of operational impacts (e.g. hazardous materials and fuel management, transport and parking management, maintenance and site security plans, emergency and contingency plans);
- strategies and action plans to feed information from monitoring into management practices;
- public awareness and training programmes for operational staff;
- indicators of compliance with licensing and approval requirements.

An EMP should include a Monitoring Plan that should be carefully designed and related to the predictions made in the EIA and the key environmental indicators. The EMP should outline

the need for monitoring, its duration and reporting procedures.

Parameters which may be relevant include:

- performance indicators in relation to critical operational issues including:
  - → water quality (marine and fresh),
  - → shoreline morphology and sediment budget,
  - → soils and sediments,
  - → noise and air quality,
  - → public health indicators,
  - → land surface and hydrology,
  - → flora and fauna.
- waste management performance indicators in relation to recycling and reuse;
- monitoring of complaints received.

Monitoring procedures should cover the following:

- the key information that will be monitored, its criteria and the reasons for monitoring;
- the monitoring locations, intervals and duration;
- actions to be undertaken if the monitoring indicates a non-compliance or abnormality;
- internal reporting and links to management practices and action plans;
- reporting to relevant authorities and, if appropriate, to the consent authority or the community.

G. CONCLUSIONS

This should summarise the prediction and evaluation of impacts, proposed mitigation and alternative processes, and residual effects after mitigation. It will emphasise:

- the more important impacts;
- who or what these will affect;
- how significant the effects will be;
- whether mitigation is possible;
- the likely success of mitigation measures adopted or recommended to alleviate those impacts.

This information can be presented either as text, or as summary tables if desired.

After mitigation measures have been assessed, residual and/or cumulative effects may remain. It is useful to set these out in a table in which the level of significance of each effect is given.

REFERENCES

A list of all references should be attached to the report.