



State Environmental Conservation Department (ECD), Sabah,  
Malaysia

**Handbook for Environmental Impact Assessment  
(EIA) in Sabah**

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## **Preface**

The passing of the *Conservation of Environment Enactment 1996* was an important step taken by the State of Sabah to provide a legal framework for the protection and enhancement of the environment. In 1999 the *Conservation of Environment (Prescribed Activities) Order 1999*, was gazetted, making Environmental Impact Assessment (EIA) a mandatory State requirement for Prescribed Activities. The overall objective of the Prescribed Activities Order is to regulate and mitigate activities associated with land development and the utilisation of natural resources.

The EIA procedure contributes towards this objective by means of providing and examining development alternatives and the assessment of any associated adverse environmental impacts. The procedure culminates in an agreement upon and implementation of recommended mitigation measures and subsequent compliance and residual impact monitoring.

A primary objective of the Environmental Conservation Department is to implement an EIA system that will contribute to responsible, effective and environmentally sound economic development in Sabah. Achieving such a goal is dependent upon transparency in procedures, collaboration between all parties and a commitment towards sustainable development within the State.

We hope the present handbook will contribute towards achieving such transparency, collaboration and commitment, thereby making the EIA system a relevant and effective tool for the protection and enhancement of the environment in Sabah.

**Eric Juin**

Director

Environmental Conservation Department

Right page: 3/4 picture

downward right side

Picture: 'Monocropping'

Oil Palm plantation covers  
more than 1 mill. hectare  
and development of agricultural  
estates more than 500 hectares  
requires an EIA

## Introduction

The aim of this handbook is to provide a guide for all those faced with the challenge of protecting the environment in Sabah whilst implementing development projects. Specific detail on procedure is provided alongside the legal and institutional background information needed to complete an EIA

In addition to this handbook, environmental guidelines for most development issues are available at ECD and Department of Environment (DOE) and should be also be referred to.

## Environmental Impact Assessment

The Environmental Impact Assessment (EIA) procedure is a management and planning tool designed to assist in the identification of the best development options, allowing for responsible consideration of the environment.

The objectives of the EIA procedure can be summarised as:

- To examine development options available and select the most appropriate
- To identify and predict the significance of any adverse environmental impact
- To identify and incorporate into the project appropriate mitigation measures
- To determine effective monitoring programmes of compliance and environmental impact.

Project proponents who recognise the potential of EIA and incorporate the procedure into project planning will undoubtedly benefit, as in the long run, costly environmental problems may be avoided and costs saved. Beneficial reasons for the project proponent embracing the EIA procedure include:

- A project that has been designed to suit the local environment is more likely to be completed on time and within budget and is more likely to avoid difficulties along the way
- A project that conserves the natural resources it relies upon will continue to be sustained by the environment for years to come
- A project that yields benefits without causing serious environmental problems is more likely to bring credit and recognition to its proponents.

### **Environmental Impact Assessment in Sabah**

The EIA procedure should contribute towards better environmental management in Sabah. To achieve this goal the State Environmental Conservation Department (ECD) has chosen to implement an EIA procedure, as described in this handbook, which focuses on:

- Prioritisation and prediction of the most significant environmental impacts
- Identification of appropriate and cost-effective mitigating measures
- Recommendations on *sufficient and realistic* monitoring programmes for compliance and environmental impact.

Furthermore the EIA procedures stress the importance of:

- *Focussed, appropriate and realistic* Terms of Reference for the assessment. This will allow for a more flexible EIA procedure, that should vary in breadth, depth and type of analysis depending on the project
- *Transparency* and openness in all steps of the EIA procedure, from initiation to review and approval.

It is important to stress that the EIA procedure is primarily a tool to predict the environmental impacts of a development project and to suggest adequate mitigation measures and monitoring programmes. EIA should be seen primarily as an *assessment and mitigation tool*.

EIA reports are regarded by ECD as *Environmental Information* supplied to the Department and/or the Review Panel in order to be able to make a proper review of the environmental impacts of the proposed project and to prepare an Agreement of Environmental Conditions that will be co-signed by the project proponent and subsequently monitored by the Department. The Agreement of Environmental Conditions will specify the mitigation measures and monitoring programmes to be implemented by the project proponent. This final stage is a key component of the EIA procedure and will indicate success if this leads to the maintenance or visible improvements of the environment.



## Legal requirements

### The Enactment

Under Section 5 (1) of *the Conservation of Environment Enactment 1996*, the ECD have the authority to make a decision as to whether any development project should undertake an EIA:

5. (1) *The Director may, subject to such rules as may be made under section 22, by order published in the Gazette, require any person undertaking the following activities:*

- (a) development of agricultural estates or plantation of an area exceeding the dimension specified in the said order;*
- (b) clearing of forest area for the establishment of agricultural estates or plantation;*
- (c) carrying out of logging operations on State land, alienated land or Forest Reserve under the provisions of the Forest Enactment 1968 of an area exceeding the dimension specified in the said order;*
- (d) carrying out of any activity, including exploration for minerals, mining, farming, clearance of vegetation and setting up of agricultural estates in any area which in the opinion of the Director may pollute or in any way affect the sources of supply of water for human consumption;*
- (e) development of commercial, industrial and housing estates of an area exceeding the dimension specified in the said order;*
- (f) extraction and removal of rock materials;*
- (g) activities which may cause pollution of inland waters of the State or endanger marine or aquatic life, organism or plants in inland waters, or pollution of the air, or erosion of the banks of any rivers, watercourse or the foreshores and fisheries; or*
- (h) any other activities which may injure, damage or have any adverse impact on the quality of the environment or the natural resources of the State,*

*to submit to the Director a report from such expert or authority and in such form as may be approved by the Director, on the impact of such activities on the natural resources and environment and any other particulars or information as may be required by the Director.*

### The Order

Furthermore, EIA is a mandatory requirement under the Conservation of Environment (Prescribed Activities) Order 1999:

*Section 3. Any person who intends to undertake any of the prescribed activities shall submit to the Director a report, which is to be prepared by such expert or authority as may be approved by the Director -*

- (a) on the impact of such activities on the environment and on the sustainable utilisation, preservation and management of the natural resources to the State; and*
- (b) on the measures being preventive, mitigating or abatement to be taken for the protection and enhancement of the environment.*

The First Schedule of the Conservation of Environment (Prescribed Activities) Order 1999, provided in Annex 1 of the Handbook, lists all activities covered by the Order.

### The seven steps

Seven procedural steps need to be followed in order to undertake an EIA in Sabah.

*Table 1. The seven EIA steps*

Step	The project proponent and EIA consultant	The ECD	The Public
Step 1	Project screening	Consultation	
Step 2	Selection of consultants	Consultation	
Step 3	Preparation of TOR	Approval	Hearing
Step 4	Undertaking the EIA study	Consultation	
Step 5	Preparation of the EIA report	Consultation	
Step 6	Review of the EIA report	Review	Hearing
Step 7	Agreement of Environmental Conditions	Approval & audit	

The project proponent is mainly involved in step 1,2 and 7, while the EIA consultant is largely responsible for step 3-6.

Some of the important features of the EIA procedure in Sabah are outlined below. However, detail on each step may be found in the following chapters of the Handbook.

### Flexibility

The EIA procedures in Sabah must be characterised by a high degree of flexibility. One of the main reasons for this is the large number of very different types of Prescribed Activities required to undertake an EIA, ranging from a small quarry operation to logging of several hundred thousand hectares. This calls for procedures that can facilitate different EIA studies and assessments.

### The TOR

A crucial step in the EIA procedure is the preparation of the Terms of Reference (TOR), as these will determine the content and scope of the work to be undertaken in the study. The TOR will always be project and site specific and depending upon requirements, may range from an investigation into a few localised impacts, or extend to a Special EIA report. The consultant in consultation with the ECD and other relevant key stakeholders and experts will identify the specific TOR.

### **Normal-EIA and Special-EIA**

In Sabah there are two formats for the EIA procedure; Normal-EIA and Special-EIA. Special-EIAs covers projects that are regarded as having special interest for the public and/or having a special magnitude regarding environmental impact. Special-EIAs are more detailed and comprehensive in determining and assessing environmental impacts, but this is ultimately dependent on the specific TOR. Special-EIA projects also require a more active involvement of the public in the selection and review of the environmental impacts. Special-EIAs are required to have a public hearing period concerning, (i) the identification and determination of key environmental issues to be covered by the EIA, and (ii) the assessments and recommendations made in the EIA report.

ECD will determine which projects are required to undertake a Special-EIA. However, the criteria used to determine if a project might undertake a Special-EIA include:

- Location in an environmentally sensitive area
- Location in a densely populated area
- Aesthetic or cultural concerns
- Voiced public interest or concern.

Assessment procedures for both Normal-EIA and Special-EIA will follow the *same general format*. The convergence of the procedures introduces flexibility into the assessment system and removes the possible need for some project proponents to submit both a Normal- and a Special-EIA. An interdisciplinary review panel will be established to review Special-EIA reports.

### **Public hearings**

The public hearing procedure provides a two-stage opportunity for the public to provide input and comments:

- *Stage 1- TOR for Special EIA.* Suggestions as to the issues the Special-EIA should consider, thus ensuring that the TOR for the Special-EIA address the main issues and concerns
- *Stage 2 - Assessment of Special EIA reports.* Comments on the validity and relevance of the assessments and proposed mitigation and monitoring measures.

The public hearing period is 2 weeks for TOR and 1 month for the assessment of the reports. The hearings will be announced (tri-lingual) in the local newspapers. The TOR and the Special-EIA reports will be made available from the project proponent, the ECD office and homepage and at the office of the EIA consultant.

Comments from the public shall be sent to ECD and the EIA consultant will provide a written reply to the comments. Replies will be made available at the ECD office and homepage. The ECD will take into consideration the comments and the replies and will include relevant public concerns in the TOR or in the Agreement of Environmental Conditions.

Other requirements for public involvement, for example public meetings and surveys, may be stipulated in the TOR.

### **Transparency**

The EIA procedure in Sabah is a transparent and open system. All relevant information concerning the EIA procedures will be made available upon request from the ECD and/or through the ECD homepage. Available information will include for example, the present handbook, specific environmental guidelines, EIA consultants, Terms of Reference, EIA reports, public comments. The homepage address is:

*[www.sabah.gov.my/jkas](http://www.sabah.gov.my/jkas)*

### **EIA processing**

Most of the steps required to complete an EIA are in the control of the project proponent and the consultant (time used to undertake scoping, draft TOR, report, etc.). For processing of reports within ECD, the Department has formulated the following targets:

- Meeting with ECD to review scoping activities: Maximum 2 weeks upon receipt of scoping note
- Review of draft TOR: Maximum 2 weeks for EIA and 4 weeks for Special-EIA (including the public hearing period) upon receipt of the draft TOR to the first TOR review meeting with ECD
- Review of EIA Report: Maximum 2 months for EIA and 3 months for Special-EIA (including public hearing period) upon receipt of the EIA report to the first EIA report review meeting with ECD.

### **ECD and DOE**

The State ECD and Federal DOE jointly share the responsibility for administering the EIA system in Sabah. ECD is responsible for EIAs covered by the Conservation of Environment (Prescribed Activities) Order 1999 (see Annex 1), and are hereafter required to follow the procedures described in this handbook. The Department of Environment is responsible for EIAs covered by the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order, 1987, however, in Sabah, the order only applies to Prescribed Activities not listed in the Conservation of Environment (Prescribed Activities) Order 1999. Project proponents and EIA consultants are requested to contact the Departments for further clarification of responsibilities and specific procedures.

## EIA procedures – a quick reference

Table 2: A quick reference to the seven EIA steps

The seven steps	Summary of main required activities
Step 1: Project screening	Project proponent: <ul style="list-style-type: none"> <li>• Check Annex 1 to see if the project is required to undertake an EIA</li> <li>• Consult the ECD as to whether the project should undertake an EIA</li> </ul>
Step 2: Selection of consultants	Project proponent: <ul style="list-style-type: none"> <li>• Select consultants to undertake preparation of TOR and the EIA</li> </ul>
Step 3: Preparation of TOR	EIA consultant: <ul style="list-style-type: none"> <li>• Undertake scoping activities and present the results to ECD</li> <li>• Prepare a draft TOR</li> <li>• Undertake the public hearing activities required for Special-EIA</li> <li>• Finalise the TOR and obtain final approval from ECD</li> </ul>
Step 4: Undertaking the EIA study	EIA consultant: <ul style="list-style-type: none"> <li>• Assess environmental impacts</li> <li>• Assess mitigation measures</li> <li>• Assess monitoring programmes</li> </ul>
Step 5: Preparation of the EIA report	EIA consultant: <ul style="list-style-type: none"> <li>• Adhere to the ECD requirements and 'standard table of content' in the preparation of the EIA report</li> <li>• Prepare the EIA report in line with the ECD chapter-by-chapter recommendations</li> </ul>
Step 6: Review of the EIA report	EIA consultant: <ul style="list-style-type: none"> <li>• Submit the EIA report to ECD</li> <li>• Undertake the public hearing activities required for Special-EIA</li> <li>• Participate in review meetings</li> <li>• Submit additional information if required and finalise the EIA report</li> </ul>
Step 7: Agreement of Environmental Conditions	Project proponent: <ul style="list-style-type: none"> <li>• Review the draft Agreement of Environmental Conditions prepared by ECD</li> <li>• Co-sign the Agreement of Environmental Conditions</li> <li>• Implement mitigation measures and monitoring programmes.</li> </ul>

1/3 picture right side downward

Picture: 'Kinabalu Skov'

Forest cover at Mt. Kinabalu.

Extraction of timber or development  
of forest plantations on areas exceeding  
500 hectare requires an EIA

Text box right side down

Right + left side: Full picture: ' Kinabalu 2'

Left side: Full picture



## 1 Step 1: Project screening

Steps	The project proponent and EIA consultant	The ECD	The public
Step 1	Project screening	Consultation	
Step 2	Selection of consultants	Consultation	
Step 3	Preparation of TOR	Approval	Hearing
Step 4	Undertaking the EIA study	Consultation	
Step 5	Preparation of the EIA report	Consultation	
Step 6	Review of the EIA report	Review	Hearing
Step 7	Agreement of Environmental Conditions	Approval & audit	

In step 1 the project proponent should:

- Check Annex 1 to see if the project is required to undertake an EIA
- Consult the ECD as to whether the project should undertake an EIA.

### 1.1 Prescribed Activities

Activities listed in Annex 1 are required by law to carry out an EIA under the Conservation of Environment (Prescribed Activities) Order, 1999.

The Conservation of Environment (Prescribed Activities) Order, 1999, will from time to time be amended and it is therefore advisable to consult the ECD during the early screening phase. Amended versions of the Conservation of Environment Enactment and Prescribed Activities are also available on the ECD homepage.

## **1.2 Consultation with the ECD**

It is the responsibility of the project proponent to consult the ECD as to whether or not a proposed development project is covered by the Conservation of Environment (Prescribed Activities) Order, 1999.

However, in practice, the EIA process starts when the project proponent applies to the relevant authorities for project authorisation. At this stage, the relevant authorities may determine if the project is covered by the Conservation of Environment (Prescribed Activities) Order, 1999, or for other reasons, find that the project ought to undertake an EIA and therefore refer the project proponent to the ECD.

Based on the preliminary information supplied to the ECD by the project proponent or the authorities, the ECD will advise on whether the project should proceed and therefore should undertake an EIA .

It is strongly recommended that a *meeting* between the ECD and the project proponent is arranged and undertaken at this early stage of the EIA process in order to create a common understanding of the reason and objectives for the EIA study, the advantages of the process and the activities involved.

Left + right side: Full picture: 'Monkey 2'

Right side: Full picture

## 2 Step 2: The EIA consultants

Steps	The project proponent and EIA consultant	The ECD	The public
Step 1	Project screening	Consultation	
Step 2	Selection of consultants	Consultation	
Step 3	Preparation of TOR	Approval	Hearing
Step 4	Undertaking the EIA study	Consultation	
Step 5	Preparation of the EIA report	Consultation	
Step 6	Review of the EIA report	Review	Hearing
Step 7	Agreement of Environmental Conditions	Approval & audit	

In the second step the project proponent should:

- Select consultants to undertake preparation of TOR and the EIA.

### 2.1 Select EIA consultants

The project proponent must select consultants to initially undertake scoping activities and preparation of TOR. Upon approval of the TOR the project proponent can prepare a detailed contract with a consultant firm to undertake the EIA study.

#### Tasks

The main tasks and responsibilities of the consultant is to; (i) undertake scoping activities and prepare the TOR (see EIA procedures, Step 3), and (ii) prepare, submit and present the EIA report (see EIA procedures, Step 4-6).

**Responsibilities**

The EIA consultant is only responsible for:

- The *quality* of the scoping activities and the TOR
- The *quality* of the impact assessment and proposed mitigation and monitoring measures presented in the EIA report. The consultant is responsible for the environmental assessment and the proposal of effective and realistic mitigation measures and monitoring programmes for the identified environmental issues.

*The impact assessment submitted by the consultant must be fully independent and unbiased. Proposals for mitigation measures and monitoring programmes, however, should be realistic, practical and feasible and therefore need to be closely discussed and reviewed with the project proponent.*

**Contact ECD for a list of consultants**

The ECD acknowledges the importance of having qualified and experienced consultants to undertake the EIA. A list of registered consultant firms can be obtained from the ECD or the ECD homepage.

If the ECD Director is not satisfied with the quality and accuracy of the contents of the EIA reports being submitted EIA consultant firms will be removed from the list of registered consultant firms .

**Requirements**

The requirements set for EIA consultants include:

- The EIA must be undertaken by a registered consultant firm
- The consultant firm must have at least one permanent specialist with a minimum of three years relevant environmental experience
- Submission of Curriculum Vitae and subsequent approval of each team member before commencement of the EIA study.

Left + right side: Full picture: 'Forest air'

Right side: Full picture



### 3 Step 3: Preparation of TOR

Steps	The project proponent and EIA consultant	The ECD	The public
Step 1	Project screening	Consultation	
Step 2	Selection of consultants	Consultation	
Step 3	Preparation of TOR	Approval	Hearing
Step 4	Undertaking the EIA study	Consultation	
Step 5	Preparation of the EIA report	Consultation	
Step 6	Review of the EIA report	Review	Hearing
Step 7	Agreement of Environmental Conditions	Approval & audit	

In the third step the EIA consultant should:

- Undertake scoping activities and present the results to ECD
- Prepare a draft TOR
- Undertake the public hearing activities required for Special-EIA
- Finalise the TOR and get final approval from ECD.

#### 3.1 Scoping activities

The scoping exercise allows the identification of potential adverse environmental issues of concern in order to determine the Terms of Reference (TOR) for the EIA report. The objective of the scoping process is to *determine the focus, scope and content of the environmental impact assessment*. Scoping is the responsibility of the EIA consultant.

##### 3.1.1 Issue identification

The identification of environmental concerns ensures that the EIA is sufficiently comprehensive and prevents the study from becoming unnecessarily protracted or expensive. Issue identification includes:

- Listing all main project activities
- Listing all main resources that will be used or affected by the project
- Listing all main environmental issues affected by the project
- Appraisal of potential impacts from each project activity.

### The matrix

To facilitate identification of the main issues, an initial long list matrix needs to be prepared. The matrix includes; (i) a graphic summary and grouping of the adverse environmental issues arising from the project, and (ii) a preliminary assessment of the importance of each of these environmental issues. The suggested ECD matrix format is provided in Table 3.

*Table 3. Long list scoping matrix of environmental issues*

Environmental issues	Issues of concern	Score
Exploration and construction/implementation stage. List:		
<ul style="list-style-type: none"> <li>• Physical issues</li> <li>• Ecological issues</li> <li>• Socio-Economic issues</li> </ul>		
Operational, production and maintenance stage. List:		
<ul style="list-style-type: none"> <li>• Physical issues</li> <li>• Ecological issues</li> <li>• Socio-Economic issues</li> </ul>		
Abandonment stage. List:		
<ul style="list-style-type: none"> <li>• Physical issues</li> <li>• Ecological issues</li> <li>• Socio-Economic issues</li> </ul>		

Note: *Issues of Concern*: Briefly describe the main aspects of concern for each environmental issue for each stage of the project.

Grouping of environmental issues arising from the project is based on:

- *The life cycle of the project* should be divided into the logical stages of activity. *For example*: (i) exploration and construction/implementation stage, (ii) operational, production and maintenance stage, and (iii) abandonment stage
- *Components of the environment*, which should be divided into three groups:

(i) Physical; covering all physical and chemical aspects of the environment, including finite (non-biological) natural resources and degradation of the physical environment by pollution

(ii) Ecological; covering all ecological aspects of the environment, including renewable natural resources, conservation of biodiversity, habitat-species interactions and pollution of the biosphere

(iii) Socio-economic; covering all human aspects of the environment, including social issues affecting individuals and communities, cultural aspects, conservation of heritage, temporary and permanent economic consequences of environmental change.

A preliminary assessment and scoring of the issues should be based on a general, but holistic assessment of the following aspects:

- The magnitude of the impact
- The permanence of the impact
- The reversibility of the condition
- To what extent the impact is cumulative.

The following scores should be used:

- 1: Minor potential adverse environmental impact
- 2: Medium potential adverse environmental impact
- 3: High potential adverse environmental impact.

#### **Data collection**

The EIA consultant will undertake an independent appraisal of potential adverse environmental issues on the basis of, for example:

- Information supplied by the project proponent
- Discussions with the project planners, relevant agencies, scientific institutions, local community representatives and relevant authorities and experts concerning the related development. Particular environmental aspects of a proposed project may be subject by law, or Government policy, for approval or consideration by another Government Agency, Statutory Authority or Local Authority, and these authorities also have to be consulted
- During issue identification an active and open participation by the general public, local communities affected, local experts and relevant authorities is encouraged by the ECD
- When possible, information on the project should be supplemented with reference to similar projects elsewhere. Site visits and inspections of similar operating facilities are also useful.

#### **Documentation**

Scoping methods used and activities undertaken during the identification of environmental issues should be clearly documented.

Environmental data for issue identification may be obtained from both primary and secondary sources. The availability and reliability of such data needs to be established as part of the scoping study. Existing environmental guidelines should be used as reference whenever possible.

### **Possible issues**

Listed below are examples of possible environmental issues that might be considered in the scoping phase.

#### *Examples of physical issues*

- Sources of air and noise pollution and negative impacts
- Indication of areas with risk of slope instability
- Estimation of potential soil erosion and soil loss
- Estimation of flood flows, flood areas and other adverse hydrological impacts
- Estimation of impact on river geomorphology i.e. bank erosion, scouring. Increased / decreased sediment deposition
- Estimation of impact on coastal and off shore geomorphology i.e. erosion, scouring. Increased / decreased sediment deposition
- Will the project modify the landscape to the extent that drainage patterns are significantly affected
- Will the project abstract raw water from surface water or groundwater resources? Is the yield sustainable and will it leave sufficient water for other users and ecological functions
- Changes to water quality including groundwater due to erosion and other pollutants described
- Estimation of additional colour to or reduced clarity of the receiving waters
- Soil compaction and fertility.

#### *Examples of ecological issues*

- Extent of habitat loss and indication of possible effects on flora and fauna
- Endemic, rare or endangered species
- Loss of biodiversity
- Will the project result in the introduction of new species of plant or animals into an area or result in a barrier to the migration or movement of species.

#### *Examples of socio-economic issues*

- Predicted probable changes to landscape or other features in project area and loss of aesthetic appeal
- Who and how many people are adversely affected
- Potential social issues that are likely to arise
- Project demands for water, electricity, sewage, drainage, telecommunications, waste disposal and others
- Estimation of waste disposal and methods
- Project traffic generation volume and distribution
- Estimated changes / impact to carrying capacity of the project area

### **3.1.2 Priority setting**

Following identification of potential environmental concerns using the long list matrix, a priority list of key environmental issues should be drawn up. The priority list should be clearly described and arguments for the priority setting given. A priority 'Top X' list is thereby established.

The number of environmental issues depends on the content and scope of the project but it is often seen that only 5-10 key adverse environmental issues arise as a consequence of a development project.

In making the priority list it is important to:

- Make the choice of significant adverse environmental issues on the basis of magnitude, geographical extent, significance to decision-makers or special local sensitivities (for example soil erosion, presence of endangered species, nearby historical sites, protected areas or burial grounds)
- Do not consider only the receptors of impact during the construction and operational stages. Due attention should be paid to the project outputs following abandonment and continued destruction to habitats
- Examine the significance of the impacts in relation to existing environmental standards (for example location, volume or concentration) against Malaysian or international environmental quality standards
- Incorporate assessment of the environmental priorities and preferences held by society, particularly those held by people likely to be affected by the end result of the activity
- Consider the degree to which the impacts can be mitigated during planning, construction and operations.

### **3.1.3 Presentation of scoping results**

Following scoping activities, the consultant must forward a scoping note including the following to ECD:

- Project description
- Maps (location including longitude and latitude or UTM co-ordinates, habitat, water catchment, nearest protected area, etc.)
- List of identified and proposed prioritised environmental issues
- Long list scoping matrix with an initial assessment of all identified environmental issues in relation to the project
- Description of issues and arguments for priority setting
- Documentation of scoping activities undertaken.

A meeting between the consultant and the ECD will be held in order to assess the scoping results and activities. If the results are regarded sufficient by ECD, the preliminary TOR will be discussed.

At this stage a decision will be made by ECD as to whether the EIA should be a Normal-EIA or a Special-EIA.

## **3.2 Preparation of draft TOR**

The exercise described above yields a key set of issues that need to be resolved by the EIA. The next step is to determine the strategies to be adopted for assessment and resolution. The TOR provides a written framework for the proposed EIA study and allows the EIA to proceed in a systematic manner.

Following initial discussion with ECD a draft TOR has to be prepared by the consultant. Typically, the draft TOR should include the following:

- Background information on the nature and extent of the project
- Scope of work for the EIA study
- Schedule and methods for impact, mitigation measures and monitoring programmes, including data to be collected and how (primary and/or secondary data collection)
- Activities involving key stakeholders
- Identification of consultant to undertake the study, including detailed Curriculum Vitae for each team member
- Work schedule with tentative and final completion dates.

The draft TOR has to be submitted to ECD. It is recommended that the consultant hold consultations with the ECD on the contents of a draft TOR, as this will result in a common understanding of the issues to be covered. A standard draft TOR format is available at the ECD. The TOR normally consists of approximately 10-15 pages, excluding Curriculum Vitae.

### **3.3 Public hearing for Special-EIA TOR**

A public hearing concerning the content of TOR is required for Special-EIAs. The draft TOR will be announced in local newspapers, providing an opportunity for public comment on the forthcoming EIA. The public hearing period will be 14 days and written comments from the public can be sent to ECD either by mail or via the ECD homepage.

The project proponent will bear the cost for the public announcement. The size of the newspaper notification is a minimum ¼ page. Specific regulations can be obtained from the ECD.

The draft TOR is available from the project proponent, the EIA consultant and the ECD office and homepage.

The consultant will provide a written reply to the public comments. The public comments and reply will also be made available at the ECD office and homepage.

### **3.4 Approval of TOR**

#### **Approval of TOR for EIA**

The consultant will finalise the TOR based on the ECD review of the draft TOR. The EIA study may proceed once the ECD has agreed on the final contents of the TOR.

#### **Approval of TOR for Special-EIA**

For Special-EIAs, the ECD will take into consideration the public comments and the written reply by the EIA consultant. The ECD will instruct the EIA consultant to include relevant public proposals in the TOR. The EIA consultant will finalise the TOR and the EIA study may proceed once the ECD has agreed on the final contents of the TOR.

#### **Approval of consultants**

The final TOR will include an approved list of consultants to undertake the EIA study. Upon approval of the TOR the project proponent can prepare a detailed contract with the consultant to undertake the EIA study.

Left + right side full picture: "Copper mine"

Right side: Full picture



#### 4 Step 4: Undertaking the EIA study

Steps	The project proponent and EIA consultant	The ECD	The public
Step 1	Project screening	Consultation	
Step 2	Selection of consultants	Consultation	
Step 3	Preparation of TOR	Approval	Hearing
Step 4	Undertaking the EIA study	Consultation	
Step 5	Preparation of the EIA report	Consultation	
Step 6	Review of the EIA report	Review	Hearing
Step 7	Agreement of Environmental Conditions	Approval & audit	

In the fourth step the EIA consultant should:

- Assess environmental impacts
- Assess mitigation measures
- Assess monitoring programmes.

The EIA study consists of three main assessments, namely, (i) assessment of the environmental impacts of the project, (ii) assessment of mitigation measures, and (iii) assessment of subsequent monitoring programmes.

For each of the assessments a three-pronged strategy is recommended, namely, (i) review of known impacts/mitigation measures/monitoring programmes for the type of development project, (ii) investigation and (iii) evaluation.

*Table 4. Recommended overall methodology for the EIA study*

Steps	Impact assessment	Assessment of mitigation measures	Assessment of monitoring programmes
<b>Activities</b>			
Review	Appraisal of possible impacts	Exploration of possible mitigation measures	Exploration of possible monitoring programmes
Investigation	Focused data collection and analysis	Study which measures could be implemented and how	Study which programmes could be applied and how
Evaluation	The significance of the adverse environmental impacts	The effectiveness of the mitigation measures	The reliability of the monitoring programmes

The impact assessment made by the consultant must be fully independent and unbiased. Proposals for mitigation measures and monitoring programmes, however, should be realistic, practical and feasible and therefore need to be closely discussed and reviewed with the project proponent.

#### **4.1 Impact assessment**

The TOR outlines the key environmental issues the EIA study should cover. Data collection and analysis should be carefully planned and executed in order to fulfil the requirements of the TOR.

However, it should be stressed that it remains the responsibility of the consultant to secure that the EIA study addresses *all key adverse environmental impacts, mitigation measures and monitoring programmes* of relevance for the proposed project. The issues may have been identified during the scoping exercise, but may also be 'discovered' during the a dual EIA study.

#### 4.1.1 Review

##### Appraisal of key issues

A thorough review of literature and experiences on the development activity should be undertaken to identify the key environmental impacts that are already known. The review should summarise the practical experiences that have been gained at the local, national and international level, identifying the environmental problems that have been encountered elsewhere as a result of this type of project. The review should also identify general and site-specific issues. For example, it is well known that commercial logging activities in the region have a major impact on soil erosion and therefore it will be better to report on what is known rather than predict from baseline data.

The review should be undertaken by consulting relevant guidelines and literature, consulting local and national experts, practitioners, DOE, ECD, other relevant institutions, reviewing other EIA reports (ECDs library can be used) and internet information.

#### 4.1.2 Investigation

##### Focused data collection and analysis

Methodologies to be used for investigation of adverse environmental impact should be carefully considered, selected and applied. Each development project will have site-specific impacts and the EIA consultant should decide the best methodology to be used to ensure that the impact assessments made are representative of the environment being described.

For the assessment of adverse environmental impacts it is encouraged to:

- Use scenarios
- Focus on cumulative impact
- Use visualising techniques
- Consider aesthetic and visual environmental impacts.

Following the review and determination of assessment methodology, appropriate baseline data has to be collected. It is important to stress that collection of environmental (baseline) data must be focussed, practical and relevant to the impact assessments. Only data of immediate relevance for the impact assessment, and/or the recommended mitigation measures and monitoring programmes, should be collected and analysed.

It can furthermore be noted that data:

- Should focus on selected ecosystem components, as it is often impossible to obtain a comprehensive collection of environmental data
- Should focus on the existing habitat and the physical environment components that are expected to receive the most serious impacts
- Has to be relevant to the geographic boundaries of the EIA study. The relevant boundaries may be determined from an understanding of the cascade of interactions and effects that activities have on the environment. For example, site clearing and earthworks cause soil erosion and consequently siltation of rivers, which may be a source of local or public water supply. The geographic boundary of the EIA study should extend beyond the project site and include down-stream/down-wind effects

- Should be concise and relevant to the project and location. Data tables must be referred to and the reason for inclusion should be explained. Inclusion of irrelevant data, particularly if it impedes decision making, can be detrimental to the review of the EIA
- On the 'socio-economic or human environment' should only be collected only if directly relevant for the key adverse environmental issues of the project
- On aesthetic and landscape values of the existing environment in the project and surrounding areas should be included
- Can utilise where appropriate inference, extrapolation or prediction of environmental conditions and responses from environmental studies in other areas when actual data is lacking. Although such information may only be of indeterminate reliability as regards the project being evaluated, it is nevertheless often adequate for assessing impacts
- May be obtained from both primary and secondary sources
- Should be sought from environment-related agencies, universities, research institutions and other established sources before embarking on extensive and expensive field data collection programmes.

Although the importance of baseline data for impact and monitoring purposes must be acknowledged, *over commitment of time and resources on environmental studies at the existing environment should be avoided*. Protracted data collection may not necessarily improve the quality of the information upon which decisions are made. On the contrary, protracted or excessive environmental data collection can be an impediment to decision making as it may distract from the key environmental issues. During a necessarily limited period of sampling, a snapshot impression is obtained and it is important to be aware that this is so.

On the other hand, relevant data on the existing environment may serve as a protection for the proponent against later unjustified claims of damage to the environment by the project. A project carrying out a well-focused study is better placed to advance its case, assuming there are adequate mitigating measures, placing the project in a strong position to meet any later challenges.

### **Examples of environmental data**

Listed below are examples of environmental variables that might be collected.

- *Hydrology*: Existing stream flow records or erosion / accretion data available / consulted? Comparison with other studies / existing literature?
- *River and coastal geomorphology*: Describe / map existing system? Existing wave / tide / erosion / accretion data available / consulted?
- *Water, air, noise*: Existing noise, water or air data available / consulted? Comparison with other studies / literature? Have the water users downstream been considered?
- *Meteorology*: Existing data relevant to the project and location available / consulted? - Data collected as part of baseline monitoring? - Comparison with other studies / literature?
- *Geology and soils*: Evaluation of site from existing records? - Data collected as part of baseline monitoring? - Comparison with other studies?
- *Biological / ecological*: Existing data available / consulted? - Is the site located partly, wholly or nearby a protected area? - Has a detailed ecological survey been undertaken? - Comparison with other studies / literature?

- *Socio-economic*: Was the aesthetic value of the project area investigated - as perceived by the general public? Description of archaeological sites within or nearby project area? Description of sites of religious interest / importance within or nearby project area. Have existing, water, electricity and telecommunications been determined? Data on present and planned road system and capacity included? Has the carrying capacity for the site been estimated?

### 4.1.3 Evaluation

#### Significance

Following the review, data collection and analysis, the consultant should evaluate the significance of *the key adverse environmental issues* identified. Significance depends on an *integrated* impact assessment in relation to four criteria, namely:

- The *magnitude* of change/effect, which is a measure of the importance in relation to the spatial boundaries
- The *permanence* of the impact, which defines whether the condition is temporary or permanent.
- The *reversibility* of the condition, which defines whether the condition can be changed and is a measure of the control over the effect of the condition
- To what extent the impact is *cumulative*, which is a measure of whether the impact will have a single direct effect or whether there will be a cumulative effect over time, or a synergistic effect with other conditions.

The evaluation of significance should be based on the predicted and assessed environmental impact and when possible be compared with existing acceptable standards. However, significance is not easy to define and subjective judgement is normally also required. An active and open participation by the general public, local communities affected and local experts and authorities in the impact assessment is encouraged. The level of significance consequently determines the level of mitigation required to reduce the impact to an acceptable level.

## 4.2 Assessment of mitigation measures

It makes little sense to carry out impact assessments unless they are used to avoid, mitigate or remedy environmental problems. Mitigation of impacts is the stage at which preventive, remedial or compensatory measures for each of the adverse impacts assessed as significant are considered.

The consultant must explore possible mitigation measures for the adverse environmental impacts defined. All the main adverse environmental impacts should be reviewed, analysed and evaluated in detail in relation to possible mitigation measures, while the minor impacts should be reviewed, analysed and assessed in less detail. For example, the consultant should consider alternative project designs, changes in project layout and the cost estimates for different mitigation measures.

#### **4.2.1 Review**

##### **Exploration of possibilities**

A thorough review of appropriate mitigation measures should be undertaken. What are the key environmental mitigation measures? What practical experiences have been gained at the local, national and international level? What environmental problems have been solved elsewhere as a result of the mitigation measures? What general and site-specific mitigation measures exist that are appropriate for the project?

The review should consult all relevant guidelines and literature and should consult local and national experts, practitioners, DOE, ECD, relevant institutions, review of other EIA reports and internet information.

#### **4.2.2 Investigation**

##### **Study which measures could be implemented and how**

Mitigation measures then have to be investigated concerning efficiency, practicability and cost-effectiveness. Each of the proposed mitigation measures should be described and analysed in detail. This includes for example the technical requirements and specification for the mitigation measure and when and how the mitigation measures should be incorporated into the project design and construction contract documents.

Analysis and site visits in order to predict the effectiveness have to be made. This includes analysis of for example the appropriate design, location and timing of the possible mitigation measure. If for example the implementation of a sedimentation pond or silt screen is a possible mitigation measure, investigation regarding e.g. location, size, composition, have to be made.

The estimated costs for the mitigation measures have to be presented.

Data on mitigation measures that are indirectly linked to the development project, for example rehabilitation efforts in adjacent areas should also be investigated. Most development projects have irreversible adverse environmental impacts and by acknowledging this, the project proponent may want to compensate through involvement in environmental improvement projects thus contribute towards the general conservation and maintenance of the environment in Sabah. For example, if the project destroys mangroves, it might be justifiable for the project proponent to commit towards a mangrove rehabilitation project in an adjacent area to compensate for the adverse impact caused by the project.

#### **4.2.3 Evaluation**

##### **Effectiveness**

An evaluation of the overall effectiveness of the mitigation measures should finally be made.

It is important that the EIA consultant works closely with the project proponent in evaluating the mitigation measures in order to ensure that the assessments, and recommendations, are practical, cost-effective and at the same time sufficient to mitigate the impact.

### 4.3 Assessment of monitoring programmes

The consultant must explore possible and viable monitoring programmes and must present a schedule for monitoring:

- Compliance of the recommended mitigation measures
- The residual impact on the environment.

The monitoring programmes should focus on establishing simple monitoring and follow up requirements that will secure that the mitigation measures are applied and that the project impact on the environment remains within acceptable levels. It is important to establish an appropriate and practical monitoring programme that can be handled and implemented by the project proponent and/or appointed consultant. This often means that the number of environmental issues monitored should be kept to a minimum.

#### 4.3.1 Review

##### Exploration of possibilities

A review of the possible monitoring programmes should be undertaken. Which parameters should and could be monitored? What practical experiences have been gained at a local, national and international level?

The review should be undertaken through, for example, consulting all relevant guidelines and literature, consulting local and national experts, practitioners, DOE, ECD, relevant authorities, review of other EIA reports and internet information.

#### 4.3.2 Investigation

##### Study which programmes could be implemented and how

Monitoring programmes has to be investigated concerning efficiency, practicability and cost-effectiveness. Site visits should be undertaken in order to determine the appropriate monitoring sites, sampling schedule and equipment.

For compliance of mitigation measures, the investigation should include:

- How to check that actual implementation of recommended mitigation measures has taken place
- The location of mitigation measures and monitoring sites on maps and pictures
- Time schedule for the programme, including frequency of site visits in relation to the projected duration
- Requirements for periodic reporting
- How and when audit/review of results should be undertaken.

For residual impacts, the investigation should include:

- What *indicators* should be used for monitoring the impact of the project on key environmental issues. The indicators should relate to environmental impacts where possible future mitigation measures exist. For example, following the conversion of forested land to oil palm plantation there is no need to monitor impacts on biodiversity as no amount of mitigation can restore the original ecosystem. However, monitoring water

quality remains important, as controlling effluent discharge will reduce continued pollution

- Definition of *standards and threshold values* for each of the selected indicators to allow for ongoing monitoring. For example the following thresholds could be used: (i) Warning threshold; below this threshold the project proponent can continue implementation, over the warning threshold, mitigation measures have to be investigated and put into force, (ii) Critical threshold; over this threshold a temporary stop to the project must be initiated, the source of problem identified and work only continued if appropriate mitigation measures can and are put into place
- A detailed study on 'the what should be done when and by whom'. This includes for example, the *responsibilities* and role of the project proponent and estimated staff and consultant requirements to ensure proper implementation of the monitoring programme
- Monitoring *costs and reporting* requirements. What are the estimated monitoring costs, when and how often should the monitoring reporting take place and who is responsible for reporting.

### 4.3.3 Evaluation

#### Reliability

In evaluating the overall reliability and effectiveness of the monitoring programmes, the EIA consultant should work closely with the project proponent in order to ensure that the assessments is practical, cost-effective and at the same time sufficiently effective in controlling compliance of mitigation measures and monitoring (and correcting) residual impacts.



Left + right side: Full picture: 'Hill constr.1'

Right side: Full picture

## 5 Step 5: The EIA report

Steps	The project proponent and EIA consultant	The ECD	The public
Step 1	Project screening	Consultation	
Step 2	Selection of consultants	Consultation	
Step 3	Preparation of TOR	Approval	Hearing
Step 4	Undertaking the EIA study	Consultation	
Step 5	Preparation of the EIA report	Consultation	
Step 6	Review of the EIA report	Review	Hearing
Step 7	Agreement of Environmental Conditions	Approval & audit	

In the fifth step the EIA consultant should:

- Adhere to the ECD requirements and 'standard table of contents' in the preparation of the EIA report
- Prepare the EIA report in line with the ECD chapter-by-chapter recommendations.

### 5.1 ECD requirement and 'standard table of contents'

The main purpose of an EIA report is to clearly list and describe what has been assessed *and recommended*. Each of the environmental issues defined in the TOR or identified during the EIA study, has to be assessed in relation to; (i) environmental impact, (ii) possible and recommended mitigation measures, and (iii) recommended monitoring requirements.

Of utmost importance is the effective communication of assessment findings and recommendations. The findings of an EIA study need to be documented in a clear and concise manner devoid of unnecessary technical details. The usefulness of an EIA report is measured by how the potential problems are foreseen and addressed with adequate and straightforward answers and proposals.

The EIA shall bring forward in a straightforward way the results and conclusions of the analysis *for each of the environmental issues studied*, for example the assessed impact on (i) mangroves, (ii) coral reefs, (iii) drainage and flooding, and (iv) soil erosion of a proposed land reclamation development project. The EIA shall furthermore clearly bring forward the

results, conclusions and recommendations regarding feasible mitigation and monitoring measures *for each of the environmental issues studied*.

An EIA is not supposed to conclude, decide or recommend on the project as a whole.

EIA reports, in summary or full (Special EIA), will be made available at the ECD office and/or homepage. The EIA consultant is required to prepare and submit the report in Word-format, and if possible also maps, etc. in electronic format, for inclusion on the homepage.

It should be noted that according to section 18 (c) of the Conservation of Environment Enactment, anyone who submits a report (EIA) containing any fact, data or information which, is false or calculated to deceive, is guilty of an offence and can be imprisoned for three years and fined RM 30,000.00.

The EIA report is the responsibility of the EIA consultant.

#### **Table of content**

Table 4 provides the necessary items and structure for an EIA report to be submitted to ECD. This may be expanded to include other aspects of relevance to the project in question.

*Table 5. Standard table of content for an EIA report*

Chapter no.	Title
1	Executive summary
2	General information
3	Project description
4	Impact prediction and evaluation
5	Recommended mitigation measures
6	Recommended monitoring programme
Annexes	Annex 1. Baseline environmental conditions
	Annex 2. Methodologies and analysed data
	Annex 3. List of references
	Annex 4. TOR and consultant activities

The report should also include; (i) table of content, (ii) list of tables, (iii) list of figures, (iv) list of pictures, (v) list of maps and (vi) table of abbreviations. The latter should be kept to a minimum.

## 5.2 Chapter-by-chapter recommendations

### EIA report chapter 1: Executive summary

The executive summary should be regarded as a non-technical résumé of the findings and recommendations of the EIA. The executive summary should be in Bahasa Malaysia and English, and should include the following two sections.

#### **(i) Project description**

A short description of the proposed development project.

#### **(ii) Findings**

Findings in relation to *each* of the environmental issues defined in the TOR or identified during the EIA must be summarised in relation to:

- The assessed environmental impacts
- Recommended mitigation measures
- Recommended monitoring programme.

Environmental impacts that are irreversible or threaten fauna and flora, environmental quality and sustainable development should be highlighted.

The findings may be summarised in a table. *No general or overall conclusion or recommendations concerning the development project are supposed to be given.*

### EIA report chapter 2: General information

This chapter should include data in relation to the undertaking of the EIA. The chapter requires 3 sections.

#### **(i) Project title and project proponent**

Name of firm, address, telephone and fax number, name and designation of contact person responsible for the project, other projects subject to EIA, which have been carried out, are being carried out, and/or will be carried out.

#### **(ii) EIA consultants**

Name of firm, address, telephone and fax number, list of team members involved in the preparation of the report and their field of expertise, list of EIA reports, which have been carried out. Each team member should verify participation on the report by a signature.

#### **(iii) Public hearing**

For Special-EIAs, information concerning the public hearing of the EIA report should be listed, including procedures, duration and availability of the report to the public.

### EIA report chapter 3: Project description

This chapter should include a description of the proposed project with a clear explanation for the need, content and scope of the project. The chapter is divided in 3 sections.

#### **(i) Statement of need**

Short argumentation for the need for the project, including identification of the aim and beneficiaries of the project.

#### **(ii) Concept and phases**

This section introduces the project concept and the intentions of the project proponent. Each phase of project activity should be described separately. Planned or possible future project expansions should also be described.

#### **(iii) Location description**

This section should make it possible to assess the existing location and environment in and around the project area. The section should consist mainly of location maps, photos and other visual information, but should also include *a brief site description*, including the pertinent features in the project area, for example rivers, mangroves, hill slopes, etc.

#### **Maps, descriptions, etc.**

The site descriptions, geographical and visual information provided should include:

- Photographs of the existing environment in the project and surrounding area
- Location, including longitude/latitude or UTM co-ordinates and geographic boundaries of the project area and the assessment area
- Local plan development and requirements
- Location of nearby land owned or leased by the project proponent
- Land use and existing environment of project site and surrounding areas
- Ongoing developments in the same area
- Position and distance of nearest protected area/sensitive/undisturbed habitat
- Drainage/hydrology indicating river system housing the project
- Slope map derived from 1:10,000 topographic map or larger.

The consultant is also expected to provide additional information such as:

- Cadastral plan
- Visualisations, for example before/after
- Three-dimensional slope aspect maps
- Other land titles in surrounding areas
- Proposed/planned development activities in surrounding areas.

#### **(iv) Project status**

The section should include an exact description of the status of implementation of the project. Is the project on the planning stage? Has implementation begun and if so, which activities have been undertaken when and where?

The section should also include a concise overview of the approval procedures for the project. What approvals are needed and when? What approvals have already been received, submitted and/or will be submitted, when submitted, and from which authority?

## EIA report chapter 4: Impact prediction and evaluation

This chapter should include impact assessments of *the environmental issues* identified by the scoping exercise and laid down in the TOR for the EIA. If additional environmental issues are identified during the EIA study they should also be included and assessed. The chapter contains 3 sections.

### (i) The most important environmental impacts

This section outlines and describes in brief the impacts that have been evaluated to be the most likely and significant environmental impacts of the project. The 'Top X' key impacts included in this section are later evaluated and documented in detail in section (iii) of this chapter.

#### Examples

'The primary impacts during construction are:

- Sediment spills from the dredging and reclamation activities
- Water quality as a result of the dredging and reclamation activities
- Ambient noise and dust levels
- Navigation impacts
- Socio-cultural impacts.

Of these, the sediment spill issue is likely to be the most significant and the following analysis prioritises this issue.'

'The most important potential adverse impact in the planting, maintenance and production phase relates to

- Fertiliser application
- Pest and disease control/seed control
- Solid waste disposal from oil palm mill
- Continuous draining of peat soil.'

### (ii) The EIA matrix

The section includes the EIA matrix as illustrated in Table 6 and provides an overview of *all* adverse environmental impacts evaluated in the EIA study.

The ECD matrix format divides the impacts into stages. As for the initial scoping exercise, the EIA should be divided according to the project life cycle, *for example* (i) exploration and construction/implementation stage, (ii) operational, production and maintenance stage, and (iii) abandonment stage.

Table 6. The EIA matrix

Environmental assessment/ Main adverse environmental impacts	Magni- tude	Perma- nence	Reversi- bility	Cumula- tive
Exploration and construc- tion/implementation stage				
Operational, production and maintenance stage				
Abandonment stage				

All of the environmental impacts included in the EIA study should be assessed according to the criteria below and the scores shown in the matrix.

- The *magnitude* of change/effect, which is a measure of the importance in relation to the spatial boundaries. The following scale should be used: (1) change/effect only within the project site, (2) change/effect to local conditions and/or to areas immediately outside, (3) regional/ national/ international change/effect
- The *permanence* of the impact, which defines whether the condition is temporary or permanent. Scale: (1) no change/not applicable, (2) temporary; (3) permanent
- The *reversibility* of the condition, which defines whether the condition can be changed and is a measure of the control over the effect of the condition. Scale: (1) no change/not applicable, (2) reversible, (3) irreversible
- To what extent the impact is *cumulative*, which is a measure of whether the effect will have a single direct effect or whether there will be a cumulative effect over time, or a synergistic effect with other conditions. Scale: (1) no change/not applicable, (2) non-cumulative/single, (3) cumulative.

### **(iii) Impact assessment**

Each of the environmental impacts listed in the EIA matrix should be assessed in this section.

The 'Top X' listed impacts (in chapter 4, section (i) of the EIA report) should be prioritised and assessed in detail, while the remaining impacts listed in the matrix should be assessed in less detail.

For each environmental impact, the specific methodology of review, data collection and analysis should be described and the results of the analysis and conclusions of the assessment presented.

The methodologies used for the review, data collection and analysis are to be clearly stated and documented.

#### **Example**

'The method used for noise impact prediction is the DENL-method (Day-Evening-Night-Level). The procedure calculates the average noise in the 3 most trafficked months and the noise incidents are weighed depending on the time of the day. Noise in the evening are added 5 dB and in the night 10 dB'.

The results of the analysis and conclusion of the assessments have to be presented in a clear and concise manner. The conclusion must clearly and specifically summarise the results of the analysis and must correspond to the scores given in the EIA matrix. It is important in the analysis and conclusions to use and refer to existing environmental guidelines and published literature/case studies.

#### **Example**

'The project will result in an estimated 3 % loss of the live coral in the area. However, loss of coral is cumulative, and the cumulative effect over the years of a number of '3 % developments', would be significant'



## EIA report chapter 5: Recommended mitigation measures

This chapter should include recommended and possible mitigation measures for the environmental impacts assessed in chapter 4 of the EIA report. Adverse impacts that cannot be mitigated must be highlighted. The chapter includes two sections.

### **(i) Recommendations**

The section should include a priority list of the most important mitigation measures that the project proponent should adopt, as recommended by the consultant.

It is important that the EIA consultant works closely with the project proponent in preparing the shortlist of recommended mitigation measures in order to ensure that the recommendations are practical, cost-effective and at the same time sufficient to mitigate the impact.

*The recommended mitigation measures will provide the basis for the environmental conditions and mitigation measures to be agreed upon by the project proponent and the ECD and laid down in the Agreement of Environmental Conditions (see step 7 in this handbook).*

### **Examples of recommended mitigation measures**

'Deployment of a fixed silt screen to the north of the reclamation area to protect the coral reef'. Details are provided in Annex.'

'Provision of 250 meters buffer zone is recommended from the edge of the water catchment boundary.'

'A trapezoidal lined diversion channel located across the slope will convey excess runoff from higher areas and prevent sediment-laden water from reaching the river. Side slopes of the channel will not exceed 2:1.'

Each of the recommended mitigation measures should be described in detail. This includes for example when and how the recommended mitigation measures should be incorporated into the detailed project design and in the construction contract documents.

Recommendations such as 'a proper handling and responsible management of fertiliser and pesticides' or 'proper management of effluent from the factory' are not acceptable.

Cost-estimations for all proposed mitigation measures have to be provided.

Documentation and references.

Documentation on the review, data collection and analysis and assessment of the recommended mitigation measures needs to be provided. The existing environmental guidelines available at ECD, Federal DOE and other sources should be referred to.

### **(ii) Additional mitigation measures**

In this section additional mitigation measures should be described. These additional mitigation measures includes measures that:

- Should be implemented, even though they are directed towards adverse environmental impacts of a minor significance

- Have been analysed and assessed, but for some reasons, e.g. cost-effectiveness, were considered inappropriate to implement
- Are indirectly linked to the development project, for example, rehabilitation efforts in adjacent areas.

The additional mitigation measures will be reviewed by the Review Panel and ECD and might be included in the Agreement of Environmental Conditions (see step 7 in this Handbook).

### **Examples of additional environmental improvements**

'Initiate a local reef rehabilitation project to counter direct loss of habitat'

'Initiate a local mangrove conservation project to counter direct loss of habitat in the lagoon'

## **EIA report chapter 6: Recommended monitoring programme**

This chapter should describe the recommended schedule and monitoring programme for:

- Compliance of the recommended mitigation measures (as described in chapter 5, section (i), of the EIA report)
- The residual impacts of the project on the environment.

The chapter includes two sections.

### **(i) Monitoring programme for compliance of mitigation measures**

This section clearly outlines methods to monitor the compliance of *all* the recommended mitigation measures. The methods should be designed in such a way that it will be possible for the project proponent to demonstrate that the mitigation measures are effectively implemented. The methods should include detail on how compliance of the recommended mitigation measures should be monitored, by whom and how often.

The recommended methods should include:

- How to check that actual implementation of recommended mitigation measures has taken place
- The location of mitigation measures and monitoring sites on maps and photographs
- Time schedule for the programme, including frequency of site visits in relation to the projected duration
- Requirements for periodic reporting
- How and when audit/review of results should be undertaken.

### **(ii) Monitoring programme for residual impacts**

The section should clearly describe a *recommended* monitoring programme that will measure key residual environmental impacts of the project. The programme should be designed in such a way that will make it possible for the project proponent to demonstrate that the project has acceptable impacts on the identified key environmental issues. The monitoring programme should also include details as to how the key adverse changes in the environment should be monitored, by whom and how often.

The monitoring programme for residual impacts should include:

- Indicators for key environmental issues
- Standards. It is not enough to just include - within an Annex - environmental standards used in Malaysia. Detail on how these standards should be applied should be described and related to the project
- Methodology, location and schedule. The methodology used for monitoring has to be stated. Maps, photographs and co-ordinates of proposed sampling areas should be presented. Regular monitoring is paramount to success in impact reduction. A recommended time schedule for monitoring should be stated
- Responsibilities and costs. It should be established in detail what should be monitored, when and by whom. This includes for example, the responsibilities and role of the project proponent and estimated staff and consultant requirements, ensuring proper implementation of the monitoring programme. An estimated budget should be provided as well as how the monitoring should be incorporated into the detailed project design and contract documents
- Reporting. Recommendations for monitoring reporting have to be given. When and how often should the monitoring reporting take place and who is responsible for the reporting.

**Example: Indicators**

'The environmental impact of road construction will be monitored in relation to the following issue: Noise.'

**Examples: Standards**

'The pH of the retention pond water will be monitored on a hourly basis and if it falls below 4, discharge will be halted and lime will be added.'

'Noise generated must not exceed 65 dB at the factory boundary and not exceed 55 and 45 dB at the residential area at day and night respectively.'

'Effluent discharge into the river will be monitored for ammonical nitrogen and discharge will be halted if concentrations exceed 0.1 ppm.'

**Examples: Methodology and location**

'Project impact on air quality in the construction phase: Continuous on-site air sampling will take place using high volume sampler (HVS). The samplers will be placed in the prevailing wind direction, upwind and downwind of pollution sources within a radius of 1 km.'

'The water quality of the river flowing through the project area will be monitored on a weekly basis for PCB's and other polycyclic hydrocarbons at location 1. All other water quality parameters will be measured on a monthly basis at sites 2 and 3.'

'It is recommended that two of the sampling points used for this study (WN4) near the discharge point and (WN5) downstream of the proposed loading and processing area, be used to monitor oil and grease on a weekly basis.'

## EIA report: Annexes

Annexes should include all information not immediately relevant to the main text of the EIA. Annexes should include:

### **Annex 1: Baseline environmental conditions**

This annex should include additional relevant information, maps and photographs of the existing environment at the proposed development site not included in chapter 3 of the EIA report. The annex should primarily include descriptions of immediate relevance for the impact assessment and the recommendations made in chapters 4-6 of the report.

### **Annex 2: Methodology and analysed data**

In this annex the methodologies used in the EIA for assessment of environmental impact and mitigation measures should be elaborated upon. Methodologies should be documented and references given. All data collected, modelled and extrapolated during the EIA should be provided. Environmental sampling reports, for example on ambient air data, noise levels data, water quality data, should be presented in detail.

### **Annex 3: List of references**

In this annex references used for the preparation of the EIA report should be listed.

### **Annex 4: TOR and activities undertaken by the EIA consultant**

This annex should include all other relevant information for the review of the EIA report, for example:

- TOR for EIA consultants
- List of consultations held
- Details of involvement of key stakeholders (how, when, who).

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## 6 Step 6: Review of the EIA report

Steps	The project proponent and EIA consultant	The ECD	The public
Step 1	Project screening	Consultation	
Step 2	Selection of consultants	Consultation	
Step 3	Preparation of TOR	Approval	Hearing
Step 4	Undertaking the EIA study	Consultation	
Step 5	Preparation of the EIA report	Consultation	
Step 6	Review of the EIA report	Review	Hearing
Step 7	Agreement of Environmental Conditions	Approval & audit	

In the sixth step the EIA consultant should:

- Submit the EIA report to ECD
- Undertake the public hearing activities required for Special-EIA
- Participate in review meetings
- Submit additional information if required and finalise the EIA report.

### 6.1 Submission of the EIA report

A minimum of fifteen copies of the report should be submitted to ECD. The report has to be submitted in Word-format. Maps, etc. should also if possible be submitted in electronic form.

All members of the study team must affix their signatures to the EIA report and at least three copies must contain original signatures of the team involved in the study.

### 6.2 Public hearing for Special-EIA reports

A public hearing concerning the content and quality of the assessments and proposals made in the EIA report should be conducted for Special-EIAs. The availability of the Special-EIA report will be announced in the local newspapers, providing an opportunity for the general public to put forth their comments on the report. The public hearing period will be one month.

Comments from the public shall be sent to ECD either by mail or through the ECD homepage. A comment form is available for quick entry of comments on the ECD homepage.

The project proponent will bear the cost for the public announcement. The size of the newspaper notification is a minimum  $\frac{1}{4}$  of a newspaper page. Specific regulations can be obtained from the ECD.

The Special-EIA report is available from the project proponent, the EIA consultant, and ECD office and ECD homepage. The Special-EIA report will also be made available at the public library in Kota Kinabalu and Sandakan and other designated sites when necessary.

Depending on TOR, the EIA consultant may be required to announce and undertake additional public hearing activities such as public hearing meetings.

The EIA consultant will provide a written reply to the written public comments. The public comments and reply will be made available at the ECD office and homepage.

### **6.3 Review of EIA reports**

Reviews of Normal-EIA reports will be carried out by ECD. When necessary, other Federal and State Departments and external experts will be called upon to provide comments.

The review process seeks to ensure that impartial and proper consideration of the EIA report takes place, and include:

- A critical review of the environmental impact assessments made and the mitigation measures and monitoring programmes proposed in the EIA report
- To request additional information if deemed necessary.

A Review Panel will be established for Special-EIAs. The Review Panel will consist of appointed members with special expertise in the environmental issues assessed. The list of members of the Review Panel can be obtained from ECD and ECD homepage. The objective of the Review Panel is to ensure that impartial and proper consideration of the Special-EIA report takes place, and:

- To critically review the environmental impact assessment and the mitigation measures and monitoring programmes proposed in the EIA report
- To consider the public comments and reply from the EIA consultant
- To request additional information when deemed necessary
- To advise the Director of ECD on the terms to be included in the Agreement of Environmental Conditions (see step 7 in the EIA procedures).



The EIA consultant will be called for a meeting with ECD and/or the Review Panel.

The review of the EIA report will be regarded finished when it is found that:

- The environmental impact assessment is sufficient for the ECD or the Review Panel to assess the most important environmental effects of the project
- Proposed mitigation and monitoring measures are found to be appropriate, realistic and sufficiently detailed to be used in the formulation of the Agreement of Environmental Conditions (see step 7 in the EIA procedures).

If important environmental aspects were not sufficiently addressed in the first report submission, or if mitigation and monitoring measures have been insufficiently described, additional information will be requested.

If after two re-submissions the ECD or the Review Panel still finds the information received insufficient the project proponent will be asked to contract a new EIA consultant.

The two possible outcomes of the review are:

- An environmental non-approval of the proposed Development Project
- A draft Agreement of Environmental Conditions (AEC), see step 7.

### **6.3.1 An environmental non-approval of the project**

It should be stressed that EIA reports only are to be regarded as Environmental Information supplied to the Department in order for the Department to make decisions. These decisions will not only be based on the findings (and statements in the EIA report), but will be based on holistic assessments of the impacts of the projects in relations to for example (i) each of the environmental issues studies, (ii) policies and plans of the Governments, (iii) assessments and recommendations made by other governmental departments, by review panels, by comments from the public, etc.

An environmental non-approval of the proposed project may occur if for example the EIA report and/or the review has shown that the proposed project will result in substantial adverse environmental impact, if no appropriate mitigation measures can be found, if the project is in contradiction to governmental policies and plans, or if substantial assessments and/or recommendations made by other governmental departments, review panels, the public, etc.

It should however also be stressed that the Department emphasises a thoroughly and proper initial environmental assessment of proposed development projects in the screening phase (see step 1), and therefore foresee that only very few projects will receive an environmental non-approval. As mentioned earlier, the Department regards the EIA primarily as an assessment and mitigation tool, to be used to make development projects as environmental friendly as possible.

In the case of environmental non-approval the ECD will forward an environmental non-approval letter to the relevant project approving authorities (refer to the Conservation of Environment (Prescribed Activities) Order 1999).

*6. No prescribed activities shall be carried out or commenced until -*

*(a) a report required to be submitted under paragraph 3 has been considered by the Director, and the Director, subject to such orders or directions as the Director is empowered to make under the Enactment, has given permission in writing for such activities to be undertaken or commenced;*

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## 7 Step 7: Agreement of Environmental Conditions

Steps	The project proponent and EIA consultant	The ECD	The public
Step 1	Project screening	Consultation	
Step 2	Selection of consultants	Consultation	
Step 3	Preparation of TOR	Approval	Hearing
Step 4	Undertaking the EIA study	Consultation	
Step 5	Preparation of the EIA report	Consultation	
Step 6	Review of the EIA report	Review	Hearing
Step 7	Agreement of Environmental Conditions	Approval & audit	

In step 7 the project proponent should:

- Review the draft Agreement of Environmental Conditions prepared by ECD
- Co-sign the Agreement of Environmental Conditions
- Implement mitigation measures and monitoring programmes.

### 7.1 Draft Agreement of Environmental Conditions

The Agreement of Environmental Conditions is an essential step in the EIA procedure. In the Agreement the project proponent will legally bind the project to undertake the specific environmental mitigation measures and monitoring programme and to bear the costs for the environmental mitigation measures.

The contents of the Agreement of Environmental Conditions will therefore summarise the extent to which the EIA procedure will augment and protect the environment.

ECD will draft an Agreement of Environmental Conditions based on the EIA report, the proposed mitigation measures and impact and compliance monitoring programme. The outcome of the review process, including public comments and the recommendations of the Review Panel in the case of Special-EIA, will also be reflected in the draft.

### **Content of the Agreement**

The Agreement of Environmental Conditions will typically include:

*Table 7. Content of Agreement of Environmental Conditions*

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Chapter content

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An undertaking: Co-signature sheet of the Agreement of Environmental Conditions

Terms and conditions, including

Short description of project concept

Legal requirements

Compliance of mitigation measures for impacts

Monitoring programmes and supervision

Obligations of the project proponent, including compliance of mitigation measures, contract agreement, data and reports required

Consultation

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The draft Agreement will be forwarded to the project proponent. Meetings will be held as necessary.

The legal authority regarding environmental approval and conditions according to the Conservation of Environment (Prescribed Activities) Order 1999 is shown in Box 3.

6. *No prescribed activities shall be carried out or commenced until -*

*(a) a report required to be submitted under paragraph 3 has been considered by the Director, and the Director, subject to such orders or directions as the Director is empowered to make under the Enactment, has given permission in writing for such activities to be undertaken or commenced; and*

*(b) the person carrying out such activities has undertaken in writing to comply with all such orders or directions as may be made by the Director and to allow the Director to carry out such works as the Director may deem necessary under section 4 of the Enactment.*

7. *In the event that there has been a breach of the undertaking given under paragraph 6, the Director may by notice in writing direct that any of the prescribed activities shall cease forthwith.*

## 7.2 Final Agreement of Environmental Conditions

If agreement has been reached on the environmental conditions, the project proponent will be called to ECD in order to co-sign the Agreement of Environmental Conditions with the Director of the ECD. With the co-signed Agreement of Environmental Conditions the project is environmentally approved and may proceed to the next stage of implementation. Approving authority ECD will forward the Agreement of Environmental Conditions to the relevant project approving authority. The approving authority is the Government authority that decides, in view of the environmental and development costs and benefits to the community, how (or whether) a project should proceed. Project approving authorities include:

- The National Development Planning Committee (NDPC) for Federal Government sponsored projects
- The State Cabinet for State Government sponsored projects
- The various Local Authorities or Regional Development Authorities (RDA) with respect to planning approval within their respective area
- The Ministry of International Trade and Industry or MIDA for industrial projects.

The approved Agreement of Environmental Conditions is valid for 2 years, implying that implementation of the development project covered by the Agreement has to be initiated within two years after the approval date of the Agreement. If implementation has not begun within this time limit, the ECD may request for a new EIA procedure to take place.

The content of the Agreement of Environmental Conditions will be available on request from the ECD office. For Special EIAs the Agreement of Environmental Conditions will also be available on the ECD homepage.

If the Agreement of Environmental Conditions can not be agreed upon, the ECD will forward an environmental non-approval letter to the relevant project approving authorities.

## 7.3 Monitoring of Agreement of Environmental Conditions

Mitigation measures and monitoring programmes must be implemented and monitored by the project proponent as specified in the Agreement of Environmental Conditions.

The project proponent will typically be required to submit environmental monitoring reports to the ECD on a periodic basis (as defined in the Agreement of Environmental Conditions). The project proponent is required to obtain the format for the environmental monitoring report from the ECD.

If contractors are to be employed, the mitigation measures and monitoring programmes should be written up as clauses to be included into the contractual documents.

In addition to self-monitoring by the project proponent, ECD will audit the compliance of the Agreement of Environmental Conditions. The audit will be undertaken through:

- Review of the monitoring reports supplied by the project proponent as stipulated in the agreement
- On-site visits to the project location.

For a Special-EIA, the environmental audit may be undertaken by an Audit Panel consisting of ECD and appointed external representatives. The composition of the Audit Panel is available from the ECD office and homepage.

It is highly recommended that the project proponent approach the ECD immediately for advice if difficulties are encountered concerning implementation of the agreed mitigation measures or monitoring programmes.

It should be noted that according to section 5A (2) of the Conservation of Environment (Amendment) Enactment 1999, any person who fails to submit any report or comply with any of the approved conditions of the report as specified by the Director shall be guilty of an offence, and shall, on conviction, be liable to imprisonment for five years and to a fine of RM 50, 000.00 and to a further fine of RM 1,000.00 for every day that the offence is continued after a notice by the Director requiring him to comply with the act specified therein has been served upon him.



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## Activities legally required to undertake an EIA

Table 10. Conservation of Environment (Prescribed Activities) Order, 1999

Section	Paragraph
1. Agricultural Development	i. Development of agricultural estates or plantations covering an area of 500 hectares or more – (a) from land under secondary or primary forests; (b) which would involve the resettlement of more than 100 families or more; or (c) which would involve modification in the use of land
	ii. Conversion of mangrove swamps and other wetland areas into agricultural estates having an area of 50 hectares or more
	iii. Development of agricultural area adjacent to any conservation area, park or sanctuary declared under any written law
2. Forestry	i. Extraction or felling of timber covering an area exceeding 500 hectares or more
	ii. Extraction or felling of timber within or adjacent to any water catchment area whether it has or has not been declared under any written law
	iii. Development of forest plantation having an area exceeding 500 hectares
3. Development of commercial, industrial and housing estates	i. Development of commercial, housing or industrial estates covering an area exceeding 50 hectares or more
	ii. Development of industrial estates with factories to accommodate medium or heavy industries
	iii. Conversion of mangrove swamps or other wetland areas into industrial, commercial or housing estates covering an area of 30 hectares or more
	iv. Reclamation of land, whether by the sea or along river banks, for housing, commercial, or industrial estates
	v. Development of industrial, commercial or housing estates within 1000 metres from the high-water mark of the coastal areas and within the foreshores of the State
	vi. Construction of buildings for commercial purposes or buildings exceeding 4 storeys high for residential purposes on hills with slopes having gradient of 20 degrees or more
3. Activities which may pollute inland water or affect sources of water supply	i. Development of groundwater with a supply capacity of 4500 cubic metres or more per day
	ii. Construction of dams, artificial lakes or reservoirs with a surface area of 50 hectares for impounding of water
	iii. Irrigation schemes covering an area of 1000 hectares or more
	iv. Creation of lakes, ponds for the rearing of fish or prawns, covering an area of 50 hectares or more
	v. Mining pursuant to any Mining Lease issued under any written law covering an area exceeding 50 hectares or more or where mining involves the use of chemicals (including explosives) of any nature
	vi. Diversion of watercourses, streams or rivers or the excavation of sand and other rock materials there from

5. Fisheries and activities which may endanger marine or aquatic life, plants in inland waters or erosion of river banks

- i. Fish culture and other forms of fishing on a commercial scale which involve the setting up of fishing appliances and equipment in the rivers, watercourses or coastal sea

6. Extension and removal of earth, rock materials and mining

- i. Quarrying of aggregates, limestone, silica, quartzite, sandstone, sand, marble or stones within 3 kilometres of any existing residential, commercial or industrial areas, or which may cause damage or have an adverse impact on fragile ecosystem
- ii. Open cast mining for minerals or any form of mining for minerals which is likely to affect the landscape of the mining area so as to require rehabilitation thereof upon the cessation of mining activities; or
- iii. Extraction or removal of earth with a volume of 50,000 cubic metres or more from any area on State land, Forest Reserve or alienated land for any purpose

7. Any other activities which may damage or have an adverse impact on quality of environment or natural resources of the state

- i. Construction of parks, resorts or other recreational facilities or major roads on hills with slopes having gradient of 20 degrees or more
- ii. Construction of golf courses
- iii. Construction of port facilities (including waterhouses, godowns, container yards and cargo storage facilities) or open jetties with a length of 100 metres or more or closed landing jetties for commercial use along any of the rivers or sea front
- iv. Development of recreational or resort facilities within 1000 metres from the high-water mark of the coastal area and within the foreshores of the State
- v. Creation of parks, resort or recreational facilities having an area of 30 hectares or more for commercial purposes
- vi. Any development activity intended to be carried out within a water catchment area declared under any written law
- vii. Development of tourism-related facilities having an area of 30 hectares or more

## References

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Barrow, J. (1997) *Environmental and Social Impact Assessment: an Introduction*. Arnold, London.

Danish Ministry of Environment and Energy, 1995. *Environmental Impact Assessment in Denmark*.

Danish Ministry of Environment and Energy, 1995. *Strategic environmental assessment of bills and other government proposals. Examples and experiences*.

Department of Environment, 1995. *Environmental Impact Assessment Guidelines*, Department of Environment, Ministry of Science, Technology and Environment, Malaysia

Department of Environment, 1995. *Environmental Impact Assessment Guidelines For Dams and/or Reservoirs Projects*, Department of Environment, Ministry of Science, Technology and Environment, Malaysia. EG 8/95

Department of Environment, 1995. *Environmental Impact Assessment Guidelines For Development of Resort and Hotel Facilities in Hill Stations*, Department of Environment, Ministry of Science, Technology and Environment, Malaysia, EG 8/95

Department of Environment, 1998. *Environmental Impact Assessment Guidelines For Forestry*, Department of Environment, Ministry of Science, Technology and Environment, Malaysia, EG 1/98

Department of Environment, 1998. *Environmental Impact Assessment Guidelines For Coastal and Land Reclamation*, Department of Environment, Ministry of Science, Technology and Environment, Malaysia, EG 2/98

Gilpin, Alan, 1995. *Environmental Impact Assessment. Cutting edge for the twenty-first century*.

Natural Resources and Environment Board (1995) *A Handbook of the Policy and Basic Procedure of Environmental Impact Assessment (EIA) in Sarawak*. Natural Resources and Environment Board, Kuching Sarawak.

Pastakia, C.M.R. (1998). *The Rapid Impact Assessment Matrix (RIAM) - A New Tool for Environmental Impact Assessment*. In: Kurt Jensen (ed.), *Environmental Impact Assessment Using the Rapid Impact Assessment Matrix (RIAM)*, Olsen & Olsen, Fredensborg, Denmark

Wathern, P. (ed.) *Environmental Impact Assessment: Theory and Practice*, Routledge, London.

Discussions with key stakeholders, relevant authorities, international and local EIA consultants.