

# PART TWO – LEARNING THE FUNDAMENTALS

## 2. LEARNING THE FUNDAMENTALS

### 2.1 WHAT IS THE EIA MECHANISM?

 There is a common misconception that an EIA is a report. In fact, an EIA is NOT simply a Report but is a Process.

EIA should not be viewed as solely for assessing the adverse environmental impacts arising from a project and finding out mitigation measures for such impacts. There are more about an EIA as a planning tool.

On the other hand, EIA practitioners see that: EIA is a **PROCESS** and a **PROACTIVE PLANNING TOOL**:

- To pre-empt adverse environmental impacts associated with development projects, by assessing their environmental implications and ensuring that measures are implemented to avoid any potential problems that are identified;
- To provide a major meeting point between development decisions and environmental management; and
- To provide dialogue and consultation among stakeholders which link to the decision making process.

**Literature Review of what an EIA is.....**

*“ EIA is a process carried out to ensure that the likely significant environmental effects of certain projects are identified and assessed before a decision is taken on whether a proposal should be allowed to proceed. This means that the most environmentally favourable option, or at least the environmentally acceptable option, can be identified at an early stage and projects can then be designed to avoid or to minimise environmental effects” (Environmental Agency, UK, May 2002)*

*“EIA is a process to safeguard a transparent, publicly accountable decision making process in which sufficient environmental consideration is assured, inter alia by sufficient environmental information of good quality” (Robert Verheem, Dutch EIA Commission)*

### 2.1.1

### How Do You See the Use of the EIA Mechanism?

 There are some common myths about why an EIA is needed:-

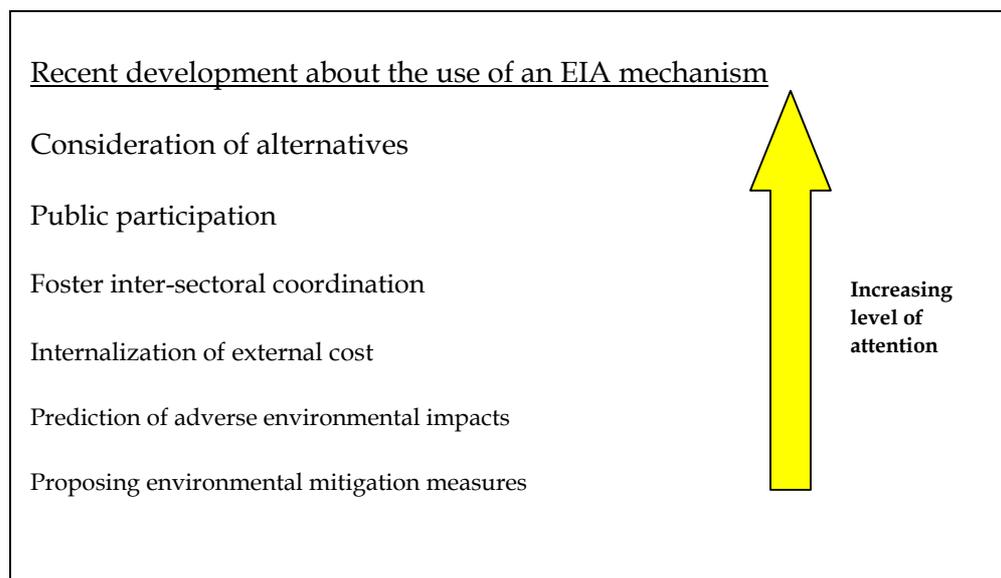
“EIA is needed only because Environmental Protection Department wants it!”

“EIA is needed to fulfil the requirements under the EIA Ordinance!”

On the other hand, EIA practitioners see that: the EIA mechanism can be used:

- To enhance public support for the project;
- For early resolution of stakeholders’ concerns;
- To provide a legal and credible framework for dealing with environmental issues;
- To promote public image of project proponents; and
- As a decision making tool.

Increasing attention is given in the EIA to the consideration of alternatives to avoiding, minimizing and mitigating adverse environmental impacts of the proposed developments. Also, public participation is becoming a key element in the EIA process.





**VIP**

An EIA mechanism can apply to projects or development, in the order of priority, to:

- **Avoid** adverse environmental impacts
- **Minimize** and control adverse environmental impacts
- **Mitigate** adverse environmental impacts

Under the EIAO Guidance Note GN1/2002, it sets out 10 basic principles of the EIA process.

**Principle One:** Proactive Planning and Decision Tool

**Principle Two:** Avoidance, Pre-emption and Prevention of Adverse Environmental Consequences

**Principle Three:** Making Positive Influence on Decision Making at the Earliest Possible Opportunity and Thinking Proactively about Options and Alternatives

**Principle Four:** Living Process Throughout the Project Cycle

**Principle Five:** Making EIA Recommendations Enforceable

**Principle Six:** Flexibility Amidst Robustness and Transparency, with Public Participation and with the Ability to Adapt to Changes

**Principle Seven:** Seeking Practical Environmental Outcomes for the Environment and Community

**Principle Eight:** Avoidance of any Late Focus

**Principle Nine:** Efficiency Amidst Effectiveness

**Principle Ten:** Transparent Agreement among Relevant Parties, Clear Expectations of what need to be done and what the Performance will be, and Explicit Resolution of any Conflicts

The importance of avoidance of environmental problems can be illustrated in the ecological section of the Technical Memorandum of the EIA Process:

#### EIAO TM Annex 16 Section 5.4.1

The General Policy for mitigating impacts on important habitats and wildlife, in the order of priority, are:

(a) Avoidance:

Potential impacts shall be avoided to the maximum extent practicable such as adopting suitable alternatives (e.g. change of site, design, construction method, alignment, layout, programme, etc). In extreme cases when the ecological assessment identifies some very serious impacts which could not be mitigated, the “no-go” alternative may be the only realistic option and shall be included and assessed against all other options.

(b) Minimizing:

Unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc.

(c) Compensation:

The loss of important species (e.g. trees) and habitats (e.g. woodland) may be provided elsewhere (on-site or off-site) as a compensation. Enhancement and other conservation measures shall always be considered, whenever possible.

#### **A word on mitigation:**

#### **Definition of Mitigation Under EIA Ordinance**

Schedule 1 of the EIAO

“Mitigation”, for a designated project -

- (a) means the elimination, reduction or control of adverse environmental impacts of the project;
- (b) includes restitution by replacement, restoration, compensation or other means for damage to the environment caused by the impacts.

## 2.3 *EXAMPLES OF GOOD EIA PRACTICES (SOURCE: EXAMPLES AND GOOD PRACTICES UNDER THE EIAO, EPD)*

### 2.3.1 *Avoidance of Environmental Problems at Planning Stage by Alternative Alignment and Design*

- ✓ Site Selection
- ✓ Alignment Option
- ✓ Choice of development/ construction/ operation type, scale and form
- ✓ Choice of technology/fuel type

#### Examples of Avoiding Environmental Problems at the Planning Stage

- Case 1 - KCRC East Rail Extension from Hung Hom to Tsimshatsui
- Case 2 - HEC's 1,800 MW Gas-fired Power Station
- Case 3 - Improvement to the Lantau North-South Road Link
- Case 4 - Tung Chung and Tai Ho Remaining Developments
- Case 5 - 132kV Power Cable from Po Lam to Tui Min Hoi

### 2.3.2 *Minimization and Mitigation of Environmental Impacts through incorporation of Mitigation Measures at the Design Stage*

- ✓ Design of suitable layout, form and configurations
- ✓ Environmental treatment technologies and facilities
- ✓ Built-in protection zones

#### Examples of Environmental Measures at the Design Stage

- Case 6 - Cyber Port Development
- Case 7 - West Rail Phase 1
- Case 8 - Hong Kong Disneyland

### 2.3.3 *Incorporation of Mitigation Measures during the Construction Stage*

- ✓ Phasing of reclamation/works
- ✓ Minimize pollution using silt curtain
- ✓ Minimize noise impact using noise barrier/acoustic cover
- ✓ Environmental monitoring and audit

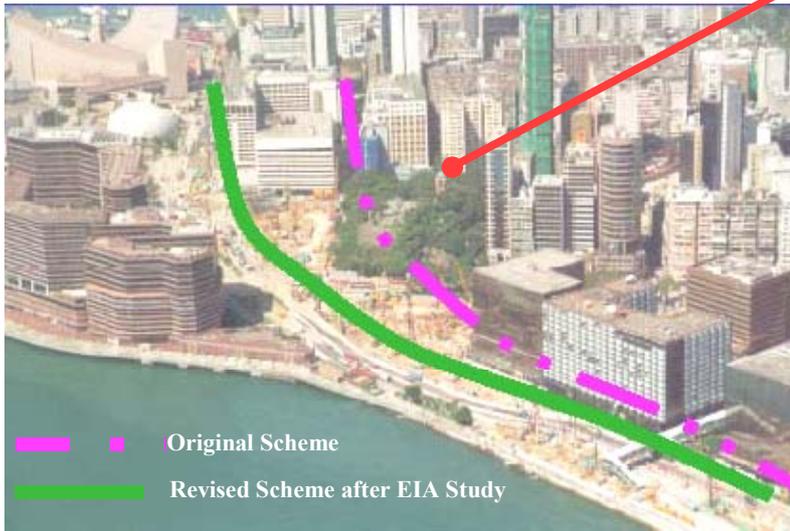
#### Examples of Environmental Measures to Minimize Impacts During Construction

- Case 9 - Pak Shek Kok Reclamation
- Case 10 - Dredging at Cheung Sha Wan Fish Culture Zone
- Case 11 - Reclamation for HEC's 1,800 MW Gas-fired Power Station
- Case 12 - Northern Access Road for Cyber Port

## Case Study 1: KCRC East Rail Extension from Hung Hom to Tsimshatsui

### **Nature and Scope of the Project:**

Construction and operation of approximately 1.5 km underground railway.



The polygonal Edwardian - Style Signal Hill Tower was erected in 1907 to house the time-ball apparatus. It helped bring a western standard of time to a Chinese society that used the traditional timing system.

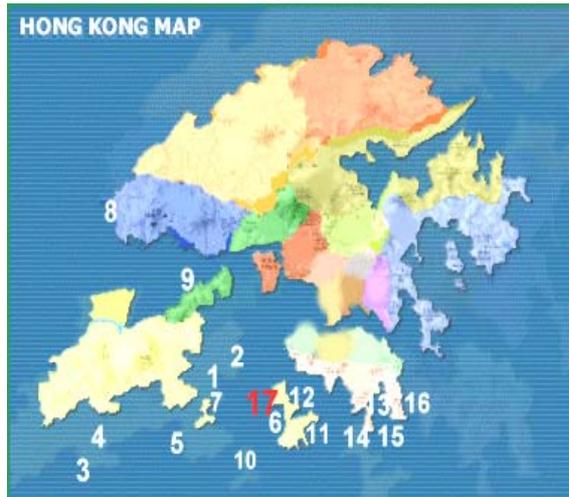
### **Key Environmental Concerns:**

The original scheme encroached upon the Signal Hill site of high cultural heritage value.

### **Basic EIA Principle applied to resolve the concerns:**

Avoid adverse environmental impacts by alternative alignment and design to avoid the 100-year-old Signal Hill.

## Case Study 2: HEC's 1,800 MW Gas-fired Power Station



- Site 1 - South Hei Ling Chau
- Site 2 - South Sunshine Island
- Site 3 - South Tai A Chau
- Site 4 - South Siu A Chau
- Site 5 - South Shek Kwu Chau
- Site 6 - West Lamma
- Site 7 - North Cheung Chau
- Site 8 - Lung Kwu Tan
- Site 9 - North Lantau
- Site 10 - Artificial Island, West Lamma Channel
- Site 11 - South East Lamma
- Site 12 - East Lamma
- Site 13 - Western Coastline of D'Aguiar Peninsula
- Site 14 - South West Stanley Peninsula
- Site 15 - South East Stanley Peninsula
- Site 16 - Artificial Island, Bokharo Rocks
- Site 17 - Lamma Extension

### Nature and Scope of the Project:

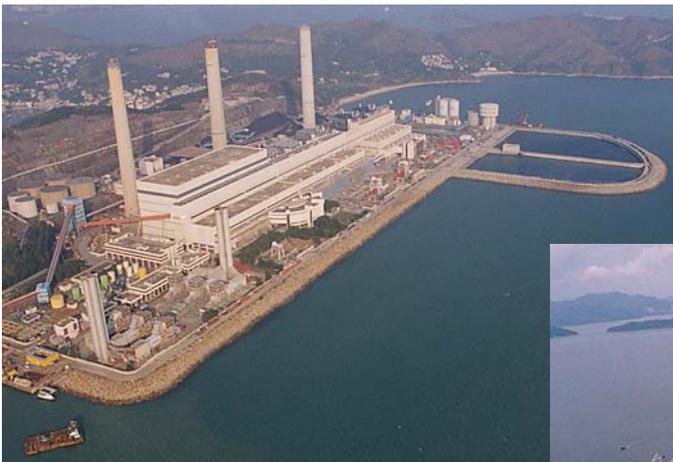
Proposal for a new 1800 MW Power Station

### Basic EIA Principle applied to resolve environmental concerns:

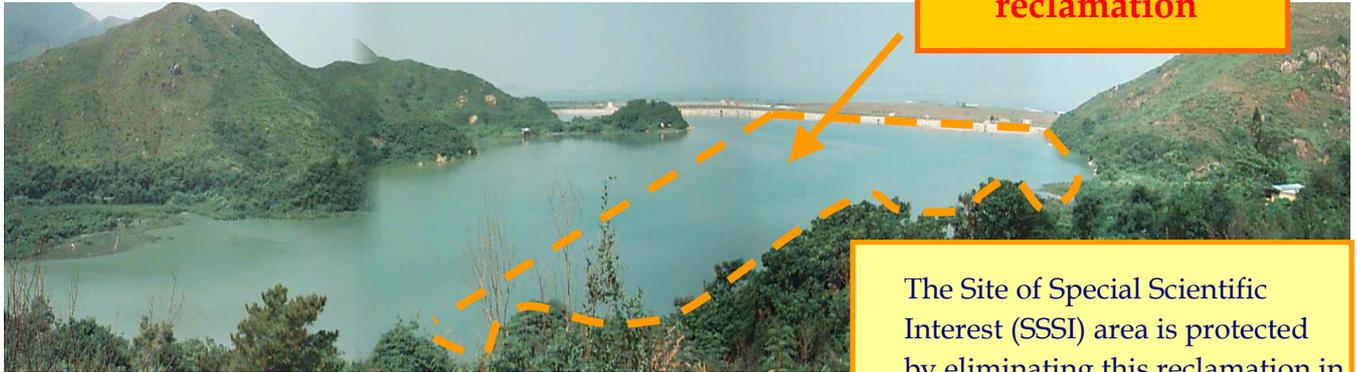
**Comprehensive Site Screening** - At the early planning stage, 17 alternative sites were shortlisted for environmentally sound option.

**Avoidance of Adverse Impact** - At the early planning stage, different coal and gas firing technologies identified and evaluated.

**Alternative Environmental Technology and Facility** - Adopting environmentally friendly fuel for new power generation to avoid significant pollutants emission and minimizing reclamation.



### Case Study 3: Tung Chung and Tai Ho Remaining Developments



**The original reclamation**

The Site of Special Scientific Interest (SSSI) area is protected by eliminating this reclamation in Tai Ho Bay



**Elimination of the reclamation in Tai Ho Bay completely**



**Natural Stream Courses and Habitats being Conserved**



#### Nature and Scope of the Project:

A Reclamation Project

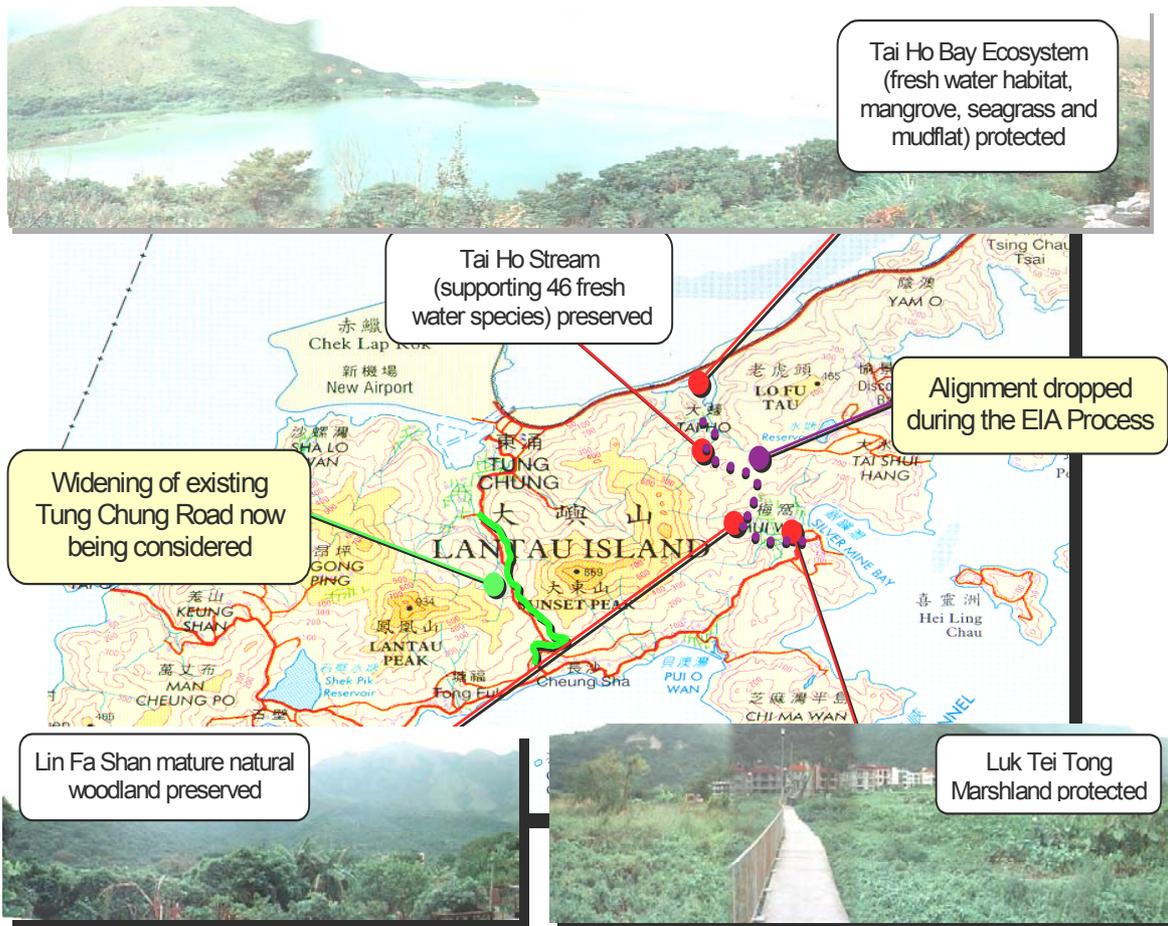
#### Key Environmental Concerns:

There were ecological impacts in Tai Ho Bay due to the new development.

#### Basic EIA Principle applied to resolve the concern

Avoid the ecological impacts through the EIA process by elimination of the reclamation in Tai Ho Bay completely.

## Case Study 4: Improvement to the Lantau North-South Link



### Nature and Scope of the Project:

To improve the existing sub-standard Tung Chung Road and provide an improved roadway for connecting north and south Lantau.

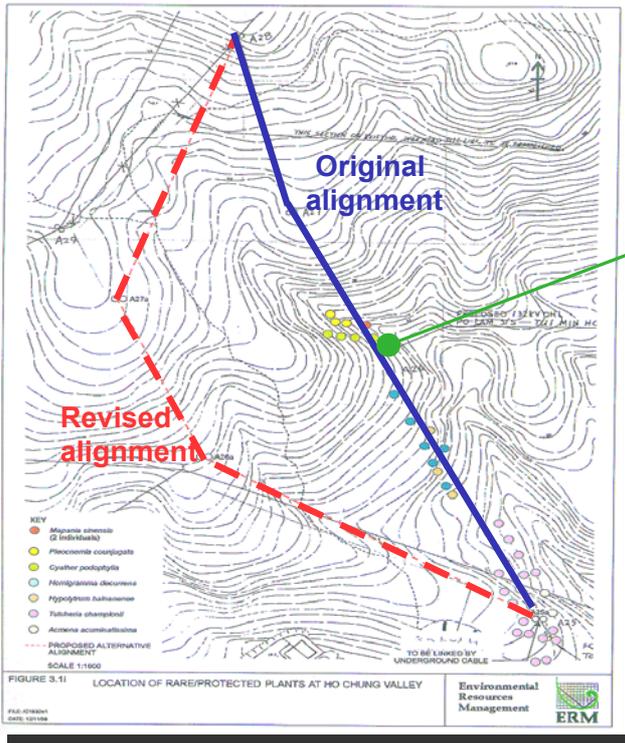
### Key Environmental Concerns:

The proposed road will go through rural area, comprising country parks and ecologically sensitive areas.

### Basic EIA Principle applied to resolve concerns:

The **avoidance** and **minimization** of environmental impacts has been a key element throughout the EIA process. A comprehensive option assessment process was undertaken which provided an evaluation and comparison of 4 northern alignment options and 4 southern alignment option combinations within the Tai Tung Shan – Cheung Sha corridor.

## Case Study 5: 132kV Power Cable from Po Lam to Tui Min Hoi



### Nature and Scope of the Project:

Construction and operation of 132kV overhead pole line and underground cable, parts of which lie within the Ma On Shan Country Park and Conservation Areas in Tseng Lan Shue, Ho Chung and Pak Kong.

### Key Environmental Concerns:

Rare tree species and protected trees species are found along the original alignment.

### Basic EIA Principle applied to resolve the concerns:

**Avoid** adverse environmental impacts by alternative alignment and **minimize** impacts by environmentally friendly design.

## Case Study 6: Cyber Port Development



### Nature and Scope of the Projects:

The Cyberport development is proposed as a world class location for information technology, involves the construction of housing and commercial developments, distributor roads, sewage treatment plant and 300m long sewage submarine outfall on an existing reclaimed land of 26 ha.

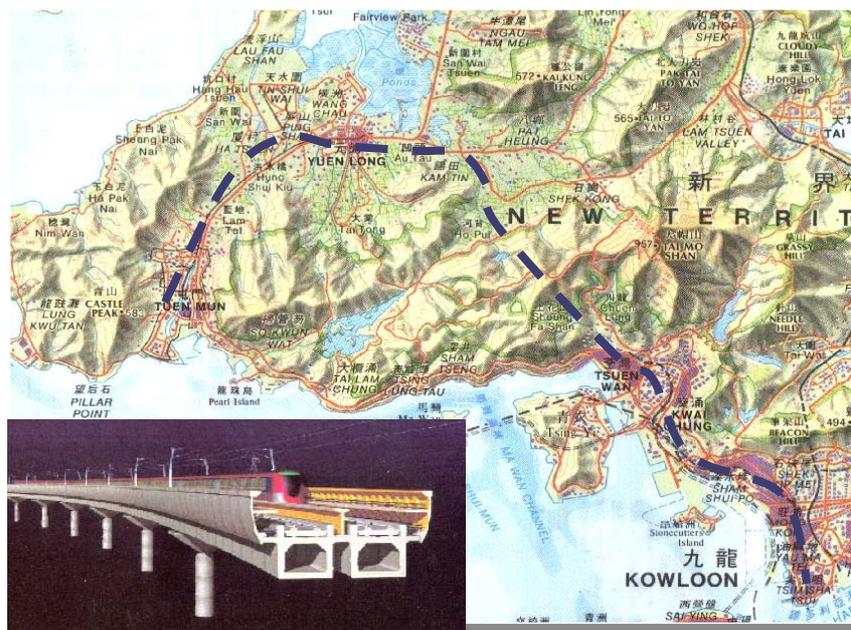
### Key Environmental Outcomes:



Temporary noise enclosures/ barriers and sufficient watering of the filling materials to control environmental pollution.



## Case Study 7: West Rail Phase 1

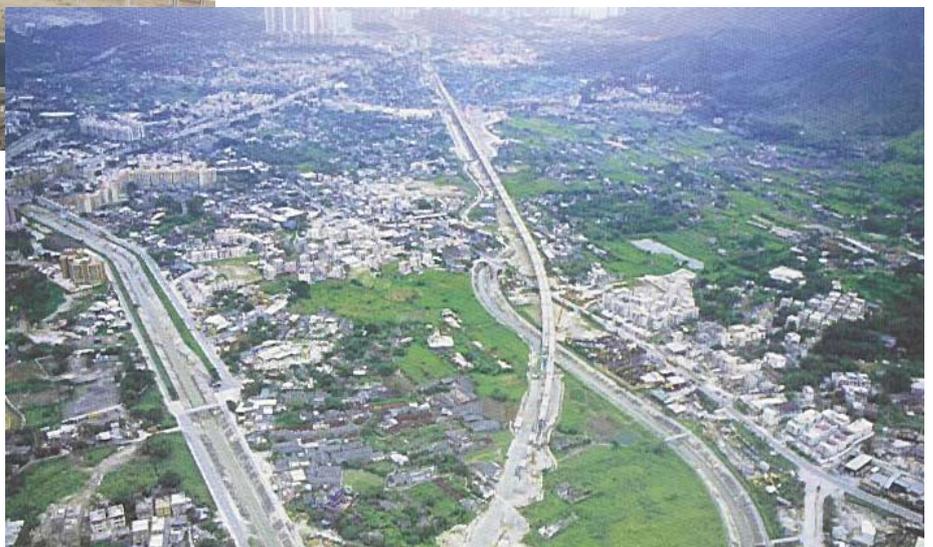


### Nature and Scope the Project:

The Project is an electrified double – tracked passengers railway system

### Key Environmental Outcomes:

About 560,000 existing and future residents to be protected by special noise reduction design, noise barriers and enclosures devised through EIA.



## Case Study 8: Hong Kong Disneyland



Armour rock sloped seawall design was adopted to facilitate recolonization of intertidal and subtidal hard surface assemblages



2 km long Natural Coastline preserved by adopting an open drainage channel design



6 km long landscaped earth bunds were incorporated in the Theme Park Layout Plan to protect 25,000 and 11,000 residents at Discovery Bay and Peng Chau respectively



Ecologically sensitive area will be protected by zoning the Pa Tau Kwu Headland and nearby waters as Conservation Area as recommended by the EIA study

### **Key Environmental Outcomes:**

Comprehensive environmental measures incorporated into the Theme Park development project which will create over 20,000 employments and attract 20 million visitors per year.

**Case Study 9: Pak Shek Kok Reclamation**



**Key Environmental Outcomes:**

Reclamation phasing to minimize suspended solids and sediment plumes dispersion.

**Case Study 10: Dredging at Cheung Sha Wan Fish Culture Zone**



**Key Environmental Outcomes:**

Use of silt curtains and closed dredging grab to minimize SS dispersion to protect the 22 ha Fish Culture Zone.

### Case Study 11: Dredging for HEC 1,800MW Gas-fired Power Station at Lamma Extension



#### Key Environmental Outcomes:

Minimize SS dispersion using silt curtain to protect nearby sensitive receivers.

### Case Study 12: Northern Access Road at Cyber Port Development



Noise Sensitive Receiver:  
Podium of a High-rise  
Building

Noise enclosure for  
rock breaking

#### Key Environmental Outcomes:

Minimize noise emission using noise barrier and noise cover.

The Project Administration Handbook for Civil Engineering says:

“The need for a project may arise:

- a. to meet planning and development requirements;
- b. to improve existing facilities/services; or
- c. to complete an existing development programme.

In order to establish the need for a project, general consideration should be given to:

- a. the problems requiring solution;
- b. alternative solutions, including an assessment of relative merits and demerits;
- c. reasons for the choice of the preferred option vis-à-vis other possible solutions; and
- d. consequences of doing nothing.

It is the responsibility of the client to consider the need for a project, and help explain the rationale for the project before defining a project.

At the commencement of preliminary project planning, it should be determined that, among others, that:

- a. the need for a project has been identified and justified;
- b. the proposed project will meet the need in full and part.



**VIP**

Robust project justification and alternative development do play a central role in a project life cycle, including the Technical Feasibility Study and Feasibility Study stages.

To facilitate progress in later stage of a project life cycle, a project proponent is advised to rigorously identify environmental impacts and apply the cardinal principle of EIA, viz, **avoidance-minimization-mitigation**. The application of EIA mechanism is more important in the project conceptual stage when solution space is aplenty.



In light that the public very often want to understand the need, justification and alternatives of a project, these considerations should be recorded and presented with justifications in the project development history.

The following should be viewed solely for training purpose. It should not be construed as legalistic or comprehensive.

## 2.5.1

*Fundamentals and Principles of EIA Mechanism*

**What is the use of an EIA mechanism? What is the basis of the EIA Ordinance and Environmental Permits?**

The EIA mechanism provided for under the EIAO plays a significant role in balancing the need to protect the environment and development needs. As stated in the Policy Objectives 2001, the EIAO helps project proponents to pay due regard to environmental protection requirements at the early stages of project planning. Effective operation of the EIA mechanism is very important as development pressures continue to increase.

The EIAO is an ordinance to provide for assessing the impact on the environment of certain projects and proposals, for protecting the environment and incidental matters.



**How can a person have access to the latest information regarding the EIAO?**

The EIAO register Office on 27/F Southorn Centre, Wanchai, Hong Kong displays all EIAO records for public access. In addition, the public can gain access through the EIAO website <http://www.epd.gov.hk/eia/> to the latest EIA information which include approved EIA reports, EIA Study Briefs Environmental Permits issued, etc. The webpage also contains useful references such as the EIAO Guidance Notes, EIA good practices and examples, and other useful resources.



**At what stage should a proponent put environmental considerations into project planning?**



Environmental considerations should be part and parcel in **every planning or decision making step** of a project, starting from the strategic planning stage to the construction and operational stages. A number of strategic environmental assessment studies have been completed and can be referred to in our Cyber EIAO Help Bench.

A project proponent is suggested to follow up recommendations of strategic studies in project implementation, particularly at the project conceptual stage. Early focus on environmental issues can help avoid environmental problems.



**What are the practices of avoidance, minimization and mitigation in a general EIA process?**

These are the cardinal principles of the EIA mechanism in the order of priority.



One of the key aims of the EIA process is to **avoid and prevent adverse environmental consequences** from proposed projects. If adverse environmental impacts cannot be fully avoided, measures should be considered to reduce and control the possible environmental impacts to the established criteria.

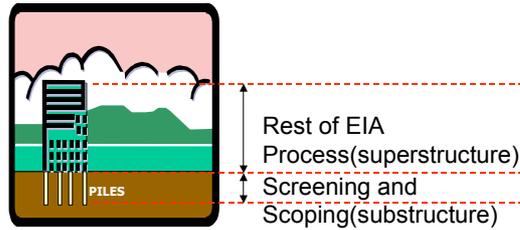
For better communication with EIA report readers, the project history section of the EIA report should list out alternative considerations to avoid environmental impacts.



**What are the relationships among screening, scoping and an EIA study?**

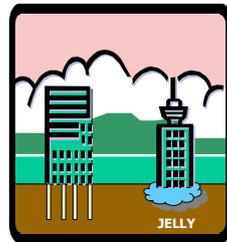
In a typical EIA process, screening is to determine whether a proposal requires an EIA study whereas scoping identifies relevant environmental issues to be examined in the EIA study. The importance of screening and scoping in an EIA process can be illustrated by the following :

## Importance of Screening and Scoping



- Screening – determine whether pile foundation is required
- Scoping – determine what type of pile foundation is required (bored-piles, H-piles, etc)

## Importance of Screening and Scoping



Without screening and scoping EIA process, like a building sitting on jelly, very unstable

## Importance of Screening and Scoping



Finally, building will collapse

If an applicant decides to submit an EIA, the applicant should submit a project profile for application of a study brief. In preparing a study brief, a scoping exercise will be carried out with a view to identifying pertinent environmental issues.

For more information on the process and timeline, readers can refer to the booklet [<A Guide to the Environmental Impact Assessment Ordinance>](#).



**Is an EIA compulsory for Environmental Permit application for a Designated Project?**

For application of an Environmental Permit, a Designated Project can either go through an EIA process or through application for permission to apply directly for Environmental Permit.



**What are the roles of public comments in the EIA process?**

The EIAO is a **transparent process**. The public and the ACE may comment on project profiles and EIA reports during the public inspection stage.

For more in-depth understanding of the role of public comments, readers can refer to the Judgement on the Appeal to Sheung Shui and Lok Ma Chau Spur Line on the EIAO Website



**What are the roles of a client over EIA consultants throughout the course of an EIA study?**

Apart from contractual requirements, it is advisable to develop a partnership relationship between a client and the consultant. A client shall take ownership of a project, knowing that they are responsible for project implementation as well as EIA recommendations. They should check whether the EIA assumptions, inputs, and recommendations are engineering practicable and effective for timely and orderly delivery of their works.



### How to prepare a project profile?



Requirements of a project profile are laid down in Annex 1 & 2 of the EIAO TM.

As a piece of advice, in light that a project profile very often is the first piece of project information for public access, a project profile shall be prepared clearly but with adequate information for the public to understand the scope of a project to avoid misunderstanding.



### How to get references from similar projects and EIAs?

All the EIA reports approved under the EIAO are available for public access in the EIAO Register Office and on the EIAO Webpage, <http://www.epd.gov.hk/eia/>



### What is the role of baseline study and input assumptions in impact assessment?

A credible and adequate baseline and impact assessment form the very basis of EIA study. Without a proper establishment of these fundamental matters, an EIA will not be credible.



### How to get credible prediction from quantitative models?

All prediction techniques, by their nature, involve some degree of uncertainty. The use of appropriate model and accurate input data is the key to obtain credible predictions from models. It is imperative for all parties, especially a proponent, to get involved in the scenarios and assumptions development. A proponent shall review the process to ensure that the parameters are indeed that the proponent will implement.



**What is the function of an Environmental Monitoring and Audit program ? The roles of Environmental Team and Independent Environmental Checker? Who should engage them?**

The Environmental Monitoring and Audit Guidelines for Development Project in Hong Kong is a useful resource from which readers can draw reference.

The Guidelines explain that an EM&A programme is an effective means to oversee the environmental performance of a development project during its implementation, and to apply appropriate mitigation measures to ameliorate adverse environmental impacts. Indeed, not all development projects are required to conduct EM&A programmes. It is a requirement of an approved EIA study to conclude the need of an EM&A. Part Six of this Manual will discuss further on an effective EM&A programme with case studies.



**What are some useful techniques for a proponent to review flexibility in implementation of mitigation measures?**

Upon completion of an EIA, a project proponent is responsible for implementing mitigation measures and proposals in an EIA. A project proponent should therefore review all these proposals in details with a view for an efficient, effective but flexible implementation. In light that an Implementation Schedule might summarize many EIA recommendations, a project proponent should diligently review it among other recommendations in the EIA report, noting the Schedule might be the backbone in terms of promise delivery.

Useful review guidance is available in the EIAO Guidance Note No 5/2002 & 3/2002 entitle respectively “Implementation Schedule for Mitigation Measures arising from the Environmental Impact Assessment Process” and “Flexibility and Enforceability of Mitigation Measures Proposed in an Environmental Impact Assessment Report”.

Broadly speaking, a project proponent shall check over the effectiveness and engineering viability (such as whether there are enough construction clearance, adequate traffic sight line, or presence of conflicting utilities) over implementing proposals. As a general tip, a proponent shall also check over the **Five “W”s** as:

- **What** mitigation measures will be implemented?
- **Who** will implement the measures?
- **When** will the measures be implemented?

- **Where** (i.e. at what location) will the measures be implemented?
- To **what** standards or requirements should these measures be implemented?

Part Six of this Manual will discuss in detail and provide more hand-on tips on how to maximize the flexibility of implementing mitigation measures.