



# **ADVICE NOTES ON CURRENT PRACTICE**

(in the preparation of Environmental Impact Statements)



*Guardians of the Environment*

**ENVIRONMENTAL PROTECTION AGENCY**  
**An Ghníomhaireacht um Chaomhnú Comhshaoil**



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(in the preparation of Environmental Impact Statements)

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Construction Industry Federation	Irish Farmers Association
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Department of Environment, Heritage and Local Government	Irish Industrial Explosives Ltd.
Department of Transport	Irish Meat Processors Association
Dublin Port Company	Irish National Petroleum Company Ltd.
Eirgrid	Irish Salmon Growers Association
ESB	Office of Public Works
Electricity Regulator	Radiological Protection Institute of Ireland
Food Safety Authority of Ireland	The Railway Inspectorate, Department of Public Enterprise
Glanbia Dairies	Smurfit Group Services
Glanbia Foods	Steel Company of Ireland
Health and Safety Authority	Sustainable Energy Ireland
	Waterways Ireland



## INTRODUCTION

These Advice Notes are designed to accompany the *Guidelines on the information to be contained in Environmental Impact Statements*, also published by the EPA.

They contain greater detail on many of the topics covered by the Guidelines and offer guidance on current practice for the structure and content of Environmental Impact Statements. They are divided into five sections, each providing detailed guidance on specific aspects to be considered in the preparation of an EIS.

**Section 1** addresses the information to be included in an EIS in relation to the description of the proposed development.

**Section 2** considers, under the headings of existing environment, impacts and mitigation measures, the description and analysis of specific environmental topics.

**Section 3** provides guidance on the topics which would usually be addressed when preparing an EIS for a particular class of development, highlighting typical issues which arise. The projects are grouped into 33 generic types, which have similar development or operational characteristics.

**Section 4** examines the issue of consultation and lists of government departments, agencies, organisations, institutes and NGOs who may be consulted during the preparation of an EIS.

**Section 5** gives a short description of the most common problems found in current practice in the preparation of environmental impact statements.

## PROJECT DESCRIPTION

### INTRODUCTION

This section provides guidance on the type of information to be included in an EIS in relation to the description of the proposed development. In describing the proposed development, all relevant phases of the existence of the project from construction through existence and operation, to decommissioning and restoration are considered. This description may include the following topics:

- alternatives examined;
- characteristics of the project;
- existence of the project;
- description of other developments.

It must be stressed that not all of the topics described in the following section are likely to be of relevance to all projects. The level of detail required will vary considerably according to the sensitivity of the existing environment and the potential of the project for significant effects.

### ALTERNATIVES EXAMINED

Alternatives, where relevant, may be described at three levels indicating the main reasons for choosing the proposed development. These consider alternative locations, designs and processes.

#### DESCRIPTION OF ALTERNATIVE LOCATIONS

Some locations have more inherent environmental problems than others. Such sites can usually be avoided in favour of sites which have few constraints and the maximum capacity to sustainably assimilate the development.

#### DESCRIPTION OF ALTERNATIVE DESIGNS

Most problems will be capable of a number of design solutions by varying the site layout, building massing or location of facilities. Where designers are briefed at an early stage about environmental factors, these can usually be incorporated along with other design parameters.

#### DESCRIPTION OF ALTERNATIVE PROCESSES

Within each design solution there can be a number of different options as to how the processes or activities of the development can be carried out. These can include management of emissions, residues, traffic and the use of natural resources.

Consideration of environmental factors can influence the selection of processes which avoid adverse impacts.

### CHARACTERISTICS OF THE PROJECT

In providing a description of the physical characteristics of the project development, issues such as site layout, design and size/scale, as well as any existing development on site, are considered.

#### DESCRIPTION OF SITE LAYOUT

The description of the development on the site includes issues such as the following:

- the location of the development: local and site context;
- the distance to other significant features on and offsite;
- the level and height of the proposed development in relation to existing features;
- the extent of site coverage/use and the

- size of the site;
- a plan of the existing site accompanying the proposed site plan at an appropriate scale.

#### DESCRIPTION OF DESIGN

In providing a description of the significant physical characteristics of the proposed development, the following aspects may be included:

- the layout of the development on the site;
- the shape, surface and characteristic features of each element;
- the principal activities proposed;
- the principal processes proposed;
- associated or secondary developments.

#### DESCRIPTION OF SIZE OR SCALE

The description of project size or scale, indicates the magnitude or intensity of the development when in operation. It includes issues such as the following:

- the area, length, width and height of each major element;
- the relative size and scale of the development in its context;
- the extent of the activities proposed;
- the volumes, magnitudes or intensity of each process.
- the number of features clearly indicated where relevant (such as the number of houses).

#### DESCRIPTION OF EXISTING DEVELOPMENT

Where consent is required for a development involving an extension or expansion of an existing operation, the description of the existing environment includes those parts of the development

already in place.

### THE EXISTENCE OF THE PROJECT

The description of the existence of the project considers all aspects of the project lifecycle from construction to decommissioning. These include the following:

- construction;
- commissioning;
- operation;
- changes to the project;
- decommissioning.

#### DESCRIPTION OF CONSTRUCTION

In discussing the construction phase of development, issues such as the following may be relevant:

##### **Land-use requirement**

- Cut, fill, borrow, staging and disposal areas;
- Access and haul routes;
- Drainage diversions and areas affected;
- Construction parking, office, canteen and storage areas.

##### **Construction activity**

- Site preparation and pre-construction activities;
- Duration, type and location of major operations;
- Sequence of activities;
- Major temporary features: cranes, holding ponds and stockpiles etc.

##### **Significant effects**

- Landtake;
- Noise and vibration;
- Traffic;
- Water: for example groundwater drawdown;
- Effluents: sewage, run-off, spillages;
- Emissions.

**Environmental protection measures**

- Monitoring;
- Protection barriers;
- Operational procedures;
- Contingency measures.

**DESCRIPTION OF COMMISSIONING**

In providing a description of the commissioning of a project issues such as phasing, testing and commissioning and establishment of mitigation measures are examined.

**Phasing**

This refers to the gradual development of the project according to a well-defined design. The description of phasing becomes relevant if significant impacts or mitigation measures do not form part of the initial phase. The description clearly identifies when each such impact or mitigation measure will become apparent.

**Testing and commissioning**

On some large projects there is a considerable time delay between the end of construction and the commencement of full operation. Such delays and any interim effects, which may be different from those of normal operation, are described.

**Establishment of mitigation measures**

Some mitigation measures are not fully effective at the time of commissioning; for example, measures which are dependent on biotic processes such as the establishment of a screen of trees. The time required for such measures to become effective is clearly described.

**DESCRIPTION OF THE OPERATION OF THE PROJECT**

When describing the operation of the

project, include comprehensive, accurate descriptions of project processes and activities, materials and natural resources utilised and the effects, residues and emissions anticipated by the operation of the project.

**Principal Processes or Activities**

The core processes or activities which characterise the development are described.

The **Scope** of the project is described indicating the limits of the types, quantities or intensity of the processes or activities which will take place at the site. Where a wide or changing range of activities is envisaged, an attempt should be made to define the parameters of the project. (For example, the generic range of an industry's product types, or the variety of goods to be handled at a seaport).

**Operations**

Operations are described in general terms which indicate the daily, weekly or annual times and duration of activities, shifts, seasonal patterns and holidays. Where there are significant variations in the intensity of the operations, these are also highlighted.

**Processes**

Processes are described in only sufficient detail to facilitate an assessment of the scope for environmental effects. Descriptions include the elements and materials used; the conditions of temperature/pressure/containment; and the control and monitoring systems used.

These elements can be divided into stages or streams of activity as appropriate. Descriptions include in process recycling and contingency measures.

For multipurpose plants the Environmental Impact Statement describes the general nature of the processes involved, the range of materials used and the control and monitoring systems with attention drawn to any process with potential for significant effects.

### **Activities**

Activities associated with all parts of the project are described:

- arrivals: employees, materials, customers;
- sorting: parking, stockpiling, waiting, lairage;
- process: indoor and outdoor, day and night, peak and off-season;
- numbers: shifts, times and duration of occupation.

### **Occasional activities**

Occasional, but regular, activities are described where any potential exists for additional significant impacts. Examples include the following:

- annual or regular refit or maintenance operations;
- emergency, fire and evacuation drill;
- emergency venting;
- celebrations or spectacles (for example launching of a ship);
- holiday times, shut down;
- recreation, leisure or other unstructured activity.

### **Occupants**

Occupants are described in appropriate classes. Examples include the following:

- employees;
- visitors, customers and spectators;
- maintenance, security and monitoring personnel or agencies.

### **Materials used**

Materials which, by their nature, quantity, state or potential for combination, represent a potential hazard to health or environment are identified, drawing particular attention to any formal designation of the hazard. All significant materials are described in terms of the following:

- amount (onsite and annual use);
- state (gas, frozen, containerised);
- storage and handling locations and conditions;
- use, processing and consumption;
- transportation routes: to and on-site.

An inventory of the full range of materials used, processed or consumed on site is made to allow an accurate assessment of eventual residues, emissions and wastes and their impacts.

Where there may be significant potential for variations in the amount of material to be used, either through current uncertainties or through process variations, these should be included. Where appropriate, some basis for the assumptions which underpin the amounts and range of materials to be used is given so that third parties can be assured that figures given are realistic. Other such materials which are present on the site in significant quantities but which are rarely or never consumed for example coolants, fire suppressers are included.

### **Natural resources used**

The full range of natural resources likely to be used, processed or consumed by the project operations are described. Natural resources include the following:

- energy (the natural resources consumed offsite);

- assimilative capacity of water, soils and air;
- water;
- minerals.

Each of the above is described in terms of:

- amount;
- state;
- storage and handling;
- use;
- transportation.

### **Effects, residues and emissions**

The following is an indication of the typical effects, emissions and residues which could be included in this section organised according to the topic headings set out in the Regulations.

#### **Human beings**

- Economic opportunities;
- Health effects;
- Nuisance;
- Risks/hazards.

#### **Fauna**

- Disturbance – human presence, noise;
- Emissions;
- Fragmentation of habitat, territory;
- Pests/diseases;
- Results of vegetation, habitat change.

#### **Flora**

- Change of landuse – farming, access;
- Emissions;
- Introduced species;
- Loss/creation/change of habitat.

#### **Soils**

- Soils and geology;
- Salts;
- Organic, inorganic compounds;
- Organic wastes;
- Radio nuclides;
- Removal;

- Micro-organisms;
- Drainage.

#### **Water**

- Water quantity;
- Suspended solids;
- Organic, inorganic compounds;
- Temperature;
- Nutrients;
- Gas;
- Tainting;
- Additional runoff;
- Contamination by micro-organisms.

#### **Air**

- Dust;
- Noise;
- Vibration;
- Heat;
- Light;
- Radiation (ionising and non-ionising);
- Odours;
- Organic, inorganic compounds;
- Organic wastes;
- Radio nuclides;
- Organisms.

#### **Climatic factors**

- Climate altering substances;
- Reflected/deflected wind, heat, cold.

#### **Landscape**

- Structures;
- Crowds;
- Traffic;
- Parking;
- Lighting.

Material Assets, including the architectural and archaeological heritage, and cultural heritage

- Produce;
- Wastes;
- Traffic;
- By-products;
- Buildings and structures of architectural,

- historical or artistic interest;
- Destruction or degradation of monuments, archaeological sites and artefacts;
- Exposure to accidental damage;
- Trespass or intrusion;
- In some instances, linguistic impacts and impacts on place-names.

#### **Miscellaneous Emissions**

- Gradual accumulation/slow releases;
- Spills and accidental releases;
- Seconds/rejects/carcasses;
- Cuttings/trimmings;
- Projectiles (for example ‘fly-rock’);
- Litter.

Note that ‘effects, residues and emissions’ refers to the gross impact, namely, without reference to the existing environment or to mitigation measures.

#### **Waste Management**

The sources of all major emissions, residues or wastes are identified. These include both the emissions of normal operation and those which can be reasonably foreseen or planned for. Examples of the latter include spillages, escapes and accidental emissions.

A full account of measures to manage such wastes is indicated. This includes the following:

- waste prevention;
- waste minimisation;
- waste recycling;
- waste disposal.

The account indicates, where relevant, the availability of alternatives which might avoid, reduce or minimise emissions, residues or wastes.

Secondary Processes and Activities  
Large developments have many secondary

activities which can also produce impacts. These include the following:

- transportation and handling of goods outside and within the site;
- employee, customer or visitor traffic;
- maintenance, security, monitoring activities and associated structures;
- catering, recreation and leisure activities and associated structures.

#### **DESCRIPTION OF CHANGES TO THE PROJECT**

Descriptions of any anticipated changes to the project are discussed, examining proposed growth, decommissioning and any other changes anticipated or planned.

#### **Proposed Growth**

In the interests of the proper planning and development of an area it is often prudent for a competent authority to consider the potential for the growth of a development. The principal reason is to determine whether a site or vicinity will have the capacity to sustainably assimilate the larger project.

Description of proposed growth can take either of two forms:

- future phases of the project, for which permission is sought, considers all potentially significant impacts in the Environmental Impact Statement;
- or
- long term growth, expansion and development of the project may be shown on an Indicative Masterplan. Potentially significant impacts of this aspect of the development are predicted, in very general terms.

#### **Decommissioning**

Projects such as mines, quarries and

landfill operations, and projects which exploit finite non-renewable natural resources usually require that the site is rehabilitated following closure. The project description includes a detailed account of the decommissioning proposal. Where decommissioning is specifically proposed as a mitigation measure then the Environmental Impact Statement indicates the following:

- financial, technical and administrative provisions to ensure that the measures can and will be implemented;
- effective contingency mitigation measures should the planned measures fail;
- monitoring provisions, action thresholds and remedial strategies for potential impacts arising;
- aftercare requirements and post closure management.

### **Other Changes**

In some instances projects may be subject to changes other than growth or planned closure. Ageing is the most common type of change, causing deterioration and weathering of physical fabric. Depending on maintenance levels, there may be a lowered level of effectiveness of both monitoring and environmental protection systems.

## **OTHER DEVELOPMENTS**

Offsite and secondary developments arise either directly or indirectly from the operation of a project. Issues such as transportation, energy and utilities may be considered.

### DESCRIPTION OF OFFSITE DEVELOPMENTS

Provision of infrastructure and services for major developments can often require

development of a scale (and impact) commensurate with the main development. Examples include the following:

### **Transportation**

Road:

- new roads, bridges, junctions, signs, lights;
- upgrading (i.e. improving the horizontal or vertical alignment). This can sometimes be overlooked as a potentially serious source of impact.

Rail:

- new tracks, bridges, junctions, signs, lights.

Port:

- new berths or unloading facilities;
- deepening or widening approaches;
- additional navigation aid.

Airports:

- lengthening runways.

### **Energy**

Electricity:

- new/upgraded switching, substations or transformers and housing;
- new/upgraded transmission lines and supports.

Gas:

- new/upgraded pipelines;
- New/upgraded pumping and/or pressure control stations.

### **Other**

Water:

- additional water abstraction;
- new/upgraded pipelines;
- new/upgraded reservoirs for potable or fire fighting water;

Sanitary Services:

- new/enlarged landfill sites
- new/upgraded drainage services;



- new/upgraded treatment plants;

Telecom:

- new/upgraded cabling, transmission masts.

#### DESCRIPTION OF SECONDARY DEVELOPMENTS

This is an aspect of the project description which usually only has relevance for very large projects. It refers to developments carried out by parties other than the applicant, which *directly arise* because of the project. It is usually sufficient to draw attention to the fact that these developments are likely to occur, specifying the location, if possible. Examples of such secondary development include the following:

- new transportation, energy or other developments;
- new residential, commercial or social facilities in response to a large new employer in an underdeveloped area;
- new industrial, warehousing, commercial or service accommodation in the immediate vicinity of a new transportation node: airport, sea port or rail head or road junction;
- new industrial developments in the vicinity of major sources of primary raw materials: mineral ores, gas, oil, coal;
- new supplies or services in the vicinity of major manufacturing enterprises.

## ENVIRONMENTAL TOPICS

### INTRODUCTION

This section provides guidelines on the description and analysis of impacts on specific environmental topics, as set out in the Planning and Development Regulations, 2001 (SI No. 600 of 2001). It examines these topics in terms of the description of the existing environment: the context, character, significance and sensitivities; the potential impacts and the proposed mitigation measures. In many instances, it discusses more information than may be necessary for projects of lesser complexity. The amount of detail provided will be determined by the circumstances of each project.

### HUMAN BEINGS

#### HUMAN BEINGS IN THE EXISTING ENVIRONMENT

This is a broad ranging section which covers the existence, activities and well-being of people, usually considering people as groups or 'populations'. While most developments by people will affect other people, the Environmental Impact Statement concentrates on those topics which are manifested in the environment, such as new landuses, more buildings or greater emissions. Issues such as employment, commercial competition, zoning and other social and economic issues are dealt with by more specific instruments (such as the Planning Acts). Issues which may be examined under this heading include the following:

- Economic Activity - will the development stimulate additional development and/or reduce economic activity, and if either, what type, how much and where?

- Social Consideration - will the development change patterns and types of activity and landuse?
- Land-use - will there be severance, loss of rights of way or amenities, conflicts, or other changes likely to ultimately to alter the character and use of the surroundings?
- Health and Safety - will there be risks of death, disease, discomfort or nuisance?

#### Context

Indicate the location of sensitive neighbouring occupied premises likely to be directly affected, and other premises which although located elsewhere, may be the subject of secondary impacts such as alteration of traffic flows or increased urban development. The following should be noted in particular:

- homes;
- hospitals;
- hotels and holiday accommodation;
- schools and rehabilitation workshops;
- commercial premises.

Indicate the numbers of occupants likely to be directly affected.

- Occupants of sensitive accommodation;
- Other occupants of premises;
- Other potential receptors of impacts, noting in particular transient populations, such as drivers, tourists, walkers;
- Describe any significant trends evident in the overall growth or decline of these numbers, or of any changes in the proportion of one type of activity relative to any other.

Indicate any commercial activity which likely to be directly affected, with resultant environmental impacts .

#### Character

Indicate the occupations, activities or interests of principal potential receptors.

- Where relevant, describe the resources or attributes in the existing environment which each group uses or values;
- Where relevant, indicate the time, duration or seasonality of any of those activities.

**Significance**

Indicate the significance of the principal groups or activities likely to be affected. Refer to any existing formal or published designation or recognition of such significance.

**Sensitivity**

Describe any significant concerns, fears or opposition to the development known to exist among receptor groups. Identify, where possible, the particular aspect of the development which is of concern, together with the part of the existing environment which may be threatened.

IMPACTS ON HUMAN BEINGS

**"Do Nothing" Impact;**

Describe how trends evident in the existing environment will continue and with what consequences for existing populations.

**Predicted impact;**

- Describe the number, population, type and location of persons or communities affected;
- Describe changes in overall population and their activities;
- Describe changes in patterns of employment, landuse and economic activity;
- Describe the consequences of change, referring to indirect, secondary and cumulative impacts;
- Describe the potential for interaction with other impacts;
- Describe the worst case for human

beings if all mitigation measures fail.

MITIGATING ADVERSE IMPACTS ON HUMAN BEINGS

Describe the mitigation measures proposed to:

- avoid sensitive communities or designs which may affect them;
- reduce the impacts which may affect them;
- minimise exposure of the community to the effects;
- remedy any adverse impacts caused.

**FAUNA**

FAUNA IN THE EXISTING ENVIRONMENT

The level of detail on fauna which is required will vary considerably with the ecological significance of the existing environment. A competent ecologist should be able to determine the level of detail appropriate to the potential for significant impacts on fauna likely to be affected by the development.

This is primarily intended to cover the topic of natural habitats and their fauna. Where appropriate it may also include managed fauna, most commonly this will mean livestock. Where appropriate the fauna of freshwater and marine habitats are included even if they cover much less area than the terrestrial ones. While coverage in most cases will be based on birds, fish and mammals, reference may also be needed to invertebrates and the state of knowledge of these groups. Where habitat conditions suggest that unusual invertebrate communities are likely they are investigated in detail.

On occasion descriptions of existing fauna

can be particularly difficult because of :-  
 – *The restriction of time or seasonal availability to study the site and the mobile, seasonal and elusive nature of some species.* The description of the fauna will sometimes involve analytical measurement and/or trapping. Such data is collected by standard and replicable methods carried out representatively on the habitats likely to be significantly affected. It is tied in with any relevant vegetational and physical measurements made (for example on water-table, microclimate).

For this section to be useful for impact prediction, it describes the fauna by reference to its habitat and not to a simple list of the species present. Protected species, sites and habitats or National Parks or Red Data Book species should be identified and described within the area of the proposed development. The objective of the description is to arrive at an understanding of the workings of the habitat so that the resources which sustain it can be protected wherever possible. Food-chain relationships, territorial requirements and movement corridors are recognised for their potential importance in defining impacts. The identification of communities or specific species, which are significant because of their scarcity, is also important in this section.

The seasonality of many specific creatures (for example migrant birds and insects) and plants may mean that they will not be evident at the time of the survey. Where such a possibility exists, the author uses literature sources, if any, to provide relevant information and explicitly draws attention to the limitations of the survey and the consequences of such limitations.

All published zoological information on

the site should be quoted in precise form .

### **Context**

The report, accompanied by a simple scale map or plan of the existing site, typically indicates:-

- the principal habitats of the site;
- significant locations for breeding, feeding, roosting, crossing etc.;
- sites for survey/trapping.;
- the numbers of species using the site, their duration and season;
- the numbers of vertebrate species;
- existing or proposed protected sites.

### **Character**

The species/communities of the site are described, based as much as possible on the separate habitats. Attention is drawn to:

- the diversity of species insofar as it is known and the presence of rare species
- the activities for which the animals use the site
- special requirements of the species present, e.g. territory size, habitat quality, current management, lack of disturbance

### **Significance**

The significance of the fauna is assessed by its diversity, population size or density.

In particular

- are the species which use the site common or rare in a national or European context ?
- are there any existing or pending formal designations for species within or adjacent to the site?
- have the species been subject to such designations elsewhere in Ireland?
- are they native or introduced to the site in question?
- are their numbers changing or relatively stable?
- do they use the site for breeding,

feeding or resting?

- are any of the fauna significant as prey for other (off-site) species, as game, commercial assets, tourism resources, modifiers of vegetation.

The use of rating systems to define the importance of some groups may be useful but should be fully explained.

### **Sensitivity**

Describe if any of the fauna of the site is known to be particularly sensitive to, or dependent on, the continued availability of some aspect of the existing environment such as food, shelter, isolation.

## IMPACTS ON FAUNA

### **"Do Nothing" Impact;**

Describe how trends evident in the existing environment will continue and with what consequences for fauna.

### **Predicted impact;**

- describe the number/ population, type and location of organisms affected;
- describe changes in species diversity;
- describe any impacts for the maintenance of the regenerative capacity of the ecosystem-system;
- describe the consequences of change to the larger population, referring to indirect, secondary and cumulative impacts;
- describe the results on fauna of changes in the vegetation, e.g. animal dispersal and movement
- describe the potential for interaction with other impacts, for example. those on soil, water, humans;
- distinguish temporary and permanent impacts where possible;
- describe the worst case for fauna if all mitigation measures fail.

## MITIGATING ADVERSE IMPACTS ON FAUNA

Describe the mitigation measures proposed to;

- avoid changes to supporting habitats/vegetation/vital resources;
- reduce the effects on animal communities and their habitats;
- reduce exposure of the animal community and their habitats to the impact;
- remedy any adverse impacts caused to animal communities and their habitats.

## FLORA

### FLORA IN THE EXISTING ENVIRONMENT

The level of detail on flora which is required will vary considerably with the ecological significance of the existing environment. A competent ecologist should be able to determine the level of detail appropriate to the potential for significant impacts on flora likely to be affected by the development.

This is primarily intended to examine the topic of natural habitats and their vegetation. Where appropriate it may also include managed habitats and vegetation. It describes the different habitats on-site with their flora, concentrating on the more natural areas. Where appropriate the vegetation of freshwater and marine habitats are dealt with even if they cover an area much less than the terrestrial ones. A generalised view of surrounding/adjacent habitats is also given, particularly if they are very different.

For this section to be useful in impact prediction, it describes the vegetation of the habitats and is not simply a list of

species present. The objective of the description is to arrive at an understanding of the ecology of each habitat by including details of relevant environmental factors. In this way the resources which sustain the habitats can be protected whenever possible. Protected species, sites and habitats or National Parks or Red Data Book species should be identified and described within the area of the proposed development. A further objective is to identify and protect plant communities or specific plants which are significant because of their rarity.

It is essential to describe the plants that create or define the habitat. In many cases these will be the vascular or higher plants but in specific habitats like bogs, woodlands, mountain cliffs and waterbodies, lower plants (mosses, lichens, algae) are equally or more relevant and must be dealt with at species level. In all cases the report should mention any published botanical information on the site. Adequate description may involve the measurement of abundance as well as presence. Such data is collected by standardised and reproducible methods, referenced if possible, so that they are useful for later monitoring.

The seasonality of higher plants may mean that they are not evident at the time of the survey. Where such a possibility exists the report must explicitly draw attention to these limitations.

### **Context**

The report may be illustrated with a scaled map or plan showing:-

- existing habitats or plant communities;
- locations of sensitive or rare species;
- significant natural features such as outcrops, streams etc.

It is important to show adjacent plant communities that could be affected by developments on the project site. Features on the published large scale Ordnance Survey sheets should be mentioned even if they have been modified since the mapping.

### **Character**

The type of plant community is described, drawing attention to the following issues if relevant:

- dominant species;
- species diversity;
- stability/change;
- dependence on particular environmental factors;
- existing management.

Photographs of habitat may be useful but their positions should be referenced onto a site plan.

### **Significance**

The significance of the existing flora is assessed by an evaluation section which can be regarded as a stand alone item, or summary. Topics to be dealt with include whether

- the existing vegetation is widespread in the locality and country;
- there are significant communities or species present (or previously recorded) on the site;
- whether notable species might be expected at times of the year other than when fieldwork was done;
- use is made of the vegetation by significant fauna or by people;
- there are existing/pending formal designations for species or habitats within the site ;
- other similar sites have received such designation.

An evaluation scheme such as international,

national, county and local may be appropriate but should only be used for plant groups/habitats that are well known.

**Sensitivity**

Describe any aspects of the existing environment on which the plant communities are known to depend and which could change for example such as shelter, watertable, nutrient status, agricultural management, air or water quality.

■ IMPACTS ON FLORA

**"Do Nothing" Impact;**

Describe how trends evident in the existing environment will continue and with what consequences for flora.

**Predicted impact**

- Describe the location, area and type of plant communities directly affected;
- Describe changes in species diversity, paying particular attention to sensitive species;
- Describe any impacts on the maintenance of the regenerative capacity of the ecosystem-system;
- Describe any changes to the vegetation that will arise from impacts to fauna, e.g. reproduction, grazing;
- describe indirect and long term effects brought about by changes in environmental factors including soil disturbance;
- distinguish between temporary and permanent impacts;
- Describe the worst case for flora if all mitigation measures fail.

■ MITIGATING ADVERSE IMPACTS ON FLORA

Describe the mitigation measures proposed to;

- avoid changes to habitats / vegetation / vital resources;
- reduce the effects on the plant communities and the habitats;
- reduce exposure of the plant communities and their habitats to the impact;
- remedy any adverse impacts caused to plant communities and the habitats.

**SOILS & GEOLOGY**

■ SOILS/GEOLOGY IN THE EXISTING ENVIRONMENT

This section refers to all natural materials underlying a development, from the ground surface to an appropriate depth underground. It includes the bedrock and overlying subsoils (Quaternary deposits), which are in the scientific domain of the geologist and the topsoil and associated A and B horizons which are in the domain of the soil scientist.

The level of detail required on the soils/geology, for individual projects, will vary considerably depending on the importance of the proposed site, the nature of the project, the degree of interaction with the underlying materials and the likely potential impacts.

Competent geologists and soil scientists should be able to determine the level of detail appropriate to the potential of a project for significant impacts on the underlying soils/geology.

Environmental impacts related to soils/geology normally involve interaction with other topics and are often dealt with under those topics. For example, in a mining project the issue of potential subsidence is dealt with under material assets.

Soils/Geology can be assessed in terms of their;

- removal, erosion or extraction;
- stability/ground conditions;
- potential to interact with groundwater by facilitating movement or by chemically altering it;
- ability for growing plants;
- three phase system of solid, liquid and gas;
- capacity as an organic filter;
- being a modulator of the hydrologic cycle;
- value as a material asset;
- Intrinsic scientific value / geological heritage;
- potential as a saleable commodity.

The investigation required to adequately describe the soils/geology of a project may include some or all of the following:

- mapping and geophysical surveys;
- boreholes, trial pits and augering;
- sampling for particle size and chemical analyses;
- in-situ and laboratory engineering type tests.

Urban or brownfield sites should be examined for possible contamination.

**Context**

As the soils/geology beneath the site are part of the larger underground environment it is necessary to place these deposits within the overall geological context of the area.

A general description of the overall setting would include a description of the principal lithologies (types of strata) present, the structure and the relationship between the geology and the geomorphology of the area. The site

characterisation in an EIS should be presented in the form of an interpretative report including maps and cross-sections where appropriate. The map legends will vary with the requirements of the project. For example;description of the soils should include each of the principal soil type present in the area, their relationship with the topography, land use and productive capacity.

TOPIC	RANGE	
Drainage:	Excessive	Waterlogged
Assimilative Capacity:	Very Good	Very Poor
Erosion Risk:	High	Low

Those properties of soils/geology which may be influenced by the proposed development are described and cross-referenced to other relevant topics (for example in the case of soils, flora, hydrology and land-use) and similar if not identical map scales used.

**Character**

The bedrock and subsoil types, their mineralogy, hydrogeological and engineering properties, degree of weathering and vertical and horizontal extent are described. Any structural, geological and geomorphic features on the site should be identified and described.

Each soil type present at a site is described in terms of its classification, soil profile, site characteristics (relief, slope, vegetation, etc.), drainage conditions and properties such as texture, structure, colour and root development. Comment should be made on the suitability for different types of cultivation, productive capacity and its ability to attenuate potential contaminants.



**Significance**

The value of soils and geological deposits as non-renewable natural resources are examined where large quantities may be obliterated (for example by water impoundment or motorway development). Some soils and geological deposits are of intrinsic scientific value because of their undisturbed state and are of interest for pedology, geology and archaeology. Soils and geological deposits can often be of significance because of their role in sustaining biotic and hydraulic processes.

**Sensitivity**

While all soils and geological formations are vulnerable to gross degradation or destruction by contamination or removal, some are also vulnerable to a narrower range of specific impacts which can alter their character. Such vulnerabilities include:-

- Compaction - leading to loss of structure and changes in soil drainage;
- Hydrology - changes to the water table affecting many processes, both biotic and chemical;
- Hydrogeology - changes in soils and geological formations may increase or decrease the exposure of groundwaters to infiltration.

IMPACTS ON SOILS GEOLOGICAL STRATA

**"Do Nothing" impact;**

- Describe how trends evident in the existing environment will continue and with what consequences for soils/geology.

**Predicted impact;**

- Describe the potential for interaction with other impacts;
- Describe the worst case scenario if all mitigation measures fail.

MITIGATING ADVERSE IMPACTS ON SOILS/GEOLOGICAL STRATA

- Describe mitigation measures proposed to;
- minimise changes to soils/geological deposits;
  - reduce the impacts on soils/geological deposits;
  - reduce exposure of the soils/geological deposits to the impact;
  - remediate any adverse impacts caused to soils/geological deposits.

**WATER**

WATER IN THE EXISTING ENVIRONMENT

This topic deals with all natural bodies. The level of information required in this section may vary considerably depending on the sensitivity of the receiving waters and on the potential of the emissions to cause significant pollution. Competent hydrologists and hydrogeologists should be capable of determining the appropriate level of detail to assess the potential of a project to cause significant impacts on adjacent water bodies.

Descriptions of water in the existing environment are structured to ensure that all aspects are addressed. Water in all aspects of the environment can be considered under the topics:-

- Surface freshwater - streams, bogs, ponds, rivers, lakes;
- Estuarine waters - including marshes;
- Marine waters - coastal, offshore;
- Groundwaters - shallow and deep.

A wide range of issues may need to be addressed when considering this large and complex topic. These include:

**Physical**

- Precipitation, interception and evapotranspiration;
- Movement, horizontal and vertical;
- Infiltration, run-off and flooding;
- Erosion, transportation and deposition of material;
- Temperature, volume, velocity.

**Biotic**

- As a habitat;
- Supporting habitats.

**Chemical**

- Nutrients;
- Gases;
- Contaminants;
- pH;
- Trace elements;
- Mineralisation.

**Beneficial Uses**

- Assimilative capacity;
- Potability;
- Recreation and aesthetics;
- Productive capacity;
- Power;
- Transportation.

**Context**

Maps, diagrams and sections illustrating the location and extent of all surface water bodies and aquifers on and adjacent to the site are included. These illustrations are accompanied by text describing and including relevant information such as:-

- all sources of water - springs, flushes, wells;
- the watershed and water budget of each catchment;
- the names and order of any surface water body;
- the direction and relative magnitude of flow of all water movements both surface and groundwaters;

- aquifer recharge areas;
- geological description of major (regionally important), minor (locally important) and non-aquifers (poor quality);
- details of any Local Authority groundwater protection schemes.

**Character**

The following information may be included, describing aspects of water on and adjacent to the development site:-

- all groundwater level records;
- the quality of all groundwaters and surface waters including pH and nutrient status;
- the natural processes which take place within water bodies;
- the extent and maximum levels of any recorded flooding;
- aquifer characteristics and properties;
- hydraulic conditions;
- aquifer vulnerability.

**Significance**

Because of its mobility, the significance and quality of water often needs to be considered beyond the confines of the development site. Significance may include issues such as:-

- The relative quality of the water (surface and groundwaters);
- The importance of the quantities of the water (surface and groundwater) if any;
- The use of the water for industry, farming, drinking, transportation, assimilation, production, fishing, recreation, power;
- The importance of water as a habitat.

Descriptions of significance include designations, standards or publications which comment on any aspect of the quality of the water.

### **Sensitivities**

Describe any of the water's characteristic natural properties or beneficial uses critically respondent on any aspect of the quality of the characteristics of water, such as:-

- Dissolved gases;
- Temperature;
- pH;
- Mineralisation;
- Velocity;
- Volume;
- Sediment load;
- Purity;
- Availability.

Where water quality or availability is found to be vulnerable to significant impacts due to changes in any of its key characteristics, then the mechanisms which can trigger such changes are clearly identified.

### IMPACTS ON WATER

#### **"Do Nothing" Impact;**

- Describe how trends evident in the existing environment will continue and with what consequences for surface waters and groundwaters.

#### **Predicted impact;**

- Describe the location and extent of any waters likely to be affected;
- Describe the character and significance of any changes in water quality or flows;
- Describe any impacts for the maintenance of the reproductive capacity of the ecosystem-system;
- Describe the consequences of change, referring to indirect, secondary and cumulative impacts;
- Describe the potential for interaction with other impacts.
- Describe the worst case for water if all mitigation measures fail.

### MITIGATING ADVERSE IMPACTS ON WATER

- Describe mitigation measures proposed to;
- avoid locations adjacent to sensitive waters - especially pristine or naturally oligotrophic waters;
  - minimise or eliminate discharges to waters;
  - treat or restore polluted waters to appropriate levels.

## **AIR**

The principal topics described in this section are air quality, noise, vibration and radiation.

### AIR QUALITY IN THE EXISTING ENVIRONMENT

This section deals with the existing air quality with regard to air pollutants, both gaseous and particulate.

#### **Context**

- Describe the geographical location of the project development;
- Describe the features of the development which could potentially impact the air quality.
- The extent of the area studied should be proportionate to the scale and potential impact of the development.

Indicate the locations sensitive to air quality such as dwellings, schools, hospitals, outdoor amenity areas. Where vegetation, water and fauna are likely to be sensitive, this should be indicated.

Describe existing potential sources of air pollution such as industrial areas, roads, rail, airports, domestic activities. Identify any topographical or meteorological features which are likely to influence the

dispersion of air pollutants.

**Character**

Describe the existing environment with regard to pollutants present and pollutants which are potentially generated as a consequence of the proposed development. These pollutants may be gases, vapours, odours, suspended particulates and metals. Dust deposition should also be considered.

Where appropriate, measurements and/or modelling should be performed to quantify the existing air quality according to current applicable standards. The timescale available to undertake representative monitoring may be limited. It may be appropriate to use long term monitoring data in equivalent locations when it is available.

**Significance**

Describe the air quality environment with reference to existing or pending designations, standards or limits. Highlight locations with particularly low or high levels of pollution.

High levels of pollution may be significant in terms of the impact upon the development itself, e.g. housing developments, agriculture.

**Sensitivity**

Consider how the identified locations could be affected by changes in the air quality of the environment.

IMPACTS ON AIR QUALITY

**“Do Nothing” Impact;**

Describe how the quality of the air environment is expected to evolve with time, due to changes for example in road traffic; air traffic, industrial and domestic

activities.

**Predicted impact**

Assess the adverse and beneficial impact in terms of the predicted changes in concentration of air pollutants and also with respect to absolute limits where appropriate. Take account of meteorological conditions as appropriate. Consider the impact on humans, vegetation and fauna where relevant.

In the case of developments which themselves are sensitive to air quality, consider the impact of the existing air quality on the development itself.

MITIGATING ADVERSE IMPACTS ON AIR QUALITY

Mitigation measures to be considered include:

- elimination or reduction of air emissions at source;
- substitution of pollutant emissions or processes ;
- optimisation of dispersion of pollutants through stack height, temperature, velocity and distance to receivers.

Describe the worst case if all mitigation measures fail.

**NOISE**

NOISE IN THE EXISTING ENVIRONMENT

Any sound which can cause nuisance or a deterioration of amenities or the quality of life is examined under this topic.

**Context**

Describe the geographical location of the development. Describe features of the development which could potentially

impact the noise environment. Indicate the noise sensitive locations such as dwellings, schools, hospitals, outdoor amenity areas, parks. In some cases there may be noise-sensitive fauna which should be identified. Describe other features relevant to noise, such as existing industrial areas, roads, rail, and airports.

### **Character**

Describe the existing environment in terms of ambient noise levels, and dominant existing noise sources. Where appropriate, measurements and modelling should be performed to quantify the noise environment according to current applicable standards.

### **Significance**

Describe the noise environment with reference to established criteria, and formal noise zoning if relevant. Highlight areas with especially low, or high noise levels. Areas with high existing noise levels may be significant in terms of the impact upon the development itself, e.g. housing developments.

### **Sensitivity**

Consider how the identified noise sensitive locations could be affected by changes in the noise environment. Areas with existing low levels of noise would in general be found to be more sensitive than areas with high existing noise levels.

## IMPACTS OF NOISE

### **"Do Nothing Impact";**

Describe how the noise environment is expected to evolve with time, due to changes for example in road traffic, air traffic, and industrial activities.

### **Predicted impact;**

Assess the adverse or beneficial impacts on

humans, and fauna where relevant, in terms of the change in noise level and also with respect to absolute limits where appropriate. Consider noise levels outdoors, and indoors. Take account of relevant time periods such as day, evening, night, weekends, as appropriate. Are there any special features, such as tonal noise, impact noise, or significant levels of low-frequency noise.

In the case of developments which themselves are noise-sensitive, such as dwellings, schools, hospitals, consider the impact of the existing noise environment on the development itself.

## MITIGATING ADVERSE NOISE IMPACTS

Mitigation measures to be considered include:

- elimination or control of noise at source;
- reduction in noise propagation by use of noise screens, and by ensuring sufficient distance to receivers;
- reduction in noise level at receiver by screening and insulation;
- control of the time periods during which noise occurs.

Describe the worst case if all noise mitigation measures fail

## VIBRATION

### VIBRATION IN THE EXISTING ENVIRONMENT

Any movement of ground or structures which can cause structural damage, nuisance or a deterioration of amenities or quality of life is examined under this topic.

Where the main effect of transmitted

vibration is the generation of audible sound, this topic can be dealt with under noise.

### **Context**

Describe the geographical location of the development, indicating the vibration sources associated with the development, and vibration sensitive locations such as dwellings, schools, hospitals, industrial facilities. In some cases it may be necessary to consider vibration-sensitive fauna. Indicate the location of structures or buildings which may be susceptible to vibration damage.

### **Character**

The existing environment would generally be expected to display no significant vibration features. In some cases, e.g. near existing quarries, close to rail tracks, industrial buildings, and within urban areas there may be detectable vibration levels which should be described.

### **Significance**

The existing vibration regime is described with reference to any relevant standards. Areas with high existing vibration levels may be significant in terms of the impact upon the development itself, e.g. residential developments, or other vibration-sensitive buildings close to railways, quarries etc.

### **Sensitivity**

Humans are particularly sensitive to vibration. Consider how the human population could be affected by nuisance associated with increases in vibration levels or vibration events. Consider the vibration levels that may be of concern in terms of cosmetic or structural damage to buildings. Are there industrial facilities, or fragile buildings which could be expected to be especially sensitive to vibration.

## IMPACTS OF VIBRATION

### **"Do Nothing Impact";**

Describe how the vibration environment is expected to evolve with time, due to for example extended quarrying, rail, traffic etc.

### **Predicted impact;**

Consider the adverse or beneficial impacts on humans, fauna and buildings where relevant. Describe the vibration levels, and character of the vibration to be expected at the receiver locations. Will the vibration be perceptible, or cause a nuisance? Will it manifest itself as audible sound within buildings. Will it result in detectable displacement of the ground and structures. Assess the scale of the impact according to relevant standards, in terms of annoyance to humans, interference with industrial facilities, and damage criteria for buildings.

In the case of developments which themselves are vibration-sensitive, such as dwellings, schools, hospitals, consider the impact of the existing vibration environment on the development itself.

## MITIGATING ADVERSE VIBRATION IMPACTS

Mitigation measures to be considered include:

- elimination, or reduction of the vibration at source
- isolation of the vibration source from the receiver (breaking the transmission paths)
- vibration isolation of the receiver
- control of the time periods during which vibration occurs

Describe the worst case if all vibration mitigation measures fail.

## RADIATION

### RADIATION IN THE EXISTING ENVIRONMENT

Radiation is a general term to describe transmission of radiant energy, particles or electromagnetic waves. For any proposed development it will be necessary to specify the particular type of radiation which is being considered. The following types may need to be considered:

Ionising radiation, electromagnetic radiation (e.g. radio and communications transmitters), electric and magnetic fields, visible light (urban lighting, industrial lighting). In the case of light pollution or glare, this may alternatively be dealt with under the topic of landscape. Radon may alternatively be dealt with under air quality.

#### **Context**

Describe the geographical location, and features of the development which may impact on the radiation environment. Indicate proximity to humans, dwellings, hospitals, and sensitive electronic equipment. Existing sources of radiation should be identified (e.g. power lines, aerials, urban lighting, natural ionising radiation).

#### **Character**

Describe the existing environment in terms of the nature of the radiation, and measured radiation fields.

#### **Significance**

The existing radiation environment is described with reference to any relevant standards. Are there any features of special significance, e.g. areas of countryside unaffected by light pollution. Areas of high radiation level may be significant for the

development itself (e.g. developments for human habitation).

#### **Sensitivity**

Consider the potential effects on humans, in terms of health, as a function of radiation dose. In the case of visible light, the sensitivity of the human population to glare and light pollution should be considered. Are there items of electrical equipment which are likely to be particularly sensitive to electromagnetic radiation, such as navigation, or medical equipment.

### IMPACTS OF RADIATION

#### **"Do Nothing" Impact;**

Describe how the radiation environment is expected to change with time.

#### **Predicted impact;**

Consider the adverse or beneficial impacts on humans, and sensitive equipment where relevant. Determine the radiation doses, or in the case of visible light, the nuisance expected for the human population. Assess significance according to relevant standards. In the case of location of housing developments in areas of high background radiation, consider the radiation exposure of the human population in the development.

### MITIGATING ADVERSE RADIATION IMPACTS

Mitigation measures to be considered include:

- elimination, or attenuation of the radiation at source;
- reduction in transmitted radiation by means of screening, and by ensuring sufficient distance to receivers;
- shielding people or equipment at receiver locations.

Describe the worst case if all radiation mitigation measures fail.

## CLIMATE

### CLIMATE IN THE EXISTING ENVIRONMENT

Climate in an Environmental Impact Statement generally refers to the local climatological conditions or "microclimate" of an area, such as local wind flow, temperature, rainfall or solar radiation patterns.

In a limited number of cases the impact of a development in a global context may also be relevant.

#### Context

For the purposes of Environmental Impact Assessment, a development may be seen to have potential climatic implications if it's emissions are likely to alter meteorological conditions with possible weather effects. In this context, it is important to identify receptors which may be particularly sensitive to climate change.

A development may also have microclimate effects. A distinctive microclimate is usually the result of factors such as aspect, scope and shelter.

A development may also have implications on a wider scale – such as globally, where it may represent a significant proportion of the national contribution of greenhouse gases.

#### Character

Prevailing weather systems are described with long term patterns and trends noted in particular. The distinguishing features of the microclimate are described emphasising, where relevant, the time at which the effect is most pronounced.

#### Significance

The importance and implications of the climate or microclimate are described.

For example;

- Does it support distinctive flora or fauna?
- Are certain agricultural, horticultural, forestry practices facilitated?
- Is land-use amenity enhanced?

#### Sensitivities

Describe the potential environmental consequences of climate change and where relevant the potential environmental consequences of microclimate changes.

### IMPACTS ON CLIMATE

#### "Do Nothing" Impact

Describe how trends evident in the existing climatic environment will continue and with what consequences for climate and microclimate.

#### Predicted impact;

- Describe the climatic factors which will be affected stating to what extent change will occur;
- Describe the consequences of change referring to indirect, secondary and cumulative impacts;
- Describe the potential for interaction with other impacts.
- Describe the worst case if all mitigation measures fail.

### MITIGATING ADVERSE IMPACTS ON CLIMATE

Describe mitigation measures proposed to

- avoid changes to climate;
- reduce effects of changes
- remedy any adverse impacts caused.



## THE LANDSCAPE

### LANDSCAPE IN THE EXISTING ENVIRONMENT

This topic has two separate but closely related aspects. The first aspect to be considered is visual impacts focusing on the extent to which new developments can be seen, the second aspect is impacts on the character of the landscape, examining responses which are felt towards the combined effects of the new development. This latter topic is complex because it encompasses many other impacts such as noise, odours, ecology, history and because attempts to scientifically measure feelings and perceptions are not reliable. Cross reference with appropriate specialist topics such as ecology, archaeology and architectural history is very important.

#### Context

Areas from which the existing site can be seen are generally noted. Particular attention is drawn to views from the following:

- designated tourism routes and view points;
- other roads;
- residences, hotels and amenities.
- sites and monuments of archaeological, architectural or historical interest.

‘Views’ implies significant visibility.

Areas of the site which are visible from beyond the site boundary are noted, drawing particular attention to areas which

- are seen against the skyline, water or distant views;
- obstruct the views of features or visual amenities;
- are a particular focus of visual attention.

If the site and its environs have areas of

distinctive and different character, those are mapped and described. The principal landscape features which are described and illustrated include the following:-

- Topography and drainage;
- Enclosures, including field boundaries;
- Settlement patterns and land-uses;
- Natural features;
- archaeological, architectural, historical or cultural features
- Visual foci - external and internal;
- Vegetation;
- Circulation routes.

#### Character

It is important that the character of a landscape is described and assessed by reference to both natural and cultural criteria.

- Natural and human features combine to create distinctive areas within landscapes, each of which can be illustrated and described for analysis and planning purposes;
- The description of landscape character uses systematic approaches which clearly differentiate between subjective assessments and objective description;
- It is important to differentiate between the character of the site as perceived from within the site and perceived from the larger landscape beyond;
- A description of the intensity and character of land-use is an important factor. Heavy traffic, for example, can alter landscape character.

#### Significance

The description of the significance of the existing landscape examines issues such as the following;

- Does the development site intrude upon any designated views?
- Is the site within or adjacent to any designated landscape or amenity area?

- Is the site or its environs part of or prominently visible from any archaeological monument, historical site or location of architectural, artistic or heritage importance?
- Is any part of the site visible from a wide area?
- Is the site or its environs used for any activity in which landscape character or views play an important role such as tourism, hill-walking?
- Can any trends in the landscape be identified or reasonably inferred?
- At all times the significance of the overall landscape (of which the site forms part) must be considered.

### **Sensitivity**

Describe any of the attributes of the existing landscape or views capable of being changed in such a way as to significantly alter its perceived character and appearance.

## IMPACTS ON LANDSCAPE

### **"Do Nothing" Impact;**

Describe how trends evident in the existing environment will continue and with what consequences for the character and appearance of the landscape.

### **Predicted impact;**

- Describe the location and extent of areas affected;
- Describe changes in character and visibility;
- Describe any impacts for the maintenance of the reproductive capacity of the ecosystem-system;
- Describe changes in patterns of land-use;
- Describe the consequences of change, referring to indirect, secondary and cumulative impacts;
- Describe the potential for interaction with other impacts.

- Describe the worst case for the landscape if all mitigation measures fail;
- consider the impact of the development on the overall landscape character of the area of which the development forms part

## MITIGATING ADVERSE IMPACTS ON LANDSCAPE

Describe mitigation measures proposed to:

- avoid developments in sensitive or prominent landscapes;
- reduce the visual intrusiveness of the design;
- reduce the visibility of the project.

**MATERIAL ASSETS** – including the architectural and archaeological heritage and cultural heritage

## **Introduction**

Resources that are valued and that are intrinsic to specific places are called 'material assets'. They may be of either human or natural origin and the value may arise for either economic or cultural reasons.

The assessment objectives vary considerably according to the type of assets, those for economic assets being concerned primarily with ensuring equitable and sustainable use of resources. Assessments of cultural assets are more typically concerned with securing the integrity and continuity of both the asset and its necessary context.

## ECONOMIC ASSETS OF NATURAL ORIGIN INCLUDE:

- assimilative capacity of air and water;
- non-renewable resources (e.g. minerals, soils);
- renewable resources (hydraulic head, wind exposure);

- deep water berthage.

**ECONOMIC ASSETS OF HUMAN ORIGIN INCLUDE:**

- Cities, towns, villages and settlements;
- transportation infrastructure (roads, railways, airports etc);
- major utilities (water supplies, sewage, power systems etc);
- ownership and access.

**CULTURAL ASSETS OF A PHYSICAL TYPE INCLUDE:**

- archaeology in context;
- architecture in context;
- settlements;
- monuments, features and landmarks;
- historic sites and structures;
- geological heritage.

**CULTURAL ASSETS OF A SOCIAL TYPE INCLUDE:**

- language and dialects;
- folklore and tradition;
- religion and belief;
- literary and artistic association.

Because of the different assessment objectives and methods, this section will hereafter be subdivided into:

Economic Assets  
Cultural Assets

**ECONOMIC ASSETS IN THE EXISTING ENVIRONMENT**

This general topic is intended to deal with physical resources in the environment which may be of either human or natural origin. The objective of the assessment is to ensure that these assets are used in a sustainable manner, so that they will be available for future generations, after the

development of the project. Examples of these assets include:-

- Transportation Infrastructure
- Assimilation Capacity
- Major Utilities
- Deep Berthage
- Cities and Towns
- Non Renewable Resources
- Ownership and Access
- Renewable Resources

**Context**

Describe the location and extent of the asset.

- Does it extend beyond the site boundary?

**Character**

Describe the nature and use of the asset.

- It is exploited, used or accessible?
- Is it renewable or non-renewable and if so over what period?

**Significance**

Describe the significance of the asset.

- Is the material asset unique, scarce or common in the region?
- Is its use controlled by known plans, priorities or policies?
- What trends are evident or may reasonably be inferred?

**Sensitivity**

Describe the changes in the existing environment which could limit the access to, or the use of, the material asset.

**IMPACTS ON ECONOMIC ASSETS**

**"Do Nothing" Impact;**

Describe how trends evident in the existing environment will continue and with what consequences for material assets such as traffic, services infrastructure, urban development and resources.

**Predicted impact;**

- Describe the activities, areas, infrastructure and resources likely to be affected;
- Describe changes in overall land-use;
- Describe the consequences of change, referring to indirect, secondary and cumulative impacts;
- Describe the potential for interaction with other impacts;
- Describe the worst case for material assets if all mitigation measures fail.

■ MITIGATING ADVERSE IMPACTS ON ECONOMIC ASSETS

Describe Mitigation Measures proposed to:

- avoid locations or designs which could compromise material assets;
- reduce the impacts on material assets;
- compensate for any loss of access, capacity, resources or investment.

Cultural Assets in the Existing Environment

This section deals with those aspects of the environment which are valued because of their age, history, beauty or tradition. Some of these topics are the subject of highly developed fields of academic study, some may be of interest only to the people of the local parish. Some features and artefacts which may be encountered are the subject of specific legislation and government policy in terms of protection. This includes:

- Archaeological Heritage;
- Architecture;
- History;
- Landscape and Garden Design;
- Folklore and Tradition;
- Structures, features and other landmarks;
- Geological features;
- Language and dialect;
- Religion;
- Settlements;

- Inland waterways (canals and navigable rivers);
- Language and dialect;
- Placenames.

**Context**

It should be noted that the preservation of the context of items of cultural heritage, especially archaeological monuments can be of equal importance to the preservation of the remains themselves. The Cultural Heritage section of an EIS may need to be cross-examined to the Landscape section.

The description includes illustrations and written descriptions of:-

- the features: their location, interiors and curtilage (where relevant), number and contexts;
- approaches and access to the features;
- the Record of Monuments numbers (if appropriate).
- visual impact

**Character**

Describe the type of features present, the condition of the features and the type and extent of access to the features.

**Significance**

- Describe any status or designation which applies to the feature, noting in particular whether that status has a statutory basis and/or whether it may impose additional constraints on development;
- Describe the relative abundance/ scarcity of such features;
- It is particularly important to determine the local significance of items of cultural heritage. While these may not appear in any official listings or designations they can be of overwhelming importance to the community;
- Describe any trends which can be identified or reasonably inferred;

- Discuss the potential to encounter archaeological material at any stage;
- Describe any documentary or historical references to the development site;
- Describe any potential or associated remains that may be predicted.

**Sensitivity**

Describe any changes which could significantly alter:-

- the sustained preservation of the feature;
- the sustained preservation of the context;
- continued access to the feature.
- describe any potential or associated remains that may be predicted;
- describe any documentary or historical references to the development site.

IMPACTS ON CULTURAL ASSETS

**"Do Nothing" Impact;**

Describe how trends evident in the existing environment will continue and with what consequences for the cultural heritage.

**Predicted impact;**

- Describe the number, population, type and location of features of cultural heritage likely to be affected;
- Describe changes to features or their context;
- Describe changes in patterns of land-use and access;
- Describe the consequences of change, referring to indirect, secondary and cumulative impacts;
- Describe the potential for interaction with other impacts.
- Describe the worst case for cultural heritage if all mitigation measures fail.

MITIGATING ADVERSE IMPACTS ON CULTURAL ASSETS

Describe Mitigation Measures proposed to:

- avoid locations or designs containing or affecting features of cultural heritage;
- minimise impacts on such features (excavate or monitor);
- remedy any changes in context or fabric which may occur.

It is important to note here also that the concept of indirect effect is very relevant to the protection of archaeological and architectural heritage, e.g. lowering of water tables may adversely affect waterlogged archaeological deposits; air pollution or vibrations may adversely affect architectural heritage.

**THE INTERACTION OF THE FOREGOING**

All environmental factors are inter-related to some extent. This heading draws attention to significant interaction and interdependencies in the existing environment.

In practice interactions between one topic and another are usually discussed under each of those topic headings rather than in a specific "Interactions" section. For example the effect of water pollution in plant life would usually be discussed under the heading of "Flora and Fauna".

Where an EIS is being prepared by a number of specialist consultants it is important that a co-ordinator ensures that interactions between the various disciplines are taken into consideration.

Other examples of interactions include:-

- Existing land-use practices which sustain natural processes;

- Existing plants which sustain significant fauna;
- Existing soils which sustain significant flora and fauna;
- The quality, quantity or location of water can affect physical, biotic or chemical processes;
- Existing air quality can sustain land-uses and natural processes.

Interactions are usually highly complex. The example below shows how a change in any one of the above factors, land-use, water quality, vegetation, fishlife or tourism, could affect all of the other inter-related factors.

Low intensity farming maintains pristine water quality and natural river bank vegetation which provide feeding and breeding sites for game fish. The game fish provide opportunities for tourism related economic activity which eases pressure for more intensive farming.



## **TOPICS USUALLY ADDRESSED IN EIS'S FOR PARTICULAR PROJECT TYPES**

### **INTRODUCTION**

This section provides guidance on the topics which would usually be addressed when preparing an Environmental Impact Statement for developments of a particular project class.

The Fifth Schedule of the Planning and Development Regulations, 2001 (SI No 600 of 2001) sets out a comprehensive list of project types, and development thresholds where relevant (except roads), subject to Environmental Impact Assessment for the purposes of the Regulations. For ease of reference, these Advice Notes have condensed this comprehensive list into 33 Project Types comprising a number of related generic development types with similar development and/or operational characteristics. Table 1 provides a cross reference of the development types listed by the Regulations with the relevant Project Types used in these Advice Notes. Table 2 provides a cross reference to Project Types and the relevant page number.

Please note with regard to flora and fauna and archaeology that impacts may be encountered due to the specific location of a particular development rather than project type.



TABLE 1  
Cross-Reference  
of Regulation  
Project Types

2001 REGULATIONS FIFTH SCHEDULE PART I			EPA ADVICE NOTES PROJECT TYPES
1.		A crude oil refinery (excluding undertakings manufacturing only lubricants from crude oil); Or	Type 0
2.	a	an installation for the gasification and liquefaction of 500 tonnes or more of coal or bituminous shale per day.	Type 1
	b	A thermal power station or other combustion installation with a heat output of 300 megawatts or more; Or	Type 2
3.	a	A nuclear power station or other nuclear reactor including the dismantling or decommissioning of such a power station or reactor <sup>7</sup> (except a research installation for the production and conversion of fissionable and fertile materials, whose maximum power does not exceed 1 kilowatt continuous thermal load).	Type 3
	b	All installations for the reprocessing of irradiated nuclear fuel.	Type 3
		Installations designed:	Type 3
		• for the production or enrichment of nuclear fuel;	Type 3
		• for the processing of irradiated nuclear fuel or high level radioactive waste;	Type 4
		• for the final disposal of irradiated fuel;	Type 4
		• solely for the final disposal of radioactive waste;	Type 4
		• solely for the storage (planned for more than 10 years) of irradiated fuels or radioactive waste in a different site than the production site.	Type 4
4.	a	Integrated works for the initial smelting of cast iron and steel.	Type 5
	b	Installations for the production of non-ferrous crude metals from ore, concentrates or secondary raw materials by metallurgical, chemical or electrolytic processes.	Type 5
		An installation for the extraction of asbestos or for the processing and transformation of asbestos or products containing asbestos:	Type 6
5.	a	in case the installation produces asbestos-cement products, where the annual production would exceed 20,000 tonnes of finished products;	Type 6

<sup>7</sup> Nuclear power stations and other nuclear reactors cease to be such an installation when all nuclear fuel and other radioactively contaminated elements have been removed permanently from the installation site.

<b>2001 REGULATIONS FIFTH SCHEDULE PART I</b>		<b>EPA ADVICE NOTES PROJECT TYPES</b>
	b in case the installation produces friction material, where the annual production would exceed 50 tonnes of finished products or;	Type 6
	c in other cases, where the installation would utilise more than 200 tonnes of asbestos per year.	Type 6
6.	Integrated chemical installations, i.e. those installations for the manufacture on an industrial scale of substances using chemical conversion processes, in which several units are juxtaposed and are functionally linked to one another and which are:	Type 7
	a For the production of basic organic chemicals.	Type 7
	b For the production of basic inorganic chemicals.	Type 7
	c For the production of phosphorus, nitrogen or potassium based fertilisers (simple or compound fertilisers).	Type 7
	d For the production of basic plant health products and of biocides.	Type 7
	e For the production of basic pharmaceutical products using a chemical or biological process.	Type 7
	f For the production of explosives.	Type 7
7.	A line for long-distance railway traffic or an airport <sup>8</sup> with a basic runway length or 2,100 metres or more	Types 8 & 9
8.	a Inland waterways and ports for inland waterway traffic which permit the passage of vessels of over 1,350 tonnes.	Type 10
	b Trading ports, piers for loading and unloading connected to land and outside ports (excluding ferry piers) which can take vessels of over 1,350 tonnes.	Type 10
9.	Waste disposal installations for the incineration, chemical treatment as defined in Annex IIA to Directive 75/442/EEC <sup>(9)</sup> under heading D9, or landfill of hazardous waste (i.e. waste to which Directive 91/689/EEC <sup>(10)</sup> applies).	Type 32
10.	Waste disposal installations for the incineration or chemical treatment as defined in Annex IIA to Directive 75/442/EEC under heading D9 of non-hazardous waste with a capacity exceeding 100 tonnes per day.	Type 32

<sup>8</sup> In this context, "airport" means an airport which complies with the definition in the 1944 Chicago Convention for setting up the International Civil Aviation Organisation (Annex IV).

<sup>9</sup> OJ No L 194, 25.7.1995 p. 39. Directive as amended by Commission Decision 94/3/EC (OJ No. L 5, 7.1.1994 p. 15).

<sup>10</sup> OJ No L 337, 31.12.1991 p. 20. Directive as last amended by Directive 94/31 EC (OJ No L 168, 2.7.1994 p. 28).

<b>2001 REGULATIONS FIFTH SCHEDULE PART I</b>		<b>EPA ADVICE NOTES PROJECT TYPES</b>
11.	Groundwater abstraction or artificial groundwater recharge schemes, where the annual volume of water abstracted or recharged is equivalent to or exceeds 10 million cubic metres.	Type 16
12.	a Works for the transfer of water resources between river basins, where this transfer aims at preventing possible shortages of water and where the amount of water transferred exceeds 100 million cubic metres per year.	Type 12
	b In all other cases, works for the transfer of water resources between river basins, where the multi-annual average flow of the basin of abstraction exceeds 2,000 million cubic metres per year and where the amount of water transferred exceeds 5 per cent of this flow.	Type 12
13.	Waste water treatment plants with a capacity exceeding 150,000 population equivalent as defined in Article 2 point (6) of Directive 91/271/EEC <sup>(11)</sup> .	Type 30
14.	Extraction of petroleum and natural gas for commercial purposes where the amount extracted exceeds 500 tonnes/day in the case of petroleum and 500,000 cubic metres per day in the case of gas.	Type 19
15.	Dams and other installations designed for the holding back or permanent storage of water, where a new or additional amount of water held back or stored exceeds 10 million cubic metres.	Type 12
16.	Pipelines for the transport of gas, oil or chemicals with a diameter of more than 800 millimetres and a length of more than 40 kilometres.	Type 20
17.	Installations for the intensive rearing of poultry or pigs with more than:	Type 13
	a 85,000 places for broilers, 60,000 places for hens;	Type 13
	b 3,000 places for production pigs (over 30 kilograms) or;	Type 13
	c 900 places for sows;	Type 13
18.	Industrial plants for the:	
	a Production of pulp from timber or similar fibrous materials.	Type 27
	b Production of paper and board with a production capacity exceeding 200 tonnes per day.	Type 27

<sup>11</sup> OJ No L 135, 30.6.1991p. 40. Directive as last amended by the 1994 Act of Accession.

<b>2001 REGULATIONS FIFTH SCHEDULE PART I</b>		<b>EPA ADVICE NOTES PROJECT TYPES</b>
19.	Quarries and open-cast mining where the surface of the site exceeds 25 hectare, or peat extraction, where the surface of the site exceeds 150 hectares.	Types 15 & 18
20.	Construction of overhead electrical power lines with a voltage of 220 kilovolts or more and a length of more than 15 kilometres.	Type 20
21.	Installations for storage of petroleum, petrochemical or chemical products with a capacity of 200,000 tonnes or more.	Type 21
<b>2001 REGULATIONS FIFTH SCHEDULE PART II</b>		<b>EPA ADVICE NOTES PROJECT TYPES</b>
1.	<b>AGRICULTURE, SILVICULTURE AND AQUACULTURE</b>	
a	Projects for the restructuring of rural land holdings, where the area to be restructured would be greater than 100 hectares.	Type 11
b	The use of uncultivated land or semi-natural areas for intensive agricultural purposes, where the area to be used for such purposes would be greater than 100 hectares.	Type 11
c	Water management projects for agriculture, including irrigation and land drainage projects, where the catchment area involved would be greater than 1,000 hectares or where more than 20 hectares of wetlands would be affected.	Type 12
d	(i) Initial afforestation which would involve an area of 50 hectares or more.	Type 11
	(ii) Replacement of broadleaf high forest by conifer species, where the area involved would be greater than 10 hectares.	Type 11
	(iii) Deforestation for the purpose of conversion to another type of land use, where the area to be deforested would be greater than 10 hectares of natural woodlands or 70 hectares of conifer forest.	Type 11
e	(i) Installations for intensive rearing of poultry not included in Part I of this Schedule which would have more than 40,000 places for poultry.	Type 13
	(ii) Installations for intensive rearing of pigs not included in Part I of this Schedule which would have more than 2,000 places for production pigs (over 30 kilograms) in a finishing unit, more than 400 places for sows in a breeding unit or more than 200 places for sows in an integrated unit.	Type 13

<b>2001 REGULATIONS FIFTH SCHEDULE PART II</b>		<b>EPA ADVICE NOTES PROJECT TYPES</b>
f	Seawater fish breeding installations with an output which would exceed 100 tonnes per annum; all fish breeding installations consisting of cage rearing in lakes; all fish breeding installations upstream of drinking water intakes; other freshwater fish breeding installations which would exceed 1 million smolts and with less than 1 cubic metre per second per 1 million smolts low flow diluting water.	Type 14
g	Reclamation of land from the sea, where the area of reclaimed land would be greater than 10 hectares.	Type 11
2.	<b>EXTRACTIVE INDUSTRY</b>	
a	Peat extraction not included in Part I of this Schedule which would involve a new or extended area of 50 hectares.	Type 15
b	Extraction of stone, gravel, sand or clay, where the area of extraction involved would be greater than 5 hectares.	Type 18
c	All extraction of minerals within the meaning of the Minerals Development Acts, 1940 to 1999.	Type 17
d	Extraction of stone, gravel, sand or clay by marine dredging (other than maintenance dredging), where the area involved would be greater than 5 hectares or, in the case of fluvial dredging (other than maintenance dredging), where the length of river involved would be greater than 500 metres.	Type 18
e	All geothermal drilling and drilling for the storage of nuclear waste material; drilling, other than test drilling, for water supplies, where the expected supply would exceed 2 million cubic metres per annum.	Type 16
f	All surface industrial installations for the extraction of coal, petroleum (excluding natural gas), ores, or bituminous shale not included in Part I of this Schedule.	Type 17
g	All extraction of petroleum (excluding natural gas) not included in Part I of this Schedule.	Type 19
h	All onshore extraction of natural gas and offshore extraction of natural gas (where the extraction would take place within 10 kilometres of the shoreline) not included in Part I of this Schedule.	Type 19
3.	<b>ENERGY INDUSTRY</b>	
a	Industrial installations for the production of electricity, steam and hot water not included in Part I of this Schedule with a heat output of 300 megawatts or more.	Type 2
b	Industrial installations for carrying gas, steam and hot water with a potential heat output of 300 megawatts or more, or transmission of electrical energy by overhead cables not included in Part I of this Schedule, where the voltage would be 200 kilovolts or more.	Type 20

<b>2001 REGULATIONS FIFTH SCHEDULE PART II</b>		<b>EPA ADVICE NOTES PROJECT TYPES</b>
	c Installations for surface storage of natural gas, where the storage capacity would exceed 200 tonnes.	Type 21
	d Installations for underground storage of combustible gases, where the storage capacity would exceed 200 tonnes.	Type 21
	e Installations for surface storage of fossil fuels, where the storage capacity would exceed 100,000 tonnes.	Type 21
	f Installations for industrial briquetting of coal and lignite, where the production capacity would exceed 150 tonnes per day.	Type 22
	g Installations for the processing and storage of radioactive waste not included in Part I of this Schedule.	Type 3
	h Installations for hydroelectric energy production with an output of 20 megawatts or more, or where the new or extended superficial area of water impounded would be 30 hectares or more, or where there would be a 30 percent change in the maximum, minimum or mean flows in the main river channel.	Type 2
	i Installations for the harnessing of wind power for energy production (wind farms) with more than 5 turbines or having a total output greater than 5 megawatts.	Type 33
4.	<b>PRODUCTION AND PROCESSING OF METALS</b>	
	a All installations for the production of pig iron or steel (primary or secondary fusion) including continuous casting.	Type 5
	b Installations for the processing of ferrous metals:	Type 5
	(i) hot-rolling mills and smitheries with hammers, where the production area would be greater than 500 square metres;	Type 5
	(ii) application of protective fused metal coats, where the production area would be greater than 100 square metres;	Type 5
	c Ferrous metal foundaries with a batch capacity of 5 tonnes or more or where the production area would be greater than 500 square metres.	Type 5
	d Installations for the smelting, including the alloyage, of non-ferrous metals, excluding precious metals, including recovered products (refining foundry casting etc.) where the melting capacity would exceed 0.5 tonnes or where the production area would be greater than 500 square metres.	Type 5
	e Installations for surface treatment of metals and plastic materials using an electrolytic or chemical process, where the production area would be greater than 100 square metres.	Type 5

<b>2001 REGULATIONS FIFTH SCHEDULE PART II</b>		<b>EPA ADVICE NOTES PROJECT TYPES</b>
	f All installations for manufacture and assembly of motor vehicles or manufacture of motor-vehicle engines.	Type 23
	g Shipyards, where the area would be 5 hectares or more, or with capacity for vessels of 10,000 tonnes or more (dead-weight).	Type 23
	h All installations for the construction of aircraft with a seating capacity exceeding 10 passengers.	Type 23
	i Manufacture of railway equipment, where the production area would be greater than 100 square metres.	Type 23
	j Swagging by explosives, where the floor area would be greater than 100 square metres.	Type 5
	k All installations for the roasting and sintering of metallic ores.	Type 5
5.	<b>MINERAL INDUSTRY</b>	
	a All coke ovens (dry coal distillation).	Type 1
	b All installations for the manufacture of cement.	Type 7
	c All installations for the production of asbestos and the manufacture of asbestos based products not included in Part I of this Schedule.	Type 6
	d Installations for the manufacture of glass, including glass fibre, where the production capacity would exceed 5,000 tonnes per annum.	Type 7
	e All installations for smelting mineral substances including the production of mineral fibres.	Type 7
	f Manufacture of ceramic products by burning, in particular roofing tiles, bricks, refractory bricks, tiles, stoneware or porcelain, with a production capacity exceeding 75 tonnes per day, or with a kiln capacity exceeding 4 cubic metres and with a density per kiln exceeding 300 kilograms per cubic metre.	Type 7
6.	<b>CHEMICAL INDUSTRY (DEVELOPMENT NOT INCLUDED IN PART I OF THIS SCHEDULE)</b>	
	a Installations for treatment of intermediate products and production of chemicals using a chemical or biological process.	Type 7
	b All installations for production of pesticides and pharmaceutical products, paint and varnishes, elastomers and peroxides using a chemical or biological process.	Type 7
	c Storage facilities for petroleum, where the storage capacity would exceed 50,000 tonnes.	Type 21

<b>2001 REGULATIONS FIFTH SCHEDULE PART II</b>		<b>EPA ADVICE NOTES PROJECT TYPES</b>
	d Storage facilities for petrochemical and chemical products, where such facilities are storage to which the provisions of Article 9, 11 and 13 of Council Directive 96/82/EC apply.	Type 7
7.	<b>FOOD INDUSTRY</b>	
	a Installations for manufacture of vegetable and animal oils and fats, where the capacity for processing raw materials would exceed 40 tonnes per day.	Type 24
	b Installations for packing and canning of animal and vegetable products, where the capacity for processing raw materials would exceed 100 tonnes per day.	Type 24
	c Installations for manufacture of dairy products, where the processing capacity would exceed 50 million gallons of milk equivalent per annum.	Type 24
	d Installations for commercial brewing and distilling; installations for malting, where the production capacity would exceed 100,000 tonnes per annum.	Type 24
	e Installations for confectionery and syrup manufacture where the production capacity would exceed 100,000 tonnes per annum.	Type 24
	f Installations for the slaughter of animals, where the daily capacity would exceed 1,500 units and where units have the following equivalents: 1 sheep               =     1 unit 1 pig                 =     2 units 1 head of cattle   =     5 units	Type 25
	g All industrial starch manufacturing installations.	Type 24
	h All fish-meal and fish-oil factories.	Type 24
	i All sugar factories.	Type 24
8.	<b>TEXTILE, LEATHER, WOOD AND PAPER INDUSTRIES</b>	
	a All installations for the production of paper and board not included in Part I of this Schedule.	Type 27
	b Plants for the pre-treatment (operations such as washing, bleaching, mercerisation or dyeing of fibres or textiles), where the treatment capacity would exceed 10 tonnes per day.	Type 26
	c Plants for the tanning of hides and skins, where the treatment capacity would exceed 100 skins per day.	Type 26
	d Cellulose-processing and production installations, where the production capacity would exceed 10,000 tonnes per annum.	Type 27



<b>2001 REGULATIONS FIFTH SCHEDULE PART II</b>		<b>EPA ADVICE NOTES PROJECT TYPES</b>
9.	<p><b>RUBBER INDUSTRY</b></p> <p>Installations for manufacture and treatment of elastomer based products, where the production capacity would exceed 10,000 tonnes per annum.</p>	Type 7
10.	<p><b>INFRASTRUCTURE PROJECTS</b></p> <p>a Industrial estate development projects, where the area would exceed 15 hectares.</p> <p>b</p> <ul style="list-style-type: none"> <li>(i) Construction of more than 500 dwelling units.</li> <li>(ii) Construction of a car-park providing more than 400 spaces, other than a car-park provided as part of, and incidental to the primary purpose of, a development.</li> <li>(iii) Construction of a shopping centre with a gross floor space exceeding 10,000 square metres</li> <li>(iv) Urban development (other than that referred to in subparagraphs (i) to (iii)) which would involve an area greater 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area, and 20 hectares elsewhere.</li> </ul> <p><i>(In this paragraph, 'business district' means a district within a city or town in which the predominant land use is retail or commercial use).</i></p> <p>c All construction of railways and of intermodal transshipment facilities and of intermodal terminals not included in Part I of this Schedule which would exceed 15 hectares in area.</p> <p>d All airfields not included in Part I of this Schedule with paved runways which would exceed 800 metres in length.</p> <p>e New or extended harbours and port installations, including fishing harbours, not included in Part I of this Schedule, where the area, or additional area, of water enclosed would be 20 hectares or more, or which would involve the reclamation of 5 hectares or more of land, or which would involve the construction of additional quays exceeding 500 metres in length.</p> <p>f</p> <ul style="list-style-type: none"> <li>(i) Inland waterway construction not included in Part I of this Schedule which would extend over a length exceeding 2 kilometres.</li> <li>(ii) Canalisation and flood relief works, where the immediate contributing sub-catchment of the proposed works (i.e. the difference between the contributing catchments at the upper and lower extent of the works) would exceed 1,000 hectares or where more than 20 hectares of wetland would be affected or where the length of river channel on which works are proposed would be greater than 2 kilometres.</li> </ul>	<p>Type 28</p> <p>Type 28</p> <p>Type 28</p> <p>Type 28</p> <p>Type 28</p> <p>Type 8</p> <p>Type 9</p> <p>Type 10</p> <p>Type 10</p> <p>Type 12A</p>

<b>2001 REGULATIONS FIFTH SCHEDULE PART II</b>		<b>EPA ADVICE NOTES PROJECT TYPES</b>
	g Dams and other installations, not included in Part I of this Schedule, which are designed to hold water or store it on a long-term basis, where the new or extended area of water impounded would be 30 hectares or more.	Type 12
	h All tramways, elevated and underground railways, suspended lines or similar lines of a particular type, used exclusively or mainly for passenger transport.	Type 8
	i (i) Oil pipelines and associated installations not included in Part I of this Schedule, where the length of new pipeline would exceed 40 kilometres.	Type 20
	(ii) Gas pipelines and associated installations not included in Part I of this Schedule, where the design pressure would exceed 16 bar and the length of new pipeline would exceed 40 kilometres.	Type 20
	j Installation of overground aqueducts which would have a diameter of 1,000 millimetres or more and a length of 500 metres or more.	Type 20
	k Coastal work to combat erosion and maritime works capable of altering the coast through the construction, for example, of dikes, moles, jetties and other sea defence works, where the length of coastline on which works would take place would exceed 1 kilometre, but excluding the maintenance and reconstruction of such works or works required for emergency purposes.	Type 12B
	l Groundwater abstraction and artificial groundwater recharge schemes not included in Part I of this Schedule where the average annual volume of water abstracted or recharged would exceed 2 million cubic metres.	Type 16
	m Works for the transfer of water resources between river basins not included in Part I of this Schedule where the annual volume of water abstracted or recharged would exceed 2 million cubic metres.	Type 12
11.	<b>OTHER PROJECTS</b>	
	a All permanent racing and test tracks for motorised vehicles.	Type 29
	b Installations for the disposal of waste with an annual intake greater than 25,000 tonnes not included in Part I of this Schedule.	Type 31
	c Waste water treatment plants with a capacity greater than 10,000 population equivalent, as defined in Article 2, point (6) of Directive 91/271/EEC not included in Part I of this Schedule.	Type 30

<b>2001 REGULATIONS FIFTH SCHEDULE PART II</b>		<b>EPA ADVICE NOTES PROJECT TYPES</b>
	d Sludge-deposition sites where the expected annual deposition is 5,000 tonnes of sludge (wet).	Type 31
	e Storage of scrap metal, including scrap vehicles where the site area would be greater than 5 hectares.	Type 5
	f Test benches for engines, turbines or reactors where the floor area would exceed 500 square metres.	Type 23
	g All installations for the manufacture of artificial mineral fibres.	Type 7
	h All installations for the manufacture, packing, loading or placing in cartridges of gunpowder and explosives or for the recovery or destruction of explosives substances.	Type 7
	j All knackers' yards in built-up areas.	Type 25
12.	<b>TOURISM AND LEISURE</b>	
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	b Sea water marinas where the number of berths would exceed 300 and fresh water marinas where the number of berths would exceed 100.	Type 10
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	d Permanent camp sites and caravan sites where the number of pitches would be greater than 100.	Type 28
	e Theme parks occupying an area greater than 5 hectares.	Type 28
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	a Any changes or extensions of development which would: <ul style="list-style-type: none"> <li>(i) result in the development being of a class listed in Part I or paragraphs 1 to 12 of Part II of this Schedule, and</li> <li>(ii) result in an increase in size greater than: <ul style="list-style-type: none"> <li>- 25 per cent or</li> <li>- an amount equal to 50 per cent of the appropriate threshold</li> </ul> </li> </ul> whichever is the greater.	
	b Projects in <b>Part I</b> undertaken exclusively or mainly for the development and testing of new methods or products and not used for more than two years. <i>(In this paragraph, an increase in size is calculated in terms of the unit of measure of the appropriate threshold).</i>	

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**PROJECT TYPE**

**0**

**– Crude Oil Refineries.**

**INTRODUCTION**

Crude oil refineries are generally perceived to be of significant environmental concern, as major potential sources of air and water pollution. There can also be a significant explosion and fire hazard associated with operation. Other impacts include spillage or leakages, health and safety risk, transportation issues and noise.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Site evaluation/testing;
- Time of year, duration and phasing;
- Site preparation works;
- Employment;
- Accommodation;
- Working Hours;
- Construction techniques;
- Access;
- Noise, traffic, dust, vibration;
- Spoil deposition;
- Extensions of infrastructure (water, power, roads etc);
- Pipe laying;
- Materials (including sourcing, transportation and storage);
- Fencing.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Atmospheric emissions (SO<sub>2</sub>, hydrocarbons, others);
- Odours;
- Liquid effluent;
- Visible plant and emissions;
- Potential for oil spillages/Containment failure;
- Solid waste generation and disposal;
- Noise and vibration;

- Water usage;
- Power demands;
- Traffic (including marine vessels);
- Fire and explosion hazard;
- Employment;
- Hours of operation;
- Times of shift change;
- Light Pollution;

**MONITORING OF**

- Air;
- Noise;
- Surface Water;
- Groundwater;
- Human and animal health;
- Soil deposition;
- Nature and quantity of raw materials;
- Nature and quantity of products;
- Handling and storage of products;
- Transportation of products (indicate routes, vessels, volumes);
- Process control and monitoring (including HAZOP/HAZAN);
- Ancillary facilities;
- Pollution Control Measures;
- Emergency Plan.

**DECOMMISSIONING**

- Site contamination;
- Removal of structures (marine and terrestrial);
- Site restoration;
- Bonding, post-closure monitoring and management.

**GROWTH**

- Extension prospects;
- Infrastructural capacity;
- Upgrading of plant.

**ASSOCIATED DEVELOPMENTS**

- Waste disposal;



- By-product based industries;
- Distributors;
- Marine traffic and associated developments;
- Road traffic.

## ENVIRONMENTAL EFFECTS

Typical significant impacts likely to affect:-

### HUMAN BEINGS

- Employment;
- Safety (risk of fire and explosion);
- Health (Air and Water Pollution);
- Light nuisance.

### FAUNA

- Habitat loss;
- Impacts due to liquid effluent;
- Disturbance due to on-site activity;
- Spillage/other hazard risks;
- Impacts on agricultural stock.

### FLORA

- Impacts due to atmospheric emissions;
- Impacts due to liquid effluents (pre and post closure);
- Habitat loss (marine and terrestrial);
- Phytotoxic substances in air or water;
- Spillages/other hazard risks;
- Impacts on pasture and tillage.

### SOILS (AND GEOLOGY)

- Soils obliteration;
- Soils acidification from atmospheric accretions;
- Effects of any shore works on sediment movement.

### WATER

- Impacts on surface and groundwater;

- Pollution (physical, chemical or biological) during construction;
- Impact of effluent;
- Impact of leakages;
- Effects on drainage and run-off due to introduction of large impervious area;
- Turbulence impacts due to shipping.

### AIR

- Atmospheric emissions of sulphur dioxide (SO<sub>2</sub>), hydrocarbons and other pollutants;
- Odours;
- Impacts of unplanned releases;
- Noise from refinery, shipping and road traffic;
- Noise from flares;
- Noise from PA systems;
- Dust during construction and from road traffic.

### CLIMATE

- Installations for hydroelectric energy production;
- Industrial installations for the production of electricity, steam and hot water.

### THE LANDSCAPE

- New structures on site;
- Transportation loading/unloading facilities;
- Traffic;
- Parking;
- Visible atmospheric emissions (including flares);
- Night lighting.

### MATERIAL ASSETS

- Traffic impacts (including marine navigation if applicable);
- Disposal sites for solid wastes;
- Capacity of existing infrastructure;

- Implications for other potential land/foreshore /navigational user.

■ CULTURAL HERITAGE

- On-site features/artefacts.

■ THE INTERACTION OF THE FOREGOING

**POSSIBLE MITIGATION OPTIONS**

- Bunding;
- Landscaping;
- Mound, berm or wall building for noise containment purposes;
- Comprehensive emergency procedures;
- Timing of operations (including transportation);
- Monitoring programmes;
- Siting alternatives;
- Design alternatives.

**PROJECT TYPE**

1

- **Installations for the gasification and liquidification of coal or bituminous shale;**
- **Coke ovens (dry coal distillation).**

**INTRODUCTION**

The principal impacts arising from these project types include atmospheric emissions (gas and dust), surface/groundwater pollution, traffic concerns and possible long-term soil contamination.

**PROJECT DESCRIPTION**

Checklist of the items to be described:

**CONSTRUCTION**

- Duration and phasing;
- Site preparation works;
- Working Hours;
- Accommodation;
- Transportation of large plant;
- Noise, traffic, dust, vibration;
- Employment;
- Materials;
- Pipe laying;
- Traffic;
- Extensions of infrastructure (water, power, access etc).

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Raw materials intake, handling and storage (see Project Type 21);
- Product handling storage and distribution (see Project Type 21);
- Atmospheric emissions (NO<sub>2</sub>, SO<sub>2</sub>, others);
- Odours;
- Water usage;
- Fire and explosion hazard;
- Process control (HAZOP/HAZAN);
- Pollution control measures;

- Leakage of gas/liquid;
- Dust generation;
- Residues and wastes generated and disposal;
- Noise;
- Traffic (including dust considerations);
- Lighting.

**DECOMMISSIONING (IF APPLICABLE)**

- Site decontamination;
- Predicted lifespan of installation;
- Rehabilitation and post closure management.

**GROWTH**

- Predicted expansion;
- Change of product or raw materials.

**ASSOCIATED DEVELOPMENTS**

- Industries which require the produce or by-products as raw materials;
- Distribution enterprises;
- Gas companies.

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect the following:-

**HUMAN BEINGS**

- Employment;
- Dust/air emission impacts on health/health benefits of smokeless fuels;
- Leakage/fire hazard/explosion hazard.

**FAUNA**

- On-site habitat loss;
- Food chain effects of released toxins.

FLORA

- On-site habitat loss;
- Air Pollution effects.

SOILS (AND GEOLOGY)

- Soils obliteration;
- Soils for waste disposal site coverings;
- Soils erosion by wind (see under water)
- Stability.

WATER

- Seepage or run-off of containments;
- Dissolution of airborne emissions;
- Surface/groundwater abstraction.

AIR

- Dust release;
- Gas escape from production and storage areas;
- Odours.

CLIMATE

- NO<sub>2</sub> and SO<sub>2</sub> contributions to acid rain (with reference to international status);
- Contribution to ozone depletion (with reference to international status);
- Global warming effects;

THE LANDSCAPE

- Visual intrusion of structures and stockpiles;
- Lighting.

MATERIAL ASSETS

- Impact on transportation infrastructure;
- Power and water supply;
- Disposal sites for solid waste.

CULTURAL HERITAGE

- On-site items of value.

THE INTERACTION OF THE FOREGOING

**POSSIBLE MITIGATION OPTIONS**

- Siting alternatives;
- Design alternatives including:-
- Storage areas enclosure;
- Storage areas bunding;
- Hours of operation;
- Recycling of solid wastes;
- Treatment of surface water before discharge;
- Odour destruction with hot gas incinerators.

**PROJECT TYPE****2**

- **Thermal power stations or other combustion installations;**
- **Industrial installations for the production of electricity, steam and hot water;**
- **Installations for hydroelectric energy production.**

**INTRODUCTION**

Projects in this category are usually on a large scale and as a consequence have potentially large-scale impacts. Installations are typically expansive and if thermally operated, will have a large volume of atmospheric emissions. If water powered, they will also tend to have significant impacts on the power source. Electricity, the final product of such installations, normally causes large scale linear impacts in distribution though transmission lines are usually the subject of separate applications for permission. Given the significance of potential impacts and their persistence in the environment, site selection and routing of infrastructure to the site are of great importance. (In the assessment of hydroelectric projects reference should also be made to Project Type 12).

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Site evaluation/testing;
- Time of year, duration and phasing;
- Site preparation works;
- Employment;
- Accommodation;
- Working Hours;
- Construction techniques;
- Access;
- Dust, noise, traffic, vibration;
- Materials (including sourcing, transportation and storage);
- Powerline connections;
- Pipe laying;
- Extensions of infrastructure (water, power, roads etc);

- Spoil deposition;
- Fencing.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Fuel requirements;
- Fuel transport/supply links;
- Fuel leakage;
- Fuel hazard;
- Water requirement;
- Water discharge (including temperature information);
- Waste production (especially ashes and sludges);
- Waste disposal;
- Atmospheric emissions especially NO<sub>2</sub> and SO<sub>2</sub>;
- Effluent control measures and by-products;
- Noise creation;
- Lighting;
- Employment;
- Emergency procedures;
- Hours of operation and shift changes.

**DECOMMISSIONING (IF APPLICABLE)**

- Useful lifespan;
- Proposals for alternative usage/demolition following closure;
- Reversibility of impacts.

**GROWTH**

- Opportunities and likelihood of expansion.

**ASSOCIATED DEVELOPMENTS**

- Heavily power-dependent industry;
- Accommodation for workers;
- Projects utilising waste heat;
- Fuel transportation and handling facilities;
- Projects utilising emission control by-products;
- Connections to main transmission network (though this may be the subject

of a separate application of permission).

## **ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

### **HUMAN BEINGS**

- Employment;
- Accommodation;
- Pollution impacts (noise, dust, other emissions).

### **FAUNA**

- Site disturbance;
- Emissions;
- Water discharges on aquatic fauna;
- New water bodies.

### **FLORA**

- Site clearance and works;
- Emissions;
- Water discharges (especially regarding temperature).

### **SOILS (AND GEOLOGY)**

- Soils acidification;
- Soils for bunding;
- Excavation and removal of soil and rock;
- Stability.

### **WATER**

- Impacts of any discharges;
- On-site drainage impacts;
- Fuel leakage;
- Construction impacts;
- Impacts of damming watercourses (where relevant).

### **AIR**

- Atmospheric emissions;
- Electromagnetic radiation;
- Odours;
- Noise.

### **CLIMATE**

- NO<sub>2</sub> and SO<sub>2</sub> contributions to acid rain (with reference to international status);
- Contribution to ozone depletion (with reference to international status);
- Global warming effects;
- Temperature effects in immediate area, especially if there are warm water discharges.

### **THE LANDSCAPE**

- Cooling towers;
- Other power station buildings;
- Powerlines;
- Substation/(ESB)/Transformers;
- Access roads;
- Visual emissions.

### **MATERIAL ASSETS**

- Power availability;
- Road network;
- Water supply;
- Possible effect on radio navigational facilities of aircraft.

### **CULTURAL HERITAGE**

- Disturbance of artefacts/features;
- Access routes;
- Piping.

### **THE INTERACTION OF THE FOREGOING**

## **POSSIBLE MITIGATION OPTIONS**

- Siting selection;
- Design alternatives;
- Emission scrubbers;
- Bunding of fuel handling/storage area;
- Routing of supply pipes and transmission powerlines;
- Routing of supply lorries;
- Re-use of hot air/water emissions in generation process;
- Design of power transmission network;
- Alternative fuel supplies.

**PROJECT TYPE****3**

- **A nuclear power station or other nuclear reactor including the dismantling or decommissioning of such a station or reactor;**
- **Installations for the processing or reprocessing of irradiated nuclear fuel;**
- **Installations for production or enrichment of nuclear fuels;**
- **Installations for the processing of high-level radioactive waste;**
- **Installations for the storage or irradiated fuels or radioactive waste on a site other than the production site.**

**INTRODUCTION**

Projects in this category are usually on a large scale and have potentially large scale and long term impacts. Of particular environmental concern are the potential effects of accidental release of radiation to the atmosphere and waters, the long-term contamination of land, air or water, potential adverse effects on human health and the impacts associated with the disposal of radioactive waste.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Site evaluation/testing;
- Time of year, duration and phasing;
- Site preparation works;
- Employment;
- Accommodation;
- Working hours;
- Access;
- Construction techniques;
- Materials (including sourcing, transportation and storage);
- Noise, traffic, dust and vibration;

- Pipe laying;
- Powerlines;
- Extensions of infrastructure (water, power, roads etc);
- Spoil deposition;
- Fencing.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Employment;
- Hours of operation and time of shift change;
- Traffic (ships and road vehicles);
- Water requirements;
- Waste discharges;
- Transportation, storage and use of fuel;
- Storage or disposal of spent fuel;
- Transportation of spent fuel;
- Safety;
- Management procedures.

**DECOMMISSIONING (IF APPLICABLE)**

- Plant operational life;
- Demolition;
- Long term post-closure management and maintenance;

**GROWTH**

- Expansion of activity.
- Associated developments.

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

**HUMAN BEINGS**

- Health hazard - radioactive wastes, fire hazard, workers and nearby residences;
- Employment;
- Power generation;

**FAUNA**

- Disturbance during construction;
- Consequences of uncontrolled discharges (bio-accumulation etc);
- Increase in temperature and chlorine levels in outfall area.

**FLORA**

- Site clearance and works;
- Land use of surroundings.

**SOILS (AND GEOLOGY)**

- Sink of radioactive material;
- Excavation and removal of soil and rock;
- Stability.

**WATER**

- Discharges to and abstraction from water bodies and sea;
- Pollution of surface and groundwater due to uncontrolled discharge;
- Increase in supplying traffic (transport of radioactive waste);
- Impact of sub-surface repositories.

**AIR**

- Unplanned or uncontrolled discharges to atmosphere;
- Noise (from installation and associated infrastructure).

**CLIMATE**

**THE LANDSCAPE**

- Visual impact of plant (particularly high domed reactor building);
- Large amount of land required;
- Devastation in the event of serious accident;
- Visual impact of power distribution lines.

**MATERIAL ASSETS**

- Power generation;
- Contribution to local economy;
- Effects on land or property prices.

**THE INTERACTION OF THE FOREGOING**

- Tourism, loss of amenity.

**POSSIBLE MITIGATION OPTIONS**

- Site selection;
- Processes alternatives;
- Hazard and risk analysis;
- Monitoring Programme;
- Emergency plans;
- De-commissioning plans;
- Alternative transportation, handling and storage.



**PROJECT TYPE****4****- Installations designed solely for the permanent storage or final disposal of radioactive waste and irradiated fuel.****INTRODUCTION**

The main significant impacts associated with these projects are the leakage of radioactive waste and the potential effects of the by-products of waste destruction. These project types have, in common with Project Type 03, the potential to generate long term impacts.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Site evaluation/testing;
- Time of year, duration and phasing;
- Site preparation works;
- Accommodation;
- Working hours;
- Access;
- Employment;
- Noise, traffic, dust, vibration;
- Extensions of infrastructure (water, power, roads etc);
- Materials (including sourcing, transportation and storage);
- Pipe laying;
- Construction techniques;
- Large scale excavation;
- Spoil deposition;
- Fencing.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Category of waste;
- Quantity and condition of water;
- Transportation, handling and interim storage;
- Processing, preparation of wastes;

- Disposal;
- Management and monitoring of facility;
- Commissioning;
- Filling programme;
- Ventilation, drainage and cooling plant;
- Staffing;
- Traffic.

**DECOMMISSIONING (IF APPLICABLE)**

- Site security;
- Stabilisation of site;
- Long-term maintenance and monitoring.

**GROWTH**

- Expansion of storage capacity.

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

**HUMAN BEINGS**

- Hazards of leakage through accident or external event e.g. earthquake;
- Cross site transfers of radioactive waste;
- Health effects.

**FAUNA**

- Contamination of food chains.

**FLORA**

- Take up of contaminated discharges.

**SOIL (AND GEOLOGY)**

- Water
- Planned and unplanned marine discharges;
- Long-term and cumulative discharges to groundwaters.

**AIR**

- Aerial discharges arising from combustion (dioxins could be formed);
- Dust/Airborne particles.

**CLIMATE**

**THE LANDSCAPE**

- Visual impact of structures.

**MATERIAL ASSETS**

- Property value;
- Sterilisation of natural resources.

**THE INTERACTION OF THE FOREGOING**

**POSSIBLE MITIGATION OPTIONS**

- Landscaping;
- Site alternatives;
- Emergency arrangements for accidents;
- Monitoring measures;
- Alternative storage and disposal methods.

**PROJECT TYPE****5**

- **Integrated works for the initial smelting of cast iron and steel;**
- **Installations for the production of non-ferrous metals from ore, concentrates or secondary raw materials by metallurgical, chemical or electrolytic processes;**
- **Installations for the production of pig iron or steel including continuous casting;**
- **Installations for the processing of ferrous metals by hot-rolling mills and smitheries with hammers or applications of protective fused metal coats;**
- **Ferrous metal foundries;**
- **Installations for the smelting, including the alloyage of non-ferrous metals;**
- **Installations for surface treatment of metals and plastic materials using an electrolytic or chemical process;**
- **Swaging by explosives;**
- **Installations for the roasting and sintering of metallic ores;**
- **Storage of scrap metal.**

**INTRODUCTION**

Projects of this type have the capacity to generate impacts from air and water discharges, noise, transportation and associated activities. Impacts are largely determined by the scale of the development.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Site evaluation/testing;
- Time of year, duration and phasing;
- Site preparation works;
- Employment;

- Accommodation;
- Working hours;
- Construction techniques;
- Materials (including sourcing, transportation and storage);
- Extensions of infrastructure (water, power, roads etc);
- Pipe laying;
- Access;
- Noise, traffic, dust, vibration;
- Spoil deposition;
- Fencing.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Atmospheric emission;
- Raw materials: quantities, types, transportation, handling and storage;
- Volume, type, transportation and storage of finished product;
- Hours of operation;
- Times of shift changes;
- Employment;
- Energy supply, storage and handling (if applicable);
- Waste generation and disposal;
- Operation methods;
- Traffic;
- Water and power requirements;
- Water discharges;
- Noise;
- Lighting;
- Emergency Procedures.

**DECOMMISSIONING (IF APPLICABLE)**

- On-site effluent containment facilities.

**GROWTH**

- Changes in production techniques;
- Any expansion of activity anticipated;
- Change of products.

Associated developments:-

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

**HUMAN BEINGS**

- Employment;
- Health issues/Nuisance.

**FAUNA**

- Contaminated deposition and run-off.

**FLORA**

- Contaminated deposition and run-off;
- Effluent.

**SOILS (AND GEOLOGY)**

- Excavation and removal of soil and rock;
- Stability

**WATER**

- Contaminated deposition and run-off.
- Groundwater contamination from planned and unplanned discharges.

**AIR**

- Odour;
- Noise;
- Airborne particles;
- Dust.

**CLIMATE**

- Installations for hydroelectric energy production;
- Industrial installations for the production of electricity, steam and hot water.

**THE LANDSCAPE**

- Visual impact of buildings, stockpiles and transportation infrastructure.

**MATERIAL ASSETS**

- Community benefit from purchase of supplies and services;
- Supplier and product traffic.

**THE INTERACTION OF THE FOREGOING**

**POSSIBLE MITIGATION OPTIONS**

- Changes in design (and increase in height) of stacks to improve dispersion of emissions ensuring that odour nuisance is not caused;
- Site alternatives;
- Process alternatives;
- Fuel alternatives;
- Raw material alternatives.

**PROJECT TYPE**

**6**

- Installations for the extraction of asbestos or for the processing and transformation of asbestos;
- Installations for the production of asbestos and the manufacture of asbestos based products;
- Installations for the production of asbestos-cement products or friction material.

**INTRODUCTION**

Projects of this type are of particular environmental concern due to the respiratory damage which asbestos dust can cause. This is a concern to the employees, the surrounding population and anyone coming into contact with the product.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Duration and phasing;
- Traffic, noise;
- Dust.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Raw materials intake: quantity, type;
- Raw material storage: handling and transportation;
- Quantity and type of product;
- Aqueous effluent;
- Handling, transportation and storage of product;
- Dust generation (inside and outside plant);
- Waste generation and disposal;
- Secondary raw materials and processes;
- Containment of asbestos in event of fire or other emergency;
- Safety.

**DECOMMISSIONING (IF APPLICABLE)**

- Safe reuse of buildings;
- Safe demolition of buildings;
- Decommissioning of on site storage and disposal facilities.

**GROWTH**

- Any anticipated expansion of activity or change of process or product.

**ASSOCIATED DEVELOPMENTS**

- Solid waste disposal facilities.

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

**HUMAN BEINGS**

- Health impacts to workers and to general population.

**FAUNA**

- Dust impacts;
- Impacts of water contamination.

**FLORA**

- Site habitats loss.

**SOILS (AND GEOLOGY)**

- Excavation and removal of soil and rock;
- Stability.

**Water**

- Hazard of pollution;
- Rainwater/surface run-off management systems.

**AIR**

- Dust inside and outside plant;
- Ventilation filters;
- Unloading of raw materials;
- Loading of finished products;
- Transportation dust containment measures;
- Noise;
- Vibration from trucks;
- Emissions during emergency event.

**CLIMATE**

**THE LANDSCAPE**

- Visual aspects of buildings;
- Lighting.

**MATERIAL ASSETS**

- Infrastructural impacts (water supply/roads/power);
- Sterilisation of natural resources.

**CULTURAL HERITAGE**

- On-site features/artefacts.

**THE INTERACTION OF THE FOREGOING**

**POSSIBLE MITIGATION OPTIONS**

- Siting alternatives;
- Ventilation alternatives;
- Processes and product alternatives;
- Storage area design;
- Water management system alternatives;
- Emergency procedures;
- Worker breathing apparatus and clothing design;
- Transportation/loading alternatives;
- Monitoring systems.

**PROJECT TYPE****7**

- **Integrated chemical installations for the production of basic organic, and inorganic chemicals; production of phosphorous, nitrogen or potassium based fertilisers; production of basic health products and biocides; production of basic pharmaceutical products and for the production of explosives;**
- **Installations for the manufacture of cement;**
- **Installations for the manufacture of glass, including glass fibre;**
- **Installations for smelting mineral substances including the production of mineral fibres;**
- **Manufacture of ceramic products by burning**
- **Installations for treatment of intermediate products and production of chemicals using a chemical or biological process;**
- **Installations for production of pesticides and pharmaceutical products, paints and varnishes, elastomers and elastomer based products, peroxides using a chemical or biological process;**
- **Storage facilities for petrochemical and chemical products;**
- **Installations for the manufacture of artificial miner fibres;**
- **Installations for manufacturing, packing, loading or placing in cartridges of gunpowder or explosives or for the recovery or destruction of explosives substance;**

**INTRODUCTION**

This project type has the potential to create significant environmental impacts on the health of humans and animals (wild and agricultural livestock) and damage to sensitive

ecosystems. Other impacts include those on air quality from incineration processes, on water quality from effluent discharges and the hazard associated with fires and explosions. The size and scale of facilities can also give rise to concern about visual impact.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Site evaluation /testing;
- Time of year, duration and phasing;
- Site preparation works;
- Employment;
- Accommodation;
- Working hours;
- Access;
- Traffic, noise, dust, vibration;
- Construction techniques;
- Access route (especially for large items of plant);
- Extensions of infrastructure (water, power, roads etc);
- Materials (including sourcing, transportation and storage);
- Pipe laying;
- Spoil deposition;
- Fencing.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Operation methods;
- Range of raw materials:- transportation, handling storage;
- Energy sources, quantities used and on-site storage and transportation;
- Range of products, quantities, transportation, handling and storage;
- Traffic;
- Waste generation and discharges;
- Waste storage, accumulation or disposal on-site;

- Water discharges;
- Atmospheric emissions;
- Water and power requirements;
- Fire and explosion hazard;
- Hours of operation and shift changes;
- Process control and monitoring, (including HAZOP and HAZAN);
- Emergency plans;
- Uncontrolled emissions;
- Noise;
- Lighting.

**DECOMMISSIONING (IF APPLICABLE)**

- Reuse of buildings/structures;
- Contamination of site.

**GROWTH**

- Further phases;
- Changes in process or products.

**ASSOCIATED DEVELOPMENTS**

- Suppliers of chemicals.

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

**HUMAN BEINGS**

- Reduction in air quality;
- Health hazards of raw materials used: air emissions.

**FAUNA**

- Discharges (air emissions, effluent).

**FLORA**

- Discharges (air emissions, effluent);
- Quarrying raw material.

**SOIL (AND GEOLOGY)**

- Contamination by discharges;
- Excavation and removal of soil and rock;
- Stability.

**WATER**

- Abstraction and discharge;
- Dissolution of airborne emissions;
- Leakage of effluent;
- Leakage of stored chemicals.

**AIR**

- Emissions;
- Odours;
- Noise;
- Dust.

**CLIMATE**

**THE LANDSCAPE**

- New structures;
- Storage;
- Access;
- Advertising.

**MATERIAL ASSETS**

- Upgrading local infrastructure.

**THE INTERACTION OF THE FOREGOING**

**POSSIBLE MITIGATION OPTIONS**

- Monitoring programme: water quality, air quality, livestock;
- Siting alternatives;
- Process design alternatives;
- Alternative waste disposal strategies;
- Above ground storage facilities and pipes;
- Bunding and collection measures for spillage control.



**PROJECT TYPE**



- **Railway Lines**
- **Tramways;**
- **Elevated and underground railways;**
- **Intermodal transshipment facilities and terminals.**

**INTRODUCTION**

**Railway and associated developments are of concern principally for visual, noise and vibration considerations, particularly in settled areas. Severance can create problems for other infrastructure, farming interests, amenity uses and wildlife. The locations of routes and stops can significantly affect settlement patterns in the long-term.**

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Site evaluation/testing;
- Time of year, duration and phasing;
- Site preparation works;
- Corridor acquisition, clearance and management prior to construction;
- Access;
- Noise, vibration, traffic, dust;
- Electromagnetic interference;
- Materials (including sourcing, transportation and storage);
- Watercourse diversions;
- Employment;
- Accommodation;
- Working hours;
- Construction techniques (especially scale of machinery to be used);
- Pipe laying;
- Extension of infrastructure (water, power,

- roads etc);
- Spoil deposition;
- Fencing.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Horizontal and vertical alignment;
- Design and location of bridges, culverts, crossings, structured, signals and yards;
- Power and signal network;
- Power supply requirements and associated developments;
- Frequency type and scale of usage;
- Passenger and/or cargo access;
- Speed of trains/trams;
- Noise (including on-train warning devices including horns and audible traffic warning devices at level crossings) and vibration generation;
- Loudspeaker systems;
- Parking location and adequacy;
- Waste disposal;
- Emissions from rolling stock to land and air;
- Electromagnetic interference;
- Maintenance (including use of herbicides);
- Safety;
- Lighting.

**DECOMMISSIONING (IF APPLICABLE)**

- Not applicable in most cases.

**GROWTH**

- Extensions to network;
- Extensions to station/parking capacities;
- Increase in frequency/change of traffic types.

**ASSOCIATED DEVELOPMENTS**

- Cleaning/catering services;

- Retail outlets (especially in or near stations);
- Industrial and commercial development;
- Residential development (especially near stations);
- Car parking areas.

## **ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

### **HUMAN BEINGS**

- Settlement patterns;
- Movement patterns;
- Transportation costs;
- Noise/vibration;
- Amenity impacts;
- Disruption/nuisance;
- Travel times;
- Opportunities for development;
- Community severance;
- Safety.

### **FAUNA**

- Barrier and corridor effects, especially for mammals.

### **FLORA**

- Clearance of cover along corridor;
- Colonisation of new linear habitat and interaction with adjacent existing habitats;
- Maintenance regime effects (including herbicides).

### **SOIL (AND GEOLOGY)**

- Contamination due to wastes, leakages and application of herbicides;
- Stability;
- Induced erosion.

### **WATER**

- Construction impacts on watercourses;
- Pollution due to waste-water and application of herbicides;
- Risk of contamination arising from spillage of engine fuel or lubricants or hazardous cargo.
- Intersection of water table;
- De-watering effects.

### **AIR**

- Noise;
- Vibration;
- ;
- Release of toxic vapours / gases resulting from spillage of hazardous material.

### **CLIMATE**

- Positive cumulative impacts of deferred and avoided impacts on climate arising from use of public transport.

### **THE LANDSCAPE**

- Visual intrusion of linear corridor;
- Visual intrusion of bridges, powerlines, signalling systems, parking sheds, stations, car parks and trains/trams;
- Change of landscape character due to induced landuse changes.

### **MATERIAL ASSETS**

- Adjustments to installed infrastructure;
- Linear barrier to future development;
- Opportunities for development at nodes;
- Vibration damage to buildings.

### **CULTURAL HERITAGE**

- Impacts on architecturally significant buildings;

- Impacts on archaeological artefacts.

#### THE INTERACTION OF THE FOREGOING

### **POSSIBLE MITIGATION OPTIONS**

- Routing alternatives;
- Design alternatives;
- Modal/technological alternatives;
- Alternative station/junction sites;
- Landscaping;
- Vibration reduction measures such as choice of rolling stock;
- Reduction in overspill of loudspeaker noise/lighting;
- Hours of construction and operation;
- Underpasses/bridges for humans/wildlife/domesticated animals;
- Habitat presentation;
- Maintenance and management programme of corridor.

**PROJECT TYPE**

**9**

- Airports;
- Airfields.

**INTRODUCTION**

Aerodrome development projects can give rise to a wide variety of environmental concerns, depending largely, on the scale of the project. The principal issues typically include noise, landscape, traffic and ecology. These issues are often of major concern if the development is taking place in close proximity to an urbanised area. The large land take required for runways can also be a significant impact.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Site evaluation/testing;
- Acquisition and clearance and management prior to construction;
- Time of year, duration and phasing;
- Site preparation works;
- Access;
- Traffic, noise, dust and vibration;
- Materials (including transportation, sourcing and storage);
- Construction techniques;
- Employment;
- Accommodation;
- Working hours;
- Pipe laying/drainage works;
- Extension of infrastructure (water, power, roads etc);
- Spoil deposition;
- Fencing.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Type, hours and frequency of air traffic;
- Seasonal and daily variations;
- Parking and taxiing;

- Horizontal and vertical alignment of runway, taxiing and parking areas;
- Clearance requirements;
- Safety, lighting beacons and other navigation aids;
- Control areas;
- Maintenance areas;
- Passenger areas;
- Fuel storage areas;
- Cargo areas;
- Catering services;
- Emergency services;
- Security services;
- , security and access control;
- Fuel dumping;
- Hazard and risk;
- Analysis;
- Strategic/military risks;
- Level of activity (especially flights);
- Noise;
- Flight approach/take off paths;
- Maintenance of site;
- Lighting;
- Bird and mammal control;
- Emergency procedures;
- Drainage from increased hard surfaced/compacted ground areas including Introduction of pollutants;
- Traffic, parking, transportation, signposts and access;
- Vibration;
- Communications and associated electromagnetic radiation.

**DECOMMISSIONING (IF APPLICABLE)**

- Alternative uses

**GROWTH**

- Potential for construction of new/extended runways;
- Terminal facilities, car parking, access roads;
- Intensification of use requiring new

navigation/communications equipment.

#### ■ ASSOCIATED DEVELOPMENTS

- Accommodation developments;
- Catering facilities;
- Transport links;
- Cargo handling/storage facilities;
- Industries availing of air transport facility.

### **ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

#### ■ HUMAN BEINGS

- Convenience (expanded range of transport options);
- Noise interference;
- Nuisance/ disturbance from lighting;
- Displaced settlement patterns (residential);
- Employment opportunities.

#### ■ FAUNA

- Habitat loss/loss of diversity;
- Attraction of birds to open spaces;
- Bird and mammal control programmes.

#### ■ FLORA

- Loss of habitats/habitat diversity;
- On-site features/habitats;
- Impacts of maintenance regime.

#### ■ SOIL (AND GEOLOGY)

- Contamination due to fuel spillages;
- Loss of soil profiles during construction;
- Impacts on geological heritage.

#### ■ WATER

- Reduced groundwater percolation due to

introduction of large hard surfaced and compacted earth areas;

- Risk of contamination due to runoff from land areas which may be subject to spillages/leakages;
- Irrigation;
- Impact of swathe maintenance activities - especially where pesticides or fertilisers are concerned;
- Impact of de-icing agents, dumped fuels, fire fighting materials.

#### ■ AIR

- Noise;
- Vibration;
- Odours;
- Light pollution;
- Dumped fuels;
- Air pollution (aircraft exhaust).

#### ■ CLIMATE

- Possible microclimate effects due to large scale land use change;
- Contribution of aircraft emissions to global climate change.

#### ■ THE LANDSCAPE

- Visual impact of terminal facilities and access links;
- Change of visual character of runway area;
- Visibility of aircraft parking areas/hangars;
- Visibility of navigation aids;
- Visual impact of aircraft - approaching and on ground;
- Change in landscape character due to noise and airport related developments.

#### ■ MATERIAL ASSETS

- Impact in terms of addition to existing transport network;

- Impact on water supply, power supply, road/rail traffic & telecommunications networks;
- Opportunities for development;
- Severance of local road network.

#### CULTURAL HERITAGE

- Loss/disturbance of archaeological/architectural material during construction;
- Limits to growth;
- Operational restrictions (routes, times);
- Control of associated development.

#### THE INTERACTION OF THE FOREGOING

### **POSSIBLE MITIGATION OPTIONS**

- Siting alternatives;
- Design alternatives;
- Hours of operation;
- Types of aircraft;
- Types of cargo;
- Access routes;
- Noise insulation of adjacent residences;
- Habitat preservation;
- Ecological monitoring and management;
- Monitoring programmes;
- Emergency plans.

**PROJECT TYPE****10**

- **Inland waterways and ports;**
- **Trading ports;**
- **New or extended harbours;**
- **Inland waterways;**
- **Seawater and freshwater marinas.**

**INTRODUCTION**

Typical impacts from this type of development include many of those set out for project types 8 & 9. These projects are of particular environmental concern due to noise, vibration, dust and traffic impacts during construction operation and loading/unloading operations. The generation of increased traffic on water and on surrounding roads can also be of concern. Other impacts include those on water quality particularly from dredging activity and leakage. The potential for impacts arising from induced developments (i.e port-related activities) should be given consideration from the outset.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Evaluation/site testing;
- Time of year, duration and phasing;
- Site preparation works;
- Employment;
- Accommodation;
- Working hours;
- Construction techniques;
- Materials (including sourcing, transportation and storage);
- Access;
- Traffic, noise, dust, vibes;
- Pipe laying;
- Extensions of infrastructure (water, power, railways, roads etc);
- Dredging/disposal of spoil;
- Fencing.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Type, tonnage, frequencies, seasonality;
- Loading/unloading, handling, storage and processing and/or distribution, by type of product;
- Marine structures, including dredging, filling and navigation aids;
- Induced effects - erosion and siltation;
- General handling equipment, cranes, conveyors;
- Fire and hazard control equipment;
- Runoff interceptor and treatment systems;
- Dust control systems;
- Storage facilities;
- Access, parking and movement (on-site and off);
- Solid waste generation of disposal;
- Water supply (bunkerage);
- Power supply;
- Monitoring proposals;
- Pollution and emergency control procedures;
- Access control, fences, water, signs, security;
- Traffic (on water and roads);
- Pest control;
- Cleaning facilities;
- Storage;
- Lighting;
- Public address systems;
- Emergency procedures;
- Employment;
- Seasonality, hours of option and shifts.

**DECOMMISSIONING (IF APPLICABLE)**

- Possible uses of the facilities should the port cease or reduce operations.

**GROWTH**

- Likelihood of adjacent secondary/tertiary

- developments;
- Likelihood of future expansion.

**ASSOCIATED DEVELOPMENTS**

- Port related industry;
- Access and transportation developments;
- Maintenance and supply enterprises;
- Packing/storage enterprises;
- Catering enterprises;
- Residential developments.

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

**HUMAN BEINGS**

- Provision of employment;
- Relocation;
- Amenity impacts;
- Health impacts and/or nuisance due to noise, dust or water pollution.

**FAUNA**

**Aquatic**

- Discharges planned and accidental (including anti-fouling mechanisms);
- Loss of habitat.

**Other**

- Introduction of new species;
- Attraction of pest species;
- Disturbance of existing species.

**FLORA**

**Aquatic**

- Discharge from vessels, storage/handling areas and machinery;
- Physical disturbance due to increased turbulence/dredging;
- Introduction of exotic species;
- Accidental discharges.

**Terrestrial**

- Loss of habitat due to site clearance;
- Introduction of exotics/attraction of pests.

**SOILS (AND GEOLOGY)**

- Excavation;
- Stability;
- Erosion;
- Spoil deposition/removal;
- Erosion and siltation.

**WATER**

- Planned and unplanned discharges from vessels;
- Discharges from machinery;
- Seepage from storage areas;
- Spillages;
- Dredging;
- Turbulence;
- Currents.

**AIR**

- Noise (with reference to hours of operation);
- Dust;
- Lighting overspill;

**CLIMATE**

**THE LANDSCAPE**

- Marine structures;
- Navigation aids;
- Erosion control measures;
- Cranes;
- Storage facilities;
- Vessels;
- Lighting;
- Secondary/tertiary developments;
- Parking areas;
- Rail developments.



■ MATERIAL ASSETS

- Impacts on infrastructure, particularly road and rail networks water and power supply;
- Opportunities for development.

■ THE INTERACTION OF THE FOREGOING

**POSSIBLE MITIGATION OPTIONS**

- Siting;
- Design;
- Limits to growth;
- Limits to hours of operation;
- Control of associated development;
- Limits to types of cargo;
- Dust suppression;
- Noise containment;
- Emergency procedures;
- Traffic routing;
- Management and monitoring - procedures;
- Runoff management and control.

**PROJECT TYPE**

**11**

- **Restructuring of rural land holdings;**
- **Use of uncultivated lands or semi-natural areas for intensive agricultural purposes;**
- **Initial afforestation;**
- **Replacement of broadleaf species with conifers;**
- **Deforestation for the purposes of conversion to another type of land use;**
- **Reclamation of land from the sea.**

**INTRODUCTION**

Projects which entail a significant change in land use of previously uncultivated land, land reclamation and afforestation projects can be of concern for a variety of reasons. The most common of these issues are the loss of on-site ecological diversity and resultant downstream impacts, the impacts associated with altered flow regimes and impacts on water quality. These project types can also result in significant landscape impacts. Concern about these issues is often heightened because such projects take place on relatively undisturbed sites, often of high ecological and amenity value which may also contain previously undisturbed archaeological sites.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Source and transportation of materials;
- Machinery to be used;
- Duration, phasing and timing of operations;
- Access route (and upgrading if applicable);
- Watercourse diversions;
- Stockpiling/staging areas;
- Equipment compounds;

- Temporary environmental protection measures.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Deep ploughing;
- Drainage;
- Planting fencing;
- Weed control/pesticides;
- Fertilisers/additives;
- Adjustment of watercourses;
- Cycles of use;
- Maintenance/renewal requirements.

**DECOMMISSIONING (IF APPLICABLE)**

Potential to reinstate natural processes.

**GROWTH**

- Possible plans to extend the regime to adjacent lands.

**ASSOCIATED DEVELOPMENTS**

- Timber processing and treatment plants;
- Storage sheds;
- Pumphouses (for irrigation/drainage).

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

**HUMAN BEINGS**

- Settlement patterns;
- Landuse patterns;
- Access for tourism, amenity.

**FAUNA**

- Changes to extent/diversity of habitat;
- Introduction of new species;
- Shift in species mix/abundance;

- Indirect impacts on aquatic species due to water quality changes;
- Impacts of fencing.

#### FLORA

- Loss of indigenous vegetation;
- Use of pesticides/fertilisers (including loss to adjacent areas);
- Introduction of new species;
- Alterations to soil structure and fertility;
- Alterations to soil moisture regime.

#### SOILS (AND GEOLOGY)

- Erosion;
- Stability/settlement;
- Drainage;
- Flooding;
- Removal of existing soils type;
- Geological heritage;
- Alteration of soil structure/fertility.

#### WATER

- Siltation;
- Turbidity;
- Pollution from pesticides/fertilisers;
- Changes in water budget within drainage basins;
- Impact on land drainage;
- Impact on flooding;
- Acidification (from conifers);
- Leachates (from reclamation).

#### AIR

- CO<sub>2</sub> balance.

#### CLIMATE

- Wind shelter;
- Contributions to acid rain issues;
- Contributions to greenhouse gas effects.

#### THE LANDSCAPE

- Changes in landscape character;
- Obstruction of views;
- Changes in elevation;
- Changes in landcover/vegetation;
- Associated works: roads, fences, drains;
- Reclamation structures (sea walls, groynes, dykes, pumping stations);
- Creation of ditches/dykes;
- Coastal defences;
- Associated structures.

#### CULTURAL HERITAGE

- Impacts on large areas of undisturbed ground;
- Decay of organic remains due to changes in soil moisture regime.

#### MATERIAL ASSETS

- Access route upgrading and increases in traffic.

#### THE INTERACTION OF THE FOREGOING

### **POSSIBLE MITIGATION OPTIONS**

- Siting alternatives;
- Design/layout alternatives;
- Drainage alternatives;
- Selection of species;
- Retention of control areas;
- Monitoring of water quality;
- Silt traps.

**PROJECT TYPE**

**12**

- **Works for the transfer of water resources between river basins;**
- **Dams and other installations for permanent storage of water;**
- **Water management projects for agriculture, including irrigation and land drainage projects.**

**INTRODUCTION**

These project types can give rise to significant impacts, which can be direct such as loss of productive topsoil, changes in landuse and habitats, or indirect, such as facilitation of new developments (industry, agriculture, infrastructure) which may in turn impact on the environment.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Site evaluation/testing;
- Time of year, duration and phasing;
- Site preparation works;
- Employment;
- Accommodation;
- Working hours;
- Acquisition of lands and management prior to development;
- Dredging/excavation and spoil deposition;
- Construction techniques;
- Watercourse diversions (temporary);
- Pipe laying;
- Materials (including sourcing, transportation and storage);
- Infrastructural extensions (water, power, roads etc);
- Access;
- Traffic, noise, dust and vibration;
- Fencing.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Operational range of water levels;
- Operational range of flows;
- Seasonal/daily variations of operations;
- Monitoring and control procedures;
- Maintenance systems;
- Principal structures including impoundment structures, access, pipelines, power lines, diversion, channels, control mechanism, buildings and fences;
- Maintenance.

**DECOMMISSIONING (IF APPLICABLE)**

- Safety;
- Reversibility;
- Alternative uses.

**GROWTH**

- Future extensions to scheme.

**ASSOCIATED DEVELOPMENTS**

- Intensification of or new landuses;
- Rehousing of displaced residences;
- Power transmission lines;
- Water pipes;
- Adjustment of affected infrastructure.

**ENVIRONMENTAL EFFECTS**

**TYPICAL SIGNIFICANT IMPACTS LIKELY TO AFFECT HUMAN BEINGS**

- Displacement (major water improvement projects);
- Creation/loss of amenity;
- Community severance;
- Changes to landuse and settlement patterns.

#### FAUNA

- Changes due to attend habitat;
- Disturbance during construction;
- Effects of changes in water quality and flow regime;
- Effects due to changes in flora.

#### FLORA

- Alterations to habitats due to flooding/drainage;
- Indirect impacts due to altered land-use practices;
- Aquatic and terrestrial species should be considered.

#### SOILS (AND GEOLOGY)

- Erosion and siltation;
- Excavation/deposition of soil;
- Loss of/changes to soil;
- Drainage.

#### WATER

- Changes to the physical, chemical and biotic characteristics of water bodies;
- Effects on the groundwater and surface water flow regimes and quality.

#### AIR

- Dust generation (particularly during construction).

#### CLIMATE

- Drainage of wetlands may reduce occurrence of mist and fog due to drainage of wetlands;
- Local climatic effects, particularly regarding temperature and evaporation, due to creation of a reservoir.

#### THE LANDSCAPE

- Direct impacts can arise due to spoil deposition, dam construction and machinery presence during construction;
- Indirect inputs can occur due to factors such as powerlines, water mains and treatment works and changes in land usage.

#### MATERIAL ASSETS

- Roads;
- Power supply networks;
- Water supply;
- Potential uses of water resources.

#### CULTURAL HERITAGE

- Flooding of monuments, artefacts and settlements;
- Disturbance of items of historical importance such as bridges and weirs;
- Significant changes in long established land use patterns.

#### THE INTERACTION OF THE FOREGOING

### POSSIBLE MITIGATION OPTIONS

#### Dams:-

- Siting and design alternatives;
- Water usage rates;
- Routing of infrastructure;
- Bank protection;
- Habitat creation.

#### Drainage schemes:-

- "Do Nothing" scenario;
- Reduction of extent of works;
- Maintenance of control areas;
- Habitat creation.

**PROJECT TYPE**  
**12A**

**- Canalisation and flood relief works.**

**INTRODUCTION**

A wide range of positive and adverse impacts – direct, indirect and cumulative can be associated with such projects. Positive impacts on property, landuse and public safety need to be balanced with potential impacts on aquatic ecology, archaeology, amenities and induced flooding effects downstream. Early evaluation of the ultimate causes can be instructive when examining alternatives.

**PROJECT DESCRIPTION**

Checklist of the items to be described:

**CONSTRUCTION**

- Site evaluation/testing;
- Site preparation works;
- Temporary Accommodation of materials and personnel;
- Acquisition and management of lands prior to development;
- Site preparation works – including fencing and felling;
- Time of year, duration and phasing;
- Working hours/days;
- Equipment maintenance and storage areas;
- Water Course Diversion (temporary);
- Infrastructure Diversions (permanent);
- Construction techniques and programme;
- Materials (including sourcing, transportation and storage);
- Dredging and excavation;
- Spoil handling, storage and final deposition;
- Access and traffic;
- Noise, dust and vibration.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Operational range of water levels and associated controls;
- Maintenance/Management Cycles;
- Safety and Contingency Plans;
- Operational Control.

**DECOMMISSIONING (IF APPLICABLE)**

**GROWTH**

- Future extensions – especially down stream.

**ASSOCIATED DEVELOPMENTS**

- Intensification of, or new, landuses in flood protected areas
- Riverside Amenity and Leisure Activities
- Riverside Access
- Induced downstream food peaks
- Induced scouring and siltation.

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect the following:

**HUMAN BEINGS**

- Displacement of properties and rights to access or use;
- Creation/loss of amenities;
- Landuse intensification in flood protected areas.

**FAUNA**

- Induced effects due to loss of river and bankside flora;
- Disturbance during construction;
- Changes due to habitat alterations;
- Induced effects due to changes in water

quality and flow regime.

**FLORA**

- Alterations to aquatic, bankside and floodplain habitats;
- Indirect impacts due to induced changes in adjacent landuse practices.

**SOILS (AND GEOLOGY)**

- Erosion and deposition – especially downstream of the project area;
- Excavation/deposition of spoil;
- Contamination spoil disposal and handling;
- Alteration to soils due to changed flooding and/or water table.

**WATER**

- Changes to the physical, chemical and biotic characteristics of water bodies;
- Direct and indirect effects on the groundwater and surface water flow regimes.

**AIR**

- Changes to the physical, chemical and biotic characteristics of water bodies;
- Direct and indirect effects on the groundwater and surface water flow regimes.

**CLIMATE**

Local microclimatic changes due to alterations /loss of the floodplains

**THE LANDSCAPE**

- Alterations to the natural appearance and character of the river due to loss of vegetation and the introduction of regular geometric landforms

- Alterations to the appearance and character of floodplains following flood protection

Potential for new river and riverside amenities

**MATERIAL ASSETS**

- Diversion interception / accommodation of infrastructure
- New riverbank access routes

**CULTURAL HERITAGE**

- Loss/disturbance of monuments, artifacts and cultural landscape due to excavation or disturbance
- Alteration to long established landuse patterns

**THE INTERACTION OF THE FOREGOING**

- Flood protection can induce significant and widespread changes to landuse and settlement patterns in hitherto unusable areas.
- Intensification of landuses particularly for leisure and amenity – can follow major capital works projects or rivers.

**POSSIBLE MITIGATION OPTIONS**

- Evaluation of upstream causes of flooding
  - especially landuse practices
- Augmented flood storage areas in natural floodplains upstream
- High water flood diversions
- Use of planted berms versus concrete walls
- Selective, instead of uniform, removal of natural riverbank features
- Integration of leisure, amenity features into engineering solution
- Ecological and Archaeological monitoring prior to and during construction.

**PROJECT TYPE**  
**12B**

**- Coastal work to combat erosion and maritime works capable of altering the coast through various construction works.**

**INTRODUCTION**

The scale and significance of such works can vary considerably and can take place within dynamic natural and manmade coastal environments. Such works can give rise to direct and induced impacts.

Large-scale civil engineering works are often required to construct such projects. Evaluation of alternatives is an important mitigation strategy.

**PROJECT DESCRIPTION**

Checklist of the items to be described:

**CONSTRUCTION**

- Site evaluation;
- Access arrangements, traffic - on-shore and off-shore;
- Temporary Accommodation for personnel, equipment and materials;
- Equipment maintenance and storage areas;
- Dredging/excavation, handling, storage and disposal of spoil;
- Sourcing, storage, handling and placement of materials;
- Construction techniques, programme, duration and phasing;
- Temporary works (cassions, sheet piling, earthworks etc.);
- Navigation and hazard warning systems (temporary).

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Navigation and hazard warning systems

- (permanent)
- Monitoring, maintenance and control procedures

**DECOMMISSIONING (IF APPLICABLE)**

**GROWTH**

**Associated Developments:-**

- Post construction use of on-shore and off-shore access arrangements
- Induced cumulative effects – remote from site – due to large scale erosion and deposition

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect the following:

**HUMAN BEINGS**

- Disruption /displacement of existing beneficial access and uses, on-shore, near shore and off-shore, landuses;
- Beneficial effects of erosion control and improved navigation safety;
- Impacts on commercially exploited fauna and flora.

**FAUNA**

- Alterations to movement, feeding, breeding, roosting, nesting/spawning of terrestrial and marine species;
- Effects of altered human access (for hunting, fishing, gathering, walking etc.) due to temporary and permanent facilities.

**FLORA**

- Change (permanent and temporary) to near shore, on-shore, off-shore and benthic habitats;



- Changes in the sustaining resources of the relevant habitats, especially adjacent wetlands;
- Interactions between introduced and existing habitats.

#### SOILS (AND GEOLOGY)

- Induced alteration to patterns of erosion and deposition;
- Mobilisation of suspended solids.

#### WATER

- Alterations to the patterns of flow, mixing, settlement and suspension;
- Alterations to beneficial uses associated with the physical, chemical and biotic characteristics of water;
- Induced effects on adjoining wetland water level.

#### AIR

#### CLIMATE

Localised microclimatic effects due to induced altered patterns of near ground air movement patterns.

#### The Landscape

- Changes to the appearance and character of natural coastlines and seascapes due to altered topographic, geomorphology, habitats, landuses, structures and associated navigation installations;
- Changes to the appearance and character of natural coastlines and sea-scapes due to induced changes of landuses in the vicinity of the works.

#### MATERIAL ASSETS

- Effects on existing infrastructure during construction (especially roads);

- Attraction of new landuses and infrastructure.

#### CULTURAL HERITAGE

Erosion or submergence of monuments, artefacts and long established land use patterns.

#### THE INTERACTION OF THE FOREGOING

- Induced erosion and deposition patterns can interact with landuses, beneficial uses of the coastal zone, habitats and the landscape.

### **POSSIBLE MITIGATION OPTIONS**

- Siting, design and construction alternatives;
- Duration, timing and phasing of works;
- Location and access to temporary construction works;
- Integration of ecological, landscape and amenity betterment with design;
- Provision of construction and operational environmental monitoring and management programmes.

**PROJECT TYPE**

**13**

- **Pig-rearing installations;**
- **Poultry-rearing installations.**

**INTRODUCTION**

The principal concerns which are likely to arise in this context stem from the issues of waste handling (mainly slurry/manure) and odours. The significance of impacts is very much a factor of the site's proximity to sensitive receptors such as aquifers or residences. Such projects frequently dispose of wastes at locations which are not adjacent to the animal rearing operations.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Extension of infrastructure (water, power, access);
- Site preparation works;
- Materials;
- Access.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Access and transportation;
- Food, storage, handling and transportation;
- Water and power supply;
- Quantification of inputs (feed, stock, power);
- Quantification of outputs (animal wastes, products, other wastes);
- Animal housing structures and associated activities, heating, ventilation, cleaning;
- Other structures (offices, maintenance);
- Waste storage, handling and transportation;
- On-site infrastructure, water storage, roads, fences;
- Waste disposal areas and transportation

- routes;
- Waste disposal methods including equipment, duration, frequency, seasons, weather conditions, monitoring and recording.

**DECOMMISSIONING (IF APPLICABLE)**

- Removability of structures;
- Long-term contamination.

**GROWTH**

- Potential changes in numbers, types, intensity or methods.

**ASSOCIATED DEVELOPMENTS**

- Processing plants;
- Foodstuff suppliers;
- Breeding stock suppliers;
- Equipment suppliers;
- Off-site infrastructure upgrading.

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

**HUMAN BEINGS**

- Nuisance and loss of amenity.

**FAUNA**

- Introduction of predator and scavenger species;
- Pest control measures;
- Spreading of disease as a result of contact with contaminated domestic animals/birds, carcasses or slurry.

**FLORA**

- Potential effects on vegetation due to eutrophication, effluent seepage/run-off;

- Waste spreading.

#### SOILS (AND GEOLOGY)

- Nutrient levels;
- Assimilative capacity of soils;
- Transmissivity and conductivity of geology.

#### AIR

- Malodours arising from housing units and manure/slurry stores;
- Malodours arising from slurry spreading;
- Malodours due to transportation of livestock/slurry;
- Noise (particularly in anticipation of feeding);
- Volatilisation of ammonia.

#### WATER

- Leakage of effluent (including during transportation);
- Pollution by contaminated run-off;
- Disposal of carcasses;
- Location and timing of slurry spreading.

#### CLIMATE

- Gases emitted from slurry/manure;
- Methane (contribution to greenhouse gases);
- Ammonia (contribution to acidifying gases).

#### THE LANDSCAPE

- Visibility of structures;
- Potential visual impact as a result of water body eutrophication;
- Impact of odours on amenities and landscape character.

#### MATERIAL ASSETS

- Potential positive impact if slurry/manure gases are trapped for energy usage;
- Source of soil nutrients.

#### THE INTERACTION OF THE FOREGOING

### **POSSIBLE MITIGATION OPTIONS**

- Re-cycling of slurry/manure as energy source or fertiliser;
- Monitoring of waste disposal;
- Management of waste disposal;
- Noise absorption measures;
- Effective slurry containment.

**PROJECT TYPE**

**14**

**- Fish breeding installations.**

**INTRODUCTION**

These projects can give rise to concern about the impacts on wild stock through the potential of disease and loss of genetic diversity. The visual impacts of the facilities - especially floating installations (cages) and the impacts on general water quality - can also be significant. Other impacts arise from the infrastructure associated with such projects. Much of the concern arises because these projects are frequently located in isolated rural areas which are also tourism resources.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

**Land Based:-**

- Access;
- Extension of infrastructure;
- Accidental water pollution;
- Power supply;
- Pipelaying.

**Water Based:-**

- Anchoring;
- Waterside access areas.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Quantity, type and lifecycle of stock;
- Nutrient inputs and outputs;
- Use of chemicals (pesticides, fungicides);
- Traffic on water and roads;
- Water and power requirements;
- Manual/automatic feeding;
- Water discharges;
- Confinement measures;
- Waste discharges;
- Disposal of dead fish;

- Noise;
- Lighting;
- Monitoring and maintenance programmes.

**DECOMMISSIONING**

- Lifecycle of components.

**GROWTH**

- Further planned phases;
- Other types of stock planned.

**ASSOCIATED DEVELOPMENTS**

- Similar development by others;
- Suppliers of brood stock;
- Processors of fish;
- Maintenance and supply enterprises.

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

**HUMAN BEINGS**

- Conflicting landuses (tourism, water based leisure, angling);
- Health hazards of chemicals used.

**FAUNA (AQUATIC)**

- Discharges;
- Introduction of predators;
- Introduction of disease;
- Loss of genetic diversity (accidental escapes);
- Change in species distribution;
- Scavenger organisms.

**FAUNA (OTHER)**

- Birds: killed as predators, caught in nets/cages;
- Seals: killed as predators, caught in

nets/cages.

#### ■ FLORA (AQUATIC)

- Discharges;
- Eutrophication.

#### ■ SOIL (AND GEOLOGY)

#### ■ WATER

- Abstraction and discharges (land-based only);
- Addition of nutrients, chemicals, organic material and sediments;
- Turbidity;
- Effects of currents;
- Litter.

#### ■ AIR

- Noise (pumps, agitators).

#### ■ CLIMATE

#### ■ THE LANDSCAPE

- New structures, storage, access and utilities;
- Visibility of cages, moorings, piers and boats;
- Litter.

#### ■ THE INTERACTION OF THE FOREGOING

- Tourism, through combination of effects on wildlife, fishing and effect of visual impacts.

#### ■ MATERIAL ASSETS

- Employee, supplier and product traffic (often large trucks).

### **POSSIBLE MITIGATION OPTIONS**

- Examination of a wide range of siting options;
- Design of visible facilities;
- Selection of environmentally sustainable processes:-
  - Fallowing;
  - Discharge treatment;
  - Alternative anti-fouling, delousing additives.

**PROJECT TYPE**

**15**

**- Peat Extraction.**

**INTRODUCTION**

The most significant environmental impact of peat extraction is the drainage of peatland. As peatland depends on a very high water table, the effects of drainage can occur over a wide area and cause significant loss of floral and faunal diversity. Pollution of surface water by peat silt is also a problem near extraction areas. Other impacts include visual impacts associated with vegetation loss, access routes and operation.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Land acquisition and management prior to drainage and prior to harvesting;
- Drainage;
- Access Routes.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Methods (cutting, drying, stacking, collection);
- Timing;
- Processing;
- Production rate;
- Employment;
- On-site transportation;
- Off-site transportation.

**DECOMMISSIONING (IF APPLICABLE)**

- Removal of structures;
- Closure/maintenance of drains;
- Rehabilitation/reuse of cut-over bogs and associated infrastructure.

**GROWTH**

- Available peatland in area.

**ASSOCIATED DEVELOPMENTS**

- Sales outlet;
- Horticulture;
- Power stations;
- Transportation infrastructure.

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

**HUMAN BEINGS**

- Change in access;
- Traffic;
- Loss of amenity (recreation/hunting);
- Land use after restoration.

**FAUNA**

- Change in soil fauna/loss of faunal diversity;
- Habitat loss;
- Impacts on aquatic fauna.

**FLORA**

- Change in water table;
- Change in vegetation;
- Habitat loss.

**SOIL (AND GEOLOGY)**

- Effects of drainage/lowered water table;
- Changes of soil texture, drainage, chemistry;
- Susceptibility to water and wind erosion;
- Excavation and removal of soil and rock;
- Erosion;
- Impact on geological heritage.

#### AIR

- Dust: blowing of milled peat;
- Nutrient input to intact peatland.

#### WATER

- Pollution of surface waters by peat silt;
- Changes in bed and oxygen conditions;
- Changes in flow rates/downstream effects.

#### CLIMATE

- Potential for contribution to climate changes through combustion of peat products;
- Altered micro-climate through loss of vegetation and water content.

#### THE LANDSCAPE

- Visibility of workings;
- Changes in vegetation;
- Access routes/tracks;
- Stockpiles, covers.

#### MATERIAL ASSETS

- Possible use of cut-away bog after restoration;
- Agriculture, forestry, wildlife.

#### CULTURAL HERITAGE

- Uncovering and damage to buried features, trackways, artefacts;
- Possible effect on preservation of buried features/artefacts due to changes in water table.

#### THE INTERACTION OF THE FOREGOING

### POSSIBLE MITIGATION OPTIONS

- Site selection;
- Harvesting method selected;
- Drainage method selected;
- Roadside screening;
- Silt control;
- Revegetation for agriculture or forestry;
- Restoration of peatland vegetation;
- Habitat creation by flooding.

**PROJECT TYPE**

**16**

- **Groundwater abstraction and artificial groundwater recharge schemes.**
- **Geothermal drilling;**
- **Drilling for storage of nuclear waste material;**
- **Drilling for major water supplies;**

**INTRODUCTION**

This category refers to individual (generally) boreholes drilled deeply into geological formations or groups of boreholes drilled into the shallow formations.

These project categories generate environmental concerns in two principal areas, namely the threat to groundwater dynamics (flow regime, vulnerability, and chemical/physical properties) and the impacts of associated pipe-laying. Other concerns can include the effects on individual wells, on the water supplies to wetlands and subsidence which can be a cause for concern in certain geological conditions.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Site evaluation/testing;
- Site preparation work;
- Storage of topsoil;
- Time of year, duration and phasing;
- Employment;
- Accommodation;
- Working hours;
- Site lighting;
- Well design;
- Methods of well construction;
- Well drilling and completion;
- Method of sampling strata, fluids and gases;
- Materials (including sourcing,

- transportation and storage);
- Details of drilling muds and fluids;
- Storage and disposal of drill cuttings;
- Storage and disposal of contaminated liquid discharges;
- Borehole grouting;
- Well testing procedures;
- Disposal of flows from test pumping;
- Borehole abandonment;
- Pipeline construction;
- Traffic/noise/dust/vibration;
- Access;
- Infrastructural extensions (water, power roads etc);
- Post construction site rehabilitation;
- Fencing.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Generation facility (geothermal);
- Waste management;
- Pumping facilities and associated power and water supply routes, pump housing;
- Maintenance and management and monitoring programme;
- Noise;
- Leakages;
- Safety procedures;
- Fencing, signs, gates, access points;
- Settlement monitoring programme.

**DECOMMISSIONING (IF APPLICABLE)**

- Borehole abandonment;
- Groundwater quality;
- Reversibility of surface developments;
- Re-usability of infrastructural investments.

**GROWTH**

- Possible extension of operations adjacent to sites;
- Possible changes in volumes/depths or



times of use.

#### ASSOCIATED DEVELOPMENTS

- Surface installations (treatment works, storage areas, generators, industrial developments substations).

### ENVIRONMENTAL EFFECTS

Typical Significant impacts likely to affect:-

#### HUMAN BEINGS

- Loss of amenity due to building of structures/pipe-laying.

#### FAUNA

- Disturbance due to presence of new operation;
- Possible effects arising from lowering of water table;
- Possible effects of groundwater contamination.

#### FLORA

- Water table/dewatering impacts;
- Linear impacts due to pipe-laying/other infrastructure.

#### SOILS (AND GEOLOGY)

- Extraction/deposition of drilled material;
- The impacts of extraction on hydrogeological (groundwater) regime;
- Capacity of geological formations to sustain containment (of nuclear waste);
- Contamination due to leakage/spillage;
- Subsidence potential
- Excavation and removal of soil and rock;
- Erosion;
- Geological heritage.

#### WATER

- The impacts of abstraction on the hydrogeological regime;
- Capacity of existing regime to sustain the abstraction;
- Contamination potential with particular reference to the recharge of contaminated groundwaters and their migration over long time periods;
- Contamination potential due to the slow term migration of contaminated groundwaters;
- Depletion of resources;
- Effects on yields of local well;
- Effects on surface waters/wetlands;
- Pipe laying impacts.

#### AIR

- Dust emissions;
- Noise.

#### CLIMATE

#### THE LANDSCAPE

- Visibility of structures (especially during the drill and exploration phases);
- Visibility of associated linear developments (with reference to timescale);
- Indirect visual impacts due to changes in water regimes.

#### MATERIAL ASSETS

- Depletion of long term resources;
- Subsidence potential;
- Infrastructural impacts (principally water mains in the case of water drilling schemes).

#### CULTURAL HERITAGE

- Impacts due to any associated pipe

- laying activity;
- Dewatering of organic remains.

■ THE INTERACTION OF THE FOREGOING

**POSSIBLE MITIGATION OPTIONS**

- Site investigation;
- Development of accurate hydrogeological models;
- Borehole grouting;
- Water level monitoring;
- Replacement water supplies;
- Leakproof piping;
- Siting/routing alternatives;
- Reduced abstraction/removal rates;
- Ecologically and archaeologically supervised pipe-laying.

**PROJECT TYPE****17**

- **Mineral extraction, excluding minerals as defined under the Minerals Development Acts 1940 to 1995;**
- **All surface industrial installations for extraction of coal, petroleum, ores or bituminous shale.**

**INTRODUCTION**

This activity covers the extraction of a wide variety of materials and many initial forms of processing. Specific major concerns often include waste disposal, effects on groundwater and surface water, accidental discharges of chemicals, visual impact, contamination of surrounding lands, subsidence, noise, vibration, dust, loss of amenity and rehabilitation and after-care of the site.

**PROJECT DESCRIPTION**

Checklist of typical items to be described;

**CONSTRUCTION**

- Exploration drilling;
- Noise, dust, vibration, traffic;
- Lighting;
- Working hours;
- Dewatering;
- Borrow pits for containment structures;
- Temporary stockpiles of ore, waste or – Temporary measures for effluent containment and disposal;
- Initial mine opening (decline development) and associated surface blasting and drilling.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Extraction rate;
- Ore and waste composition and mineralogy;

- Mining methods;
- Stability and security of any open-pits;
- Subsidence prediction and control;
- Working hours;
- Times of shift changes;
- Times of blasting;
- Predicted vibration levels;
- Dewatering methods;
- Water replacement schemes;
- Potential for acid rock drainage or other in-mine pollution;
- Water discharges, requirements;
- Processing methods and reagent usage and storage;
- Specific precautions for particularly hazardous chemicals (if any);
- Waste disposal especially tailings impoundments and rock piles;
- Topsoil storage and stripping;
- Pollution from contaminated drainage;
- Containment failure risks;
- Control and monitoring measures;
- Transportation and materials handling;
- Ancillary facilities.

**DECOMMISSIONING**

- Sealing of mine entrances/security of pit perimeter;
- Long-term stability of underground workings and open-pit walls;
- Long-term water pollution potential and control;
- Removal, alternative use for surface buildings;
- Strategies for site rehabilitation including phasing, monitoring and post closure management;
- After-care proposals and eventual land-use options;
- Bonding or other funding of costs of closure/early abandonment.

**GROWTH**

- Potential for additional reserves;

- Capacity for additional spoil heaps/tailings impoundments.

**ASSOCIATED DEVELOPMENTS**

- Transportation infrastructure (road, rail, marine);
- Any replacement water supply schemes;
- Power supply.

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

**HUMAN BEINGS**

- Health and Safety;
- Amenity.

**FAUNA**

- Loss of habitat due to surface installations;
- Aquatic habitat alteration by changes in water quality and/or volume during or after mining;
- Effects of heavy metals or other dust or vibration on agricultural stock;
- Creation of new habitats.

**FLORA**

- Loss/creation of habitats due to surface installations;
- Changes in quality and volume of surface and groundwaters;
- Discharges (effluent and air) on agricultural and natural vegetation.

**SOILS (AND GEOLOGY)**

- Loss of topsoil;
- Loss of geologically important sites;
- The impacts of extraction on the hydrogeological (groundwater) regime;
- Subsidence potential;

- Dust deposition and contamination;
- Potential for post-mining contamination due to effects of dewatering workings;
- Contamination by accidental spills.

**WATER**

- Consumption of natural resources;
- Changes in character and volume of water discharges from dewatering;
- Disposal of surface or underground mine drainage, process effluent, leachates from waste rock, tailings, site runoff;
- Contamination from accidental spills (of reagents, fuel, process water, tailings);
- Effects on surface waters/wetlands;
- The impacts of dewatering on the hydrogeological regime;
- Depletion of resources;
- Effects on local well yields;
- Contamination from surface or underground mine workings;
- Acid mine drainage during working and after closure;
- Lowering of water tables;
- Contamination from tailings or waste rock;
- Increased vulnerability to contamination from after-use of surface workings.

**AIR**

- Air quality from mine vents;
- Dust and air emissions from processing;
- Dust from surface drilling, internal haul roads, tailings and transportation, materials storage and handling;
- Fly rock from surface workings.

**NOISE AND VIBRATION**

- Noise during construction of screening berms;
- Surface drilling;
- Air over-pressure from blasting;
- Blasting times;

- Vibration from blasting during development and operation;
- Ventilation raises;
- Process plant particularly for crushing and grinding;
- Transport, including internal haulage;
- Klaxons and PA systems.

#### CLIMATE

#### THE LANDSCAPE

- Visibility of surface workings, screening, surface plant, spoil/tailings depositories;
- Post decommissioning rehabilitation.

#### MATERIAL ASSETS

- Effect on agriculture due to mining activities;
- Effect on surface structures due to vibration and settlement;
- Road damage due to transport and machinery use;
- Effects related to the provision of infrastructure for extraction projects;
- Effects potential for groundwater development in the mine area, in the future, especially down gradient.

#### CULTURAL HERITAGE

- Loss of sites by surface workings or structures;
- Damage to old structures by vibration from blasting and transportation;
- Changes to water table may affect preservation of buried organic features/artefacts.

#### THE INTERACTION OF THE FOREGOING

### **POSSIBLE MITIGATION OPTIONS**

- Site selection for surface installations;

- Mine design and mining method for either surface or underground;
- Hours of operation and timing and design of blasting;
- Landscaping and screening;
- Water management and control systems, including dewatering methods;
- Dust and noise control;
- Alternatives processing and plant design and waste disposal sites and their management;
- Alternative mine closure and after use options;
- Transport options.

**PROJECT TYPE**  
**18**

- **Quarries and open-cast mining of stone, gravel, sand or clay;**
- **Extraction of stone, gravel, sand or clay by marine dredging or fluvial dredging.**

**INTRODUCTION**

This project type has the potential to create significant environmental impacts during operation in terms of traffic, noise, dust, vibration, water pollution, visual intrusion and loss of groundwater supplies. It can also pose a safety hazard to workers, the public and fauna (farm and wild stock). The impact can be permanent, even after closure and decommissioning, unless carefully planned rehabilitation is undertaken.

**PROJECT DESCRIPTION**

Checklist of typical items to be described:

**CONSTRUCTION**

- Acquisition and management prior to development;
- Exploration drilling and trenching;
- Location of stockpiles, access, plant and accommodation during initial development phase;
- Duration, timing and working hours of initial phase.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Quarrying rate and method (including equipment);
- Duration and phasing;
- Nature and quantity of material to be extracted;
- Quarrying method;
- Stability of quarry faces;
- Working hours;
- Frequency of blasting and predicted

- vibration levels;
- Water discharges, requirements;
- Dewatering and water table lowering;
- Processing methods, plant and machinery;
- Fuel and other chemical storage (if any);
- Disposal of excess topsoil, waste rock;
- Boulders and unmarketable products;
- Transport (internal and external);
- Monitoring;
- Any progressive rehabilitation;
- Dust generation and control;
- Safety;
- Power supplies and telephone links;
- Noise;
- Fencing, sign, lighting.

**DECOMMISSIONING**

- Fencing and security;
- Long-term quarry face stability;
- Long-term water pollution potential and control;
- Removal of buildings/plant and machinery;
- Strategies for site rehabilitation;
- Monitoring and management and eventual land use options after closure;
- Bonding or other funding of costs of closure.

**GROWTH**

- Potential for expansion of area, increases in output, or further processing.

**ASSOCIATED DEVELOPMENTS**

- Haulage enterprises;
- Machinery maintenance;
- Downstream processing.

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

#### HUMAN BEINGS

- Health and Safety;
- Amenity.

#### FAUNA

- Loss of habitat;
- Aquatic habitat alteration by changes in water quality and/or volume;
- Effects of dust or vibration on agricultural stock;
- Creation of new habitats.

#### FLORA

- Loss of habitats;
- Changes in quality and volume of surface and groundwaters;
- Dust blow to lands adjacent to site and transport routes;
- New habitats created, especially after decommissioning.

#### SOILS (AND GEOLOGY)

- Stability;
- Loss of topsoil;
- Loss/creation of geologically important sites;
- Dust deposition;
- Potential for erosion and/or subsidence of working;
- Impacts of dewatering on the structure of surface deposits and soil.

#### WATER

- Changes in character and volume of water discharges;
- Contamination from accidental spills;
- The impacts of extraction on the hydrogeological (groundwater) regime;
- Depletion of resources;
- Lowering of water table;
- Effects on yield of local wells;

- Contamination from surface during working and after closure;
- Increased vulnerability to contamination from after-use of surface workings.

#### AIR

- Dust from processing, drilling and internal haul roads;
- Dust from transportation, material storage and handling;
- Fly rock from surface workings.

#### NOISE AND VIBRATION

- Surface drilling;
- Air over-pressure from blasting;
- Vibration from blasting;
- Process plant noise particularly for crushing and grinding;
- Transport noise, including internal haulage.

#### CLIMATE

#### THE LANDSCAPE

- Visibility of surface workings;
- Visibility of surface plant;
- Visibility of dust adjacent to site and transport roads;
- Visibility of character due to the intensity and nature of development.

#### MATERIAL ASSETS

- Effects of vibration on surface structure;
- Road damage due to transport and machinery use;
- Loss of, or damage to water supplies;
- Effects potential for groundwater development in the area, in the future, especially downgradient of the site;
- Impacts on geological heritage.

■ CULTURAL HERITAGE

- Loss of sites by surface workings or structures;
- Damage to old structures by vibration from blasting or transportation;
- Effect on the preservation of buried organic remains due to changes in water table.

■ THE INTERACTION OF THE FOREGOING

**POSSIBLE MITIGATION OPTIONS**

- Site selection;
- Alternative layouts: quarry, plant and waste;
- Hours of operation timing and design of blasting;
- Landscaping and screening;
- Water management and control systems;
- Dust and noise control;
- Management of waste disposal;
- Transport routing;
- Vehicle washing for dust suppression;
- Rehabilitation and after use;
- Alternative duration of the life span of the workings.



**PROJECT TYPE****19**

- **Extraction of petroleum;**
- **Extraction of natural gas both onshore and offshore.**

**INTRODUCTION**

Concerns arise from the flammable and potentially polluting nature of the fuels and associated wastes and by-products. The extraction process is a highly industrialised one requiring significant supporting infrastructure. The extraction process can have direct and indirect impacts on the geology and hydrology over large areas.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

- Exploration and site preparation;
- Duration, phasing and time of year;
- Spoil deposition;
- Disposal of contaminated liquid discharges;
- Disposal of flows from test pumping;
- Pipeline construction/infrastructural developments;
- Bore grouting;
- Noise/dust/vibration;
- Access and working areas;
- Post construction site rehabilitation;
- Disposal of waste and by products of exploration.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Composition, chemistry, estimates of size of field and extraction rates;
- Extraction methodology, with associated inputs and emissions and transportation of inputs;
- Storage handling, timing and duration of phasing of operation;
- Employees, numbers, shifts and hours;
- By products and wastes at point of extraction (flares, etc);
- Pumping, handling, storage facilities for

- products;
- Water supply;
- Power supply;
- Lighting;
- Potential for groundwater contamination;
- Security measures;
- Potential for subsidence;
- Potential for air pollution/odours;
- Noise, dust and vibration;
- Specific precautions for hazardous chemicals;
- Risk of hazard due to fire explosion, or uncontrolled atmospheric releases;
- Emergency and evaluation procedures;
- Management and monitoring procedures.

**DECOMMISSIONING (IF APPLICABLE)**

- Removability of structures;
- Re-watering fields;
- Long term geological stability;
- Long term potential for water pollution;
- Well sealing.

**GROWTH**

- Expansion.

**ASSOCIATED DEVELOPMENTS**

- Distribution/haulage/shipping enterprises;
- Refineries;
- Maintenance facilities;
- Catering facilities;
- Storage facilities;
- Energy industries.

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

**HUMAN BEINGS**

- Safety/hazard;

- Employment;
- New economic activities;
- Settlement patterns.

#### FAUNA

- Disturbance impacts;
- Spillage impact risk.

#### FLORA

- Potential impact of leakages / spillages;
- Potential impacts of connecting infrastructure.

#### SOIL (AND GEOLOGY)

#### WATER

- Hazard of leakage/spillage (surface or underground);
- Impacts on groundwater chemistry;
- Impacts on groundwater dynamics.

#### AIR

- Atmospheric emissions;
- Odours;
- Transportation of hazardous/explosive gases.

#### CLIMATE

- Downstream climatic (ozone) effects of fossil fuel usage.

#### THE LANDSCAPE

- Pumping stations;
- Lighting/fencing/signs;
- Transport/access routes;
- Storage facilities;
- Connecting infrastructure;
- Spillages hazard.

#### MATERIAL ASSETS

- Consumption of finite natural resource;
- Water and power supply;
- Transportation infrastructure (road, rail, port).

#### CULTURAL HERITAGE

- On-site heritage;
- Features traversed by roads/pipelines/other infrastructure.

#### THE INTERACTION OF THE FOREGOING

### **POSSIBLE MITIGATION OPTIONS**

- Siting alternatives for surface installation and infrastructure;
- Pipeline routing alternatives;
- Alternative methods of extraction, handling, storage and transportation;
- Alternative uses for product;
- Alternative locations and types of on-site or near-site processing or refining;
- Alternative extraction wastes;
- Alternative processing and plant configurations;
- Monitoring and management programmes;
- HAZOP and HAZAN analysis;
- Bonding and insurance arrangements;
- Hours of operation.

# PROJECT TYPE 20

- **Industrial installations and pipelines for the transport of gas, oil or chemicals, steam and hot water;**
- **Construction of overhead powerlines;**
- **Installations of overground aqueducts;**
- **Ski-runs, ski-lifts and cable-cars.**

## INTRODUCTION

Developments of this class tend to be of environmental concern because their impacts are repeated over their length. Associated developments which may subsequently occur should also be borne in mind.

## PROJECT DESCRIPTION

Checklist of items to be described:-

### CONSTRUCTION

- Site evaluation/testing;
- Time of year, duration and phasing;
- Site preparation works;
- Employment;
- Accommodation;
- Working hours;
- Access;
- Traffic, noise, dust and vibration;
- Machinery and materials access;
- Infrastructural extensions (water, power, roads);
- Excavation/spoil deposition: temporary/permanent;
- Watercourse diversions;
- Horizontal and vertical alignment;
- Construction techniques;
- Type and quantity of load;
- Materials (including sourcing, transportation and storage);
- Containment/security methods;
- Emergency procedures;
- Spoil Deposition;

- Fencing.

### OPERATION (INCLUDING RELEVANT ALTERNATIVES)

- Lifespan /cycle of components.

### DECOMMISSIONING (IF APPLICABLE)

- Future visibility of structures, if not removed.

### GROWTH

- Planned extensions/upgrading.

### ASSOCIATED DEVELOPMENTS

- Creation of conditions for other new developments, (for example, new industrial development as a result of new electricity supply; or souvenir shops at a cable car terminal.)

## ENVIRONMENTAL EFFECTS

Typical significant impacts likely to affect:-

### HUMAN BEINGS

- Amenities;
- Settlement patterns;
- New landuses.

### FAUNA

- Disturbance during construction and/or operation;
- Obstruction of animal movements.

### FLORA

- Disturbance during site clearance and/or operation;
- Accidental habitat loss impacts

(especially due to leakages).

**SOIL (AND GEOLOGY)**

**WATER**

- Interference with water courses during construction;
- Ground/surface water quality impairment due to leakages.

**AIR**

- Noise (construction and/or operation);

**CLIMATE**

**THE LANDSCAPE**

- Vegetation/other clearance during construction;
- Visual impacts of towers, booster stations, transformers, warning signs;
- Change of character in undeveloped areas.

**MATERIAL ASSETS**

- Enhancement of existing infrastructure;
- Sterilisation of lands from development.

**CULTURAL HERITAGE**

- Interference with archaeologically or otherwise culturally significant sites.

**THE INTERACTION OF THE FOREGOING**

**POSSIBLE MITIGATION OPTIONS**

- Routing alternatives;
- Design alternatives (materials, insulation, structures etc);
- Choice of construction season (with reference to flora and fauna);

- Diameter of piping/height of structures;
- Underpasses\bridges for humans/wildlife/domestic animals;
- Use of light construction machinery necessitating less clearance and ground disturbance than conventional plant.

# PROJECT TYPE 21

- Installations for storage of petroleum, petrochemical and chemical products;
- Installations for surface storage of natural gas and fossil fuels;
- Installations for underground storage of combustible gases.

## INTRODUCTION

Projects of this type are of particular environmental concern due to the significant fire and explosion hazard associated with their existence. Other potential impacts include accidental leaks and the long-term effects of soil contamination.

## PROJECT DESCRIPTION

Checklist of items to be described:-

### CONSTRUCTION

- Site preparation works;
- Traffic, noise, dust, vibration;
- Extension of infrastructure.

### OPERATION (INCLUDING RELEVANT ALTERNATIVES)

- Types and quantities of materials stored;
- Risk classifications of materials;
- Transportation, handling and storage procedures;
- Emissions, residues on containing same;
- Maintenance procedures;
- HAZOP/HAZAN analysis;
- Number, types and routes of transportation movements;
- Number of operatives and associated facilities;
- Packaging, cleaning, loading, grading or other processing of the material;
- Monitoring procedures;
- Emergency plans;
- Water and power use;

- Containment of fire fighting/dust suppression water supply;
- Spill/leak containment features;
- Site security, fencing, lighting.

### DECOMMISSIONING (IF APPLICABLE)

- Demolition;
- Contamination of site.

### GROWTH

- Further phases.

### ASSOCIATED DEVELOPMENTS

## ENVIRONMENTAL EFFECTS

Typical significant impacts likely to affect:-

### HUMAN BEINGS

- Fire and health hazard;
- Explosions.

### FAUNA

- Loss of habitat;
- Oil spillages;
- Disturbance during excavation;
- Fencing.

### FLORA

- Loss of habitat;
- Air pollution;
- Dust;
- Spillages;
- Disturbance during excavation;
- Impact of leakages.

### SOILS (AND GEOLOGY)

- Excavation and removal of soil and rock;
- Stability;

- Subsidence;
- Seepage from storage of fossil fuel resulting in soil contamination;
- Disturbance during excavation
- Sourcing of fill material;
- Impacts on geological heritage.

#### ■ WATER

- Surface run-off water;
- Leakage of hydrocarbons to ground or surface waters.

#### ■ AIR

- Leakage of natural gas/combustible gases;
- Noise and dust (especially coal dust);
- Dust generation due to handling.

#### ■ CLIMATE

#### ■ THE LANDSCAPE

- Handling and transportation equipment;
- Surface storage tanks, stockpiles;
- Piping, pumps and associated structures;
- Fences, bunds, signs.

#### ■ MATERIAL ASSETS

- Enhancement of existing infrastructure;
- Sterilisation of lands from development.

#### ■ CULTURAL HERITAGE

- Interference with archaeologically or otherwise culturally significant sites.

#### ■ THE INTERACTION OF THE FOREGOING

### **POSSIBLE MITIGATION OPTIONS**

- Site selection;
- Selection of storage/containment strategies;

- Selection of handling and transportation methods;
- Emergency plans;
- Bunding of storage facilities;
- Leak detection and monitoring;
- Spill/leak containment plans.

**PROJECT TYPE**  
**22**

**- Installations for industrial briquetting of coal and lignite.**

**INTRODUCTION**

Production, transportation, storage and emissions are primary environmental concerns in projects of this type.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Site preparation works;
- Infrastructural capacity/upgrading (roads, power, water);

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Materials supply and traffic generated;
- Input type and quantity handling, transportation and storage;
- Type and quantity of output;
- Power requirements;
- Packaging type, quantity, inputs and waste;
- Noise generation;
- Hours of operation;
- Product transport/handling and storage;
- Waste generation and disposal;
- Dust;
- Fire and explosion hazard;
- Storage and safety;
- Contaminated leachate from stockpiles.

**DECOMMISSIONING (IF APPLICABLE)**

- Site rehabilitation;
- Contamination of site.

**Growth:-**

- Likelihood of plant expansion;
- Capacity to handle additional activity and waste production.

**ASSOCIATED DEVELOPMENTS**

- Industries which require the finished products;
- Waste handling services;
- Transportation services;
- Fuel supply.

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

**Human Beings**

- Health and hazard.

**FAUNA**

- Habitat destruction/disturbance;
- Dust entering food chain;
- Soil contamination.

**FLORA**

- On-site habitat loss;
- Dust fall-out on vegetation.

**SOILS (AND GEOLOGY)**

- Stability.

**WATER**

- Surface run-off and groundwater contamination.

**AIR**

- Fumes/other noxious emissions;
- Noise.

■ CLIMATE

■ THE LANDSCAPE

- Structures;
- Stockpiles;
- Access and infrastructure;
- Landscape character changes due to traffic and industrial activity.

■ MATERIAL ASSETS

- Impact of additional power and traffic loading on existing capacity;
- Impact of potential contamination on possible future land uses.

■ CULTURAL HERITAGE

- On-site archaeology.

■ THE INTERACTION OF THE FOREGOING

**POSSIBLE MITIGATION OPTIONS**

- Site selection;
- Selection of processes and plant;
- Containment measures;
- Control of emissions from transport, production and storage facilities;
- Routing of road vehicles;
- Alternative waste treatment options;
- Maintenance and management.



# PROJECT TYPE

# 23

- **All installations for manufacture and assembly of motor vehicles or manufacture of engines;**
- **Shipyards;**
- **All installations for the construction of aircraft;**
- **Manufacture of railway equipment;**
- **Test benches for engines, turbines or reactors;**

## INTRODUCTION

The major impacts associated with this kind of project include the effects on water quality from liquid waste such as solvents, surface treatments and oil; the effects on air quality from fumes, odours; and noise impacts generated during operation. The scale of some of these development types can also give rise to concern about visual impacts.

## PROJECT DESCRIPTION

Checklist of items to be described:-

### CONSTRUCTION

- Site preparation works;
- Access;
- Extension of infrastructure (power, water, access);
- Type and quantity of product;
- Timing, quantity and routing of product dispatch;
- Quantity and type of inputs;
- Quantity and type of residue and waste arising;
- Principal processes and plant;
- Handling, transportation and storage of inputs;
- Handling, transportation and storage of products.

### OPERATION (INCLUDING RELEVANT ALTERNATIVES)

- Fumes and odours;
- Waste disposal.

### DECOMMISSIONING (IF APPLICABLE)

- Alternative uses;
- Demolition.

### GROWTH

- Expansion of activity.

### ASSOCIATED DEVELOPMENTS

- Storage;
- Suppliers;
- Finishing industries;
- Distribution and storage industries.

## ENVIRONMENTAL EFFECTS

Typical significant impacts likely to affect:-

### HUMAN BEINGS

- Nuisance (noise and odours).

### FAUNA

- Liquid waste (engine oil and kerosene solvents etc).

### FLORA

- Liquid waste (engine oil and kerosene solvents etc).

### SOILS (AND GEOLOGY)

- Stability.

■ WATER

- Liquid waste (engine oil and kerosene solvents etc).

■ AIR

- Noise;
- Dust;
- Fumes and odours.

■ CLIMATE

■ THE LANDSCAPE

- Visual impact of structures.

■ MATERIAL ASSETS

- Enhancement of existing infrastructure;
- Sterilisation of lands from development.

■ CULTURAL HERITAGE

- Interference with archeologically or otherwise significant sites.

■ THE INTERACTION OF THE FOREGOING

**POSSIBLE MITIGATION OPTIONS**

- Selection of siting and processes;
- Landscaping to lessen any visual impacts.

# PROJECT TYPE 24

- Installations for the manufacture of vegetable and animal oils and fats;
- Installations for packing and canning of animal and vegetable products;
- Installations for manufacture of dairy products, of confectionery and syrup and industrial starch;
- Installations for commercial brewing, distilling and malting;
- All fishmeal, fish-oil and sugar factories.

## INTRODUCTION

These project types can give rise to concern about impacts on air quality, from dust and odours and on water quality from effluent discharges and accidental spillages. Other impacts include health hazards from meat, bone waste and vermin attracted by stored raw material and product.

## PROJECT DESCRIPTION

Checklist of items to be described:-

- Construction:-
- Site preparation works;
- Extensions of infrastructure (water, power and access);
- Pipe laying.

### OPERATION (INCLUDING RELEVANT ALTERNATIVES)

- Type and volume of product;
- Type and quantity of inputs;
- Transportation, storage and handling of inputs and products;
- Wastes emissions and residues generated and their disposal;
- Water and power requirements;
- Air and water quality control measures;
- Hours and seasons of operations;

- Numbers of staff and shifts;
- Monitoring and management systems.

### DECOMMISSIONING (IF APPLICABLE)

- Alternative uses / reuse of buildings.

### GROWTH

- Expansion of activity.

### ASSOCIATED DEVELOPMENTS

- Supplies of raw materials.

## ENVIRONMENTAL EFFECTS

Typical significant impacts likely to affect:-

### HUMAN BEINGS

- Nuisance (odours, health hazards).

### FAUNA

- Discharges: water pollution;
- Introduction of predators and vermin;
- Impacts from waste treatment.

### FLOORA

- Storage areas;
- Introduced species.

### SOILS (AND GEOLOGY)

- Stability;
- Effects of land-spreading of wastes (particularly in dairy sector).

### WATER

- Pollution from discharges/effluent (addition of nutrients, organic materials);
- Abstraction.

AIR

- Noise;
- Odours;
- Dust.

CLIMATE

THE LANDSCAPE

- Visual impact of new structures.

MATERIAL ASSETS

- Supplier and product traffic;
- Sterilisation of natural resources.

THE INTERACTION OF THE FOREGOING

**POSSIBLE MITIGATION OPTIONS**

- Design of visible facilities;
- Siting alternatives;
- Monitoring of water quality;
- Treatment of effluent;
- Odour removal.

# PROJECT TYPE 25

- **Installations for the slaughter of animals;**
- **All knackers yards in built-up areas.**

## INTRODUCTION

The main impacts arising from these types of installations relate to water quality, odours and nuisance. The significance of impacts is dependent on the proximity of the site to dwellings or other sensitive receptors.

## PROJECT DESCRIPTION

Checklist of items to be described:-

### CONSTRUCTION

- Site preparation;
- Extension of infrastructure (water, power, access).

### OPERATION (INCLUDING RELEVANT ALTERNATIVES)

- Transportation, handling and storage of animals;
- Type, quantity, season and duration of operations;
- Type, quantity and disposal of waste, residues and emissions;
- Transportation types and routes for animals;
- Location and design of animal lairage and management;
- Storage areas for products and wastes;
- Number of staff and shifts;
- Vermin and pest control;
- Health hygiene and safety management;
- Monitoring and maintenance programmes;
- Location, design and operations of main mechanical plant;
- Security and access control.

### DECOMMISSIONING (IF APPLICABLE)

- Reuse of structures.

### GROWTH

- Change in type, intensity or reason of season of operation.

### ASSOCIATED DEVELOPMENTS

- Processing plants;
- Landfill sites.

## ENVIRONMENTAL EFFECTS

Typical significant impacts likely to affect:-

### HUMAN BEINGS

- Nuisance (vermin, pests, odours).

### FAUNA

- The attraction of pests and disease vectors such as rodents, insects, birds;
- Water pollution causing fish kills.

### FLORA

- Impacts on aquatic flora from water pollution.

### SOIL (AND GEOLOGY)

### WATER

- Run-off (yards, parking, lairage, truck washes);
- Water pollution due to high BOD content of waste;
- Contaminants such as feathers and fat (suspended solids impacts);
- Temperature increase.

**AIR**

- Odours;
- Treatment works;
- Paunch and offal storage areas;
- Rendering.

**NOISE**

- Animals in lairage;
- Refrigerated vehicles;
- Ventilation and cooling plant.

**CLIMATE**

**THE LANDSCAPE**

- Flues, cooling tanks;
- Parked refrigerator vehicles;
- Traffic.

**MATERIAL ASSETS**

- High volumes of difficult solid wastes (paunches, etc.) for disposal to landfills;
- High use of existing waste water treatment plant capacity;
- High water use requirement.

**THE INTERACTION OF THE FOREGOING**

**POSSIBLE MITIGATION OPTIONS**

- Pre-treatment of plant effluent;
- Monitoring of water quality and waste entering outfall area.

# PROJECT TYPE

# 26

- **Plants for the pretreatment (operations such as washing, bleaching, mercerisation or dyeing of fibres or textiles);**
- **Plants for the tanning of hides and skins.**

## INTRODUCTION

These types of facilities can be of environmental significance due to the potential impacts of chemical spillages, leakages and effluent discharges on receiving waters - both ground and surface waters. Operations can also generate significant odour impacts.

## PROJECT DESCRIPTION

Checklist of items to be described:-

### CONSTRUCTION

- Site preparation works;
- Extension of infrastructure;

### OPERATION (INCLUDING RELEVANT ALTERNATIVES)

- Type and quantity of impacts and products;
- Transportation, handling and storage of impacts and products;
- Type, quantity and characteristics of wastes, residue and emission arising and their disposal;
- Power and water requirements;
- Storage areas for products and waste;
- Number of staff and shifts;
- Vermin and pest control measures;
- Monitoring and maintenance control;
- Location, design and operation of main mechanical plant;
- Security and access control;
- Storage and handling of hazardous chemicals.

### ASSOCIATED DEVELOPMENTS

- Storage;
- Treatment (waste water) plant;
- Further processing (for example clothing industries).

## ENVIRONMENTAL EFFECTS

Typical significant impacts likely to affect:-

### HUMAN BEINGS

- Nuisance (odours, pests, health hazards).

### FAUNA

- Waste water discharges (damage to aquatic life and ecology of receiving waters);
- Disease vectors (pests, scavengers and vermin).

### FLORA

- Waste water discharges (damage to aquatic life and ecology of receiving waters).

### SOIL (AND GEOLOGY)

### WATER

- Abstraction (requirements for hot water are substantial);
- Assimilative capacity of receiving water;
- Contamination of ground and surface waters;
- Effects of dyes;
- Effects of biocides and moth proofing agents.

### AIR

- Noise;
- Air emissions;

- Odours (due to by-product rendering and failure to treat hydrogen sulphide and ammonia emissions).

#### ■ CLIMATE

#### ■ THE LANDSCAPE

- Visual impact of new structures;
- Boiler house stack: dominant visual element of the development.

#### ■ MATERIAL ASSETS

#### ■ THE INTERACTION OF THE FOREGOING

### **POSSIBLE MITIGATION OPTIONS**

- Monitoring Programme: water quality, air quality and testing of treated waste water;
- Treatment of waste water;
- Siting alternatives;
- Design alternatives.



**PROJECT TYPE**  
**27**

- **Industrial plants for the production of pulp from timber or similar fibrous materials;**
- **Industrial plants for the production of paper and board;**
- **Cellulose-processing and production installations.**

**INTRODUCTION**

The principal concerns which are likely in this context arise from the risk to water quality from effluent emissions, chemical spillages, and accidental leakages. Air quality can be affected by dust and airborne particles, and noise impacts during operations can also be potentially significant.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Duration and phasing;
- Site preparation works;
- Extension of infrastructure (water, power and access).

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Type and volume of product;
- Type and quantity of inputs;
- Transportation, storage and handling of inputs and products. [Note that stockpiles of unprocessed timber can be very large];
- Waste, emissions and residues generated and their disposal;
- Water and power requirements;
- Air and water quality control measures;
- Monitoring and management system;
- Storage and handling of hazardous resins, preservations or chemicals (if relevant);

- Number of staff and shifts;
- Storage, transportation and disposal of solid wastes;
- Site traffic;
- Location and characteristics of major mechanical plan;
- Fire and dust explosion precautions.

**DECOMMISSIONING (IF APPLICABLE)**

- Reuse of plant.

**GROWTH**

- Expansion/intensification of activity;
- Change in process or products.

**ASSOCIATED DEVELOPMENTS**

- Supplies;
- Storage facilities;
- Transport facilities.

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

**HUMAN BEINGS**

**FAUNA**

- Chemical spillage;
- Importation of alien species.

**FLORA**

- Chemical spillage;
- Importation of plant pathogens and pests.

**SOIL (AND GEOLOGY)**

**WATER**

- Discharges of effluent;

- Abstraction;
- Chemical spillage;
- Leakage on disposal.

#### AIR

- Noise;
- Sawdust (airborne);
- Emissions (e.g. formaldehyde and VOCs).

#### CLIMATE

#### THE LANDSCAPE

- Visual impact of plant/stockpile/traffic;
- Accumulation of timber residue on site;
- Change of character due to intensity of development.

#### MATERIAL ASSETS

- Upgrading of infrastructure.

#### THE INTERACTION OF THE FOREGOING

### **POSSIBLE MITIGATION OPTIONS**

- Siting and design alternatives;
- Monitoring of water and air quality;
- Recycling of timber residues.

# PROJECT TYPE 28

- **Industrial estates development projects;**
- **Construction of dwelling units, car parks, shopping centres;**
- **Urban development;**
- **Holiday villages;**
- **Hotel Complexes;**
- **Permanent camp sites and caravan parks;**
- **Theme parks.**

## INTRODUCTION

Developments falling into the above classes vary in potential for environmental impact according to their specific usages. For example an industrial estate containing chemically based industries will have a very different set of impacts to one containing software industries or warehousing. They all share certain common areas of impact, however. The most significant of these tend to be landscape and infrastructural impacts.

## PROJECT DESCRIPTION

Checklist of items to be described:-

### CONSTRUCTION

- Duration and phasing;
- Site preparation;
- Materials (sourcing and transportation);
- Employment;
- Noise, dust, traffic;
- Infrastructural extensions (including telecommunications, water and power and access).

### OPERATION (INCLUDING RELEVANT ALTERNATIVES)

- Type and quantity of products and inputs (if known);
- Type and quantity of residue, emissions and waste and proposals for disposal (if

- known);
- Number and type of user and seasonal/daily variation (if known).
- Traffic;
- Noise;
- Atmospheric emissions;
- Maintenance (landscape);
- Classes of usage;
- Storage of supplies/produce;
- Waste handling.

### DECOMMISSIONING (IF APPLICABLE)

Permanence of adverse impacts.

### GROWTH

- Expansion planned for future development.

### ASSOCIATED DEVELOPMENTS

- Maintenance services;
- Catering services;
- Supply/consumer industries.

## ENVIRONMENTAL EFFECTS

Typical significant impacts likely to affect:-

### HUMAN BEINGS

- Amenity;
- Accommodation;
- Employment;
- Health and safety;
- Traffic congestion.

### FAUNA

- Loss and disturbance of habitats;
- Food chain impacts;
- Introduction of vermin and pests.

FLORA

- Site preparation impacts (loss of habitat);
- Emission impacts (aquatic);
- Trampling impacts (terrestrial);
- Eutrophication (terrestrial vegetation).

SOIL (AND GEOLOGY)

WATER

- Supply capacity;
- Effluent disposal capacity;
- Water table effects.

AIR

- Atmospheric emissions;
- Odours;
- Noise.

CLIMATE

THE LANDSCAPE

- Visual impacts due to introduction of new structures;
- Visual impacts due to access roads;
- Visual impacts due to telecommunications/power lines;
- Lighting;
- Change of character due to intensification of use;
- Parking;
- Waste handling areas;
- Litter;
- Impact of removal of site vegetation;
- Impact of landscaping proposals.

MATERIAL ASSETS

- Impacts on roads;
- Impacts on water supply;
- Impacts on power;
- Impacts on telecommunications network;
- Waste disposal requirements.

CULTURAL HERITAGE

- On-site heritage;
- Features/artefacts along access or other infrastructural routes.

THE INTERACTION OF THE FOREGOING

**POSSIBLE MITIGATION OPTIONS**

- Site selection;
- Design and layout of development;
- Landscaping;
- Sensitive design/design alternatives.

# PROJECT TYPE

# 29

## - All permanent racing and test tracks for motorised vehicles.

### INTRODUCTION

Developments in this category tend to have widespread impacts because of their linear nature. Principal concerns would normally include noise, vibration, air quality, material assets (roads), severance, landscape issues, safety (humans and fauna) and cultural heritage. The location of routes can significantly affect settlement patterns in the long term.

### PROJECT DESCRIPTION

Checklist of items to be described:-

#### CONSTRUCTION

- Site evaluation/testing;
- Exploratory boreholes and trenching;
- Time of year, duration and phasing;
- Employment;
- Accommodation;
- Working hours;
- Site acquisition and management prior to development;
- Site preparation works;
- Materials (including sourcing, transportation and storage);
- Pipe laying/drainage works;
- Watercourse diversion/coffer dams;
- Access;
- Noise, vibration, traffic and dust;
- Fencing;
- Adjustment to existing infrastructure;
- Spoil deposition.

#### OPERATION (INCLUDING RELEVANT ALTERNATIVES)

- Cross sections, horizontal and vertical alignment;
- Design and location of bridges, culverts,

- crossings, junctions and other major structures;
- Type, volume and variations of traffic;
- Design speed, sight and stopping distances;
- Noise and vibration;
- Operations and maintenance;
- Constraints techniques and materials;
- Source of main materials (if known);
- Life span of surface and structures;
- Air and water emissions;
- Light, signalling and signage;
- Other safety measures;
- Landscape and environmental measures;
- Accident and emergency plans.

#### ASSOCIATED DEVELOPMENTS

- Developments which require road transport availability (including housing and industry);
- Catering/fuel services;
- Adjustment of infrastructure.

### ENVIRONMENTAL EFFECTS

Typical significant impacts likely to affect:-

#### HUMAN BEINGS

- Health and nuisance (noise, vibration, air quality);
- Travel times;
- Transport costs;
- Safety;
- Community severance.

#### FAUNA

- Disturbance;
- Animal mortality;
- Migratory obstacle / fragmentation of habitat;
- Value of new habitat.

**FLORA**

- Clearance of existing cover;
- Reorganisation of drainage pattern;
- Colonisation of new roadside habitats;
- Effects of dust and fumes;
- Habitat changes due to gritting/salting operations.

**SOIL (AND GEOLOGY)**

- Stability;
- Erosion;
- Potential for subsidence.

**WATER**

- Interference with drainage patterns;
- Run-off pollutants;
- Construction impacts to watercourse;
- Effects of de-icing chemicals and herbicides;
- Potential for accidental spills.

**AIR**

- Noise;
- Dust;

**CLIMATE**

- Atmospheric effects (ozone depletion);
- CO<sub>2</sub>, NO<sub>2</sub>, SO pollution and acid rain;
- CO<sub>2</sub> and global warming;
- Change of landscape character due to induced landuse changes;
- Change of landuse character due to intensification and use;
- Surface cuttings, fill slopes;
- Fencing, boundaries and landscaping.

**THE LANDSCAPE**

- Roadside furniture (including signage, safety, rails, lighting);
- Associated structures, bridges,

- overpasses, junctions;
- Viewing stands/other facilities (test/racing tracks);
- Car parking (racing tracks).

**MATERIAL ASSETS**

- Infrastructural upgrading;
- Power (lighting);
- Property severance.

**CULTURAL HERITAGE**

- Disturbance to items of cultural value by excavation or change of context.

**THE INTERACTION OF THE FOREGOING**

**POSSIBLE MITIGATION OPTIONS**

- Routing/siting or other alternatives;
- Design alternatives (width, surfaces, side slopes, fencing, signs, lighting);
- Width of carriageway;
- Surface alternatives;
- Road markings/signage;
- Lighting;
- Railings;
- Landscaping;
- Drainage;
- Hours of operation (race/test/tracks);
- Frequency of usage (race/test/tracks);
- "Do nothing" option;
- Underpasses/bridges for humans/wildlife/agricultural livestock.

# PROJECT TYPE

# 30

## - Wastewater treatment plants.

### INTRODUCTION

The major impacts associated with wastewater treatment plants include health hazards through biotic vectors, nuisances and traffic generated by operations, and the visual and landscape impact of the facility. The major challenge is to try and balance the positive impacts of wastewater treatment with the potentially negative impacts generated by its operation.

### PROJECT DESCRIPTION

Checklist of items to be described:-

#### CONSTRUCTION :-

- Site preparation works.

#### OPERATION (INCLUDING RELEVANT ALTERNATIVES)

- Safety and hazard control;
- Volume, type and fluctuation of wastes to be treated;
- Volume, type of fluctuations of residues and emissions;
- Power, water and chemical inputs;
- Maintenance, manning and management capacity;
- Pest and odour control;
- Perimeter security;
- Transportation of sludge (routes, destination and vehicles).

#### DECOMMISSIONING (IF APPLICABLE)

- Site Contamination;
- Site Stability.

#### GROWTH

- Phases of expansion.

#### ASSOCIATED DEVELOPMENTS

- Facilities for the disposal of sludges and solid waste.

### ENVIRONMENTAL EFFECTS

Typical significant impacts likely to affect:-

#### HUMAN BEINGS

- Health and safety;
- Nuisance;
- Residential amenity;
- Overall benefit of treatment of waste water: higher quality of water entering outfall area, decreased risk of polluted waters.

#### FAUNA

- Habitat loss/creation;
- Generation of insect nuisance;
- Eutrophication.

#### FLORA

- Eutrophication from nutrient release;
- Introduced species.

#### SOILS (AND GEOLOGY)

- Loss of topsoil.
- Stability.

#### WATER

- Improvement in quality of water discharged into outfall area;
- Contamination by uncontrolled surface run-off;
- Pathogens released with water;

- Increase in the vulnerability of underlying groundwaters.

#### AIR

- Odours;
- Other gaseous emissions;
- Noise of machinery (e.g. agitators) and transportation trucks.

#### CLIMATE

- Green house gas contribution;

#### THE LANDSCAPE

- Perimeter fences/signs, lighting;
- Access roads, entrances;
- Exposed waste;
- Site structures.

#### MATERIAL ASSETS

- Diminution of amenities for residential and leisure land-uses;
- Effects potential for groundwater development in the area, in the future, especially down gradient of the site;
- Attraction of feeding birds may impact on aircraft operations.

#### THE INTERACTION OF THE FOREGOING

- Climatic effects can concentrate or disperse airborne impacts and nuisances.

### **POSSIBLE MITIGATION OPTIONS**

- Site alternatives;
- Site layout to minimise proximity to sensitive receptors;
- Landscaping;
- Monitoring;
- High standards of site management including control of waste acceptance and

timing.



# PROJECT TYPE 31

- Installations for the disposal of waste;
- Sludge deposition sites.

## INTRODUCTION

Typical potential impacts associated with these types of installations include the pollution of surface and groundwater by leachates, fire and explosion hazard from concentration of methane and health hazards through biotic vectors. Visual and landscape impacts can also be significant, as can general nuisance caused by odours, traffic associated with operations, vermin attracted and windblown litter. The significance of impacts is also dependent on the proximity of the facility to dwellings and other places of human activity.

## PROJECT DESCRIPTION

Checklist of items to be described:-

### CONSTRUCTION

- Duration and phasing;
- Site preparation;
- Site sourcing and capping material;
- Machinery and plant;
- Traffic.

### OPERATION (INCLUDING RELEVANT ALTERNATIVES)

- Distances from residences, boundaries, watertable, surface water and conduits;
- Climatic factors;
- Leachate production rates, quantity and character;
- Quantity, type and significance of waste received;
- Containment (lining);
- Leachate collection and treatment;
- Capping/sealing and venting;
- Final profile;

- Monitoring facilities;
- Perimeter security/control/access;
- Landscaping/screening;
- Phasing;
- Capacity and lifespan of facility;
- Hours of operation;
- Daily procedures:
  - compaction/cover/capping;
- Wastes accepted/inventory/placement;
- Management procedures, equipment, staffing;
- Safety and hazard control;
- Litter, scavenging, bird, pest, nuisance and odour control;
- Gas utilisation.

### DECOMMISSIONING (IF APPLICABLE)

- Rehabilitation strategy;
- Post closure land use capability;
- Post closure monitoring/management;
- Post closure treatment (gases and leachate).

### GROWTH

- Phases of cell development;
- Sequence of rehabilitation;
- Ageing of liners/containment;

### ASSOCIATED DEVELOPMENTS

- Waste water treatment works;
- Baling stations;
- Recycling operations;
- Transportation improvements.

## ENVIRONMENTAL EFFECTS

Typical significant impacts likely to affect:-

### HUMAN BEINGS

- Health and Safety;
- Nuisance;

- Residential amenity.

#### FAUNA

- Birds, rodents and insects as pests and disease vectors;
- Scavengers attracted / pest control;
- Indirect effects from surface water pollution;
- Hazards to farm stock (e.g. choking on litter).

#### FLORA

- Obliteration by development or site drainage;
- Opportunities following rehabilitation;
- Introduction of exotic species;
- Eutrophication (litter, leachate).

#### SOILS (AND GEOLOGY)

- Need for material capping;
- Deterioration of capping soils due to upward migration of contaminants;
- Loss of topsoil.

#### WATER

- Contamination by uncontrolled surface run-off;
- Contamination of groundwater by leachates;
- Movements of contaminated groundwaters;
- Increase in the vulnerability of underlying groundwaters.

#### AIR

- Generation of methane with fire and explosion hazards;
- Odours;
- Dust;
- Noise of equipment/traffic.

#### CLIMATE

- Odour dispersal/concentration;
- Rainfall infiltration;
- Dispersal/concentration of flammable gases.

#### THE LANDSCAPE

- Visual impact and change in character due to:-
- Perimeter fences, bunds and signs;
- Access roads, entrances;
- Exposed waste, windblown litter;
- Flares, smoke, fires;
- Site structures;
- Rehabilitation measures.

#### MATERIAL ASSETS

- Diminution of amenities for residential and leisure land-uses;
- Disruption to adjacent agriculture (e.g. due to increased bird populations);
- Effects potential for groundwater development in the area, in the future, especially down gradient of the site;
- Attraction of feeding birds may impact on aircraft operations.

#### CULTURAL HERITAGE

- Degradation of the context of monuments;
- Loss of remains during surface obliteration caused by cell construction or capping soils acquisition.

#### THE INTERACTION OF THE FOREGOING

- Climatic effects can concentrate or disperse airborne impacts and nuisances.
- Landscaping and screening can be uncharacteristic of surroundings.

### **POSSIBLE MITIGATION OPTIONS**

- Integration with waste management plan;
- Selection from array of site alternatives;
- Fail-safe isolation from groundwater;
- Site layout to minimise proximity to sensitive receptors;
- Early installation of screening;
- On-going rehabilitation;
- Effective monitoring and management of leachate, groundwaters and gases;
- High standards of site management including control of waste acceptance.

**PROJECT TYPE**  
**32**

**- Waste disposal installations for the incineration, chemical treatment or landfill of hazardous and non-hazardous waste.**

**INTRODUCTION**

Typical impacts from this type of project can include those on water quality through leakage of leachates and accidental emissions, and on air quality as a result of dust, airborne particles and odour. Another negative impact can be the perceived health impacts of such facilities.

**PROJECT DESCRIPTION**

Checklist of items to be described:-

**CONSTRUCTION**

- Materials;
- Construction techniques;
- Power supply;

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Management procedures;
- Hours of operation;
- Climatic factors;
- Transportation of waste to and from installation;
- Water management and treatment, leachate collection;
- Back-up arrangements in event of malfunction;
- Quantity, type and significance of material processed;
- Timing, duration and frequency of operations;
- Type, quantity and significance of waste, residues and emissions arising;
- Operation and equipment management and quality control procedures;
- Safety and hazard control;

- Monitoring facilities;

**DECOMMISSIONING (IF APPLICABLE)**

- Long-term stability.

**GROWTH**

- Capacity;
- Future demands.

**ASSOCIATED DEVELOPMENTS**

- Sludge deposition.

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect:-

**HUMAN BEINGS**

- Health and safety;

**FAUNA**

- Disturbance;
- Contaminated water: food chain effects.

**FLORA**

- Site clearance;
- Aerial emissions.

**SOILS (AND GEOLOGY)**

- Loss of topsoil.

**WATER**

- Ground and surface water contamination;
- Dissolved airborne contaminants;
- Increase in the vulnerability of underlying groundwaters.

#### AIR

- Emissions of harmful substances/pollutants;
- Odour;
- Chimneys;
- Waste containers;
- Noise.

#### CLIMATE

- Atmospheric pollution effects.

#### THE LANDSCAPE

- Visual impacts: chimney stacks;
- Visibility of landfill site.

#### MATERIAL ASSETS

- Power supply;
- Road network;
- Effects potential for groundwater development in the area, in the future, especially down gradient of the site;
- Attraction of feeding birds may impact on aircraft operations.

#### CULTURAL HERITAGE

- On-site features.

#### THE INTERACTION OF THE FOREGOING

### **POSSIBLE MITIGATION OPTIONS**

- Secondary combustion chamber;
- Use of appropriate balance of combustion conditions and residence time (to render waste harmless);
- Gas scrubbers;
- Chimney design;
- Monitoring (plume dispersion models);
- Water management;
- Use of impermeable liners;

- Surface run-off management;
- Leachate collection and treatment.

**PROJECT TYPE**  
**33**

**- Installations for the harnessing of wind power for energy production.**

**INTRODUCTION**

These projects vary in scale – both in terms of the number of turbines and their height. It is notable that developments are continually increasing in scale in response to technical developments. The size, movement and appearance of these structures present challenges that are unique to this project type.

**PROJECT DESCRIPTION**

Checklist of the items to be described:

**CONSTRUCTION**

- Site access – permanent and temporary;
- Road transportation works – for moving very large loads;
- Site development – drainage, trenching, spoil disposal;
- Materials – sourcing, quantity, storage;
- Construction / erection; techniques / phasing / duration / timing;
- Grid extension and connections.

**OPERATION (INCLUDING RELEVANT ALTERNATIVES)**

- Lifespan components / lifecycle;
- Rotation speeds, direction, speed;
- Operational characterisation noise, flicker, electromagnetic interference

**DECOMMISSIONING (IF APPLICABLE)**

- Removal of non-functioning structures and rehabilitation of associated structures.

**GROWTH**

- Planned extension / upgrading.

**ASSOCIATED DEVELOPMENTS**

- Upgrading or provision of new grid connections, substations or other supporting infrastructure.

**ENVIRONMENTAL EFFECTS**

Typical significant impacts likely to affect the following:

**HUMAN BEINGS**

- Flicker effects (nuisance and human health);
- Television reception;
- Affects on amenities (residential and tourism).

**FAUNA**

- Disturbance during construction;
- Avoidance by sensitive species.

**FLORA**

- Habitat disturbance during construction.

**SOILS (AND GEOLOGY)**

**WATER**

- Disturbance of drainage and water courses during construction.

**AIR**

- Noise;
- Airbourne signals (T.V., microwave, radar).

#### CLIMATE

#### THE LANDSCAPE

- Visual impact of height and movement of turbines, access roads, grid connections and substations;
- Change of natural character in undeveloped areas.

#### MATERIAL ASSETS

- Grid capacity / access road capacity (large construction loads).

#### CULTURAL HERITAGE

- Effects on monuments and archaeological/cultural landscapes.

#### THE INTERACTION OF THE FOREGOING

- The interaction of noise, visual impacts, access to underdeveloped areas and effects on ecology can combine to affect perceptions of the integrity of natural areas

### **POSSIBLE MITIGATION OPTIONS**

- Site selection to avoid intrinsic sensitivity is the principal mitigation option for this project type.
- Site layout to achieve appropriate orientation and alignment is an appropriate secondary measure
- Utilisation of non-disruptive construction methods for access roads, buried cables and other site works can significantly ameliorate impacts on water, soil, ecology and archaeology.

## CONSULTATION & THE EIS PROCESS

### INTRODUCTION

Pre - application consultation is an informal but widely practised, means of ensuring that all relevant issues are addressed. Consultation offers the opportunity to gain advice and help from a wide range of state-bodies, organisations, individuals, local communities and interest groups on a formal and informal basis. Appropriate consultation is usually an essential part of the process of Environmental Impact Assessment, without which the effectiveness of the process as a whole may be greatly diminished. Attention is drawn to the need to consult with the appropriate Northern Ireland authorities where significant impacts may be carried across a national frontier.

The consultation process is discussed in more detail in Section 1 of the Guidelines on the information to be contained in Environmental Impact Statements. This section provides information on the range of bodies which may be consulted during the preparation of an Environmental Impact Statement.

### COMPETENT AUTHORITIES

These are the authorities, such as the following, charged by legislation which may examine an Environmental Impact Statement with a view to issuing a consent to develop:

- The Environmental Protection Agency;
- The Minister for the Environment, Heritage, and Local Government
- The Minister for Finance
- The Minister for Public Enterprise
- The Minister for the Marine and Natural Resources
- The relevant Planning Authority.

### STATUTORY CONSULTEES

These are organisations and authorities stipulated by legislation to be notified by a competent authority where an application is made that might be of concern. They include the following:

- An Bord Pleanála;
- An Comhairle Ealaíon (The Arts Council);
- An Taisce - The National Trust for Ireland;
- Bord Fáilte;
- Department of Agriculture and Food;
- Department of Arts, Sports and Tourism;
- Department of the Tánaiste, Enterprise, Trade and Employment;
- Department of the Environment, Heritage, and Local Government;
- Department of Communications, the Marine and Natural Resources;
- Department of Community, Rural and Gaeltacht Affairs;
- Department of Justice, Equality and Law Reform;
- Environmental Protection Agency;
- Irish Aviation Authority;
- Local Authorities (likely to be affected);
- Regional Authorities (likely to be affected);
- Commission for Electricity Regulation;
- Relevant Airport operator;
- National Authority for Occupational Safety and Health;
- National Roads Authority;
- Office of Public Works;
- Railway Procurement Agency;
- Dublin Transportation Office;
- Regional Fisheries Board;
- The Heritage Council;
- appropriate Health Board.

### OTHER CONSULTEES

Each development may impact on a wide variety of aspects of the environment and its users. The following is a list of the types of groups whose views may be typically sought



at the early stages of Environmental Impact Assessment.

#### GOVERNMENT DEPARTMENTS, AGENCIES AND BODIES

##### HUMAN BEINGS

- An Bord Pleanála
- Arts Council
- Bord Fáilte
- County Enterprise Boards
- Department of the Environment, Heritage, and Local Government
- Dublin Docklands Development Authority
- FÁS
- Forbairt
- Health and Safety Authority
- Irish Aviation Authority
- Udarás Na Gaeltachta
- Vocational Education Committees
- Local Authorities
- Local and regional development associations
- Railway Procurement Agency
- Regional Authorities
- Regional Health Boards
- Regional Tourism Organisations

##### FLORA

- Botanic Gardens
- Coillte Teoranta
- Department of Agriculture and Food
- Department of Arts, Sport and Tourism
- Department of Community, Rural and Gaeltacht Affairs
- The Heritage Service
- Teagasc

##### FAUNA

- Central Fisheries Board
- Department of Arts, Heritage, Gaeltacht and the Islands

- Department of Communication, the Marine and Natural Resources
- The Heritage Service
- Regional Fisheries Board
- Teagasc

##### SOILS (AND GEOLOGY)

- Bord na Móna
- Department of the Tánaiste, Enterprise, Trade and Employment
- Environmental Protection Agency
- Geological Survey of Ireland
- Teagasc

##### WATER

- Bord Iascaigh Mhara
- Department of the Environment and Local Government
- Department of Communications, the Marine and Natural Resources
- Environmental Protection Agency
- Marine Institute
- Regional Fisheries Board
- Harbour Authorities
- Local Authorities

##### AIR

- Department of the Environment, Heritage, and Local Government
- Environmental Protection Agency
- Radiological Protection Unit
- The Meteorological Service
- Local Authorities

##### CLIMATE

- The Meteorological Service

##### THE LANDSCAPE

- Bord Fáilte
- Local Authorities
- The Heritage Service

**MATERIAL ASSETS – INCLUDING THE ARCHITECTURAL AND ARCHAEOLOGICAL HERITAGE AND CULTURAL HERITAGE**

- Bord Gáis
- Bus Éireann
- Department of the Tánaiste, Enterprise, Trade and Employment
- Department of the Environment, Heritage, and Local Government
- Dublin Transportation Office
- Eircom
- ESB
- Iarnród Éireann
- Vodaphone, O2 and other mobile phone operators
- Sustainable Energy Ireland
- National Roads Authority
- RTE
- The Heritage Service
- National Building Agency
- National Museum of Ireland
- The Heritage Council
- Local authorities

**NON-GOVERNMENTAL ORGANISATIONS**

**HUMAN BEINGS**

- Civil Service Association
- Earthwatch (Friends of the Earth Ireland)
- Irish Countrywomen's Association
- Irish Creamery Milk Suppliers Association
- Irish Creamery and Milk Suppliers Association
- Irish Farming Association
- Irish Planning Institute
- Royal Town Planning Institute
- Voice of Irish Concern for the Environment
- Local political groups
- Local residents associations

**FLORA**

- An Taisce
- Botanical Society of the British Isles
- Irish Peatland Conservation Council
- Local Field Clubs
- Owners of private Nature Reserves

**FAUNA**

- An Taisce
- Bat Conservation Organisation
- Birdwatch Ireland
- Dublin Naturalists Field Club
- Irish Peatland Conservation Council
- Irish Whale and Dolphin Group
- Irish Wildlife Trust
- National Association of Regional Game Councils
- Local Anglers Associations
- Local field clubs

**SOILS (AND GEOLOGY)**

- Environmental Sciences Association of Ireland
- Geographical Society of Ireland
- Institute of Geologists of Ireland
- Irish Farmers Association
- The Mining Heritage Trust of Ireland
- Teagasc

**WATER**

- An Taisce
- Coastwatch Europe
- Inland Waterways Association of Ireland
- Institute of Engineers of Ireland
- Institute of Fisheries Management
- Irish Federation of Sea Anglers
- Irish Sea Study Group
- Irish Underwater Council
- Maritime Institute of Ireland
- National Federation of Group Water Schemes
- Salmon Growers Association

- Salmon Research Agency of Ireland
- Sea Angling Association
- Sherkin Island Marine Station
- Fish farming operations
- Local anglers association
- Local fishing groups
- Research institutes

#### AIR

- ENFO
- Irish Wind and Energy Association
- Research Institutes

#### CLIMATE

- Research institutes

#### THE LANDSCAPE

- An Óige
- An Taisce
- Irish Farmers Association
- Irish Landscape Institute
- Irish Mountaineering Club
- Irish Ramblers Club
- Landscape Alliance Ireland
- Macra na Feirme
- Mountaineering Council of Ireland
- Society of Irish Foresters
- Local foresters associations

#### MATERIAL ASSETS – INCLUDING THE ARCHITECTURAL AND ARCHAEOLOGICAL HERITAGE AND CULTURAL HERITAGE

- Business Groups
- Chamber of Commerce
- An Taisce
- Irish Georgian Society
- Royal Irish Academy
- Royal Institute of Architects of Ireland
- Local historical societies

## COMMON PROBLEMS

### INTRODUCTION

This section aims to provide an indication of topics and issues which, either through their treatment or omission, can give rise to problems in an Environmental Impact Statement. These examples are based on commonly observed problems in current practice.

### GENERAL

In practice the most common, general problems with EIS's are the following:

- Inadequate pre-application consultation leading to:
  - insufficient attention to significant issues or concerns;
  - excessive coverage of irrelevant topics or relatively minor issues.

The inclusion of material which is not required under the Regulations, such as detailed descriptions of the applicant, the merits of the application, discussions of compatibility with the provisions of the Development Plan and the need for the development. These topics should be confined to a separate planning application report and should not be included in the Environmental Impact Statement.

Insufficient attention paid to the need to copy and distribute the Environmental Impact Statement to the general public. Expense and difficulty for the competent authority can be minimised by:

- minimising the size of the documentation, for example consider a separate appendix for technical papers;
- the use of standard size pages and drawings, A4, A3 etc.;
- the use of graphics which can be

photocopied. If colour is used, either provide black and white alternatives or ensure that the graphic remains reasonably legible when copied in black and white.

### PROJECT DESCRIPTION

In describing the project itself the most common problems are the following:

- insufficient description of construction methods (including quantity and materials), sequences and phases; lack of detail on the full extent of groundworks such as trenching, excavation, borrow and fill areas; lack of indication of temporary developments such as haul routes, storage and accommodation compounds for contractors or fuel and materials depots;
- incomplete description of secondary and associated developments: off-site, secondary and minor developments;
- failure to specify secondary, occasional or exceptional processes.

### DESCRIPTION OF EXISTING ENVIRONMENT

#### HUMAN BEINGS

This topic can rapidly expand to include many topics (such as property prices, employment creation or commercial competition) outside the scope of an Environmental Impact Statement. Other significant areas such as nuisance or threats to health can often be omitted.

#### FLORA AND FAUNA

Too much description and not enough analysis occurs, frequently obscuring the significance and sensitivity of the site.

#### SOILS (AND GEOLOGY)

The significance of soil and geology as

non-renewable natural resources is seldom described.

■ WATER

Groundwater issues are sometimes overlooked.

■ AIR

The issue of odours are sometimes overlooked, as are dust and particulates during construction.

■ CLIMATE

Microclimate can be overlooked.

■ LANDSCAPE

Descriptions frequently fail to refer to existing designations such as County Development Plans status, listed scenic routes in tourist maps or mentions in guide books. Visibility at different times of year can also be overlooked.

Material Assets -including the architectural and archaeological heritage and cultural heritage  
The value of still unexploited mineral resources is sometimes omitted.

Failure to determine the complete archaeological potential of site, as opposed to visible remains only, is a very common omission.

*Interaction of Factors*

Any consideration of the interaction of issues, topics and impacts is frequently omitted.

■ DESCRIPTION OF IMPACTS

– Impacts are frequently described in

euphemistic language;

- Worst case scenarios (i.e. failure of mitigation) are rarely considered;
- Cumulative and interactive impacts are seldom addressed;
- Impacts of mitigation measures are usually omitted;
- Impacts of exceptional occurrences are rarely considered such as accidents, closure or abandonment.

**DESCRIPTION OF MITIGATION MEASURES**

The most commonly encountered and significant problem in Environmental Impact Statements is the complete or partial omission of any clear, legally enforceable commitment to undertake the mitigation measures proposed in response to a predicted impact.

Back up or fail-safe measures which would effectively mitigate very severe impacts, in the event of the failure of the proposed measure, are very rarely included.

## GLOSSARY OF TERMS

### Alternatives

A description of alternatives - as defined by the Regulations - alternative locations, alternative designs and alternative processes.

### Amelioration

Measures to diminish a negative impact.

### Aquifer

A body of permeable rock that is capable of storing significant quantities of water.

### Aquiclude

A rock with very low permeability, impermeable to groundwater flow, which may act as a boundary to an aquifer.

### Archaeology

The study of past societies of any period through the material remains left by those societies and the evidence of their environment. The material things (objects, monuments, sites, features, deposits) which archaeology uses to study past societies are referred to as 'archaeological heritage'.

### Baseline Survey

A description of the existing environment against which future changes can be measured.

### BAT – Best Available Techniques

Best Available Techniques shall mean the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for

providing in principle the basis for emission limit values designed to prevent and, where that is not practicable, generally to reduce emissions and the impact on the environment as a whole:

- 'techniques' shall include both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned;
- 'available' techniques shall mean those developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside the Member State in question, as long as they are reasonably accessible to the operator;
- 'best' shall mean most effective in achieving a high general level of protection of the environment as a whole.

BAT may be determined in each EU member state with reference to the Bref documents.

### **BATNEEC - Best Available Technology Not Entailing Excessive Costs**

Use of BATNEEC means that a greater degree of control over emissions to land, air and water may be exercised, utilising the best currently available technologies. In the identification of BATNEEC emphasis is placed in pollution prevention techniques including cleaner technologies and waste minimisation. This was required by the EPA as part of Integrated Pollution Control Licence under the EPA ACT 1992. BATNEEC is superseded by BAT.

## **Biotic**

Processes which relate to living organisms.

## **BPEO - Best Practicable Environmental Option**

Takes accounts of the total pollution from a process (including the risk of transfer of pollutants from one medium to another) and the technical possibilities for dealing with it.

## **Bref (See Article 16 of IPPC Directive 96/61/EC)**

These are reference documents developed under the aegis of the European Commission with input from industry, (MS) Regulators and NGO's, at the European IPPC Bureau in Seville. These documents are intended to advance the development of BAT throughout the EU (see <http://www.eippcb.jrc.es>).

## **Competent Authority**

Any authority charged with examining an Environmental Impact Statement with a view to issuing a consent to develop.

## **Commissioning**

The rendering fully operational of a project or process.

## **Decommissioning**

The final closing down, and putting into a state of safety of a development, project or process when it has come to the end of its useful life.

## **"Do nothing" Scenario**

The situation or environment which would exist if no intervention or development were carried out .

## **Ecology**

The study of the relationships between living organisms and between organisms and their environment (especially animal and plant communities), their energy flows and their interactions with their surroundings.

## **Effluent**

Any liquid discharged from a source into the environment.

## **Environmental Impact Assessment - EIA (see sections Legislation, 1.1)**

The process of examining the environmental effects of development - from consideration of environmental aspects at design stage through to preparation of an Environmental Impact Statement, evaluation of the EIS by a competent authority and the subsequent decision as to whether the development should be permitted to proceed, also encompassing public response to that decision.

## **Environmental Impact Statement - EIS**

A statement of the effects, if any, which the proposed development, if carried out, would have on the environment.

## **Emission**

- a) an emission into the atmosphere of a pollutant within the meaning of the Air Pollution Act 1987.
- b) a discharge of polluting matter, sewage effluent or trade effluent within the meaning of the Local Government (Water Pollution) Act 1977 to waters or sewers within the meaning of that Act.
- c) disposal of waste, or

d) noise.

### **EPA (see section EPA)**

The Environmental Protection Agency.

### **Geology**

The science of the earth, including the composition, structure and origin of its rocks.

### **Ground Water**

The water which flows underground through naturally porous parts of the soil or rock.

### **Habitat**

The area in which an organism or group of organisms live.

### **Hydrology**

The science concerned with the occurrence and circulation of water in all its phases and modes, and the relationship of these to man.

### **Impact**

The degree of change in an environment resulting from a development.

### **Impact Anticipation**

Using knowledge of both the development and the receiving environment to predict the likely effects and consequences.

### **Impact Avoidance**

The modification of project decisions (about site location or design for example) having regard to predictions about potentially adverse environmental effects.

### **Infrastructure**

The basic structure, framework or system which supports the operation of a development project for example, installations such as roads and sewers which are necessary to support development projects.

### **Integrated Pollution Control - IPC**

This was a National licensing/enforcement regime for specified activities. It aimed at preventing or resolving pollution problems rather than transferring them from one medium to another. All major emissions to land, air and water were considered simultaneously and not in isolation in order to minimise pollution of the environment as a whole. IPC is superseded by IPPC.

### **Integrated Pollution Prevention and Control – IPPC (see Directive 96/61/EC)**

This is an EU-wide licensing/enforcement regime for specified activities. It aims to prevent, reduce, and as far as possible eliminate pollution by giving priority to intervention at source and ensuring prudent management of natural resources, in compliance with the ‘polluter pays’ principle and the principle of pollution prevention. Emphasis is placed on energy efficiency and residuals management.

### **Land-use**

The activities which take place within a given area of space.

### **Life Cycle**

Refers to the stages in the life of a process or development including construction, operation, existence, extraction, manufacture,



storage, transport, handling, use, disposal and decommissioning.

### **"Likely Effects / Impacts"**

The effects that are proposed to take place - based on an understanding of the interaction of the proposed development and the receiving environment".

### **Methodology**

The specific approach or techniques used to analyse impacts or describe environments.

### **Mitigation**

Measures designed to avoid, reduce, remedy or compensate for impacts.

#### MITIGATION BY REMEDY

- **Impact Avoidance**  
When no change is caused.
- **Impact Reduction**  
Where the significance of adverse impacts is lessened.
- **Impact Remedy**  
When an adverse effect is replaced with a more acceptable effect.

### **Mitigation Measures**

The means by which decisions about a proposed development are modified to avoid, reduce or remedy the adverse environmental effects that are identified.

### **Monitoring**

The repetitive and continued observation, measurement and evaluation of environmental data to follow changes over a period of time, to assess the efficiency of control measures.

### **NGO**

An acronym used to describe Non Governmental Organisations.

### **Paleobiology**

The scientific study of the environments of past geological times, their land forms, climates, flora and fauna.

### **Palaeontology**

The branch of science that deals with extinct and fossil animals and plants.

### **Particulates**

Fine solids or liquid droplets suspended in the air.

### **Pedology**

The scientific study of the formation, characteristics, distribution and use of soils.

### **Pollution**

Any release to the environment which has a subsequent adverse effect on the environment or man.

### **Precautionary Principle**

The theory that the absence of complete information should not preclude precautionary action to mitigate the risk of significant harm to

### **Processes**

The activities which take place within a development.

**Project Promoter**

A term sometimes used to describe persons or organisations proposing to carry out a development.

**Radio Nuclide**

An atom that has an unstable nucleus which spontaneously disintegrates and emits radiation (alpha, beta particles or gamma radiation or both).

**Reasonably Foreseen**

A working assumption about the future that assumes that a project will be developed as planned and used within a receiving environment that will change in accordance with currently evident trends. It will include a consideration of the likelihood and consequences of abnormal occurrences - such as accidents.

**Receptor**

Any element in the environment which is subject to impacts.

**Risk Assessment**

An analytical study of the probabilities and magnitude of harm to human health or the environment associated with a physical or chemical agent, activity or occurrence.

**Scoping**

The process of identifying the significant issues which should be addressed by a particular Environmental Impact Assessment.

**Screening**

The process of assessing the requirement of a project to be subject to Environmental Impact

Assessment based on project type and scale and on the significance or environmental sensitivity of the receiving environment.

**Scrubber**

Device for flue gas cleaning.

**Services**

The conduits, pipes and lines that carry water, phones, electricity, sewage etc.

**Sensitivity**

The potential of a receptor to be significantly changed.

**Significance**

The sensitivity of a receiving environment to change or the consequence of change for the receiving environment.

**Statutory EIS**

A term sometimes used to describe an EIS prepared in accordance with the regulations.

**Statutory Consultees**

Organisations and authorities stipulated by Legislation to be notified by a competent authority if an application is made which might give that organisation a cause for concern.

**Surface Water**

Natural water bodies such as streams, lakes and rivers.

**Sustainable Development**

Defined by the Brundtland Commission 1987 "Development that meets the needs of the

present without comprising the ability of the future generation to meet their own needs".

### **Threshold**

The magnitude of a project which, if exceeded, will trigger the requirement for an Environmental Impact Assessment to be carried out.

### **Vector**

An organism (animal or fungus, for example), which transmits or acts as a carrier of parasites or disease.

## GLOSSARY OF IMPACTS

### Quality of Impacts

#### Positive Impact

A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or removing nuisances or improving amenities).

#### Neutral Impact

A change which does not affect the quality of the environment.

#### Negative Impact

A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

### Significance of Impacts

#### Imperceptible Impact

An impact capable of measurement but without noticeable consequences.

#### Slight Impact

An impact which causes noticeable changes in the character of the environment without affecting its sensitivities.

#### Moderate Impact

An impact that alters the character of the environment in a manner that is consistent with existing and emerging trends.

#### Significant Impact

An impact which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.

#### Profound Impact

An impact which obliterates sensitive characteristics.

### Duration of Impacts

#### Short-term Impact

Impact lasting one to seven years.

#### Medium-term Impact

Impact lasting seven to fifteen years.

#### Long-term Impact

Impact lasting fifteen to sixty years.

#### Permanent Impact

Impact lasting over sixty years.

#### Temporary Impact

Impact lasting for one year or less.

### Types of Impacts

#### Cumulative Impact

The addition of many small impacts to create one larger, more significant, impact.

#### 'Do Nothing Impact'

The environment as it would be in the future should no development of any kind be carried out.

#### Indeterminable Impact

When the full consequences of a change in the environment cannot be described.

#### Irreversible Impact

When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.

#### Residual Impact

The degree of environmental change that will occur after the proposed mitigation measures have taken effect.

#### Synergistic Impact

Where the resultant impact is of greater significance than the sum of its constituents.

**‘Worst case’ Impact**

The impacts arising from a development in the case where mitigation measures substantially fail.