



**The Government of The Gambia**

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# **EIA Guidelines**

**BANJUL, JULY 1999**

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## Preface

The National Environment Management Act of 1994 (NEMA) outlines the general procedures to be followed in the area of Environmental Impact Assessment (EIA) in The Gambia. The National Environment Agency (NEA) is charged with developing specific EIA regulations and procedures in consultation and co-ordination with concerned government departments, private sector entities, and non-governmental organizations. The *Fourth Draft of the Environmental Impact Assessment (EIA) Procedures, May 1996* details the process to be followed in The Gambia when conducting EIA.

The sector guidelines contained in this document serve as a framework for consideration during the scoping phase of the EIA process. These guidelines represent the universe of possible areas for investigation in The Gambia. After the initial screening process, if a project is determined to require a more in-depth analysis of potential environmental impacts, the EIA Working Group will review the project in question, and using these sectoral guidelines as a reference, develop a scope of work for the required Environmental Impact Assessment. The EIA Working Group may include all of the items listed herein, or they may determine that only a few items in the guidelines are necessary for analysis.

As a result of the scoping process, a developer will be informed in writing about the expected scope of the environmental impact study. With this paper in hand, he/she may then look for a consultant or consultants to prepare and elaborate the document, referred to as the Environmental Impact Statement (EIS).

This edition of the EIA Sector Guidelines expands the number of guidelines available: Fisheries and Aquaculture, Solid Waste Management, and Tourism Development Projects have been added to the original set of sectoral guidelines. As the need arises in the future, additional sector guidelines may be prepared for other key areas. In many instances however, it will be noted that specific guidelines do not exist for certain types of projects; in such cases, one of the existing guidelines should prove useful in facilitating the scoping process. In other words, specialised guidelines need not be in existence in order to prepare terms of reference for an environmental impact statement.

This document will be continue to be updated periodically, and it is recommended that you contact the National Environment Agency to ask for the most recent version of this document.

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## Table of Contents

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Sector 1:	Manufacturing and Processing Industries .....	1
Sector 2:	Mining and On-Site Mineral Processing .....	8
Sector 3:	Road Infrastructure.....	14
Sector 4:	Solid Waste Disposal.....	20
Sector 5:	Large Agricultural Projects.....	28
Sector 6:	Fisheries and Aquaculture .....	35
Sector 7:	Tourism Development Projects.....	42

## SECTOR 1: MANUFACTURING AND PROCESSING INDUSTRIES

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### 1. DESCRIPTION OF THE PROJECT

#### 1.1 Purpose and Physical Characteristics of the Proposed Project

- 1.1.1 Name and proposed location of the proposed project (include map in appropriate scale - appropriate scale to be determined on a case-by-case basis depending on the nature and size of development).
- 1.1.2 Project justification (describe the objectives and activities of the proposed project).
- 1.1.3 Number, type and size of buildings including chimney, and waste treatment facilities, laboratory, stores and emergency response facilities.
- 1.1.4 Position of buildings within the identified site (provide a site plan map).
- 1.1.5 Proposed access and transport arrangement.
- 1.1.6 Description of other types of structures, excavations, etc., associated with the project.
- 1.1.7 Project cost and viability (budget projections should include feasibility, engineering, environmental, and other studies).
- 1.1.8 Number of people to be employed.

#### 1.2 Land Use Requirements of the Proposed Project

- 1.2.1 During construction.
- 1.2.2 During regular operations (including land use required for disposing of all wastes).
- 1.2.3 During and after decommissioning.

#### 1.3 Production Process and Plant Description

- 1.3.1 Type(s) of products and expected quantities to be produced.
- 1.3.2 Production capacity of the plant during normal operation.
- 1.3.3 Type, source, and quantities of raw materials, water, energy, and other resources required during production.
- 1.3.4 Type, quantity, composition and strengths of chemical or other residues, fluid discharges and air/smoke emissions.
- 1.3.5 Types of mechanical, chemical or assembly processes to be used during manufacturing.

#### 1.4 Alternative Sites and Processes Considered

Note the main alternative site considered when selecting this project. Also discuss alternative processes which were considered. State reasons for selecting the proposed approach and reasons for rejecting others.

## **2. DESCRIPTION OF THE SITE AND ITS ENVIRONMENT**

### **2.1 Physical Features of the Proposed Site**

- 2.1.1 Human population and settlement patterns (note proximity of proposed site to residential dwellings).
- 2.1.2 Landscape and topography.
- 2.1.3 Water, ie. aquifers, water courses including creeks and bolongs (and discharges), and shoreline which are potentially affected by the proposed project.
- 2.1.4 Agricultural and mechanical properties of the soil on the proposed site.
- 2.1.5 Flora and fauna including habitats and typical species present (accounting for seasonal variation if necessary).
- 2.1.6 Proximity to protected wildlife areas and related buffer zones.
- 2.1.7 Monuments and sites of cultural and historic significance.
- 2.1.8 Type of activities within 500 m vicinity of the project (e.g. agricultural, residential, commercial, industrial, etc.)
- 2.1.9 Any other relevant environmental features.

### **2.2 Legislative and Policy Framework**

- 2.2.1 Information shall be provided in the environmental statement on all relevant statutory designations such as national parks, forest parks, nature reserves, and national monuments that are likely to affect or be affected by the proposed project or that are otherwise sited unreasonably close to the site identified for the proposed project. The statement should also reflect the presence of farms, schools, hospitals, and other nearby institutions.
- 2.2.2 The proposed project and site should be in conformity with national, divisional, district, and local development plans (Provide evidence of conformity).
- 2.2.3 Reference shall be made to all applicable national laws such as the National Environment Management Act of 1994, the Hazardous Chemicals and Pesticides Management Act of 1994, and the Labour and Public Health Acts of 1990.
- 2.2.4 Where applicable, reference should be made to relevant international treaties, conventions, or other agreements to which The Gambia is a Party.

## **3. IDENTIFICATION AND DESCRIPTION OF IMPACTS**

### **3.1 Impact on Human Beings and the Human-Made Environment**

- 3.1.1 Impact on public health (e.g. respiratory ailments, water contamination, noise pollution).
- 3.1.2 Impact of the development on the nearby communities (social and cultural fabric, compulsory acquisition of properties and/or the displacement of nearby communities).
- 3.1.3 Impact of the development on the local economy.
- 3.1.4 Levels, types, and possible effects of smoke and airborne emissions from the proposed development during
  - a) construction,
  - b) normal operations, and
  - c) decommissioning.

- 3.1.5 Quantities, types, levels, and effects of fluid discharges from the proposed development
  - a) during construction,
  - b) during normal operations, and
  - c) after the cessation of operations
- 3.1.6 Quantities, types, composition, and concentration of potentially hazardous substances in solid wastes generated during
  - a) construction,
  - b) normal operations, and
  - c) during decommissioning.
- 3.1.7 Levels of noise and vibrations during
  - a) construction, and
  - b) normal operations.

### **3.2 Impact on the Land**

- 3.2.1 Land Use
  - a) Area and type of land to be affected.
  - b) Impact of the development on surrounding land (arable, pastoral, residential, industrial, recreational, etc).
  - c) Impact on the aesthetic quality of the surrounding land (is the development done in such a way that the appearance of the surrounding area is not negatively affected. Assessment of the aesthetic impact may be facilitated by a photo-montage or artists impression).
  - d) Waste disposal, including possibilities of seepage and soil contamination.
  - e) Possible alternative uses of the land (what would the land be used for if not used for this project?).
- 3.2.2 Physical Changes in the Land
  - a) Impact on the aesthetic quality of the surrounding land (i.e. is the development done in such a way that the appearance of the surrounding area is not negatively affected).
  - b) Impact on the topography of the land.

### **3.3 Impact on Water Resources**

- 3.3.1 Impact of wastes, pollutants, etc. on surface water quality (chemical, biological, thermal, etc).
- 3.3.2 Impact on ground water quality and quantity.
- 3.3.3 Change of the existing hydrological regime
  - a) surface drainage,
  - b) ground water level, and
  - c) flow of underground water.

### **3.4 Impact on Air Quality and Climate**

- 3.4.1 Possible effects of hazardous air emissions including dust and other particulate on public health.
- 3.4.2 Possible effects of air emissions on wildlife (both plants and animals).
- 3.4.3 Possible effects of air emissions on surrounding buildings and infrastructure.
- 3.4.4 Offensive odours.
- 3.4.5 Climatic impacts (stratospheric ozone depletion, global warming, etc).

### 3.5 Impacts on Flora and Fauna

- 3.5.1 Area and types of habitats to be affected: damage to or loss of plant and animal species habitats, both terrestrial and aquatic (special reference should be made to potential impacts on habitats of protected, rare or endangered species; seasonal variations and movement must be considered). Detail the source of the impacts, i.e. air, water, soil pollutions, etc.
- 3.5.2 Impact on nearby nature reserves, forest parks, mangrove swamps, buffer zones, etc.
- 3.5.3 Any other ecological impacts. (Destruction of habitats, i.e. clearing of forest, brush, mangroves, discharges and emissions on vegetation, water quality, etc.)

### 3.6 Other Indirect and Secondary Impacts

- 3.6.1 Impacts of other developments associated with the project including new roads, powerlines, water supply, etc.
- 3.6.2 Relationship between the proposed project and other existing or proposed developments.
- 3.6.3 Encroachment into areas supporting critical habitats or significant biodiversity, rare and/or protected species and destruction of or damage to terrestrial wildlife habitats, migratory routes, biological resources or ecosystems that should be preserved.
- 3.6.4 Alteration of wetlands.
- 3.6.5 Impacts of the interaction of all the direct impacts listed above.

### 3.7 Information Gaps and Remaining Uncertainties

## 4. SIGNIFICANCE OF ENVIRONMENTAL IMPACTS

Based on the information and data provided under Part 3, an analysis is required to determine the significance of potentially negative environmental impacts. For example, if a number of potential impacts are identified in the identification and description stage, the magnitude of those impacts needs to be determined and an analysis conducted to determine the severity of those impacts.

Specific environmental standards, relevant to the Gambian context are in the process of being defined. However, until these standards are defined and accepted, internationally accepted practices and standards will be used. In general, there are two types of indicators of environmental impact significance: environmental standards and environmental priorities. Environmental standards for the industrial sector may include:

- # Ambient and emission standards for water and air quality
- # National and local planning regulations
- # International conventions
- # Occupational Health and Safety Standards

Certain natural resources, though valued by groups or society, are not subject to environmental standards. To determine the significance of environmental impacts, account should be taken of the environmental values held by governments, organisations and the public. Insights into environmental priorities and preferences may be found in:

- # Government policy
- # Regional and international agreements between governments and/or official organisations (i.e. Montreal Protocol on Substances that Deplete the Ozone Layer)

- # Policies of international and national non-governmental organisations
- # Representations at public enquiries

The significance of environmental impacts will also depend upon whether the benefits of a project are judged to outweigh the adverse effects of the impact on a) the sustainability of the project itself, and b) the sustainability of other development activities, eg other industries and the livelihoods of local people.

Since formal standards do not yet exist in The Gambia, the EIA Working Group will define the standards to be applied on a case by case basis during the scoping phase. These cases will then be compiled to establish a set of environmental standards.

## 5. MITIGATION MEASURES

When a developer is required to submit an Environmental Impact Statement to the Agency, it should amongst other things, provide a detailed account of measures that shall be adopted to avoid, reduce or remedy all those *significant adverse impacts* as identified in Part 4. This part of the Environmental Impact Statement shall provide information, *inter alia*, on the following:

### 5.1 Technical and Operational Measures (Appropriate Technology) related to;

- 5.1.1 Waste reduction.
- 5.1.2 Recycling.
- 5.1.3 Pollution control and treatment of air emissions, toxic effluents, and solid wastes.
- 5.1.4 Pollution containment.
- 5.1.5 Others, please specify.

### 5.2 Landscaping Measures

- 5.2.1 Restoration of construction site vegetation.
- 5.2.2 Tree planting.
- 5.2.3 Other erosion/water control measures.

### 5.3 Preservation of Monuments and Sites of Historic Value.

### 5.4 Identification of Applicable and Effective Measures to Prevent Accidents Involving Hazardous Substances.

### 5.5 Information and Training on Worker Safety.

### 5.6 Measures That Shall Be Employed to Adequately Address All the Impacts Identified in Part 4 of the Environmental Impact Statement.

### 5.7 Proposed Mode of Environmental Reporting and In-house Auditing.

## 6. MONITORING AND EVALUATION

The purpose of an environmental monitoring and evaluation programme within the Environmental Impact Statement is to provide assurance that the developer has anticipated and is prepared to monitor the environment during construction and routine operations. Impacts and impact levels predicted during the assessment stage should be monitored such that those impacts stay within the engineering and environmental acceptable limits, as well as any conditions stipulated in the decision to grant

environmental clearance. Monitoring and evaluation provides an early warning of unacceptable environmental conditions, particularly where significant impacts were predicted.

In The Gambia, the industry and manufacturing sector is characterised by a number of small-to medium scale industries. While their size may make it more difficult to monitor, collectively small industries may cause considerable negative environmental impact. Therefore, consideration should be given to monitoring of all types of industries, adjusting the scale of the monitoring and evaluation programme to the relative size and type and processes of industry. Medium- to large-scale industrial projects should have a more define monitoring programme. Such programmes may include:

- 6.1 Gaseous Discharge (continuous air monitoring of the primary pollutants at source and at previously defined air quality receptor locations, eg. residential or agricultural areas).**
- 6.2 Liquid and Solid Waste Discharges**
  - 6.2.1 Surface water monitoring of expected pollutants and water quality parameters important for human health.
  - 6.2.2 Seasonal water quality monitoring.
  - 6.2.3 Ground water monitoring.
  - 6.2.4 Monitoring upstream and downstream from the point of discharge in any receiving water body used by the public or considered environmentally significant.
- 6.3 Biological Monitoring (if biological resources near to the project are predicted to be affected, eg by the discharge of cooling water to an estuary. Use of an indicator species may be used for a rapid assessment. Such an approach requires establishment of a representative species, baseline data, and collection points).**

## SECTOR 2: MINING AND ON-SITE MINERAL PROCESSING

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### 1. DESCRIPTION OF THE PROJECT

#### 1.1 Purpose and Physical Characteristics of the Proposed Project

- 1.1.1 Name, description, and specific location of resource to be mined (including a map in appropriate scale, e.g. 1:10,000).
- 1.1.2 Quantity of known or proven reserves of the resource to be mined in this location.
- 1.1.3 Production capacity at normal operation.
- 1.1.4 Expected operational life of project.
- 1.1.5 Cost and economic viability of project.
- 1.1.6 Proposed access route and transport arrangements.
- 1.1.7 Number of people to be employed.

#### 1.2 Land Use Requirements of the Proposed Project (Area and Depth of Excavation)

- 1.2.1 During construction.
- 1.2.2 During normal operation.
- 1.2.3 For depositing mine spoils.
- 1.2.4 During decommissioning.

#### 1.3 Operational Features of the Proposed Project

- 1.3.1 Proposed mining method; surface/open-cast or deep/underground.
- 1.3.2 Type, source and quantities of water, energy and other materials that will be required:
  - a) During construction,
  - b) During normal operation, and
  - c) For land restoration.
- 1.3.3 Effluent discharges and toxic air emissions by type, quantity, and composition during construction and operation.
- 1.3.4 Chemical residues by type, composition, and strength during construction and operation.
- 1.3.5 Description of earth moving machinery to be utilised.
- 1.3.6 Type and amounts of explosive to be used; be explicit regarding frequency of usage and indicate time of year/month/day.

#### 1.4 Alternative Sites and Processes Considered

Note the main alternative site considered when selecting this project. Also discuss alternative processes which were considered. State reasons for selecting the proposed approach and site and reasons for rejecting others.

### 2. DESCRIPTION OF THE SITE AND ITS ENVIRONMENT

#### 2.1 Physical Features of the Proposed Site

- 2.1.1 Human population and settlement patterns, and the proximity of the proposed development to residential areas.
- 2.1.2 Landscape and topography.

- 2.1.3 Sources of water, i.e. aquifers and water courses, including creeks, bolongs (and discharges), and shoreline.
- 2.1.4 Type and quality of soil, i.e. agricultural and mechanical properties, and mineralogy.
- 2.1.5 Flora and fauna including habitats and typical species present (accounting for seasonal variation if necessary).
- 2.1.6 Monuments and sites of cultural and historic significance.
- 2.1.7 Present land use of the proposed site (include a land use map within a 500 m zone around the proposed site). The presence of farms, schools, hospitals, and other nearby institutions should be reflected.
- 2.1.8 Any other relevant environmental features.

## 2.2 Legislative and Policy Framework

- 2.2.1 Information shall be provided in the environmental statement on all relevant statutory designations such as national parks, forest parks, nature reserves, related buffer zones and national monuments that are likely to affect or to be affected by the proposed project or that are otherwise situated in the vicinity of the site identified for the proposed project.
- 2.2.2 The proposed project and site should be in conformity with national, divisional, district and local development plans.
- 2.2.3 Reference should be made to all applicable national legislation such as the Hazardous Chemicals and Pesticides Management Act of 1994, Part VI of the National Environment Management Act of 1994, the Minerals Act, the Public Health Act of 1990, the Labour Act of 1990, the Wildlife Conservation Act of 1977, and any other relevant laws and guidelines.
- 2.2.4 Where applicable, reference should be made to relevant international treaties, conventions, and/or other agreements to which The Gambia is a Party.

## 3. Identification and Description of the Impacts<sup>1</sup>

- 3.1 Impacts on Human Beings and the Human-Made Environment During Construction and Normal Operations
  - 3.1.1 Impact on public health (e.g. respiratory ailments, water contamination, noise pollution, increased traffic and road accident, etc.).
  - 3.1.2 Impact on the social and cultural fabric (including compulsory acquisition of properties and or the displacement of nearby communities).
  - 3.1.3 Impacts of the development on the local economy.
  - 3.1.4 Impacts of the development on local transportation.
  - 3.1.5 Levels, types, and effects of air emissions including dust from the development.
  - 3.1.6 Quantities, concentrations, types, and effects of effluent discharges from the development.
  - 3.1.7 Type and levels of noise and vibrations.
- 3.2 Impact on the Land
  - 3.2.1 Land Use
    - a) Area and type of agricultural land to be affected;
      - 1) directly through loss of the land.
      - 2) through water erosion, siltation and aeolian deposition.

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<sup>1</sup> **Impacts to include positive and negative, direct and indirect, secondary and cumulative, short-, medium- and long-term, permanent and temporary.**

- b) Impact of the development on surrounding land (arable, pastoral, residential, industrial, recreational (including beaches), etc).
  - c) Waste disposal.
  - d) Other alternate or possible alternative use of the land.
- 3.2.2 Physical Changes in the Land
- a) Impact on the aesthetic quality of the surrounding land (is the development done in such a way that the appearance of the surrounding area is not negatively affected).
  - b) Impact on topography of the land (e.g. stability of the slopes created by excavations/quarry).
- 3.3 Impact on Water Resources
- 3.3.1 Impact of wastes and pollutants on surface water quality (chemical, biological, thermal, etc.).
  - 3.3.2 Impact of water use on the aquifer (in terms of both quality and quantity).
  - 3.3.3 Change of the existing hydrological regime
    - a) surface drainage.
    - b) ground water level.
    - c) flow of underground water.
- 3.4 Impact on Air Quality and Climate
- 3.4.1 Possible effects of hazardous air emissions including dusts and other particulate on public health.
  - 3.4.2 Dusts and other particulates and their impact on the wellbeing of wildlife and vegetation.
  - 3.4.3 Offensive odours.
  - 3.4.4 Climatic impacts (Stratospheric ozone depletion, global warming, etc.).
- 3.5 Impacts on Flora and Fauna
- 3.5.1 Damage to or loss of habitats and plant and animal species, both terrestrial and aquatic (special reference should be made to the potential impacts on habitats of protected, rare or endangered species).
  - 3.5.2 Impact on nearby nature reserves, mangroves, beaches, forest parks, buffer zones, etc.
  - 3.5.3 Any other ecological impacts.
- 3.6 Other Indirect and Secondary Impacts
- 3.6.1 Impact of other developments/consequences associated with the project including new roads, powerlines, water supply, processing industries, etc.
  - 3.6.2 Relationship between the proposed project and other existing or proposed development.
  - 3.6.3 Encroachment into areas supporting critical habitats or significant biodiversity, rare and/or protected species and destruction of or damage to terrestrial wildlife habitats, migratory routes, biological resources or ecosystems that should be preserved.
  - 3.6.4 Impacts of the interaction of all the direct impacts listed above.
- 3.7 Information Gaps and Remaining Uncertainties

#### 4. SIGNIFICANCE OF IMPACTS

Based on the information and data provided under Part 3, an analysis is required to determine the significance of potentially negative environmental impacts. For example, if a number of potential impacts are identified in the identification and description stage, the magnitude of those impacts needs to be determined and an analysis conducted to determine the severity of those impacts.

Since specific environmental standards have not yet been defined in The Gambia, additional analysis is required to determine acceptable levels in the local context. For mining in general, there are four types of indicators of environmental impact significance: environmental standards, environmental values, health and welfare of local people, and conflicts of interest. Environmental standards for the mining sector may include:

- # Ambient and emission standards for water and air quality
- # National and local planning regulations
- # International conventions
- # Occupational Health and Safety Standards

Certain natural resources, though valued by groups or society, are not subject to environmental standards. To determine the significance of environmental impacts, account should be taken of the environmental values held by governments, organizations and the public. Insights into environmental priorities and preferences may be found in:

- # Government policy
- # Regional and international agreements between governments and/or official organizations (i.e. Montreal Protocol on Substances that Deplete the Ozone Layer)
- # Policies of international and national non-governmental organizations
- # Representations at public enquiries

Since formal standards do not yet exist in The Gambia, the EIA Working Group will follow internationally accepted guidelines and practice for standards. Standards for each project will be reviewed on a case-by-case basis during the scoping phase. These cases will then be compiled to establish a set of environmental standards.

#### 5. MITIGATING MEASURES

When a developer is required to submit an environmental statement to the Agency, it should amongst other things, provide a detailed description of measures that shall be adopted to avoid, reduce or remedy all those significant adverse impacts identified by the environmental study. This should include monitoring and evaluation, risk management, and auditing. This part of the Environmental Statement shall provide, inter alia, information on the following:

##### 5.1 Technical and Operational Measures

- 5.1.1 Waste reduction.
- 5.1.2 Pollution control and treatment.
- 5.1.3 Pollution containment.
- 5.1.4 Mine spoil management.
- 5.1.5 Runoff and erosion control.
- 5.1.6 Noise and vibration reduction.
- 5.1.7 Restriction of operations site.

## **5.2 Landscaping and Site Rehabilitation Measures**

- 5.2.1 Site restoration.
- 5.2.2 Re-vegetation and tree planting.

## **5.3 Preservation of Monuments and Sites of Cultural and Historic Significance.**

## **5.4 Identification of Applicable and Effective Measures to Prevent and/or Manage Accidents Involving Hazardous Chemicals.**

## **5.5 Information and Training on Occupational Health and Worker Safety.**

## **5.6 Measures That Shall be Employed to Adequately Address All the Impacts Identified in Part 4 of the Environmental Statement.**

## **5.7 Proposed Mode of Environmental Reporting and In-house Auditing.**

## **5.8 Restoration Plans.**

## **6. MONITORING AND EVALUATION**

The purpose of an environmental monitoring and evaluation programme is to provide assurance that the predicted impacts from a project are within the engineering and environmental acceptable limits and provides early warning of unacceptable environmental conditions, particularly where significant impacts were predicted.

Monitoring may be carried out with regard to:

- 6.1 Restoration of land surface (drainage, slope, stability, land shaping for subsequent use).
- 6.2 Revegetation (based on plan and objectives of restoration, specify the cover, type, vigour).
- 6.3 Ground water (recovery, quality).
- 6.4 Surface water quality (baseline is necessary in order to monitor changes).
- 6.5 Water bodies (monitor for increased turbidity, suspended solids, siltation, etc., which may adversely affect aquatic biota, birdlife, fish breeding grounds, etc.)

## SECTOR 3: ROAD INFRASTRUCTURE <sup>2</sup>

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### 1. DESCRIPTION OF THE PROJECT

#### 1.1 Purpose, Physical and Technical Characteristics of the Proposed Project

- 1.1.1 Name and justification for the proposed road.
- 1.1.2 Exact location of proposed road, including a map in an appropriate scale.
- 1.1.3 Characteristics of expected traffic (quantity, quality, and speed).
- 1.1.4 Type of road (dual carriage, main road, feeder road or upgrading of an existing road, typical cross sections, etc.).
- 1.1.5 Alignment and length of the road.
- 1.1.6 Pavement, substrate, and surfacing materials.
- 1.1.7 Type of associated drainage and design.
- 1.1.8 Alternative road access and transport arrangements during construction.
- 1.1.9 Project cost.
- 1.1.10 Number of people to be employed.

#### 1.2 Land Use Requirements of the Proposed Project (Area and Depth)

- 1.2.1 For construction including displaced and dissected properties.
- 1.2.2 During construction including work camps and storage depots (provide map highlighting specific locations of anticipated sites).
- 1.2.3 For obtaining construction materials and for depositing excavated top soil (soil and surplus materials. Include a location map to indicate site where materials will be derived from and/or deposits will be deposited outside of the development site).

#### 1.3 Features of the Proposed Project

- 1.3.1 Type, source, and quantities of raw materials, water, energy and other resources that will be required for construction and maintenance.
- 1.3.2 Description of earth moving machinery to be utilised.
- 1.3.3 Velocity of seasonal rain run-off during construction and normal operation (e.g. speed, quantity, etc.).

#### 1.4 Main Alternatives Considered

Discuss the main alternative route site(s) and borrow areas considered when selecting this project. State reasons for selecting the proposed location and reasons for rejecting others.

### 2. DESCRIPTION OF THE ROUTE AND ITS ENVIRONMENT

#### 2.1 Physical Features of the Proposed Site

- 2.1.1 Human population and settlement patterns, and proximity to the site.
- 2.1.2 Landscape and topography.

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<sup>2</sup> Ultimately, the infrastructure sector guidelines will cover roads, buildings, water supply, pipelines, airports, seaports and electricity. At this point, priority has been given to establishing guidelines for road infrastructure.

- 2.1.3 Water sources and patterns, i.e. aquifers, water courses including creeks, bolongs (and discharges), and shoreline, affected by or affecting the site.
- 2.1.4 Soil type and quality, i.e. agricultural and mechanical properties.
- 2.1.5 Flora and fauna including habitats and typical species (may be necessary to consider seasonal variations in migration and breeding).
- 2.1.6 Monuments and sites of cultural and historic significance.
- 2.1.7 Present land use (e.g. agricultural, residential, and recreational).
- 2.1.8 Buffer zones, wildlife corridors and alternative access for wildlife (e.g. culverts under the road to link areas of high ecological value for mammals) should be noted as well as the presence of farms, schools, hospitals, and other nearby institutions.
- 2.1.8 Any other relevant environmental features (e.g. rainfall).

## 2.2 Legislative and Policy Framework

- 2.2.1 Information shall be provided in the environmental statement on all relevant statutory designations such as national parks, forest parks, nature reserves, and national monuments that are likely to affect or to be affected by the proposed project or that are otherwise located in the vicinity of the site identified for the proposed project.
- 2.2.2 The proposed project and site should be in conformity with national, divisional, district, and local development plans.
- 2.2.3 Where applicable, relevant international treaties conventions, or other agreements The Gambia is a Party to should be noted.

## 3. IDENTIFICATION AND DESCRIPTION OF THE IMPACTS<sup>3</sup>

### 3.1 Impacts on Human Beings and the Human-Made Environment

- 3.1.1 Impact on public health and safety.
  - a) creation of noise and dust.
  - b) road spills of hazardous materials (diesel, oil, chemicals, pesticides, etc.)
  - c) increased road accidents involving pedestrians and cyclists.
  - d) creation of breeding grounds for disease vectors in stagnant water bodies (e.g. borrow pits or quarries).
- 3.1.2 Impact on social and cultural fabric of the community.
- 3.1.3 Impact of the development on the local economy including access to schools, medical centres, employment areas, etc.
- 3.1.4 Impact of the road on recreational, tourist, and monuments and cultural sites.
- 3.1.5 Impact of migrant construction workers on the social and cultural fabric of the societies affected by the project.
- 3.1.6 Types, size, location and actual vegetation of borrow pits.
- 3.1.7 Type and levels of noise and vibrations during construction.
- 3.1.8 Levels of dust during construction.
- 3.1.9 Information on possible waste or residues from abandoned construction equipment and spare parts, replaced structures (material or replaced bridges, culverts, pipes, etc.).

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<sup>3</sup> Impacts to include positive and negative, direct and indirect, secondary and cumulative, short-, medium- and long-term, permanent and temporary.

- 3.2 Impact on the Land
  - 3.2.1 Land Use
    - a) Area and type of land that will be affected (commercial, residential, agricultural, forest, recreational, etc.)
    - b) Impact on the value of surrounding properties and land (particularly relevant if an increase in land value induces secondary, and potentially uncontrolled development with disadvantageous effects on the landscape or environment. Likewise, surrounding land could lose its value due to the road and thereby impact the economic and residential activities of the area).
  - 3.2.2 Changes in Land Use
    - a) Impact on the aesthetic quality of the surrounding land (is the development done in such a way that the appearance of the surrounding area is not negatively affected).
    - b) Impact on the topography of the land.
- 3.3 Impact on Water Resources
  - 3.3.1 Impact of water use on local aquifer and surface water bodies during construction.
  - 3.3.2 Impairment of drinking water supply (ground water and surface water) through contamination by oil, grease, and fuel spills or silt, both during construction and operation.
  - 3.3.3 Impairment of fisheries/fishing grounds (total or partial loss or disruption of habitats, breeding grounds, and/or migratory routes of fish).
  - 3.3.4 Erosion and siltation of rivers, especially by exposure of bare ground to the rain (e.g. borrow sites, areas of major earthworks especially in rolling terrain).
  - 3.3.5 Alteration or disruption of the natural hydrologic flow regime of local rivers.
- 3.4 Impact on Air Quality and Climate
  - 3.4.1 Possible effects of hazardous air emissions including dust and other particulate on public health.
  - 3.4.2 Possible effects of air emissions on wildlife (both plants and animals).
  - 3.4.3 Possible effects of air emissions on surrounding buildings and infrastructure.
  - 3.4.4 Offensive odours.
- 3.5 Impact on Flora and Fauna
  - 3.5.1 Encroachment into areas supporting critical habitats or significant biodiversity, rare and/or protected species and destruction of or damage to terrestrial wildlife habitats, migratory routes, biological resources or ecosystems that should be preserved.
  - 3.5.2 Impact on nearby nature reserves, forest parks, mangroves, beaches, etc. (Damage through alteration of the hydrological regime, dissection of habitat, in-filling of Water bodies, increased human activity and disturbance, the impact on fisheries, breeding grounds, and migratory routes should be addressed here.)
  - 3.5.3 Any other ecological impacts, including alteration of wetlands (e.g. by causeways).
- 3.6 Other Indirect and Secondary Impacts
  - 3.6.1 Impact of other developments/consequences associated with the project including pavements, drains, culverts, bridges, etc.
  - 3.6.2 Relationship between the proposed project and other existing or proposed development.

3.6.3 Impacts of the interaction of all the direct impacts listed above.

3.7 Information Gaps and Remaining Uncertainties

#### 4. SIGNIFICANCE OF IMPACTS

Based on the information and data provided under Part 3, an analysis is required to determine the significance of potentially negative environmental impacts. For example, if a number of potential impacts are identified in the identification and description stage, the magnitude of those impacts needs to be determined and an analysis conducted to determine the severity of those impacts.

Whether environmental impacts from a road project are likely to be significant, and therefore warrant mitigation or prevention, will be a reflection of both professional assessors (eg ecologist, hydrologist, land use planner, anthropologist) in judging the benefits of the proposed development. For example, when assessing the significance of potential impacts in selecting a particular road, regard will need to be given to the trade-off between expected socio-economic benefits of the project for local populations and any potentially adverse effects on biodiversity, wildlife habitat, hydrology, water quality and human health.

An environmental assessor may determine the significance of environmental impacts through:

- # Ensuring conformity to environment/development controls such as environmental standards (eg for air quality and vehicle emissions).
- # Recognition of protected areas, national transport plans/strategies and land use development plans.
- # Taking into account political and non-governmental environmental protection agendas.
- # Consulting with those populations potentially affected by the road.

Since formal standards do not yet exist in The Gambia, the EIA Working Group will define the standards to be applied on a case by case basis during the scoping phase. These cases will then be compiled to establish a set of environmental standards.

#### 5. MITIGATING MEASURES

When a developer is required to submit an environmental statement to the Agency, it should amongst other things, provide a detailed description of measures that shall be adopted to avoid, reduce or remedy all those significant adverse impacts identified by the environmental study. This should include monitoring and evaluation, risk management, and auditing. This part of the Environmental Statement shall provide, *inter alia*, information on the following:

##### 5.1 Technical and Operational Measures

- 5.1.1 Providing adequate and suitable drainage.
- 5.1.2 Alternative borrow areas and construction materials.
- 5.1.3 Route readjustments to avoid sensitive and/or protected areas/sites.
- 5.1.4 Minimise runoff, siltation, and erosion (from both water and wind).

**5.2 Ecological and Public Health Measures**

- 5.2.1 Landscaping including re-vegetation of exposed areas and tree planting (construction sites and borrow areas).
- 5.2.2 Eliminating depressions that serve as breeding areas of mosquitoes and the like. Depressions resulting from construction may however be beneficial to wildlife, especially birds and flora, if public health issues are properly addressed (i.e. the use of killifish for mosquito control).

**5.3 Preservation of Monuments and Sites of Cultural and Historic Significance**

**5.4 Make Provisions for the Collection of Waste and the Removal of Construction Material or Abandoned Construction Equipment**

**5.5 Measures That Shall Be Employed to Adequately Address All the Impacts Identified in Part 4 of the Environmental Statement**

**6. MONITORING AND EVALUATION**

The purpose of an environmental monitoring and evaluation programme is to provide assurance that the predicted impacts from a project are within the engineering and environmental acceptable limits and provides early warning of unacceptable environmental conditions, particularly where significant impacts were predicted. Monitoring may be carried out with regard to:

- 6.1 Stabilisation of land surface (drainage, slope, minimising erosion)
- 6.2 Re-vegetation to minimise erosion (cover, type, vigour; use of indigenous species is encouraged)
- 6.3 Air pollution emissions

**1. DESCRIPTION OF THE PROJECT**

**1.1 Purpose, Physical and Technical Characteristics of the Proposed Project**

- 1.1.1 Name of and justification for the proposed waste disposal project.
- 1.1.2 Exact location of proposed project, including a map in an appropriate scale.
- 1.1.3 Characteristics of waste to be managed/disposed of at the site (specify type of waste as municipal, industrial, and/or commercial. Further specify whether wastes are putrescible organic matter, e.g. kitchen and market wastes, faecal matter; combustible organic matter, e.g. paper, textile, bone; metals, glass, oil and grease, inert e.g. soil and ash; pathogenic micro-organisms, e.g. bacteria, parasites; non-hazardous, clinical or hazardous industrial waste, construction materials, and/or mining, and agricultural wastes, including empty pesticide containers and applicators.
- 1.1.4 Type of waste management project (specify exact nature of the activity, e.g. conservation, landfill, incineration, or ocean disposal).
- 1.1.5 Detail site selection process used to locate the proposed site.
- 1.1.6 Describe waste collection and transportation methods.
- 1.1.7 Describe treatment and disposal methods (e.g. chemical, biological, physical treatment).
- 1.1.8 Describe infrastructure requirements such as buildings, plants, access roads, drainage ditches, land fill cells, incinerators, worker accommodation, etc.
- 1.1.9 Project cost.
- 1.1.10 Number of people to be employed (skilled and unskilled).

**1.2 Land Use Requirements of the Proposed Project**

- 1.2.1 During construction of a waste management facility or location of a landfill displaced properties resulting from construction and/or associated infrastructure.
- 1.2.2 During construction, including work camps and material storage depots (provide map highlighting specific locations of anticipated sites).
- 1.2.3 For obtaining construction materials and depositing excavated topsoil (soil and surplus materials. Include a location map to indicate site where materials will be derive from and/or deposits will be deposited outside of the development site).

**1.3 Features of the Proposed Project**

- 1.3.1 Type, source, and quantities of raw materials (water, energy and other resources) that will be required for construction and maintenance.
- 1.3.2 Description of earth works development, and earth moving machinery to be used.
- 1.3.3 Description of treatment and disposal processes to be used (e.g. chemical oxidation,

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<sup>4</sup> Waste management projects will depend upon the types and quantities of wastes requiring disposal. Types of projects primarily fall into the following categories: conservation systems (including recycling, resource recovery, composting and source reductions); landfill and other treatment with gas recovery and leachate control (including sanitary landfill, landfill with gas recovery and use, landfill with separate disposal zones, anaerobic digestion, gasification, pyrolysis, etc.); incineration with air pollution control (including mass burn with energy recovery, refuse derived fuel production, separate incineration for medical wastes and incineration at sea for hazardous wastes); and, ocean disposal (including dumping of treated or untreated wastes from vessels).

- stabilisation/solidification, solvent extraction, sludge processing, incineration, landfill, etc.)
- 1.3.4 In case of landfill, note procedures for separation of wastes and specialised storage facilities (i.e. cement lined pits for hazardous materials)

#### **1.4 Main Alternatives Considered**

Discuss the main alternative site(s) and processes considered when selecting this project. State reasons for selecting the proposed project and reasons for rejecting alternatives.

### **2. DESCRIPTION OF THE PROJECT AND ITS ENVIRONMENT**

#### **2.1 Physical Features of the Proposed Site**

- 2.1.1 Human population and settlement patterns, and proximity to the project site.
- 2.1.2 Landscape and topography (note natural and man-made features such as a water catchment or abandoned quarry).
- 2.1.3 Water sources and patterns, i.e. aquifers, water courses including creeks, bolongs (and discharges), and shoreline, affected by or affecting the site.
- 2.1.4 Soil type and quality, i.e. mechanical properties including porosity, ion change capacity, and ability to absorb and precipitate dissolved solids.
- 2.1.5 Flora and fauna including habitats and typical species (may be necessary to consider seasonal variations in migration and breeding). Note whether the surrounding environment is already degraded.
- 2.1.6 Monuments and sites of cultural and historic significance.
- 2.1.7 Present land use (e.g. agricultural, residential, and industrial, recreational).
- 2.1.8 Proximity to tourism development areas.
- 2.1.9 Proximity to buffer zones, wildlife corridors and alternative access for wildlife should be noted, in addition to the presence of farms, schools, hospitals, airports, industrial estate, and other nearby institutions.
- 2.1.9 Any other relevant environmental features (e.g. rainfall).

#### **2.2 Legislative and Policy Framework**

- 2.2.1 Information shall be provided in the Environmental Impact Statement on all relevant statutory designations such as national parks, forest parks, nature reserves, and national monuments that are likely to affect or to be affected by the proposed project or that are otherwise located in the vicinity of the site identified for the proposed project.
- 2.2.2 The proposed project and site should be in conformity with national, divisional, district, and local development plans.
- 2.2.3 Where applicable, relevant international treaties, conventions, or other agreements The Gambia is a Party to should be noted (e.g. Basel and Bamako Conventions on the Trans-boundary Shipment of Hazardous Wastes, etc.)

### **3. IDENTIFICATION AND DESCRIPTION OF THE IMPACTS<sup>5</sup>**

- 3.1 Impacts on Human Beings and the Human-Made Environment

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<sup>5</sup> Impacts to include positive and negative, direct and indirect, secondary and cumulative, short-, medium- and long-term, permanent and temporary.

- 3.1.1 Positive impact on public health and safety.
  - a) Improved public health and living conditions
  - b) Employment and job creation
  - c)
- 3.1.2 Negative impact on public health and safety.
  - a) Creation of noise (describe type, level/frequency and source).
  - b) Creation of dust, smoke, gases and odours (describe type and source).
  - c) Spills of hazardous materials outside designated locations (diesel, oil, chemicals, pesticides, etc.)
  - d) Spread of disease and chemical contaminants by animals (dogs, cats, rats, etc.) as a result of uncontrolled and open landfills.
  - e) Consequences of climatically induced rapid decomposition of waste (e.g. insect infestation, odour nuisance, spontaneous ignition, etc.).
  - f) Worker safety at the waste collection/disposal/processing sites (e.g. access to appropriate equipment -- gloves, boots, uniforms, and changing/washing facilities, training, etc.).
  - g) Risk of fire or explosion due to build up of combustible gases (methane, etc.).
  - h) Contamination of drinking water supply.
- 3.1.2 Impact on social and cultural fabric of the community.
- 3.1.3 Impact of the project on the local economy including security of livelihoods, access to schools, medical centres, employment areas, etc.
- 3.1.4 In cases of recycling operations, impact on informal income generating activities associated with recovery of secondary materials by the local community (i.e. plastics, glass bottles, metal, etc.).
- 3.1.5 Impact of the waste management project on recreational areas, tourism, monuments and cultural sites.
- 3.1.6 Impact of migrant construction workers on the social and cultural fabric of the society.
- 3.1.7 Impact of the introduction and/or expansion of squatter settlements into the area.
- 3.1.8 Impact on land values adjacent to or in the immediate vicinity of the site.
- 3.2 Impact on the Land
  - 3.2.1 Land Use
    - a) Area and type of land that will be affected (commercial, residential, tourism, agricultural, forest, recreational, etc.)
    - b) Impact on the value of surrounding properties and land (placement of a waste site or treatment facility may reduce the land values in the area, and thereby impact the economic and residential activities of the area).
  - 3.2.2 Changes in Land Use
    - a) Impact on the aesthetic quality of the surrounding land (is the waste management site developed in such a way that the appearance of the surrounding area is not negatively affected).
    - b) Impact on the topography of the land.
  - 3.2.3 Changes in Soil Quality/Structure
    - a) Soil erosion due to earth movement, rain action on exposed surfaces, and increased runoff due to surface compaction.
    - b) Land slipping and land slides due to poor embankment grading

- c) Contamination of soil due to improperly managed solid waste, including contamination by pathogenic microorganisms, heavy metals, salts, and organic chemicals contained in leachate.
  - d) Sterilisation of soil due to poor operational and restoration practices.
- 3.2.4 Impact on aesthetic qualities of surrounding areas caused by windblown litter and clandestine dumping in open areas and along access roads.
- 3.3 Impact on Water Resources
  - 3.3.1 During construction, impact on local watercourses (increased runoff, re-routing of watercourses which carry dislodged and eroded soil can lead to alterations in aquatic ecosystems).
  - 3.3.2 During construction and facility operations, impact of water use on local aquifer and surface water bodies.
  - 3.3.3 Impairment of drinking water supply (ground water and/or surface water) through contamination by leachate or release of fuel, grease and oil from heavy machinery used during construction.
  - 3.3.4 Erosion and siltation of rivers, especially by exposure of bare ground to the rain (e.g. quarries, land fill sites).
  - 3.3.5 Alteration or disruption of the natural hydrologic flow regime of local rivers.
  - 3.3.6 Impact on marine water quality from marine disposal including marine life, bathing areas, and other uses of the sea (e.g. if waste is diluted and dispersed, potential harm is reduced; unassimilated wastes such as certain metals and persistent toxic substances may accumulate in the ocean, posing risks to marine life).
- 3.4 Impact on Air Quality
  - 3.4.1 Possible effects of hazardous air emissions including dust and other particulate on public health (both in cases of landfill, incineration, and some recycling processes).
  - 3.4.2 Possible effects of air emissions on wildlife (both plants and animals).
  - 3.4.3 Possible effects of air emissions on surrounding buildings and infrastructure.
  - 3.4.4 Offensive odours.
- 3.5 Impact on Flora and Fauna
  - 3.5.1 Encroachment into areas supporting critical habitats or significant biodiversity, rare and/or protected species and destruction of or damage to terrestrial wildlife habitats, migratory routes, biological resources or ecosystems that should be preserved.
  - 3.5.2 Impact on nearby nature reserves, forest parks, mangroves, beaches, etc. (Damage through alteration of the hydrological regime, dissection of habitat, in-filling of water bodies, increased human activity and disturbance, the impact on fisheries, breeding grounds, and migratory routes should be addressed here.)
  - 3.5.3 Loss of deep rooted vegetation from toxic landfill gas and/or direct poisoning of flora and fauna from toxic wastes.
  - 3.5.4 Loss to agricultural production by toxic effects on crops/produce/livestock from contaminated soil (e.g. compost or sludge application).
  - 3.5.5 Any other ecological impacts, including alteration of wetlands.
- 3.6 Other Indirect and Secondary Impacts

- 3.6.1 Impact of other developments/consequences associated with the project including pavements, drains, culverts, bridges, etc.
  - 3.6.2 Relationship between the proposed project and other existing or proposed development.
  - 3.6.3 Impacts of the interaction of all the direct impacts listed above.
- 3.7 Information Gaps and Remaining Uncertainties

#### 4. SIGNIFICANCE OF IMPACTS

Based on the information and data provided under Part 3, an analysis is required to determine the significance of potentially negative environmental impacts. For example, if a number of potential impacts are identified in the identification and description stage, the magnitude of those impacts needs to be determined and an analysis conducted to determine the severity of those impacts. The significance of impacts must be viewed at the local, divisional, and national level and where necessary at the international level as well.

Environmental standards for waste disposal management projects can be divided into water quality standards, gaseous emissions and air quality standards, planning regulations, and international conventions.

- # Water quality standards. The significance of potential impacts from waste management projects on surface and ground water supplies can be measured against national water supply quality standards. In the absence of national standards, the World Health Organisation provides common water quality standards.
- # Gaseous emissions and air quality standards. National emission and air quality guidelines or standards should be referred to as a point of first priority, particularly in the case of incineration facilities. Where national standards do not exist, international guidelines may be used.
- # National and local planning regulations. Refer to protected areas such as national parks, wildlife preserves and nature reserves. Specific legislation governing environmental land management practices for solid waste treatment and disposal may also exist.
- # National legislation and international conventions/agreements which may have a bearing on siting or operation of a waste management project, including World Heritage, RAMSAR, and London Ocean Dumping Convention.

Certain natural resources, though valued by groups or society, are not subject to environmental standards. To determine the significance of environmental impacts, account should be taken of the environmental values held by governments, organisations and the public. Insights into environmental priorities and preferences may be found in:

- # Government policy
- # Regional and international agreements between governments and/or official organisations
- # Policies of international and national non-governmental organisations
- # Representations at public enquiries
- # Input from local communities regarding their priorities for public health issues, revered areas and flora and fauna, water supply issues and issues of sustainable income generation and employment.

The significance of environmental impacts will also depend upon whether the benefits of a project are judged to outweigh the cumulative adverse effects on other development activities. Since formal standards do not yet exist in The Gambia, the EIA Working Group will work closely with the Environmental Quality Working Group to identify guidelines to be applied on a case-by-case basis during the scoping phase. These cases will ultimately be compiled to establish relevant environmental standards.

## **5. MITIGATING MEASURES**

When a developer is required to submit an Environmental Impact Statement to the Agency, it should amongst other things, provide a detailed description of measures that shall be adopted to avoid, reduce or remedy all those significant adverse impacts identified by the environmental study. This should include monitoring and evaluation, risk management, and auditing. This part of the Environmental Impact Statement shall provide, *inter alia*, information on the following:

### **5.1 Site Selection**

Screening and appraisal of a number of proposed locations for landfills and/or specifications for waste management facilities should be conducted, involving a wide range of institutions to ensure appropriate location of the proposed project. The siting exercise should include data collection on social factors (land and resource use patterns, local economy, class and economic structure, local administration or power structures) in addition to physiological parameters such as climate, soil, geology, topography, hydrology, and biology/ecology. Existing siting criteria for landfills and incinerators should be followed.

### **5.2 Technical and Operational Measures**

- 5.2.1 Developer to provide contractually-binding terms for the contractor to ensure mitigating measures are implemented as specified.
- 5.2.2 If handling hazardous chemicals during construction of a waste site facility, a combination of procedures to reduce risk should be observed, including proper-handling procedures, construction of bunds and containment areas, and preparation of contingency plans.
- 5.2.3 Avoid major earthen works during the rainy season to minimise soil erosion.
- 5.2.4 Resurface and re-vegetate affected areas (reduce slope to reduce erosion).
- 5.2.5 Construction of sedimentation basins and dikes to hold runoff and allow the settling out of particles.
- 5.2.6
- 5.2.6 If landfill site is located in an area where the soil is permeable and/or the waste is highly polluting, facility design could include placement and compaction of relatively impermeable clay soils or the use of alternative linings between the base of the landfill and the first layer of waste.
- 5.2.7 Leachate management.
- 5.2.8 If incineration is to be used, adequate emission control must be ensured.

### **5.3 Ecological and Public Health Measures**

- 5.3.1 Landscaping and tree planting, including re-vegetation of exposed areas (construction sites and areas surrounding landfill sites.)
- 5.3.2 Eliminating depressions that serve as breeding areas of mosquitoes and the like.
- 5.3.3 Types of waste should be categorised and suitable disposal options developed for each type of

waste. If hazardous wastes such as acids, toxic chemicals or clinical materials are to be handled at the site, separate disposal zones/treatment processes should be established to minimise environmental impact.

- 5.3.4 Regulate transport of toxic and other hazardous materials.
- 5.3.5 Use containers during collection, transfer, and unloading to minimise dust generation; paved access roads and/or spraying of dirt roads also reduces dust.
- 5.3.6 Daily covering of incoming refuse with soil to reduce litter and odours.
- 3.3.7 Preparation of disaster preparedness plans to ensure appropriate response in case of an emergency, such as explosion or fires caused by build up of methane gases in a landfill, or poisoning of the water supply caused by toxic or hazardous wastes.

**5.4 Preservation of Monuments and Sites of Cultural and Historic Significance (identified during site selection process)**

**5.5 Make Provisions for the Source Reduction of Waste to Minimise the Quantities of Waste that Need to be Disposed of (e.g. programmes relating to recycling, and resource recovery, both at the source site and the disposal site).**

**5.6 Effective education efforts and enforcement of waste disposal regulations and practices are implemented for both waste management staff and the general public.**

**5.7 Measures That Shall Be Employed to Adequately Address All the Impacts Identified in Part 4 of the Environmental Impact Statement**

**6. MONITORING AND EVALUATION**

The purpose of an environmental monitoring and evaluation programme is to provide assurance that the predicted impacts from a project are within the engineering and environmental acceptable limits and provides early warning of unacceptable environmental conditions, particularly where significant impacts were predicted. Monitoring may be carried out with regard to:

- 6.1 Stabilisation of land surface (drainage, slope, minimising erosion)
- 6.2 Re-vegetation to minimise erosion (cover, type, vigour; use of indigenous species is encouraged)
- 6.3 Air pollution emissions
- 6.4 Water pollution levels (both within the landfill site and surrounding area, particularly wells)
- 6.5 Soil contamination
- 6.6 Training of site labourers in proper refuse handling and disposal techniques.
- 6.7 Provision of equipment (appropriate equipment is available for proper waste management)

## SECTOR 5: LARGE AGRICULTURAL PROJECTS<sup>6</sup>

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### 1. DESCRIPTION OF THE PROJECT

#### 1.1 Purpose and Physical Characteristics of the Proposed Project

- 1.1.1 Provide a description of the exact location of project, including a map in the appropriate scale.
- 1.1.2 Project justification (describe the project activities and agricultural practices to be implemented).
- 1.1.3 Crop varieties and breeds of livestock that will be cultivated and or reared respectively.
- 1.1.4 Expected output.
- 1.1.5 Project cost and viability.
- 1.1.6 Proposed access and transportation arrangements.
- 1.1.7 Number of people to be employed.

#### 1.2 Land Use Requirements of the Proposed Project (including Area and Depth of Canals/Dikes, Ditches, Causeways, Grazing Lands, Processing Plants, etc.)

- 1.2.1 During land preparation.
- 1.2.2 When operational.

#### 1.3 Operational Features of the Proposed Project

- 1.3.1 Description of methods to be employed when preparing the land (i.e. clearing forested land, preparing fallowed land, reclaiming swamplands).
- 1.3.2 Source and quantities of water, energy, and other resources that will be required.
- 1.3.3 Means of transferring irrigation water from source (e.g. from a belong) to a field.
- 1.3.4 Type and quantities of fertilisers, pesticides, and/or herbicides that will be used when preparing the land and when the project is at normal operations.
- 1.3.5 Time of year when fertiliser will be applied.
- 1.3.6 Time of year when pesticide(s) and herbicide(s) will be applied.
- 1.3.7 Type, quantity, and composition of chemical discharges resulting from run-off.
- 1.3.8 Type, quantity, and strength of residues accumulating in the soil after application of chemicals.
- 1.3.9 Procedure for disposing of empty containers, sprayers and other implements which contain chemical residues.
- 1.3.10 In the event that processing of agricultural products is a part of the project, provide details of the process(es) to be used and the source of energy to be used to run the plant/processing (eg diesel/petrol, wood/charcoal, electricity, solar).
- 1.3.11 Describe method of disposing of agricultural by-products or wastes.

#### 1.4 Alternative Sites and Processes Considered

Note the main alternative site(s) and processes considered when selecting this project. State reasons for selecting the proposed project and reasons for rejecting others.

### 2. DESCRIPTION OF THE SITE AND ITS ENVIRONMENT

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<sup>6</sup> Large scale agricultural projects are defined as projects which affect more than 10 hectares of land and focus on agricultural, agroforestry, and/or livestock production. Projects may have associated semi-industrial facilities and processes such as a dairy or food processing (freezing, canning, packaging, drying, smoking, tanning, slaughter, etc).

## **2.1 Physical and Climatic Features of the Proposed Site**

- 2.1.1 Human population and settlement patterns, and proximity of the proposed site to the community dwellings.
- 2.1.2 Landscape and topography.
- 2.1.3 Sources of water, i.e. aquifers, water courses including creeks, bolongs and discharges.
- 2.1.4 Geologic properties, including soil type and quality i.e. agricultural and mechanical properties.
- 2.1.5 Flora and fauna including habitats and typical species present (with specific reference to the value of the site, its importance as part of a divisional or national complex, such as wetlands, seasonal use by migratory birds, fish breeding grounds, etc.).
- 2.1.6 Monuments and sites of cultural and historic significance.
- 2.1.7 Present land use (mapping a 500 m zone around the proposed site, indicate e.g. the presence or absence of pastoral land or communities, forested area, etc.).
- 2.1.8 Climatic characteristics (e.g. annual rainfall, direction of wind).
- 2.1.9 Hydrological characteristics of the site (impact on the hydrology of the site; assessed for alteration of the water table, changes in the salinity regime, etc.).
- 2.1.10 Any other relevant environmental features.

## **2.2 Legislative and Policy Framework**

- 2.2.1 Information shall be provided in the environmental statement on all relevant statutory designations such as national parks, nature reserves, forest parks, park buffer zones, wildlife corridors, and national monuments that are likely to be affected by the proposed project or that are otherwise sited unreasonably close to the site identified for the proposed project.
- 2.2.2 The proposed project and site should be in conformity with national, divisional, district, and local development plans.
- 2.2.3 Where appropriate, reference should be made to such national laws as the Hazardous Chemicals and Pesticides Management Act of 1994, the Water Act, the Public Health Act of 1994, the Wildlife Conservation Act of 1977, the Forestry Act, and the Fisheries Act, etc.
- 2.2.4 Where appropriate, international treaties, conventions, or other agreements, that The Gambia is a Party to should be noted (e.g. The Ramsar Convention on Wetlands of International Importance is particularly relevant in cases of lowland agricultural development).

## **3. IDENTIFICATION AND DESCRIPTION OF THE IMPACTS<sup>7</sup>**

### **3.1 Impacts on Human Beings and the Human-Made Environment**

- 3.1.1 Impacts on public health and safety
  - a) ingestion of poison due to improper treatment and handling of chemicals.
  - b) creation of breeding grounds for disease vectors in stagnant water bodies.
  - c) accumulation of pesticides in soil and/or drinking water.
- 3.1.2 Impact on social and cultural fabric of society (i.e. changes in land allocation, division of labour).
- 3.1.3 Impacts (positive and/or negative) on any particular ethnic group or sex.

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<sup>7</sup> Impacts to include positive and negative, direct and indirect, secondary and cumulative, short-, medium- and long-term, permanent and temporary.

- 3.1.4 Impacts of the development on the local economy including food production, employment, and community participation.
- 3.1.5 Impacts of the development on local transportation.
- 3.1.6 Conflicts in water/land use with other farmers, in particular peasants and herders.

### **3.2 Impacts on Flora and Fauna**

- 3.2.1 Encroachment into areas supporting critical habitats or significant biodiversity, rare and/or protected species and destruction of or damage to terrestrial wildlife habitats, migratory routes, biological resources or ecosystems that should be preserved.
- 3.2.2 Fragmentation or isolation of habitats and plant and animal species, both terrestrial and aquatic.
  - a) breeding grounds of birds, fish, etc.
  - b) resting or wintering areas for long distance and intercontinental migratory birds.
  - c) mangrove and mangrove ecosystem.
- 3.2.3 Impact on nearby nature reserves, mangroves, rangelands, forest parks, etc.
- 3.2.4 Creation of new ecosystems.
- 3.2.5 Impacts on areas with important secondary functions (e.g. forest cover serving as windbreaks, etc.).
- 3.2.6 Potential conflicts among wildlife should be considered (e.g. conflicts between hippopotamus and warthog; detail proposed methods of non-destructive protection and control).
- 3.2.7 Any other ecological impacts.

### **3.3 Impacts on the Land**

- 3.3.1 Land Use
  - a) Area and type of land to be affected.
  - b) Impacts of the development on the site and surrounding land (arable, pastoral, residential, industrial, recreational, etc.)
- 3.3.2 Physical Changes in the Land
  - a) Impacts of the project on soil salinity, erosion, and desertification.
  - b) Impact on the topography of the land.
  - c) Impact on Water bodies caused by erosion and siltation (explore secondary effects on fish and birdlife, etc.).
  - d) Impact on the aesthetic quality of the surrounding area (is the development done in such a way that the appearance of the surrounding area is not negatively affected).

### **3.4 Impact on Water Resources**

- 3.4.1 Impact of water extraction on the aquifer (quantity, extraction limits, indications of saline intrusion).
- 3.4.2 Impact of runoff on surface water quality (chemical, biological).
- 3.4.3 Impact on ground water quality.
- 3.4.4 Change in hydrological regime:
  - a) surface drainage.
  - b) ground water level.
  - c) flow of underground water.

### 3.5 Impact on Air Quality

- 3.5.1 Dusts and other particulates emanating from production and/or processing.
- 3.5.2 Offensive odours.
- 3.5.3 Impact of aerial spraying of chemicals on air quality (consideration given to prevailing winds and seasonal variation and the areas that lie downwind of the site).
- 3.5.4 Climatic impacts (trace gas emissions from farm machinery, food and meat processing, and land clearing and burning may cause negative impacts on stratospheric ozone depletion, global warming, etc.).

### 3.6 Other Direct and Secondary Impacts

- 3.6.1 Impacts of other developments associated with the project including new roads, infrastructure such as contour bunds, dikes, and causeways, and processing equipment.
- 3.6.2 Relationship between the proposed project and other existing or proposed development.
- 3.6.3 Alteration of wetlands (e.g. by causeways)
- 3.6.4 Impacts of the interaction of all the direct impacts listed above.

### 3.7 Information Gaps and Remaining Uncertainties

## 4. SIGNIFICANCE OF IMPACTS

Based on the information and data provided under Part 3, an analysis is required to determine the significance of potentially negative environmental impacts. For example, if a number of potential impacts are identified in the identification and description stage, the magnitude of those impacts needs to be determined and an analysis conducted to determine the severity of those impacts.

The significance of impacts must be viewed at the local, divisional, and national level and where necessary at the international level as well. The cumulative effect of other similar projects should also be considered for example swamp clearance.

Environmental standards for agricultural projects can be divided into agrochemical regulations, water quality standards, planning regulations, and international conventions.

- # Agro-chemical regulations. Controls concerning the selection and applications of agro-chemicals.
- # Water quality standards. The significance of potential impacts from agricultural activities on surface and ground water supplies can be measured against national water supply quality standards.
- # National and local planning regulations. Refer to protected areas such as national parks, wildlife preserves and nature reserves. Specific legislation governing environmental land management practices may also exist, such as restrictions on deforestation in certain areas, control of development on critical slopes to protect watersheds and river courses, and maintenance of riverbank vegetation.
- # International conventions

Certain natural resources, though valued by groups or society, are not subject to environmental standards. To determine the significance of environmental impacts, account should be taken of the environmental values held by governments, organizations and the public. Insights into environmental priorities and preferences may be found in:

- # Government policy
- # Regional and international agreements between governments and/or official organizations (i.e. Montreal Protocol on Substances that Deplete the Ozone Layer; Convention on Biological Diversity)
- # Policies of international and national non-governmental organizations
- # Representations at public enquiries

The significance of environmental impacts will also depend upon whether the benefits of a project are judged to outweigh the cumulative adverse effects on other development activities. Since formal standards do not yet exist in The Gambia, the EIA Working Group will define the standards to be applied on a case by case basis during the scoping phase. These cases will then be compiled to establish a set of environmental standards.

## **5. MITIGATING MEASURES**

When a developer is required to submit an environmental statement to the Agency, it should amongst other things, provide a detailed description of measures that shall be adopted to avoid, reduce or remedy all those significant adverse impacts identified by the environmental study. This should include monitoring and evaluation, risk management, and auditing. This part of the Environmental Statement shall provide, *inter alia*, information on the following:

### **5.1 Operational Measures**

- 5.1.1 Minimization of the use of agrochemicals.
- 5.1.2 Promotion of the use of organic fertilizers and herbicides.
- 5.1.3 Soil and water management interventions.
- 5.1.4 Treatment of toxic effluents.
- 5.1.5 Protection of crops from wildlife predation.

### **5.2 Ecological Measures such as landscaping and tree planting**

### **5.3 Preservation of Monuments and Sites of Cultural and Historic Significance**

### **5.4 Identification of Preventive Measures to Contain Accidents Involving Hazardous Chemicals**

### **5.5 Training in Proper Handling of Agrochemicals and Potentially Hazardous Chemicals**

### **5.6 Identification of Measures That Shall Be Employed to Adequately Address All the Potential Impacts Identified in Part 4 of the Environmental Statement**

### **5.7 Proposed Mode of Environmental Reporting and In-house Auditing**

## **6. MONITORING AND EVALUATION**

The purpose of an environmental monitoring and evaluation programme is to provide assurance that the predicted impacts from a project are within the engineering and environmental acceptable limits and provides early warning of unacceptable environmental conditions, particularly where significant impacts were predicted. All monitoring must be conducted with reference to a pre-established baseline and using a standard methodology. Monitoring may be carried out with regard to:

### **6.1 Stabilization of Land Surface (drainage, slope, minimizing erosion)**

- 6.2 Revegetation to Minimize Erosion (use of indigenous species a priority - indication of cover, type, vigour)
- 6.3 Soil and Water Quality (chemical residues, toxicity)

## SECTOR 6: FISHERIES AND AQUACULTURE<sup>8</sup>

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### 1. DESCRIPTION OF THE PROJECT

#### 1.1 Purpose and Physical Characteristics of the Proposed Project

- 1.1.1 Provide a description of the exact location of the project, including a map in the appropriate scale.
- 1.1.2 Project justification (describe the project activities and fisheries/aquaculture management practices to be implemented).
- 1.1.3 Variety of fish species that will be caught, introduced, farmed, and/or processed.
- 1.1.4 Quantity and quality of expected output.
- 1.1.5 Project cost and viability.
- 1.1.6 Proposed transportation and cold storage arrangements.
- 1.1.7 Number of people to be employed (specify local vs foreign, skilled vs unskilled).

#### 1.2 Land Use Requirements of the Proposed Project (including land and water areas, processing and storage facilities, etc.)

- 1.2.1 During start-up preparations.
- 1.2.2 When operational.
- 1.2.3 Description of displaced or dissected properties created during construction.
- 1.2.4 Indication whether conversion of land use is required.

#### 1.3 Operational Features of the Proposed Project

- 1.3.1 Description of methods to be employed when preparing the site (i.e. clearing of land for road, building, pier or pond construction, hatcheries facilities, etc.).
- 1.3.2 Source and quantities of water, energy, and other resources that will be required.
- 1.3.3 Means of channeling water from source (e.g. from a bolong) to a pond/hatchery.
- 1.3.4 Type, quantities, and frequency of feed, chemicals and/or nutrients that will be used when preparing the pond, and when the project is at normal operations.
- 1.3.5 Type, quantity, and composition of chemical discharges resulting from pond flooding or drainage.
- 1.3.6 Procedure for disposing of empty containers, sprayers and other implements which contain chemical residues.
- 1.3.7 In the event that processing of fish products is a part of the project, provide details of the process(es) to be used, the equipment and source of energy to be used to run the plant/processing equipment (eg diesel/petrol, wood/charcoal, electricity, solar).
- 1.3.8 Describe method(s) to be used for disposing of and/or utilizing fish by-products or wastes.

#### 1.4 Alternative Sites and Processes Considered

Note the main alternative site(s) and processes considered when selecting this project. State reasons for selecting the proposed project and reasons for rejecting alternatives.

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<sup>8</sup> Projects may include: fish capture (both artisanal and industrial whereby natural stocks of aquatic organisms are utilized); aquaculture or fish farming (where measures are taken to directly influence the growth and possibly reproduction of aquatic organisms), and stocking and ranching of fish (a combination of fishery and aquaculture). Projects may also include semi-industrial facilities for fish processing (e.g. freezing, canning, packaging, drying, smoking, etc).

## **2. DESCRIPTION OF THE SITE AND ITS ENVIRONMENT**

### **2.1 Physical and Climatic Features of the Proposed Site**

- 2.1.1 Human population and settlement patterns, and proximity of the proposed site to the community dwellings.
- 2.1.2 Landscape and topography.
- 2.1.3 Sources of water, i.e. ocean, river, aquifers, water courses including creeks, bolongs and discharges.
- 2.1.4 Geologic properties, including soil type and mineral deposits.
- 2.1.5 Flora and fauna including habitats and typical species present (with specific reference to the value of the site, its importance as part of a divisional or national complex, such as wetlands, seasonal use by migratory birds, fish breeding grounds, etc.).
- 2.1.6 Monuments and sites of cultural and historic significance.
- 2.1.7 Present land use (mapping a 500 m zone around the proposed site, indicate e.g. the presence or absence of forested area, wetlands, commercial properties, etc.).
- 2.1.8 Climatic characteristics (e.g. annual rainfall, direction of wind).
- 2.1.9 Hydrological characteristics of the site (impact on the hydrology of the site; assessed for alteration of the water table, changes in the salinity regime, etc.).
- 2.1.10 Any other relevant environmental features.

### **2.2 Legislative and Policy Framework**

- 2.2.1 Information shall be provided in the Environmental Impact Statement on all relevant statutory designations such as national parks, nature reserves, forest parks, park buffer zones, wildlife corridors, and national monuments that are likely to be affected by the proposed project or that are otherwise unreasonably close to the site identified for the proposed project.
- 2.2.2 The proposed project and site should be in conformity with national, divisional, district, and local development plans, in particular the Integrated Coastal Area Management Plan.
- 2.2.3 Where appropriate, reference should be made to such national laws as the Fisheries Act, Hazardous Chemicals and Pesticides Management Act of 1994, the Water Act, the Public Health Act of 1994, the Wildlife Conservation Act of 1977, and the Forestry Act, etc.
- 2.2.4 Where appropriate, international treaties, conventions, or other agreements, that The Gambia is a Party to should be noted (e.g. The Ramsar Convention on Wetlands of International Importance).

## **3. IDENTIFICATION AND DESCRIPTION OF THE IMPACTS<sup>9</sup>**

### **3.1 Impacts on Human Beings and the Human-Made Environment**

- 3.1.1 Impacts on public health and safety
  - a) creation of breeding grounds for disease vectors in stagnant water bodies.
  - b) improper disposal of fish wastes leading to spread of disease by insects/animals.
- 3.1.2 Impact on social and cultural fabric of society (i.e. changes in land allocation).

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<sup>9</sup> Impacts to include positive and negative, direct and indirect, secondary and cumulative, short-, medium- and long-term, permanent and temporary.

- 3.1.3 Impacts (positive and/or negative) on any particular ethnic group or sex, particularly in job opportunities and security of livelihoods (cash income generation and division of labour)
- 3.1.4 Impacts on fishing rights of local population.
- 3.1.5 Impacts of the development on the local economy including food production/availability, employment, and community participation.
- 3.1.6 Impacts of the development on local transportation.
- 3.1.7 Excessive competition between commercial fishing and subsistence or artisanal fishing, leading to over-exploitation, degradation, or destruction of the resources.

### **3.2 Impacts on Aquatic Flora and Fauna**

- 3.2.1 Encroachment into areas (including land and water bodies) supporting critical habitats or significant biodiversity, rare and/or protected species and destruction of or damage to aquatic or terrestrial wildlife habitats, migratory routes, biological resources or ecosystems that should be preserved.
- 3.2.2 Fragmentation or isolation of habitats and plant and animal species, both terrestrial and aquatic.
  - a) breeding grounds of fish, birds, etc.
  - b) resting or wintering areas for long distance and intercontinental migratory birds.
  - c) mangroves and mangrove ecosystem.
- 3.2.3 Impact on nearby nature reserves, mangroves, rangelands, forest parks (particularly as it relates to cutting of wood for fish smoking and boat making).
- 3.2.4 Impact of non-sustainable methods of capture, including use of indiscriminate fishing nets, explosives and poison.
- 3.2.5 Impact on degraded water bodies.
- 3.2.6 Impact of over exploitation of fisheries stock, resulting in a long-term degradation of the resource base and a loss of genetic diversity.
- 3.2.7 Creation of new eco-systems and introduction of exotic species, leading to degradation of native stock.
- 3.2.8 Any other ecological impacts.

### **3.3 Impacts on the Land Resources**

- 3.3.1 Land Use
  - a) Area and type of land to be affected.
  - b) In the case of the construction of fish ponds or artificial lakes, impacts of the development on the site and surrounding land (residential, agricultural, industrial, recreational, etc.)
- 3.3.2 Physical Changes in the Land
  - a) Impacts of the project on soil salinity, erosion, and desertification.
  - b) Impact on the topography of the land.
  - c) Impact on water bodies and water courses caused by erosion and siltation (explore secondary effects on fish and birdlife, etc.).
  - d) Impact of disposal of fossil fuel residues, solid wastes and waste water on land.
    - d) Impact on the aesthetic quality of the surrounding area (is the development done in such a way that the appearance of the surrounding area is not negatively affected).

### 3.4 Impact on Water Resources

- 3.4.1 Impact of water extraction on the aquifer (for aquaculture, quantity, extraction limits, indications of saline intrusion).
- 3.4.2 Impact of runoff on surface water quality (chemical, biological).
- 3.4.3 Impact on ground water quality.
- 3.4.4 Change in hydrological regime:
  - a) surface drainage.
  - b) ground water level.
  - c) flow of underground water.
- 3.4.5 Degradation of water quality from water pollution from pond effluent (nutrient rich with varying chemical content depending on intensity of pond management).
- 3.4.6 Degradation of water quality from water pollution resulting from fuel oil or motor spills and/or dumping of wastes into the water body.

### 3.5 Impact on Air Quality

- 3.5.1 Dusts and other particulates emanating from site construction, production and/or processing.
- 3.5.2 Smoke and other air polluting emissions
- 3.5.3 Offensive odours.

### 3.6 Other Direct and Secondary Impacts

- 3.6.1 Impacts of other developments associated with the project including new roads, infrastructure such as sewage systems and cold storage systems.
- 3.6.2 Relationship between the proposed project and other existing or proposed development.
- 3.6.3 Alteration of wetlands.
- 3.6.4 Impacts of the interaction of all the direct impacts listed above.

### 3.7 Information Gaps and Remaining Uncertainties

## 4. SIGNIFICANCE OF IMPACTS

Based on the information and data provided under Part 3, analysis is required to determine the significance of potentially negative environmental impacts. For example, if a number of potential impacts are raised during the identification and description stage, the magnitude of those impacts needs to be determined and analysis carried out to determine the severity of those impacts.

The significance of impacts must be viewed at the local, divisional, and national level and where necessary at the international level as well. The cumulative effect of other similar projects should also be considered.

Environmental standards for fisheries and aquaculture projects can be divided into chemical regulations, water quality standards, planning regulations, and international conventions.

- # Chemical regulations. Controls concerning the selection and applications of chemicals.
- # Water quality standards. The significance of potential impacts from fisheries/aquaculture activities on surface and ground water supplies can be measured against national water supply quality standards. Specifically quality of freshwaters required to support fish and shellfish culture, potable water supplies and waste water discharge.

- # National and local planning regulations. Refer to protected areas such as national parks, wildlife preserves and nature reserves. Specific legislation governing environmental land management practices may also exist, such as restrictions on land use changes, strategic watershed plans, coastal zone development plans, fisheries development plans.
- # National legislation and international conventions/agreements on food security policies and plans, RAMSAR convention on wetlands, CITES convention on trade in endangered species.

Certain natural resources, though valued by groups or society, are not subject to environmental standards. To determine the significance of environmental impacts, account should be taken of the environmental values held by governments, organizations and the public. Insights into environmental priorities and preferences may be found in:

- # Government policy
- # Regional and international agreements between governments and/or official organizations (i.e. Montreal Protocol on Substances that Deplete the Ozone Layer; Convention on Biological Diversity)
- # Policies of international and national non-governmental organizations
- # Representations at public enquiries
- # Input from local communities regarding their priorities for public health issues, revered areas and flora and fauna, water supply issues and issues of sustainable income generation and employment.

The significance of environmental impacts will also depend upon whether the benefits of a project are judged to outweigh the cumulative adverse effects on other development activities. Since formal standards do not yet exist in The Gambia, the EIA Working Group will work closely with the Environmental Quality Working Group to identify guidelines to be applied on a case-by-case basis during the scoping phase. These cases will ultimately be compiled to establish relevant environmental standards.

## 5. MITIGATING MEASURES

When a developer is required to submit an Environmental Impact Statement to the Agency, it should amongst other things, provide a detailed description of measures that shall be adopted to avoid, reduce or remedy all those significant adverse impacts identified by the environmental study. Measures should also include monitoring and evaluation, risk management, and auditing. This part of the Environmental Impact Statement shall provide, *inter alia*, information on the following:

### 5.1 Site Preparation Measures

- 5.1.1 Prohibit construction on aquaculture ponds in environmentally sensitive areas.
- 5.1.2 Limitation of areas converted to ponds.
- 5.1.3 Existing depressions hollows and ditches to be used to stock fish, rather than creating new ponds.
- 5.1.4 Stabilization of exposed soil, grasses and other ground cover.

### 5.2 Operational Measures

- 5.2.1 Discharge potential pollutants into water with adequate dilution and dispersal capabilities.

- 5.2.2 Reduction of wastes by recycling into usable products, reduction of water use.
- 5.2.3 Utilization of non-CFC cooling agents in ice and freezing plants.
- 5.2.4 Treatment of waste prior to release.
- 5.2.5 Water quality monitoring for suspended solids, oil and grease, dissolved oxygen, nitrogen and coliform.
- 5.2.6 Management measures for sustained yields of aquatic organisms: restrictions harvests and gear (trawl bans, specified net mesh sizes), closure of areas, limited entry systems, prohibition of certain practices).

**5.3 Ecological Measures such a landscaping and tree planting**

**5.4 Preservation of Monuments and Sites of Cultural and Historic Significance**

**5.5 Identification of Preventive Measures to Contain Accidents Involving Hazardous Chemicals and Reduce Pollution**

- 5.5.1 Public education programmes on proper fuel and oil handling and bilges waste disposal.
- 5.5.2 Provision of storage handling facilities, bilge evacuation and disposal services.

**5.6 Training in Proper Handling of Agrochemicals and Potentially Hazardous Chemicals**

**5.7 Identification of Measures that shall be Employed to Adequately Address all the Potential Impacts Identified in Part 4 of the Environmental Impact Statement**

**5.8 Proposed Mode of Environmental Reporting and In-house Auditing**

**6. MONITORING AND EVALUATION**

The purpose of an environmental monitoring and evaluation programme is to provide assurance that the predicted impacts from a project are within the engineering and environmental acceptable limits and provides early warning of unacceptable environmental conditions, particularly where significant impacts were predicted. All monitoring must be conducted with reference to a pre-established baseline and using a standard methodology. Monitoring may be carried out with regard to:

- 6.1 Water quality (chemical residues, pollutants from fishing vessels, oil spills, etc.)
- 6.2 Physical, chemical and biological condition of fishing areas (monitor fish stocks to ensure sustainable yields).
- 6.3 Efficiency of fuel wood resources being used
- 6.4 Sanitary conditions associated with fish processing
- 6.5 Disposal of solid wastes and waste water from industrial processing

## SECTOR 7: TOURISM DEVELOPMENT PROJECTS<sup>10</sup>

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### 1. DESCRIPTION OF THE PROJECT

#### 1.1 Purpose and Physical Characteristics of the Proposed Project

- 1.1.1 Description of the exact location of the proposed project, including a map in the appropriate scale.
- 1.1.2 Positioning of proposed buildings and structures, illustrated on a site plan map.
- 1.1.3 Project description (elaborate on the project concept, including the type of tourism project, tourism objective, facilities, types of activities, etc.).
- 1.1.4 Project cost and viability.
- 1.1.5 Proposed access and transportation arrangements to the facility or facilities (for staff and tourists).
- 1.1.6 Number of people to be employed (distinguish between local and foreign, skilled and unskilled labour).

#### 1.2 Land Use Requirements of the Proposed Project

- 1.2.1 Description of displaced or dissected properties created during construction.
- 1.2.2 Description of work sites or storage depots (provide a map highlighting specific locations of anticipated sites).
- 1.2.3 Land use requirement for obtaining construction materials (e.g. sand, laterite) and for depositing excavated top soil (soil and surplus materials). Include a location map to indicate where materials will be derived and/or deposited outside of the development plan.
- 1.2.4 Indication of whether conversion of land from one use to another for accommodation or infrastructure is required.
- 1.2.5 Any additional land use requirements, including walking/riding trails, note whether any of the required land falls within a protected or regulated area (i.e. national park, tourism development area, etc.)

#### 1.3 Operational Features of the Proposed Project

- 1.3.1 Type, source, and quantities of raw materials, water, energy, and other resources that will be required for construction and maintenance (including water for construction, drinking, bathing, waste treatment, swimming pools, etc.).
- 1.3.2 Description of earth moving machinery to be utilized.
- 1.3.3 Type of tourism operations, including recreational activities such as sight-seeing/guided tours to natural, historic, and cultural destinations, water activities such as utilization of the beach and river, sports and nightlife, and services such as taxis, ferry and bus services.

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<sup>10</sup> Sources of environmental impacts from tourism development projects depend upon the type of project, the inputs and outputs of the project, and the various project activities. Projects may include: tourist facilities, including all buildings, open-air installations, and infrastructural establishments designed to accommodate and look after tourists and service staff (e.g. hotels, bungalows, club facilities, holiday villages, restaurants, souvenir shops, etc.), as well as supply and disposal networks for electricity, water, sewage, rubbish, etc. May also include facilities for activities such as swimming pools, golf course, tennis courts, harbours and marinas, etc. Attention must also be paid to activities which are not tied to a particular facility, such as diving, wind-surfing, hiking, riding, as well as sight-seeing tours to visit places of cultural interest and areas of outstanding natural beauty, national parks, etc.

- 1.3.4 Description of construction, management, and maintenance of infrastructure specifically, roads, waste treatment and disposal, health care, etc. Also indicate all facilities to be provided, including hotels, restaurants, recreation amenities, etc.
- 1.3.5 Type, source, and quantities of waste or sewage generated at the location (animal as well as human if the animals are being introduced into the location for tourist purposes)
- 1.3.6 Type, quantity, and composition and strength of chemicals or other residues and fluid discharges (e.g. chemical treatment of swimming pools, crafts production, etc.).

#### **1.4 Alternative Sites and Processes Considered**

Note the main alternative site(s) considered when selecting this project. State reasons for selecting the proposed project and reasons for rejecting other alternatives.

## **2. DESCRIPTION OF THE SITE AND ITS ENVIRONMENT**

### **2.1 Physical and Climatic Features of the Proposed Site**

- 2.1.1 Human population and settlement patterns; proximity of the proposed site to community dwellings.
- 2.1.2 Landscape and topography.
- 2.1.3 Sources of water, i.e. aquifers, water courses including creeks, bolongs, and discharges.
- 2.1.4 Geologic properties, including soil type and quality, and any mineral deposits.
- 2.1.5 Flora and fauna including habitats and typical species present (with specific reference to the value of the site, its importance as part of a divisional or national complex, such as wetlands, seasonal use by migratory birds, fish breeding grounds, etc.).
- 2.1.6 Monuments and sites of cultural and historic significance.
- 2.1.7 Present land use (mapping a 500 m zone around the proposed site, indicate adjacent land uses, i.e. commercial, residential, tourism, protected conservation areas, etc.).
- 2.1.8 Climatic characteristics (e.g. annual rainfall, direction of wind).
- 2.1.9 Hydrological characteristics of the site (impact on the hydrology of the site; assessed for alteration of the water table, changes in the salinity regime, etc.).
- 2.1.10 Carrying capacity of the resource base on the affected areas (specifically in relation to the projected volume of tourist traffic).
- 2.1.11 Any other relevant environmental features.

### **2.2 Legislative and Policy Framework**

- 2.2.1 Information shall be provided in the Environmental Impact Statement on all relevant statutory designations such as national parks, nature reserves, forest parks, park buffer zones, wildlife corridors, and national monuments that are likely to be affected by the proposed project or that are otherwise sited unreasonably close to the site identified for the proposed project.
- 2.2.2 The proposed project and site should be in conformity with national, divisional, district, and local development plans (ie. Tourism Development Plan, Integrated Coastal Area Management Plan, etc).
- 2.2.3 Where appropriate, reference should be made to such national laws as the Hotels and Restaurants Act of 1974, Physical Planning and Development Control Act 1990, the Public Health Act of 1994, the Wildlife Conservation Act of 1977, the Forestry Act, and Fisheries Act, etc.

- 2.2.4 Where appropriate, international treaties, conventions, or other agreements, that The Gambia is a Party to should be noted (e.g. RAMSAR, Montreal Protocol, Biodiversity, Dumping at Sea, etc.).

### **3. IDENTIFICATION AND DESCRIPTION OF THE IMPACTS<sup>11</sup>**

#### **3.1 Impacts on Human Beings and the Human-Made Environment**

- 3.1.1 Impacts on public health and safety (e.g. are potable water sources at risk of pollution due to refuse and sewage systems, increased foot and automobile traffic increasing risk of accidents, overburdening area health clinics during peak tourist season, etc.)
- 3.1.2 Impact on social and cultural fabric of society (i.e. changes in land allocation, division of labour, introduction of foreign lifestyles, social trends, attitudes, and practices).
- 3.1.3 Impacts (positive and/or negative) on any particular ethnic group or sex and/or economic class, creating unequal access to and/or divisive competition for economic opportunities.
- 3.1.4 Competition for existing provision of local goods and services (e.g. health care, investment capital, transport, potable water supplies, energy supplies, sewage system, waste disposal sites).
- 3.1.5 Impacts on the local economy including food production/availability (e.g. increased/decreased availability, increased/decreased price of goods), employment (e.g. both formal and informal, including guides, interpreters, craft-makers, entertainers, taxi drivers, catering, etc.), and community participation (e.g. community-based eco-cultural tourism).
- 3.1.6 Impacts on local transportation (design of transport systems and availability of low cost alternatives).
- 3.1.7 Conflicts over water/land use with residents, (e.g. farmers, fishermen, traditional land owners, etc.), and impact of increasing land value and/or relocation/ displacement of human populations as a result of development.
- 3.1.8 Risk of rapid decrease in income levels if the development performs poorly or fails.

#### **3.2 Impacts on Flora and Fauna**

- 3.2.1 Encroachment into areas supporting critical habitats or significant biodiversity, rare and/or protected species and destruction of or damage to terrestrial wildlife habitats, migratory routes, biological resources or ecosystems that should be preserved.
- 3.2.2 Fragmentation or isolation of habitats and plant and animal species, both terrestrial and aquatic.
- a) breeding grounds of birds, fish, etc.
  - b) resting or wintering areas for long distance and intercontinental migratory birds.
  - c) mangrove and mangrove ecosystem.
- 3.2.3 Impact on nearby nature reserves, mangroves, rangelands, forest parks, etc.
- 3.2.4 Loss of species or major stress on flora and fauna due to sport hunting, fishing, food for tourists, disturbance of breeding grounds caused by high visitation densities or continuous transportation activities, accidents to aquatic wildlife from use of boats and fishing gear, decimation of species by fires, etc.
- 3.2.5 Creation of new ecosystems.

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<sup>11</sup> Impacts to include positive and negative, direct and indirect, secondary and cumulative, short-, medium- and long-term, permanent and temporary.

- 3.2.6 Impacts on areas with important secondary functions (e.g. forest cover serving as windbreaks, beach vegetation stabilizing lagoons and sand dunes, mangrove protecting coastal areas, etc.).
- 3.2.7 Any other ecological impacts.

### **3.3 Impacts on the Land**

- 3.3.1 Land Use
  - a) Area and type of land to be affected.
  - b) Impacts of the development on the site and surrounding land (arable, pastoral, residential, industrial, recreational, beaches, etc.)
- 3.3.2 Physical Changes in the Land
  - a) Impacts of the project on soil salinity, erosion, and desertification (both inland and coastal erosion).
  - b) Impact on the topography of the land e.g. deep cuttings, high embankments, and dissection of natural valleys.
  - c) Impact on soil pollution resulting from dumping of refuse and excrement.
  - d) Impact on water bodies caused by erosion and siltation (explore secondary effects on fish and birdlife, etc.).
  - e) Impact on the aesthetic quality of the surrounding area (is the natural landscape impaired by buildings which are inappropriate in terms of location, size, external colour and style of construction?).

### **3.4 Impact on Water Resources**

- 3.4.1 Impact of water extraction on the aquifer (quantity, extraction limits, indications of saline intrusion).
- 3.4.2 Connection to the public-water supply and the resulting impact on local availability of water (taking into account both residential, commercial and agricultural uses of local inhabitants).
- 3.4.3 Impact of runoff on surface water quality (chemical, biological).
- 3.4.4 Impact on ground water quality.
- 3.4.5 Change in hydrological regime:
  - a) surface drainage.
  - b) ground water level.
  - c) flow of underground water.
- 3.4.6 Impact of sealing off large surface areas, reducing infiltration of surface water
- 3.4.7 Impact of water pollution from refuse, oil residues, and untreated waste water and sewage (e.g. marine effluent disposal, residential sewage disposal, pollution from marine vessels, infiltration of pollutants to groundwater from solid waste/sewage sludge disposal, chemicals and cleaning agents, etc.).

### **3.5 Impact on Air Quality**

- 3.5.1 Dusts and other particulates emanating from construction or maintenance of the tourist facility.
- 3.5.2 Offensive odours emanating from the facility or associated with the proposed activities.
- 3.5.3 Motor vehicle and air traffic emissions of nitric oxide, carbon dioxide, etc.
- 3.5.4 Climatic impacts (e.g. clearing of vegetation, covering large surface areas with parking areas, etc. may give rise to temperature changes in the immediate surroundings, positioning and

style of buildings may reduce air circulation which when combined with a high incidence of traffic, may result in a concentration of air pollutants, etc.).

### 3.6 Other Direct and Secondary Impacts

- 3.6.1 Impacts of other developments associated with the project including new roads, infrastructure such as sewage and drainage systems, tourist markets, etc.
- 3.6.2 Relationship between the proposed project and other existing or proposed development.
- 3.6.3 Relationship between the proposed project and unplanned or illegal development e.g. squatters may be forced into marginal lands and environmentally sensitive areas by virtue of the proposed development.
- 3.6.4 Impacts of the interaction of all the direct impacts listed above.

### 3.7 Information Gaps and Remaining Uncertainties

## 4. SIGNIFICANCE OF IMPACTS

Based on the information and data provided under Part 3, an analysis is required to determine the significance of potentially negative environmental impacts. For example, if a number of potential impacts are raised during the identification and description stage, the magnitude of those impacts needs to be determined and an analysis conducted to determine the severity of those impacts. For tourism projects in particular, impact significance should be assessed by taking into account those environmental priorities and preferences held by society but for which there are no quantifiable objectives. The significance of impacts must be viewed at the local, divisional, and national level and where necessary at the international level as well. The cumulative effect of other similar projects should also be considered.

Environmental standards for tourism development projects can be divided into water quality standards, planning regulations, national legislation to protect certain areas and species, and international conventions.

- # Water quality standards. The significance of potential impacts from tourism activities on potable water supplies and waste water discharge can be measured against national water supply quality standards, if available.
- # National and local planning regulations. Refer to protected areas such as national parks, wildlife preserves and nature reserves. Specific legislation governing environmental land management practices may also exist, such as restrictions on deforestation in certain areas, control of development on critical slopes to protect watersheds and river courses, and maintenance of riverbank vegetation.
- # International conventions

Certain natural resources, though valued by groups or society, are not subject to environmental standards. To determine the significance of environmental impacts, account should be taken of the environmental values held by government, organizations and the public. Insights into environmental priorities and preferences may be found in:

- # Government policy
- # Regional and international agreements between governments and/or official organizations (i.e. Montreal Protocol on Substances that Deplete the Ozone Layer; Convention on Biological Diversity)

- # Policies of international and national non-governmental organizations
- # Representations at public enquiries
- # Reaction from persons to be affected by the project, including local communities, tourism boards, and tour operator associations; encourage participation in the project planning stage to determine environmental protection priorities, including public health, areas revered for their local perceived value, skills training to undertake mitigating measures, protection of potable water supply, conservation of environmental services and products, and issues of sustainable income generation and employment.

The significance of environmental impacts will also depend upon whether the benefits of a project are judged to outweigh the cumulative adverse effects on other development activities. Since formal standards do not yet exist in The Gambia, the EIA Working Group will work closely with the Environmental Quality Working Group to identify guidelines to be applied on a case-by-case basis during the scoping phase. These cases will then be compiled to establish relevant environmental standards.

## 5. MITIGATING MEASURES

When a developer is required to submit an Environmental Impact Statement to the Agency, it should amongst other things, provide a detailed description of measures that shall be adopted to avoid, reduce or remedy all those significant adverse impacts identified by the environmental study. This should include monitoring and evaluation, risk management, and auditing. This part of the Environmental Impact Statement shall provide, *inter alia*, information on the following:

### 5.1 Operational Measures

- 5.1.1 Minimization of disturbance or destruction to surrounding habitats and infrastructure in order to ensure that the carrying capacity of the natural resources at the site is not exceeded by virtue of the visit or use of tourists.
- 5.1.2 Proper management of liquid and solid wastes (ensure liquid wastes are not discharged to beaches or other sensitive areas; consider incineration versus landfill or solid-waste disposal options).
- 5.1.3 Develop erosion and sediment control plans for construction and maintenance phases.
- 5.1.4 Develop water management plans to reduce water consumption, use untreated water, and reduce degree of sealing of land area.
- 5.1.5 Ensure construction plans submitted are in accordance with local ordinances on beach sand mining and other erosion control regulations.
- 5.1.6 Integrate planning to reduce traffic and pedestrian congestion and noise.
- 5.1.7 With regard to cultural tourism, ensure that village councils, village elders, tour operators and guides agree on acceptable visitation numbers, and how opportunities for income generation should be divided between the community and tour operators.

### 5.2 Ecological Measures

- 5.2.1 Landscaping and tree planting.
- 5.2.2 Monitor population dynamics of conservation-worthy wildlife within the project vicinity.
- 5.2.3 Limit tourist numbers (either physically or through pricing) for visiting sites of natural or historical importance.

- 5.2.4 Implement extensive training programme for all guides and tour operators to ensure that excursions lead to minimal environmental impacts.
- 5.2.5 Develop eco-tourism attractions with environmental protection built-in, e.g. scientific/conservation/adventure holidays.
- 5.3 Preservation of Monuments and Sites of Cultural and Historic Significance
- 5.4 Identification of Preventive Measures to Reduce and Contain Accidents Involving Hazardous Chemicals
- 5.5 Training in Proper Waste Disposal
- 5.6 Identification of Measures that shall be Employed to Adequately Address all the Potential Impacts Identified in Part 4 of the Environmental Statement
- 5.7 Proposed Mode of Environmental Reporting and In-house Auditing

## **6. MONITORING AND EVALUATION**

The purpose of an environmental monitoring and evaluation programme is to provide assurance that the predicted impacts from a project are within the engineering and environmental acceptable limits and provide early warning of unacceptable environmental conditions, particularly where significant impacts were predicted. All monitoring must be conducted with reference to a pre-established baseline and using a standard methodology. Monitoring may be carried out with regard to:

- 6.1 Stabilization of Land Surface (drainage, slope, minimizing erosion)**
- 6.2 Revegetation to Minimize Erosion (use of indigenous species a priority - indication of cover, type, vigour)**
- 6.3 Soil and Water Quality (contamination from improper waste water disposal, chemical residues, toxicity, sediment accumulation)**
- 6.4 Erosion and sedimentation impacts associated with infrastructure development such as roads, ports, harbours, marinas, hotels, shopping centres, etc.**
- 6.5 Protected and ecologically sensitive areas such as beaches, wetlands, etc.**
- 6.6 Impacts associated with recreational activities such as diving, fishing, use of all-terrain vehicles and animal guided tours, and access to areas previously denied**
- 6.7 Demands on transportation and other infrastructure such as water supply, waste water treatment and solid waste disposal, and health care facilities**
- 6.8 Effects on the local and regional society and economy**

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<sup>i.</sup> Impacts to include positive and negative, direct and indirect, secondary and cumulative, short-, medium- and long-term, permanent and temporary.