ENVIRONMENTAL IMPACT ASSESSMENT GUIDELINES FOR THE TOURISM SECTOR



Prepared by

Environmental Protection Agency

under the

Ghana Environmental Assessment Capacity Development Programme (GEACAP)

and

Ghana Environmental Assessment Support Programme (GEASP)

August 2010

# FOREWORD

The Environmental Assessment Regulations, LI 1652, was promulgated in 1999 to give comprehensive legal cover to the Ghana Environmental Impact Assessment procedures. These Regulations require that all developmental activities likely to impact adversely on the environment must be subject to Environmental Assessment. The objective of the LI is to ensure that such development activities are carried out in an environmentally sound and sustainable manner. The requirements of the LI, however, place enormous responsibilities on all stakeholders involved in development in Ghana. The nature of the responsibilities varies for different stakeholders, depending on their statutory functions, areas of jurisdiction and interests such as policy makers, implementing or regulatory agencies, planning authorities, financial intermediaries or institutions providing training or consultants providing services in EIA.

A national Environmental Assessment Capacity Development Programme (GEACaP) was initiated in 2001 with financial assistance from the Netherlands Government. This was to assist all relevant institutions in meeting their respective obligations under the LI, and to promote sustainable development in Ghana. An important aspect of the programme was the development of Environmental Assessment Sector Specific Guidelines for eight sectors, namely; Transportation, Mining (revision), Tourism, General Construction & Services, Energy, Manufacturing, Agriculture and Health. Eight networks made up of representatives from relevant stakeholder institutions were formed to facilitate the development of the guidelines for these sectors. The key objectives of the Tourism Sector Core Team included:

Defining the screening criteria for environmental assessment for tourism sector investments.

Determining the scope of Environmental Impact Assessment (EIA) for the sector.

Providing systematic procedures on Environmental Impact Statement (EIS) preparations for the sector.

Providing guidelines on common potential impacts and mitigation measures.

This document covers all the areas outlined above and it is intended to provide guidleines for the conduct of environmental assessment in the tourism sector in Ghana

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# ACKNOWLEDGEMENT

The Tourism Sector-Specific Environmental Impact Assessment (EIA) guidelines have been prepared to ensure the sustainable development of the health sector and also contribute towards sound environmental management in the tourism sector. The preparation of this document has been made possible with collective efforts of development partners, governmental institutions and individuals who committed their time and resources to complete the document.

Special mention is made by the Agency of the Royal Netherlands Government through the embassy in Accra through whose financial support the document was prepared and the Netherlands Environmental Assessment Commission for the valuable comments on the guidelines.

We wish also to acknowledge the contribution of the Executive Director of EPA Mr. Jonathan Allotey and Messrs Ebenezer Appah-Sampong and Mr. Kwabena Badu Yeboah Coordinator and Assistant Coordinators of GEACaP and Ms Christine Asare Coordinator of GEASP of EPA.

Sincere gratitude goes to professionals in the various fields who reviewed the document from time to time until the final was obtained and all those who helped to validate the document.

We are particularly indebted to Dr. Asha Rajvanshi, Professor and Head, EIA Cell, and Dr. Vinod Mathur of the Wildlife Institute of India for accepting to review the guidelines and making valuable contributions and bringing international best practices on board.

Finally, the EPA wishes to acknowledge the contributions of the following team members of the Tourism Sector-Specific Guidelines:

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###### Besides the above, valuable contributions were made by Rev. Kingsley Tetteh of the Lighthouse Chapel International Bible School, Mr Ben Ampomah Ag Executive Secretary, Water Resources Commission and Mr. G. C. Voado of the Environmental Protection Agencywhich is gratefully acknowledged.

# ABBREVIATIONS

ECOWAS Economic Community for West African States

EIA Environmental Impact Assessment

EIA Environmental Impact Assessment

EMP Environmental Management Plan

GDP Gross Domestic Product

GEACaP Environmental Assessment Capacity Development Programme

GHATOF Ghana Tourism Federation

GPRS Ghana’s Growth and Poverty Reduction Strategy

GTDC Ghana Tourist Development Company

HCIMA Hotel, Catering and Institutional Management Association

HOTCATT Hotel Catering and Tourism Training Institute

NEPAD New Economic Partnership for African Development

PER Preliminary Environmental Reports

SEA Strategic Environmental Assessment

TOR Terms of Reference

TSMTDP Tourism Sector Medium-Term Development Plan

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CHAPTER ONE

# 1.0 BACKGROUND

The Government of Ghana has recognized tourism as one of the most important socio-economic activities in the country. The impetus is being provided to make the country a competitive and quality destination in the West Africa sub- region. This has led to the increase in tourist arrivals and receipts with the hosting of important international and domestic conferences and seminars including group tours organized by the private sector and facilitated by the Ministry of Tourism and its implementing agencies.

## 1.1 Overview of the Tourism Sector

The tourism sector continues to be one of the fastest growing and most important sectors of the Ghanaian economy. The sector has shown significant growth over the last decade with tourist arrivals increasing at an average rate of 10% per annum. In 2006, tourist arrivals increased by 16 per cent i.e. from 428,533 in 2005 to 497,129 in 2006 with the corresponding receipts in growth by 18% i.e rising from US$836.1 million in 2005 to US$984.8 million . Currently, the sector is the third largest foreign exchange earner after merchandises exports and remittances from Ghanaians abroad and accounts for 6.2 percent of GDP.

Employment generated by the sector in 2007 stands at 206,091 This represents 12.5% increased over the estimated employment generated in 2006. In terms of hotel accommodation, the total number of hotel establishments registered which stood at 1,405 in 2006 increased to 1430 in 2007 while the total number of rooms registered have increased from 19,967 in 2006 to 21,275.

 Ghana’s comparative advantage in this sector includes cultural, historical and eco-tourism sites which attract regional and international tourists including African-Americans interested in Ghana’s history with respect to slavery. This reinforces the sector’s potential for investment.

 It is in this context that the Tourism Sector Medium-Term Development Plan (TSMTDP) 2006 – 2009 has been prepared. The Plan which is aimed at harnessing the potential of the sector by making Ghana a competitive and quality destination while preserving the country’s cultural, historical and environmental heritage has been prepared in the context of Ghana’s Growth and Poverty Reduction Strategy (GPRS) and in consonance with the Tourism Policy. Policy interventions expected to be implemented include: (i) promoting tourism as a major source of national revenue; (ii) promoting domestic tourism to foster national cohesion as well as redistribution of income; (iii) promoting sustainable and responsible tourism in such a way to preserve historical and cultural heritage; and (iv) enhancing the capacity and strengthening the legal and institutional framework to support the tourism industry.

## 1.2 The Need for the Guidelines

The tourism industry has the capacity to bring about immense socio-economic benefits. At the same time, it also has the potential to generate adverse impacts on communities and negatively influence the resilience of the environment and the capacity to provide life support thereby increasing the risk of eroding its ability to sustain development.

The Environmental Assessment Guideline for the tourism sector is therefore being prepared to provide guidance to both existing as well as prospective proponents of tourism projects and related activities on meet the various requirements and and to address the issues to be considered while undertaking .

The Environmental Impact Assessment Guideline is intended to highlight the salient environment and public health issues relating to the tourism activities . It provides the required guidance on how such issues can be best addressed. The document specifically provides a catalogue of tourism activities and the screening criteria for determining at the appropriate level of environmental assessment for different scales of tourism activities.. It also provides guidance on identification of the impacts of various tourism activities and the appropriate measures to be adopted for their mitigation..

The guideline provides the framework for environmental accounting right from the planning to implementation stages of tourism development programmes and activities.

## 1.3 Policy Legal and Institutional Arrangements

### 1.3.1 Tourism Policy Objectives.

Ghana’s tourism policy is strongly influenced by the Growth and Poverty Reduction Strategy 2006 – 2009 (GPRS II), and intends to contribute towards its implementation. The policy development objectives are to:

* enhance the quality, diversity, and complementarities of Ghana’s tourism products to extend the stay of tourists for maximizing benefits both for the national economy and local communities;
* ensure and maintain high standards of services and facilities in order to be internationally competitive;
* provide adequate public and private sector access to finance for tourism infrastructural development.
* promote investment in tourism development both, by local and foreign investors;
* ensure that the human resource capacity (quality and quantity) required for tourism development is in line with demands of the industry to ensure competitiveness with respect to professionalism of staff at all levels;
* create and promote awareness of responsible tourism at all levels of society;
* ensure the promotion and expansion of international, regional and domestic tourism by developing Ghana as one of the preferred tourist destinations in Africa;
* effectively manage and conserve the cultural, environmental, and historical resources of Ghana while balancing economic gains with environmental sensitivity and resource conservation;
* ensure safety, security, and privacy of all visitors by incorporating appropriate safeguards against negative effects of tourism on local communities;
* collaborate with neighboring countries for seeking support in tourism development initiatives on the continent and in the West African sub-region in line with NEPAD and ECOWAS agreements.

### 1.3.2 National Environment Policy

The thrust of the national environment policy is to regulate development activities in a manner that ensures that the capacity of the environment to provide life support services is not compromised. The policy recognizes the importance of environmental impact assessment, environmental management plans and effective environmental management tools and requires that all development activities should be subjected to environmental clearance.

###### The Environmental Protection Agency, Act 490, 1994 requires that all new developments to comply with laid down Environmental Impact Assessment Regulations and Procedures.

### 1.3.3 Tourism Sector Institutions

#### 1.3.3.1 Ministry of Tourism

Vision

To support and promote the achievement of the overall vision of the Government of Ghana, aimed at achieving a per capita income of USD 1,000 by 2015 through the realization of the sector’s full potential in contributing to economic wealth creation, employment generation, poverty reduction, environment conservation, as well as well as national and international cohesion.

This vision will be achieved through the Ministry’s effort to generate 20% growth rate per annum by 2015

Mission

The Ministry exists to create a conducive and favourable environment for sustainable growth and development that would ensure the following:

1. The tourism sector achieves a greater contribution to GDP growth through effective and efficient use of appropriate policies, corporate planning, programmes, and projects as well as public-private partnerships, and

2. Sustainable relationship with the diaspora for resource mobilization and investment.

Functions and Responsibilities

The Ministry’s functions include the following:

* Policy formulation, planning and programming for the development and promotion of domestic, regional and international tourism;
* Promulgation of legislation and regulations on tourism development, including investment policies and incentives;
* Undertaking research into regional and global tourism trends;
* Human Resource Development within the private and public sectors to effectively promote tourism;
* Liaison with other government agencies, international donor-assistance agencies, the private tourism sector and non-governmental organisations on matters concerning tourism.
* Developing policies and programmes to link up with Africans including Ghanians in the diaspora for tourism and investment promotion for the country.
* Monitoring and evaluation of sector performance

#### 1.3.3.2 Ghana Tourist Board

The Ghana Tourist Board is the main implementing agency of the Ministry of Tourism and Diasporan Relations.

The functions of the Ghana Tourist Board, as a Statutory Body, have been determined by its enabling Act, the Ghana Tourist Control Board Decree 1973 (National Redemption Council Decree 224) as amended by the Ghana Tourist Control Board (Amendment) Decree, 1977 (Supreme Military Council Decree 80).

The Board has the following as its core functions:

* Advises on the formation of policy and co-ordination of activities on tourism.
* Regulates and controls the tourism industry.
* Markets Ghana’s tourism, abroad and within the country including the publication of tourism promotional materials i.e. brochures, maps etc.
* Researches and studies on trends in the tourism industry.
* Registers, classifies, licenses and controls standards in accommodation and catering enterprises.
* Registers and licenses tour operations and travel establishments, tour guides, car rental establishments and charter operators.
* Facilitates the construction of tourism infrastructure and superstructure.
* Any other matters affecting tourism.

#### 1.3.3.3 Wildlife Division of the Forestry Commission

The Wildlife Preservation Act 43 of 1963 established modern day Wildlife Division of the (integrated) Forestry Commission. The Wildlife Reserves Regulations 1971, L.I. 710 and its subsequent amendments complement the Act 43 and mandates the Division to conserve wildlife resources throughout Ghana and, in particular, to manage the country’s designated Protected Areas, including Ramsar Sites, in the various climatic and vegetation zones. Furtherance to the Act 43 is the Forest and Wildlife Policy of 1994 which aims at conservation and sustainable development of the nation’s forest and wildlife resources for maintenance of environmental quality and perpetual flow of economic, social and cultural benefits to all segments of society.

The specific objectives of the Forest and Wildlife Policy of 1994, are to:

Manage and enhance Ghana’s permanent estates of forest and wildlife resources, preservation of vital soil and water resources, conservation of biological diversity and the environment and sustainable production of domestic and commercial produce;

Promote research-based and technology-led forestry and wildlife management, utilization and development to ensure growth and environmental stability;

Promote public awareness and involvement of rural people in forestry and wildlife conservation so as to maintain life-sustaining systems, preserve scenic areas and enhance the potential of recreation, tourism and income-generation opportunities.

The EIA Guideline for the tourism sector shall therefore enjoin all forest and wildlife based tourism related activities to enhance the preservation of vital soil and water resources, biological diversity, environmental stability and preserved scenic areas for a sustained recreation, tourism and income-generation opportunities.

#### 1.3.3.4 Environmental Protection Agency

The Environmental Protection Agency was established in 1994 under Act 490. The Act mandates the EPA to coordinate and manage the country’s environment and to collaborate with other stakeholders to seek common solutions to environmental problems.

###### The Environmental Assessment Regulations (1999) LI 1652 sets out the requirements for environmental permitting, Environmental Impact Assessment (EIA), the preparation of Preliminary Environmental Reports (PERs), Environmental Certification and Environmental Management Plans.

###### The EPA is developing and coordinating a set of EIA guidelines for eight sectors of national development, including the tourism sector to provide some guidance of on how issues in each sector could be handled.

# **1.3.3.5** **Hotel Catering and Tourism Training Institute (HOTCATT)**

#####

HOTCATT is the training wing of the Ministry of Tourism and Diasporan Relations whose main objective is to improve the standard and quality of human resources and provide quality training in the tourism sector on a sustainable basis. It has the responsibility to train people in all areas of the tourism and hospitality sector.

#### 1.3.3.6 Ghana Tourist Development Company

The Ghana Tourist Development Company (GTDC), is an autonomous quasi-private limited liability company which supports and mobilizes investments for the tourism sector.

#### 1.3.4 Ghana Tourism Federation (GHATOF)

GHATOF is a voluntary association that promotes effective linkage between the public and the private sectors and ensures better co-ordination and co-operation among the private sector associations. It is the apex body of all Tourism related associations comprising eighteen enterprise associations. These are;

* Ghana Hotels Association
* Ghana Chefs Association
* Ghana Association of Travel and Tour Agents
* Ghana Restaurants and Night Clubs Association
* Ghana Drinking Bar Association
* National Drinking Bar Operators Association
* Ghana Traditional Caterers Association
* Indigenous Caterers Association
* Car Rentals Association of Ghana
* Tour Guides Association of Ghana
* The Tour Operators Union of Ghana

GHATOF also has affiliate members, including:

* Board of Airlines
* Ghana Association of Forex Bureau
* Africa Travel Association (Ghana Chapter)
* Hotel, Catering and Institutional Management Association (HCIMA)
* Ghana Tourism Society
* Skal Club International
* Travel Writers Association of Ghana

CHAPTER TWO

# 2.0 SCOPE OF GUIDELINES AND SCREENING CRITERIA

These guidelines cover Tourism activities in the natural and modified ecosystems in Ghana. It identifies and provides guidelines for assessment of thresholds for activities under the various sectors of the tourism industry. Analysis of impacts for specific activities has been provided and mitigation measures have been proposed. These guidelines should, however, not be taken as an exhaustive list.

## 2.1 Classification of the Tourism Sector

For the purposes of this guideline, tourism activities have been grouped under the following categories:

Accommodation Establishments

Catering Establishments

Amusement and Recreational Establishment

 Transportation (please refer to transport sector specific guidelines)

### 2.1.1 Accommodation Establishments

Hotels

Motels

Inns

Service Apartments

Condominiums

Hostels

Guest Houses

Lodges

Camps

Home stays

### 2.1.2 Catering Establishments

Chop-bars

Drinking bars

Cafeteria

Restaurants

Coffee-shops

Snacks and beverages

Fast food Joints

### 2.1.3 Amusement and Recreational Services Within Tourism Facilities

Night- clubs

Discotheques

Theme park/recreational parks

Golf courses

Polo courses

Lawn tennis courts

Shooting/Fire-arm ranges

Marinas

Trails

Amusement Parks

Water sports (boating/rafting, skiing, surfing, swimming)

Angling/sports fishing, game hunting/ sports hunting

Bird watching

Safaris

Scuba diving

Trekking

Mountain climbing

Photography

Horse racing

Zoological and Botanical gardens

Conservation /Restoration of historical sites and buildings

Excavation of archaeological sites;

Aviation sports (paragliding, hand gliding)

Art galleries

## 2.2 Screening Criteria for Activities in the Tourism Sector

Various activities can be undertaken in the tourism sector. Based on the potential adverse impact on the environment and the socio-culture life of the people, activities are placed in the appropriate level of environmental assessment. These levels are:

Category A

Activities that have no significant adverse impacts and that are permitted without further environmental assessment.

Category B

Activities deemed to have significant adverse impacts that can easily be predicted and mitigated are subjected to Preliminary Environmental Assessment.

Category C

###### Activities that have significant adverse impacts that cannot be easily predicted and mitigated are subjected to a comprehensive Environmental Impact Assessment.

Institutional policies, strategic plans and complex situation are to be subjected to Strategic Environmental Assessment (SEA).

In placing tourism activities under the appropriate level of environmental assessment, a combination of criteria is used. These are: policy, legislative and general environmental attributes of the location and the types of activities being carried out.

### 2.2.1 Undertakings Requiring Registration without Further Environmental Assessment

The following tourism activities require registration without further environmental assessment:

#### 2.2.1.1 Accommodation

All accommodation units not exceeding 20 rooms and not located in a sensitive area as designated in Schedule 5 of LI 1652 (see appendix 5 for list of sensitive areas) shall be registered and permitted without further environmental assessment. These shall include:

Hotels

Motels

Inns

###### Bed and Breakfast (Units)

###### Lodges

Service Apartments

Condominiums

Chalets

Hostels

Guest Houses

Home Stays.

#### 2.2.1.2 Catering Establishments

Eating and drinking facilities with seating capacity not exceeding 50 persons and not located in sensitive areas as designated in schedule 5 of LI 1652.

#### 2.2.1.3Amusement and Recreational Establishments

All tourist amusement and recreational establishments that shall be registered without any environmental assessment for a permit shall include:

Camping sites with visitor receptor capacity not exceeding 20 persons for the purpose of the following:

Bird Watching

Scuba Diving

Trekking

Photography

Gambling/Casino with seating capacity not exceeding 50 people

Discotheques with seating capacity not exceeding 50 persons

Night Clubs with seating capacity not exceeding 50 persons and not located within 1000 meters (1 KM) radius of a residential area.

Speed Boating/Surfing with facilities not exceeding 10 motorized boats and not located in fish spawning or nursery grounds.

Rafting, Skiing and Swimming

Swimming pools, Gymnasium, Tennis courts, Saunas, Badminton/Squash courts with area coverage not exceeding 1 hectare.

Mountain Climbing

Botanical Gardens with area coverage not exceeding 5 hectares and not located in an area designated as sensitive in Schedule 5 of LI 1652.

### 2.2.2 Undertakings Requiring Preliminary Environmental Assessment (PEA).

The following tourism activities require detailed investigation before a permit is granted to commence development:

#### 2.2.2.1 Accommodation

All tourist accommodation to be subjected to a Preliminary Environmental Assessment shall include the following:

Facilities located in a coastal area with direct access to the beach or within the tidal range of an estuary or within 200 meters from the shorelines of a river and having a guest capacity not exceeding 50 rooms.

Facilities located in a non-sensitive area as designated in Schedule 5 of L11652 and not exceeding 60 rooms.

Tourist villages having a guest capacity not exceeding 50 rooms

Facilities located on hill slopes with gradient above 45 degrees and prone to erosion or rock fall or mudslide or landslide.

Resorts of all types including Spa, Sanatoria /health farms

#### 2.2.2.2 Catering Establishments

Eating and Drinking Establishments located in a sensitive area as designated in Schedule 5 of LI 1652 with seating capacity not exceeding 50 persons.

#### 2.2.2.3 Amusement and Recreational Establishments.

All tourist amusement and recreational establishments that shall be subjected to a Preliminary Environmental Assessment shall include:

Nightclubs with a seating capacity not exceeding 200 people, and not located within 1000 meters from a residential area (the building should be sound proof)

Theme/Amusement parks

Golf course

Fire ranges

Motorized vehicle/Go-kart racing

Sport hunting

Zoological gardens

Conservation/Restoration of historical sites and buildings.

Horse racetrack/Polo operations

Gambling casinos with seating capacity exceeding 50 people

The following activities are subjected to PEA provided they are not located in sensitive areas as designated in Schedule 5 of LI 1652.

Sport fishing / Angling clubs.

Speed Boating/Surfing with facilities exceeding 20 motorized boats.

Not located in a fish spawning or nursery grounds.

### 2.3.3 Undertakings Requiring Environmental Impact Assessment

#### The following tourism activities require a comprehensive and thorough environmental impact assessment for a permit:

#### 2.3.3.1 Accommodation

The following accommodation units shall be subjected to full Environmental Impact Assessment.

Any accommodation facility with a capacity exceeding 50 rooms sited elsewhere other than a sensitive area.

Accommodation facility sited in a sensitive area as designated in Schedule 5 of LI 1652.

#### 2.3.3.2 Amusements and Recreational Establishment

Resort and recreational facility sited in areas designated as in Schedule 2, sub-section 14 of LI 1652: These include:

Safaris

Mountain climbing

Gambling/Casinos located in sensitive area as designated in schedule 5 of LI 1652

Excavation of archaeological sites

Sky rails, Cable cars

Horse Racetrack/Polo operations in a built up area

Racetrack operations of motorized vehicles sports operating in a built-up area.

Facilities including trails for motorized recreational vehicles

Sport fishing/Angling in a fish spawning or nursery grounds

Aviation sports

### 2.4.4 Prohibitive Conditions

The following are conditions under which development may be prohibited:

No resort shall be established within 20 meters from the high tide mark of the coastal shoreline;

No Resort/Accommodation/Amusement and Recreational facility shall be established within 1000 meters (1 km) of a watershed and waterfall;

No outdoor firing/shooting range shall be established within 1000 meters of a built-up area or national park/biosphere reserve;

No marina shall be established within a fish spawning /nursery ground;

No tourist facility shall be established within 1 km of an area designated or known to be prone to landslides;

No tourist facility shall be established in an area prone to earthquakes such as fault lines ( should there be the need to site a facility, pre-determined building code of 1994 should be adhered to)

CHAPTER THREE

# 3.0 UNDERTAKING AN ENVIRONMENTAL IMPACT ASSESSEMENT

The first step in undertaking an environmental impact assessment is to scope the study. Scoping allows the proponent or the study-team to identify all the issues related to the project and to focus the study on the most relevant ones. The main output of scoping is a report detailing how the issues were identified. The report also should include a Terms of Reference (TOR) which outlines the main issues or outstanding issues to be considered in the environmental impact study.

A clear understanding of the proposed project and the environment in which it would be situated makes it easy for the potential issues to be identified. It is therefore necessary that the report of the environmental impact study provides description of the proposed development and the existing bio-physical and socio-economic environment.

## 3.1 General Description of the Proposed Development

The main issues to be considered in describing the proposed development are:

* Legal and regulatory framework of the project.
* Goals and objectives of the project;
* Benefits and risks from the project;
* Alternatives examined (location, designs, processes)
* Characteristics of the project (planning, site layout, design, size or scale)
* Description of constructional activities (land-use requirement; proposed works; environmental protection measures)
* Description of operational phase (processes or activities; scope; facilities and utility services required; all outputs (products and wastes); and methods to be used for the management and disposal of these outputs
* Description of other development (off-site areas or facilities affected by the project);
* Description of decommissioning phase (proposed growth, description of other changes

## 3.2 Description of Existing Environment

###### An accurate description of relevant aspects of the existing environment is necessary to predict the likely significant impacts of a development proposal.

It is important to note that all the parameters mentioned here might not be relevant to every project. A lot of time and cost will be saved if the study is focused only on those that are of relevance to the proposed project and location.

In describing the existing environment, the following should be considered:

* Climatic and atmospheric conditions; (temperatures, wind speed and direction, humidity, rainfall, air quality, sources of air pollution etc.);
* Geology: (soil characteristics, geologic hazards); hydrology (surface water, aquifers, watersheds, water quality etc.);
* Ecology: (flora and fauna, habitats, endangered species, );
* Land use: (agriculture, forests, industrial, commercial, residential), transportation routes such as roads, rail, water and air, utilities and water resources;
* Socio-economic: (population composition, population growth rate and distribution, cultural and ethnic diversity, income);
* Civic services: (electricity, telecommunication, water supply, hospitals, etc);
* Cultural heritages: (unique features of the area or its people; cemetery, traditional/sacred shrines and grove, festivals, traditional cultural/ religious practices etc).

## 3.3 Attributes of an existing environment.

To assist the preparation of systematic, accurate and comprehensive description, the attributes should be described within the following context:

Scale: - describe the location, geographic extent and magnitude of the environment factor (e.g. what volume of water flows in the stream?)

Character: - indicate the distinguishing aspect of the environment under consideration (e.g. is the water not polluted ?)

Sensitivity: - describe changes, which could significantly alter the character of this aspect of the existing environment (e.g. would any further increase in nutrients greatly affect the quality of water?)

###### Significance: - indicate what quality, value or designation is assigned to this aspect of the existing environment (e.g. is the site protected by legislation?).

## 3.4 Identification and Assessment of Impacts

Some operations and/or activities during construction, operation and decommissioning of various tourism facilities could exert significant negative and positive impacts not only on the environment but also on the socio-economic and socio-cultural lives of people living in the vicinity of the project areas.

### 3.4.1 Identification and Prediction of Impacts

It is very important to identify all the potential impacts, positive and negative; cumulative and residual; direct and indirect; short term and long term and especially those for which there is public concern. It is also important to set “impact boundaries” in order to achieve the following:

* Ensure a certain level of fairness, cost-effectiveness and efficiency in the EIA exercise.
* Focus time and resources on the most important issues.
* Limit the amount of information to be gathered and analyzed to a manageable level.
* Recommend realistic and feasible mitigation and monitoring measures.

### Methods that can be used in identifying Impacts

* Simple methods used in identifying impacts include the following:
* Adhoc Methods: - use of similar projects and professional judgment.
* Matrices: - use of two-dimensional tables (project activity versus impact) Checklist: - use of specific list of environmental parameters investigated for possible impacts (see appendixVIII for a sample checklist)
* Networks: - use of possible cause-effect linkages between various environmental factors.
* Geographic Information Systems (GIS):- use of computerized systems for multiple map overlays.
* Conduct pre-project socio-economic and socio-cultural surveys and assessment of land resource use and local skills and talents.

### 3.4.2 Assessment of Impacts

What criteria should guide in assessing the potential significance of the impacts of a project?

The following three criteria can be used to determine whether an impact is significant or not:

* Magnitude and intensity: this refers to any development, which can cause effects over a wide area, to a large number of receptors, or those normally experienced.
* Duration: implies any development which can cause impacts for a long period of time or which will cause permanent changes to any aspect of the environment.
* Certainty: this refers to the situation where the magnitude, intensity, duration or consequences of any change cannot be anticipated with a reasonable level of certainty.

###### Sometimes, an impact may be considered significant where society as a whole, a community or a significant number of individuals is concerned that some aspect of a development may adversely affect them or a valued heritage. Significance of a change is another important criterion that may be considered. The change may be small in measure but may have major impact on one or all environmental components e.g. changes in water quality (turbidity) may lead to decline in fish fauna

To facilitate evaluation of the EIS, references should be cited to recognised standards (e.g. effluent discharge standards, noise emission standards, and gas emission standards) should be made as appropriate. (appendix IX contains the environmental quality guidelines for Ghana.

### 3.4.4 Criteria for defining the significance of impacts of activities in the tourism sector

The following represent general criteria for determining adverse impacts as significant:

* When the location or operation of the activity attracts widespread public concerns or resentments.
* When activity affects domestic water supply or a major consumption or long-term commitment to water use
* When activity causes a major geologic, hydrologic or micro-climatic change
* When activity degrades an important aesthetic resource
* When activity results in major changes in land-use
* When activity is located within an area of significant geologic or hydrologic hazard e.g. within a major earthquake zone, an area prone to landslide or a major flood plan etc.)
* When activity conflicts with proposed or adopted development policy or land-use plan or policy
* When activity is located in sites designated as sensitive by law
* When an activity generates large quantities of solid and liquid waste
* When an activity emits excessive noise or smoke
* When an activity degrades and depletes the habitat quality and size respectively of a rare/endangered species of animal or plant

Specific criteria for determining the significance of Impacts of specific activities in the Tourism Sector are presented below...

|  |  |  |
| --- | --- | --- |
| Activity | Impacts | Significance Criteria |
| Dredging | Impact on benthos  | If substratum contains rich collection of benthos population or community or if benthos has high economic or social value |
|  | Mobilization of heavy metals and organo pesticides  |  If substrate contains large concentrations of heavy metals and organo-pesticides that could be mobilised e.g. >0.005mg/l; 10mg/l of zinc |
|  | Turbidity | If turbidity increases above 75 NTU  |
| Clearance of land | Habitat loss | If location to be cleared is designated as sensitive, contains rare or endangered species; has cultural/religious significance |
| Construction of ground water | Lowering of water table | If abstraction leads to depletion of aquiferIf abstraction results in intrusion of salt water into aquifer  |
| Draining of swamp/reclaiming of swamp | Habitat alteration change in land-use |  If swamp contains economic, medicinal species or is of cultural importance to stakeholder communities.If swamp serves as storm buffer for surrounding habitat or settlement.If swamp habours populations of biota of national or global conservation significance |
| Continuous Noise Generation | Effect on hearing impairment  | When noise generated exceeds the EPA permissible level for a particular zone or locationIf persons are exposed to noise levels >85d BA for more than four hours; or more than eight hours |
| Solid waste generation | Threat to public health | If solid waste generated would have to be stored or confined on premises for more than 24 hours before evacuated |
| Oil spillage | Contamination of soil and water | When oil spill, results in iridescent sheets spread over a very wide area of more than 1km2 of water surface |
| Exhaust emissions from boats generators and incinerators | Air pollution | If activities lead to levels of emissions exceeding stipulated in the EPA Environmental Quality Guidelines for Ambient Air. |
| Boating | Direct damage to shoreline and sensitive habitat | When wakes from anchors and moving boats are likely to enhance erosion of shoreline.  |
| Wildlife viewing, sight seeing | Habitat destruction through bush fire  | When tourists are likely to start bush fires through dropping of lighted pieces of cigarette or direct setting of firesWhen animals are likely to be disturbed by tourists |
| Sport fishing | Stock depletion | When juvenile fish or gravid fish are likely to be caught by the gear employed  |
| Effluent discharge | Water Pollution | When effluent is discharged into water courses, wetlands and drains. When treated effluent is discharged into water meant for multiple use. When effluent quality exceed EPA permissible standards. |

CHAPTER FOUR

# 4.0 MITIGATION OF IMPACTS

Mitigation measures are action plans or programmes developed to avoid or reduce, restore and remedy the e potential adverse impacts of a project and to enhance/ maximize its environmental, social and economic benefits or compensate for unavoidable residual impacts.

## 4.1 Mitigation of Significant Impacts

4.1.2 What is the role of mitigation in Environmental Impact Assessment?

Mitigation measures help to address significant impacts that the project may induce on environment in the short or long term. Some of the impacts may only be perceived years after the project has commenced, and may become apparent only during the monitoring phase.

4.1.3 Under what conditions are mitigation interventions necessary?

Mitigation measures are required when proposed activities are likely to have significant negative impacts on the environment or socio-economic life of affected parties. Below is a list of some categories of impacts that would require mitigation measures.

* Degradation/ Destruction of natural resources such as pollution of water bodies and destruction of drainage channels
* Destruction of flora, fauna and ecosystems;
* Degradation/ Destruction of settlements and basic social amenities such as roads, schools, markets, public places of convenience;
* Noise/odour nuisance generation;
* Enhanced visual intrusion;
* Damage to landscape and soil erosion;
* Threats to public health;
* Threats to occupational health and safety of workers;
* Fire risks;
* Destruction of cultural sites and sacred groves; and
* Air pollution

4.1.4 What are some mitigation interventions that can be instituted?

Mitigation measures can be broadly categorized into the following strategies that are aimed to meet defined objectives:

* Mitigation by avoidance

Measures considering siting, design, process, technology, route alternatives and ‘no go’ options to avoid impacts. These measures are applicable in planning stage of the project. Examples include the following:

* Selection of alternative route or relocation of facilities such as roads, power and water lines, archeological sites, sacred groves and religious sites;

Avoid dumping solid or liquid waste materials into nearby water bodies

* Mitigation by reduction

Measures attempting to reduce impact or to limit the exposure of receptors to impacts.

These measures are applicable only in the progressive phase of the development project. Such measures include:

* Reducing solid and liquid wastes through recycling;
* Use of silt traps and planting of cover crops to reduce soil erosion or sedimentation from project sites;
* Limiting the scale of a proposed project;
* Reducing noise transmission by installing acoustic filters;
* Mitigation by remedy

These are measures undertaken to restore the environment to its previous condition or to a new equilibrium and are applicable only towards the end phase of project implementation and represents the ‘end of pipe’ approach to help improve adverse conditions created by the proposed development. Examples of mitigation by remediation include:

* Installation of additional pollution control equipment;
* Landscaping to reduce visual intrusion and soil erosion;
* Remediation of contaminated or polluted water and soil;
* Restoring the quality of flow of a diverted stream or river to its original condition;
* Compensation

These represents measures to achieve no net loss and represent on-sites or off site measures considered early in the planning process and also alongside the development to offset residual impacts. Examples include

* Compensating affected communities;
* Resettlement or relocation of affected communities.
* Enhancement

These measures are aimed to achieve net positive gains and are generally applied in parallel with other compensation measures to encourage opportunities to limit the scope and scale of impacts and on improving environmental features.

## It is essential that mitigation measures are considered in the following hierarchy: avoidance, minimization, rectification, compensation and enhancement

## 4.2 Accommodation

### 4.2.1 Mitigation of Adverse Socio-Economic Impacts.

* Employ local skills as far as possible in the construction of the accommodation and other associated facilities.
* Provide alternatives to fairly compensate local people who incur losses and need to be compensated.
* Develop local infrastructure and services if possible to handle increase in population i.e. waste disposal, health care, law enforcement, schools etc.
* Evaluate and invest in enhancing traditional skills and talents.
* Avoid tampering of significant socio-cultural landmarks and traditional cultures.
* Preserve cultural and historic resources
* Conserve aesthetic resources such as waterfalls, national parks, wildlife, sanctuaries, wetlands, forest and wildlife reserves, coral reefs, lakes with unique aquatic life, heritage building and sacred areas etc.

### 4. 2.2 Mitigation of Adverse Environmental Impacts

#### 4.2.2.1 Land

Vegetation clearing must be as far as possible limited to only the project site.

If site preparation generates dust which could affect residents, then site should be sprayed with water frequently during preparation.

Access roads to such facilities must be well engineered i.e. roads must be well designed and constructed to ensure proper drainage.

Institute measures to reduce erosion to a river or stream such as installation of silt traps

#### 4.2.2.2 Air Quality

Trucks conveying construction materials must be covered with tarpaulins.

During constructional phase, un-tarred access roads must be sprinkled with water regularly to reduce dust generation.

At the operational phase, “greens” must be maintained in and around the facility i.e. landscaping must be done and maintained to reduce dust generation due to wind turbulence.

Cooling, refrigeration and air conditioning units should avoid the use of substances such as Freons to prevent damaging the Ozone Layer.

Halons must be substituted in firefighting equipment.

#### 4.2.2.3 Water Quality

Treat effluents emanating from accommodation facilities in the tourism industry to an acceptable level (ref. EPA effluent Quality Guideline) before discharging.

Do not clear vegetation beyond 100 meters to the bank of water bodies.

A programme for waste reduction and water conservation should be implemented to optimize resource use, save money and foster environmental awareness among staff.

Oil and fat traps must be installed to extract these substances from sewage waste streams

A well designed monitoring programme should be established to monitor compliance to suggested measures

If sewage is not discharged into public sewer, a biological or other treatment plant will be necessary in order to meet acceptable and or applicable effluent criteria.

A settling pond should be constructed.

The storage of pesticides and herbicides must be properly done to avoid fires and to protect humans

#### 4.2.2.4 Noise.

Abatement measures of noise must be included in the design of a tourist facility. Acoustics should be an important element of the design of toursit infasructure

 EPA noise guidelines should be adhered to in defining permissible limits of noise/sound (e.g. from outdoor music) to avoid or reduce nuisance to guest and neighbors (refer to appendix 7 for EPA ambient noise guidelines).

Noise from access roads and noise generating equipment e.g. standby generator should be mitigated through appropriate barriers

#### 4.2.2.5 Ecosystem and Wildlife

Revegetate habitats or ecosystems used by sensitive or endangered species which have special conservation/biological importance.

Avoid destruction of protected areas or sacred groves.

Conserve islands of untouched forest or natural vegetation, wetlands, creeks etc.

If necessary, leave a buffer zone of 150m away from such ecosystems.

Revegetate cleared or degraded areas by planting native species

Institute/reduce speed limits in protected areas

#### 4.2.2.6 Occupational Health and Public Safety

Pest and insect control must be based on integrated approach where the use of chemical(s) is minimized to prevent contamination and injury to health of workers or clients.

Strict rules for hygiene and cleanliness must be observed at all times to ensure that food and drinking water are not contaminated

Routine fumigation should be instituted

All job functions should be systematically reviewed to ensure that staff works in safe and sound conditions.

Protective equipment, gadgets, and clothing must be provided to workers/staff where the nature of work poses a a risk of injury.

Ergonomic design of workplace with proper ventilation, lighting etc. must be ensured.

Ensure that staff undergoes routine medical check-up to avoid transmission of diseases.

Fire prevention and protection equipment must be installed in the right quantities and qualities at vantage points. E.g. Fire extinguishers, fire alarm systems, sprinkler systems fire walls and use of non-flammable and flame retarding materials must be considered.

Institute a programme to deal with possible fire outbreak and emergencies.

Fire exits as well as structures and equipment for active or passive fire fighting must regularly be inspected.

Where there is a swimming pool, trained lifeguards must be employed.

In case smoke or fire is detected, alarms must be sounded, central air conditioning switched off and fire brigades alerted without delay.

A safe area must be established where staff and clients can converge in case of fire outbreak.

There must be enough parking spaces

There should be signboards indicating “In or Entrance”, “Out or Exit” Parking Space for clients.

## 4.3 Catering Establishments

### 4.3.1 Mitigation of Adverse Socio-economic Impacts

Maintain good housekeeping

Ensure personal hygiene of food handlers

Practice effective cleaning methods

Establish correct procedure for stock delivery and rotation

Sensitize staff on environmental hygiene

Keep to food quality standards

Routine monitoring by licensing agents of district assemblies.

## 4.4 Mitigation of Adverse Environmental Impacts

Use energy efficient stoves

Sort waste for proper disposal

## 4.5 Amusement and Recreation

### 4.5.1 Mitigation of Significant Adverse Impact of Water Sports and Recreation

#### 4.5.1.1 Marina Development

Control floodplain development to minimize fluctuations in water level

Institute turbidity reduction measures such as hopper dredging or silt fencing

Provide waste facilities on boat and on-shore

Evacuate waste from the site daily and ensure its safe disposal

Locate marinas in robust areas with consolidated ground material

Dredged material should be deposited far from shoreline from where it will not be washed back into water

Limit the number of boats and mooring in an area so that numbers of boats do not exceed the carrying capacity.

Design docks to suit the carrying capacity

Design boat piers on pilings to minimize beach erosion and deposit

Gasoline/fuel vendors should install vapour-catching devices on their pumps

Maintenance servicing of boats should be carried out at approved areas

Do not use anti-fouling paints on boats operating from the marina (ref. to Marpol guidelines)

Institute measures to reduce human vehicular conflict during construction

Institute measures to ensure occupational safety during construction

In areas where bilharzia is endemic, institute measure to reduce infestations

#### 4.5.1.2 Speed Boating and Cruise Ships

The following control measures should be instituted to prevent irreversible impacts to the environment:

* Designate ‘no anchoring’ areas in fragile habitat areas and require cruise to stay out of shallow areas to prevent sediment disturbance
* Mooring buoys should be stable to avoid anchor movements that could damage fragile substratum
* Place education charts at vantage points to educate tourists on proper anchoring and mooring of boats
* Limit number of boats and cruises in the tourism area
* Boats should provide on board waste holding tanks
* Dispose of trash and wastes on regular schedules at receptor facilities at marinas or jetties
* Provide protected suites/life jackets for regatta

#### 4.5.1.3 Surfing and Water Skiing

Provide sewage treatment plants for on-site treatment

Limit the number of skiers using a particular ski area by using reservation system.

The number of skiers should be below the carrying capacity of the available infrastructure to avoid large-scale pollution problems.

#### 4.5.1.4 Rafting

Use alternative rafting materials if raw material base is endangered or threatened by extinction or is rare

Demarcate rapids as ‘no rafting’ areas to avoid accidents

#### 4.5.1.5 Sports Fishing

Designate permit/license programme for sport fishermen the license should ensure:

catch restrictions should be set based on fish size, number, species and season

prohibit use of nets for sports fishing

prohibit useof barbed hooks and permit use of unbarbed hooks

develop a catch and release programme for small stock size fishes

#### 4.5.1.6 Wildlife/bird watching

Restrict access and designate specific observation posts

Prohibit use of disposable of plastics in the wetland/marine environment

CHAPTER 5

# 5.0 OUTLINE FOR PREPARING ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR TOURISM ACTIVITIES

An Environmental Management Plan should contain the following information:

## 5.1 Executive Summary

The Executive summary should be a non-technical summary outlining the main issues addressed in the EMP.

## 5.2 Introduction

The company’s name, location, current trends in the specific tourism activity, baseline, and benchmark management goals.

## 5.3 Policy on Environment, Health and Safety

Environmental Policy

Policy Statements and General Objective(s).

Legal and Regulatory requirements concerning the specific operation

Specific Objective.

Occupational Health and Safety Policy

Policy Statements and General Objective(s)

Legal and Regulatory requirements concerning the specific operation

## 5.4 Potential Impact Identification and Assessment

Description of Services/Activities

Nature sources, types and quantities of inputs

Nature of packaging for inputs and products

## 5.5 Potential Releases/Pollution types

Solid, liquid, gaseous, particulate emissions into environmental media (air, water, land), their effects (long/short term global/local cumulative/one off).

Other pollution types (visual, audio, thermal, explosion, accidental releases, etc.)

## 5.6 Summary of Substances/Pollution Indicators requiring Ccontrol with reference to Rregulatory/Legal Requirements, Local Standards or International Standards as they may apply).

Suggested control measures (cost and timeframe)

Potential effects on the environment if such substances/pollution indicators in (d) above exceed the legal/regulatory requirements.

## 5.7 Current Environmental Management Practices

Current environmental management practices and their limitation with regards to waste avoidance, minimization, recycling, reuse, transportation and disposal to mitigate potential impact of the operational activities must be included. The environmental management issues may include:

###### input handling and storage

* Energy Management
* Water Management
* Emergency response, readiness procedures/contingency

## 5.8 Environmental Action Plan

The plan must address mitigation of potential impacts and must include the following:.

summary of mitigation/improvement programmes to achieve desired resource conservation, waste minimization, and better quality of life for the public and at the work place environment.

environmental quality objectives (EQOs), targets/scope, actual actions to be taken, time frame, budget, the responsible manager(s), and the type of documentation.

voluntary initiatives such as cleaner production, Akoben Environmental Performance Rating and Public Disclosure (EPRD) etc and environmental outcomes from the implementation of such initiatives.

## 5.9 Occupational Health and Safety Action Plan

The plan should discuss current occupational health and safety practices and their limitations, identify hazard, recommend control actions for accident avoidance, minimization and appropriate personnel protection.

## 5.10 Administrative and Technical Arrangements to Meet Requirements

Management Structure, organization and Personnel along with details of responsibilities allocated for implementation of EMP and for achieving set targetsStaff information and training

External information and public participation including dealing with public complaints.

# Appendix 1: Environmental Assessment Form (EA1) For The Tourism Sector

Category of Activity

Accommodation Catering Establishments Tourism in wildlife

 Protected Areas

Tourism development in Historical

Cultural and Archaeological sites Water Sports Land based sports

others Please specify…………………………………………………………………

.

Description of proposed Project

Type of activities/facilities---------------------------------

(Size, Capacity, Operational period)----------------------------------

Average visitor capacity per day-------------------------------

Peak operation periods---------------------------------------------

3. Scope of proposal

Size of labour force

Construction --------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Operation -------------------------------

Area covered by facility-----------------------------

4. Proposed site

Location

Site description (attached site plan)

Zoning

Distance to nearest residential and/or other facilities

Adjacent land- use (existing & proposed)

5. Infrastructure and Utility Requirements

(i)Structures (Buildings and other Facilities:

-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

(ii)Water (source and quantity)--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

(iii) Power (Type, source and quantity)---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

(iv) Roads---------------------------------------------------------------------------------------

(v) Other utilities and Facilities:---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Baseline Information

Climate

Geology

Air quality

Water bodies (i.e. Rivers, Stream, Lake)

a) Present Absent

Indicate distance to water bodies……………………………………………..

b) Domestic use Recreational use

Transportation Fishing Irrigation

Others (Please specify) ---------------------------------------------------

Environmental Impacts of Project

 (Constructional and operational phase impacts on land, air and water)-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Socio-economic/ Socio-cultural impacts of project on stakeholder community and neighbours

5. Mitigation/environmental, enhancement and management measures

-----------------------------------------------------

Monitoring plan

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# Appendix II: Checklist of Potential Impacts

 Accommodation

The construction and operation of accommodation facilities such as Hotels, Motels, Chalets, Inns, Guest Houses, Lodges, Boatels, Park lodges and Camps, Condominiums Service Apartment etc. could result in short, medium or long -term positive and/or negative impacts.

These impacts may occur during the constructional, operational and or decommissioning phases of the project and could be socio-economic, socio-cultural and environmental.

Socio-Economic Impacts.

Socio-economic impacts association with the provision of Accommodation facilities in the tourism industry could be positive and negative. These impacts are indicated below.

Positive Impacts

Employment Generation

Provision of accommodation

Improved Aesthetic of the landscape

Improved income level from sale of artefacts and handicrafts

Provision of recreational and Catering Opportunities

Improved local economy (the whole community)

Cultural diffusion and exchange of certain aspects of local culture with introduced cultures.

Generation of income to the traditional authorities

Modernisation of certain obsolete cultural/traditional practices provision of

Opportunities for education to learning.

Negative Impacts

Influx of criminals and prostitutes into the community

Alteration in daily living pattern

Overloading of or excessive pressure on infrastructure and social utilities and services (e.g. housing, electricity, telephone, water, health etc.) due to influx of people to the community.

Socio-cultural adulterations (disregard for marital and child responsibilities, drug abuse, prostitution, child labour, etc).

Cultural clashes between the local people and the immigrants.

Environmental Impacts.

Environmental impacts associated with the construction and operation of accommodation facility in the tourism industry could be positive and negative, short, medium and or long term. These impacts are indicated below.

Positive Impacts

If the construction of accommodation facilities is well engineered they could go along way to enhance the following;

Stability of slopes enhanced due to terrain engineering.

Landscaping to improve the aesthetic of the project area

Soil erosion from site leading to siltation of local watercourses could be drastically minimized.

Negative Impacts

(i). Impacts From Site Selection:

Slope stability could be adversely affected by clearing of vegetation on the land and the construction of access roads

Soil erosion from site leading to siltation of local water courses

Loss of biodiversity

Increase Susceptibility of the soil to water and wind erosions.

Loss of wildlife habitat.

Noise pollution

Dust pollution as a threat to the health of local population/surrounding facilities.

Increased flood recurrence and storm flow volumes.

Visual intrusion.

Land degradation.

Reduce rainwater recharge of aquifers due to increase run off.

Could create traffic effects.

Health related effects.

(ii) Impacts On Air/Air Pollution:

Dust pollution due to heavy trucks using gravel roads or untarred roads to the project site.

Increase traffic to remote resorts and pristine areas as well as other areas will pollute the air with air pollutants such as Carbon dioxide, Carbon monoxide, Sulphur and nitrogen oxides.

Air can be polluted through burning of waste in incinerators.

The use of dry cleaning pollutes the air with Chemical such as Perchlorethylene, CFC and non-Chlorinated solvents

(iii). Impacts on Water Bodies or Water Pollution:

Rivers and water ways could be polluted by oils, garbage or sediment during construction and operation of accommodation facilities

Siting of access roads could impact on water resources by enhancing erosion and siltation.

Wastewater from accommodation facilities aseptically from toilet, showers, laundries, kitchen, workshops, swimming pools are sources of pollution to water bodies. Phosphate-based detergents and nitrates in raw sewage can be damaging to receiving waters and also constitute a health problem.

Phosphate and nitrates pass through sewerage system mostly without breaking down and accumulate in streams, lakes, lagoons where they provide nutrients for algae which in turn deplete oxygen, thereby killing fish and other aquatic life-forms i.e. eutrophication causing series ecological problems or imbalances mostly by coastal or lakeside resorts accommodation facilities.

(iv). Impacts On Soil and Underground Water:

Inorganic fertilizers such as ammonium nitrate, super phosphate and potash often used in greening hotel landscapes can be detrimental to the soil and pollute the aquifers and drainage systems of the area.

Parking lots and asphalt roads built for the facilities could be source of motor oil and grease pollutants leaking from trucks, cars and tours buses transporting goods and visitors to the accommodation facility as these oils and grease are washed in runoffs into ditches and find their ways into the soil and underground water.

Herbicides, Fungicides and pesticides used in spraying grass and trees surroundings such accommodation facilities are usually toxic and damaging to the environment, soil and underground water sources.

(v). Impacts on Health:

A number of commercial cleaning disinfecting, deodorising, sterilising or painting products used in housekeeping and maintenance of buildings can be environmentally toxic and constitute a health hazard.

(vi). Impact of Noise:

Construction phase of such projects could create excessive noise.

Noise generated by power generation or the music dance bands located within or near a residential areas, etc. in open-air dance floors could be a nuisance to the residents.

Where these facilities are located within national parks, the noise generated here could scare off wildlife.

(vii). Impacts Of Improper Disposal Of Solid And Liquid Waste :

Destruction of ecologically sensitive areas such as marshes and other wetlands.

Proliferation of rodents, scavengers and insects harmful to human health.

Fires health hazards and unsightly conditions.

(vii). Occupational Health and Safety Impacts:

This impact is perceived in two angles i.e. health and safety of employees and that of the tourists.

Some employees may be exposed to high temperature in the kitchen

Some employees may be exposed to humid conditions in the laundry

There is the high potential of fire outbreak.

Catering Establishments

Socio-Economic/Socio-Economic Impacts

Positive Impacts:

Catering establishments:

Generation of employment

Generation of revenue

Chop bars, drinking bars provide food and drinks not affordable prize to low-income earners

Access to food and beverages

Chop bars use simple and easy means to operate and maintain equipment

Satisfaction of various food preferences

Provision of recreation and relaxation

Exposure to dishes of other cultures

Infusion of desirable catering and service culture in indigenous culture

Negative Impacts:

Unhygienic catering services and practices lead

Public health problems

Lost of income

Lost of manpower

Source of conflicts in marital homes especially with nightclubs and discotheques

Operation of discotheques and night clubs may lead to prostitution, high crime rate drug abuse, child labour

Environmental Impacts

Traffic congestion during operational hours

Generation of solid waste or garbage

Generation of liquid waste

Improper disapproval of solid and liquid waste leads to unsanitary conditions

Noise nuisance from night clubs, discotheques

Fire hazards

Public health problems due to air pollution from excessive smoke generation during operation

Amusement and Recreation

Tourism Activities in Wildlife Protected Areas

 Socio-Economic Socio-Culture Impacts

Positive Impacts:

Protected Area tourism could lead to:

Generation of employment

Creation of recreational educational opportunities for both local people and visitors

Provision of income from collection of entrance fees

Generation of secondary economic for local communities e.g. Sale of food and artifacts

Enhancement of traditional craft

Exposure to positive experiences in other cultures

Modernization of certain obsolete cultural/traditional practices

Infusion of desirable culture elements

Negative Impacts:

Shift of labour from traditional food production to more vulnerable cash-based economy

Threats on life and properties by wounded animal from gunshots

Cultural adulteration

Prostitution and sex tourism

Drug abuse

Increase in crime rate

Child labour

Protected animals from safari parks interfere with lives of local people

Environmental Impacts

Sports Hunting

Excessive recreational hunting can reduce wildlife population

Noise from gunshots may disturb wildlife

Safari/Wildlife Watching/Sight Seeing

Littering

Loss of vegetation and soil erosion due to linking and movement of safari vehicles through fragile habitats

Bushfires started by campers can cause habitat loses

Wildlife watchers can disrupt natural habitat of wildlife and may bring about behavioural changes

Dust pollution from vehicular transport

Noise pollution from vehicular transport

Depletion of wildlife through hunting and poaching

Hiking/Camping/Trails

Off-trail trampling can cause erosion and eliminate ground cover

Littering

Addition of pathogen to soil and water from human waste

Risk of bush fires from camp fire

Introduction of exotic floral species by man-made linking trails

Trampling on vegetation by tourist leads to loss of vegetation and biodiversity

Mountain Climbing/Photography

Littering

Trampling on vegetation reduces the vegetation cover leading to erosion and land slide

Disturbance of habitats of rare species

Loss of species due to construction of trails

Tourism Activities in Historical and Archeological Sites

 Socio-Economic, Socio Cultural

Positive Impacts:

Keeping and preserving cultural identity and heritage

Generation of employment

Infusion of desirable culture elements

Generation of revenue

Provision of evidence of man and his environment for purposes of study, education and enjoyment

Conservation of traditional artisanal skills

Preservation of traditional architecture

Preservation of historical links

Provision of information of a Technological development of man

Reconstruction of the prehistoric environment into which the cultural remains were originally designed to fit.

Negative Impacts:

Cultural adulteration

Prostitution and sex tourism

Drug abuse

Increase in crime rate

Child labour

Environmental Impacts:

Littering

Generation of solid and liquid waste

Traffic congestion in small local communities

Construction of roads to these sites could lead to

Impacts of infrastructure development activities can pose a threat to fragile eco-system

Excavation of archaeological sites can generate noise and dust

Improper disposal of excavated spoils from archaeological sites alter the landscape

Religious sanctuaries, sacred places or grooves contribute the conservation of biological diversity

Water Sports and Recreation

Marinas

Socio-Economic, Socio-Cultural Impacts

Positive Impacts:

Employment generation

Improvement of income of stakeholder communities employed

Provision of social amenities (e.g. portable water, electricity health posts etc.)

Recreational and Educational Opportunities

Jetties provide safe landing bases for other water crafts

Negative Impacts:

Cultural adulteration

Reduction of quality of community water supply during construction and operation

Water-use conflicts

Threat to public health due to inadequate sanitary facilities

Environmental Impacts

Littering of solid waste and liquid waste

Spillage of oil into water

Loss of nursery and breeding sites of fish

Increased human activities may disturb wildlife habitat

Configuration of shoreline and benthos altered

Sitting Marinas close to sensitive nature reserves could destroy Flora and fauna increase effluent of adverse humid on wildlife

Anti-fouling and other chemicals containing metals and toxic components can accumulate in local waters harming shell fish and other aquatic life

Noise and dust pollution from constructional activities

Human-vehicular conflict during construction

Marina development is often accompanied by dredging fishing, construction of brake waters and increased foaling which increase turbidity in water and can be detrimental to aquatic life

Angling/Sport Fishing

Socio-Economic, Socio-Cultural Impacts

Positive Impacts:

Provides amusement and recreation or pastime

Provides sources of fish protein to practitioners

Angling minimizes use of active gear which could threaten fish resources of lakes and enclosed water bodies

Negative Impact:

Conflict between angling and other water-use

Environmental Impacts

Stock of threatened species become endangered when targeted

Stock may be endangered when gravid population is targeted

Some fishing equipment may be deposited in the waters e.g. lead sinkers and tangled line may be harmful to wildlife

Scuba Diving

 Socio-Economic, Socio-Cultural Impacts

Positive Impacts:

Provision of recreation and amusement

Provision of information for education

Negative Impact:

Accidents could arise from divers being trapped in wrecked vessels

Environmental Impact:

Divers may collect marine souvenirs and disrupt activities of marine life

Speed Boating

Socio-Economic, Socio-Cultural Impacts

Positive Impacts:

Provision of recreation and amusement

Attraction of secondary activities such as establishment of chalets and hotel facilities

Provides attraction for tourists

Negative Impacts:

Conflict with fishermen where speed boating occur in fishing grounds

Cultural adulteration due to tourists attraction

Increase in crime and other solid vices e.g. prostitution, drug abuse

Environmental Impacts

Disturbance of fish in spanning and nursery grounds

Oil spillage/leakage from boats

Increase aeration of water column by turbulence created by high-speed boats

Exhaust firms from boats degrade air quality

Anchors dropped or dragged on the sub-stratum may damage fragile benthic habitat

Sediments disturbances and settling from larger boats can harm aquatic life

Raw sewerage, plastic and other waste are discharged directly into the water or bays

Wakes from boats can cause shoreline erosion

Surfing and Water Skiing

Socio-Economic, Socio-Cultural Impacts

Positive Impacts:

Provide recreation and amusement

Attraction for tourists

Environmental Impacts

Increased aeration of water

Repeat for boating

Rafting

Socio-Economic, Socio-Cultural Impacts

Positive Impacts

Provide recreation and amusement

Provision of means of transport

Negative Impact

Accidents may occur where there are rapids

Environmental Impacts

Disturbance to wildlife e.g. water fowls and hippos

Raw materials for rafter sacred be over exploited.

Land-based Sports

Socio – Economic Impacts

Positive Impacts:

Creates employment for the local communities

Stimulates profitable domestic industries – hotels, construction, souvenirs, handicrafts, transport system, catering, guide services and ancillary services.

Generates foreign exchange for the country.

Generates revenue for government

Generates income for local population

Diversifies the focal economy and reduces over dependence on agriculture and manufacturing sectors(s)

Encourages productive use of lands, which are marginal for agriculture or manufacturing.

Promotes educational and research opportunities

Serves as a tool for conservation of the historical, cultural and ecological heritage.

Creates recreational facilities for use by local communities as well as domestic and foreign visitors.

Negative Impacts:

Over-use by tourists and surrounding human population as a result of recreation exert pressure on land use.

Felling of trees and vegetation cover causes soil erosion.

Destroys bio-diversity

Creates hostility between visitors and local communities since the latter views facilities as being established for the benefit of the former.

Social and environmental carrying capacities may be exceeded, creating social problems and degradation of the environment.

Propensity to increase prices of goods and services to the disadvantage of local people at the destinations.

Create high foreign exchange leakage in the economy as a result of imported items to service the tourism sector.

Competition with local community for the same water source creates social conflict

Use of agricultural lands deprive local population of food, employment and income

Lack of respect for the sanctity of religious places, as symbols of belief and values cause social-cultural and economic conflict with local population.

logging of trees, which could be used for production of arts and crafts cause economic loss.

introduction of tourist activities and facilities into local communities sometime create socio-cultural in-compatibility with the beliefs and values of the people.

 Environmental Impacts

Soil structure and slope stability are affected by clearing of vegetation.

Noise nuisance.

Littering

Dust generation.

Liquid waste generation

Threat to fauna and flora

# Appendix III : Annual Environmental Report Format

1. Executive summary- a brief non - technical summary of the entire report
2. Introduction
3. Environmental Policy Objectives, Strategies and Targets for the year under review
4. Description of company’s operations
5. Environmental activities for the year under review
6. Environmental problems encountered during the year and their effects
7. Progress report on mitigation measures where applicable
8. Monitoring activities and results
9. Conclusion

Four (4) copies of the report should be submitted to the Agency.

# Appendix IV: List Of Potential Stakeholders (Formal And Informal)

|  |  |  |
| --- | --- | --- |
| 1. | ACTIVITY | POTENTIAL STAKEHOLDER |
|  | Accommodation | Local Hosting Community |
|  |  | Traditional Authority (Chiefs and Opinion Leaders) |
|  |  | Hosting District Assembly |
|  |  | Town and Country Planning Dept. |
|  |  | EPA |
|  |  | Tourist Board |
|  |  | Ministry of Tourism |
|  |  | Lands Commission |
|  |  | Wildlife Div. of Forestry Commission (for park lodges and camps etc.) |
|  |  | NGO’s active in the local area |
|  |  | Hotelier association |
|  |  | Financing Institutions (both internal and external) |
|  |  |  |
| 2. | Catering Establishment | Local Hosting Community |
|  |  | Traditional Authority (Chiefs and Opinion Leaders) |
|  |  | Hosting District Assembly |
|  |  | Town and Country Planning Dept. |
|  |  | EPA |
|  |  | Tourist Board |
|  |  | Ministry of Tourism |
|  |  | Lands Commission |
|  |  | Wildlife Div. of Forestry Commission  |
|  |  | NGO’s active in the local area |
|  |  | Hotelier association |
|  |  | Financing Institutions (both internal and external) |
|  |  |  |
| 3.  | Amusement and Recreational Establish | Local Hosting Community |
|  |  | Traditional Authority (Chiefs and Opinion Leaders) |
|  |  | Hosting District Assembly |
|  |  | Town and Country Planning Dept. |
|  |  | EPA |
|  |  | Tourist Board |
|  |  | Ministry of Tourism |
|  |  | Lands Commission |
|  |  | Wildlife Div. of Forestry Commission  |
|  |  | NGO’s active in the local area |
|  |  | Hotelier association |
|  |  | Financing Institutions (both internal and external) |
|  |  |  |

# Appendix V: Critical Issues to be considered in Impact Assessment

|  |  |  |
| --- | --- | --- |
| EMPLOYMENT GENERATION | -  | The extent of habitat or ecological system to be affected (Loss of Biodiversity) |
|  | - | List of species (fauna and flora to be affected or dislodged, indicating their ecological status e.g. Rare, Sp. of special protection |
|  | - | Effect of project on water quality , air quality |
|  | - | If its a Hotel which shall be 4 stories and above a geo technical report must be conducted,  |
|  | - | Indicate the effect of the project |
|  | - | Parking spaces provision of enough space for clients |
|  | - | Potential for the project to generate traffic and this must be assessed  |
|  | - | Effect of construction on underground water |
|  | - | Surface water pollution |
| BASELINE ISSUES/DATA | - | 1. Project Description in relation to Adjoining land with 200 m radius of the site-uses must be indicated |
|  | - | 2. Climate information which must be related to impacts, how does components of climate data influence or modify the impacts. Rainfall, Temperature, RH, Wind direction, wind speed |
|  | - | 3.Topography-General nature the surface of the land slope -gentle steep) Related to the components of the project that could be affected |
|  | - | 4. Geology and soil strata layers with thickness (m) sandy, sandy loam, gravel etc |
|  |  | 5. Flora and Fauna |
|  |  | 6. Air quality |
|  |  |  |
| ACCOMMODATION |  | Inventory of Fauna and Flora (biodiversity indicating their ecological status e.g. Rare, which need special protection. Abandant and are not threatened |
|  |  | If the facility is a high rise one and will be 4 floors and above there is the need for geo-technical test |
|  |  | Provision of adequate parking space for customers |
|  |  | Indication of the natural drainage Patterns:- basis for designing the artificial and how drainage system in the area, this could influence the design and channeling of constructed drainage systems to take care of storm water etc.  |
|  |  | Dust generation and its effects on air quality and area of influence base, on wind speed and direction must be indicated |
|  |  | The level of noise and vibration to be generated and area of influence and its effect on all resources, fauna and flora, humans must be considered |
|  |  | Quality and categories of solid wastes to be generated must be assessed |
|  |  | Occupational health and safety issues must be considered |
|  |  | Traffic effects |
|  |  | Quality and characteristic presence of particular oily matter, soapy particles of liquid waste to be generated and receiving medium  |
|  |  | Quality and characteristic(pieces of food, packaging materials, pilot paper) of solid waste to be generated and receiving medium  |
|  |  | Components (wiring system, kitchen use of gas, other electrical gadgets) of the project that could be fire hazard |
|  |  | Socio-economic activities existing within to influence the project must be looked at and how these activities and project could affect each other |
|  |  | Job creation (Artifacts, African wares) |
| AMUSEMENT AND RECREATIONAL  |  | Establishment |
|  |  | Landscaping  |
|  |  |  |
| CRITICAL ISSUES TO BE CONSIDERED |  | Description of the project |
|  |  | Existing Environmental Conditions |
|  |  | 2.1 Climate, Geology, Hydrology, Siesmicity  |
|  |  | Wind speed Rainfall, Temp. RH wind direction, How they influence impacts of the project |
|  |  |  |
|  |  | 2.2 Traffic movement |
|  |  | 2.3 Air Quality and Noise levels |
|  |  | -Dust Noise |
|  |  | 2.4 Socio-economic effects: population and demography-Local economy |
|  |  | 2.5 Inventory of fauna and flora , i.e. biodiversity count |
|  |  | Indicating their ecological status i.e. either rare spp.  |
|  |  | spp needing special protection etc.  |
| 3.0 CONSULTATIONS |  | EPA |
|  |  | TCPD of District Assembly |
|  |  | GNFS |
|  |  | ECG |
|  |  | GWC |
|  |  | The Chiefs or local people, if applicable |
| 4.0 IMPACTS-IDENTIFICATION AND ASSESSMENT |  | Pre-constructional, constructional, operational and decommissioning impacts must be identified and assessed thoroughly |
| 4.1 CONSTRUCTIONAL PHASE |  | Work camp organization |
|  |  | Erosion and siltation |
|  |  | Air quality |
|  |  | Noise and Vibrations |
|  |  | Visual intrusion and Aesthetics  |
|  |  | Construction waste |
|  |  | Traffic effect |
|  |  | Occupational health and safety fauna and flora |
| 4.2 OPERATIONAL PHASE |  | Solid and liquid waste generation |
|  |  | Effect of Fire outbreak  |
|  |  | Traffic issues |
|  |  | Increase demand on utilities  |
|  |  | Issues of Air, Water pollution |
| 5.0 MANAGEMENT MEASURES |  | All impacts identified at the constructional phase must be mitigated. There is the need to impact of |
|  |  | erosion and siltation |
|  |  | Solid and liquid waste |
|  |  | Traffic effect |
|  |  | Air Quality |
|  |  | Noise/vibration |
|  |  | Visual intrusion and Aesthetics  |
|  |  | Constructional waste |
|  |  | Occupational health safety |
| 5.2 OPERATIONAL PHASE |  | Every impact identified at the operational phase of the project must be mitigated e.g. There is the need to come out with mitigation plans for : |
|  |  | Sanitation |
|  |  | House keeping |
|  |  | Utilities management  |
|  |  | Emergency response on Fire or Earth Quake |
|  |  | Maintenance |
|  |  | Occupational Health and safety |
| 6.0 MONITORING |  | All major components  |

# Appendix VI: List of Natural And Semi-Natural Ecosystems and The Main Land Use Types in Ghana

DRY LAND

Low Land Tropical Rainforest

Montane Tropical Forest

Deciduous Forest

Savanna (Open Wooded Land Or Shrubs

Coastal Scrub

Rocky Coastland

Sand Beach

Coconut Beach

Wildlife Sanctuaries

Waterfalls

Freshwater Wetland

Rivers

Streams

Lakes

Mangrove Forest

Flood Plains

Brackish And Salt Water

Estuary

Lagoons

Tidal Flats

Natural Springs

Caves

National Parks

Strick Nature

Reserve

Mangrove

Sea Grass Fed

Open Sea

Sea Floor

Man-made Landscape Ponds And Reservoirs

Salt Pans

Fish Ponds

Dams

Annual Crops Farms

Irrigated Paddy Lands

Rain-fed Paddy

Irrigated Dry Land

Rain-fed Arable Land

Perennial Crop Plantation

Forest Plantation

Perennial Crop Plantation

Pasture

Rangeland Canals

OTHERS

Roads

Railways

Rural Settlement,

Uraban Settlements

Industrial Zones

Cultural/Religious Places

Historical And Archeological Sits

Harbours

Landing Bays

Light House

Botanic Garden

Deep Shaft-mines

# Appendix VII: Description of Sensitive Areas

1. All areas declared by law as Wildlife Conservation area
2. Areas which constitute the natural habitat(s) of any threatened (endangered, data deficient and vulnerable), rare, endemic flora and fauna
3. All known historical, cultural, archeological and scientific sites that are of public interest
4. Areas known to be prone to natural environmental disturbance including coastal erosion, flooding, geological hazards (earthquake, tremor, landslide) and radioactive emissions
5. Hilly areas with gradient above 45 degrees and prone to erosion or rock fall or mudslide or landslide.
6. Areas (of land) adjoining water bodies of minimum distance 50 meters away from the bank of the water body
7. Water bodies characterized by one or more of the following conditions:

a) used for domestic purposes,

b) water within controlled/ protected areas,

c) supports wildlife and fish,

d) head waters.

1. Mangrove area characterized by one or more of the following conditions:
	1. adjoining mouth/estuary of a river/stream system;
	2. habitat for wildlife;
	3. spawning ground for fish;
	4. near or adjacent to traditional fishing ground;
	5. acting as natural buffer against shore erosion, strong winds or for storm floods

# Appendix VIII: Sample Checklist for Identifying/Summarizing Environmental Impacts

|  |  |  |  |
| --- | --- | --- | --- |
| Topical Issues | Yes | No | May be |
| Impact on Fauna |
|  Will the project impact on fauna in any of the following ways? |
| * Reduce the habitat or numbers of any designated unique, rare, or endangered species of animals?
 |  |  |  |
| * Introduce new species of animals into an area or create a barrier to the migration or movement of animals or fish?
 |  |  |  |
| * Cause attraction, entrapment, or impingement of animal life?
 |  |  |  |
| * Harm existing fish and wildlife habitats?
 |  |  |  |
| * Cause emigration resulting into human-wildlife interaction problems?
 |  |  |  |
|  |  |  |  |
| Land use  |
| Will the project impact on land use in any of the following ways? |
| * Substantially alter the present or planned use of an area?
 |  |  |  |
| * Impact component of a Forest Reserve, Wildlife Sanctuary, Ramsar Site etc.?
 |  |  |  |
|  |  |  |  |
| Natural resources.  |
| Will the project impact on natural resources in any of the following ways? |
| * Increase the rate of use of any natural resource?
 |  |  |  |
| * Be located in an area designated as or being considered for ecological preserve, cultural & heritage sites?
 |  |  |  |
|  |  |  |  |
| Energy |
| Will the project impact on energy in any of the following ways? |
| * Use substantial amounts of fuel or energy?
 |  |  |  |
| * Substantially increase the demand on existing sources of energy?
 |  |  |  |
|  |  |  |  |
| Transportation and traffic circulation.  |
| Will the project impact on transportation in any of the following ways? |
| * Movement of additional vehicles?
 |  |  |  |
| * Effects on existing parking facilities or demands for new parking?
 |  |  |  |
| * Substantial impact on existing transportation system(s)?
 |  |  |  |
| * Alternatives to present patterns of circulation or movement of people and/or goods?
 |  |  |  |
| * Increased traffic hazards to other vehicles, bicyclists, or pedestrians?
 |  |  |  |
| * Construction of new roads?
 |  |  |  |
|  |  |  |  |
| Public service.  |
| Will the project have an effect on, or result in, a need for new or altered governmental services in any of the following areas? |
| * Fire protection?
 |  |  |  |
| * Schools?
 |  |  |  |
| * Other governmental services?
 |  |  |  |
|  |  |  |  |
| Utilities.  |
| Will the project result in a need for new systems or alterations to the following utilities? |
| * Health
 |  |  |  |
| * Power and natural gas?
 |  |  |  |
| * Communication systems?
 |  |  |  |
| * Water?
 |  |  |  |
| * Sewer or septic tanks?
 |  |  |  |
| * Storm sewers?
 |  |  |  |
|  |  |  |  |
| Population.  |
| Will the project impact on population in any of the following ways? |
| * Alter the location or distribution of human population in the area?
 |  |  |  |
|  |  |  |  |
| Accident risk.  |
| Will the project impact on accident risk in any of the following ways? |
| * Involve the risk of explosion or release of potentially hazardous substances including but not limited to, oil, pesticides, and chemicals. Radiation, or other toxic substances, in the event of an accident or “upset” conditions?
 |  |  |  |
|  |  |  |  |
| Human health.  |
| Will the project impact on human health in any of the following ways? |
| * Create any health hazard or potential health hazard?
 |  |  |  |
| * Expose people to potential health hazards?
 |  |  |  |
|  |  |  |  |
| Economic. |
| Will the project impact on economic conditions in any of the following ways? |
| * Have any adverse effects on local or regional economic conditions, e.g. tourism, local income levels, land values, or employment?
 |  |  |  |
|  |  |  |  |
| Aesthetics.  |
| Will the project impact on aesthetics in any of the following ways? |
| * Change any or view open to the public?
 |  |  |  |
| * Create an aesthetically offensive site open to the public view (e.g. out of place with or design of surrounding area)?
 |  |  |  |
| * Significant change the visual scale or character of the vicinity?
 |  |  |  |

#

# Appendix IX: Environmental Quality Guidelines for Ghana

Ambient Air Quality Guidelines

|  |  |  |
| --- | --- | --- |
| Substance | Time Weighted Average (TWA) | Averaging Time |
| Sulphur Dioxide (SO2) | 900 µg/m3700 µg/m3150 µg/m3100 µg/m380 µg/m350 µg/m3 | IndustrialResidentialIndustrialResidentialIndustrialResidential | 1 hour1 hour24 hours24 hours1 year1 year |
| Nitrogen Oxides(Measured as N02) | 400 µg/m3200 µg/m3 | IndustrialResidential | 1 hour1 hour |
| 150 µg/m360 µg/m3 | IndustrialResidential | 24 hours24 hours |
| Total Suspended Particulate | 230 µg/m3150 µg/m375 µg/m360 µg/m3 | IndustrialResidentialIndustrialResidential | 24 hours24 hours1 year1 year |
| PM10 | 70 µg/m3 |  | 24 hours |
| Smoke | 150 µg/m3100 µg/m350 µg/m330 mg/m3 | IndustrialResidentialIndustrialResidential | 24 hours24 hours1 hour1 hour |
| Carbon Monoxide | 100 mg/m360 mg/m330 mg/m310 mg/m3 |  | 15 min30 min1 hour8 hours |
| Hydrogen Sulphide  | 150 µg/m3 |  | 24 hours |
| Mercury | 1 µg/m3 |  | 1 year |
| Lead  | 2.5 µg/m3 |  | 1 year |
| Cadmium  | 10 - 20 ng/m3 |  | 1 year |
| Manganese  | 1 µg/m3 |  | 24 hours |
| Dichloromethane (Methylene Chloride) | 3 mg/m3 |  | 24 hours |
| 1,2-Dichloroethane | 0.7 mg/m3 |  | 24 hours |
| Trichloroethane | 1 mg/m3 |  | 24 hours |
| Tetrachloroethene | 5 mg/m3 |  | 24 hours |

Ambient Noise Level Standards in Ghana

|  |  |  |
| --- | --- | --- |
| Zone | Description of Area of Noise Reception | Permissible Noise Level in dB (A) |
| Day06:00 – 22:00 | Night22:00 – 06:00 |
| A | Residential areas with negligible or infrequent transportation  | 55 | 48 |
| B1 | Educational (school) and health (hospital clinic) facilities  | 55 | 50 |
| B2 | Area with some commercial or light industry | 60 | 55 |
| C1 | Area with some light industry, place of entertainment or public assembly and place of worship such as churches and mosques | 65 | 60 |
| C2 | Predominantly commercial areas | 75 | 65 |
| D | Light industrial areas | 70 | 60 |
| E | Predominantly heavy industrial areas | 70 | 70 |

SECTOR SPECIFIC EFFLUENT QUALITY GUIDELINES FOR DISCHARGES INTO NATURAL WATER BODIES

(MAXIMUM PERMISSIBLE LEVELS)

|  |  |  |
| --- | --- | --- |
|  | PARAMETER | SECTORS |
|  |  | Textile | Food &Beverages | Paints &Chemicals | Pharmaceuticals | Paper and Pulp | Hotels and Resorts | Wood and wood processing |
| 1. | pH  | 6 - 9 | 6 - 9 | 6 - 9 | 6 - 9 | 6 - 9 | 6 - 9 | 6 - 9 |
| 2. | Oil & Grease (mg/l) | 5 | 5 | 10 | 5 | 10  | 5 | 5 |
| 3. | Temperature increase | < 3oC above ambient | < 3oC above ambient | < 3oC above ambient | < 3oC above ambient | < 3oC above ambient | < 3oC above ambient | < 3oC above ambient |
| 4. | Colour (TCU) | 400 | 200  | 300 | 150 | 200 | 150 | 250 |
| 5. | COD (mg/l) | 250  | 250  | 250 | 250 | 250 | 250  | 250 |
| 6. | BOD5 (mg/l) | 50  | 50  | 50 | 50  | 50 | 50 | 50  |
| 7. | Total Dissolved Solids (mg/l) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 8. | Chromium (+6) mg/l | 0.1 |  |  |  | 0.1 | 0.1 | 0.1 |
| 9. | Sulphide (mg/l) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| 10. | Phenol (mg/l) | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 11. | Total Coliforms (MPN/100 ml) | 400  | 400  | 400 |  | 400 | 400 | 400 |
|  |  | Textile | Food &Beverages | Paints &Chemicals | Pharmaceuticals | Paper and Pulp | Hotels and Resorts | Wood and wood processing |
| 12 | E. Coli (MPN/100 ml) | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| 13. | Turbidity (N.T.U.) | 75 | 75 | 75 | 75 | 75 | 75 | 75 |
| 14. | Total Suspended Solids (mg/l) | 50  | 50 | 50 | 50 | 50 | 50  | 50  |
| 15. | Lead (mg/l) | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 16. | Nitrate (mg/l) | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| 17. | Total Phosphorous (mg/l) | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 18. | Conductivity (μS/cm) | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| 19. | Mercury (mg/l) | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 |
| 20. | Ammonia as N (mg/l) |  | 1.0 |  |  |  | 1.0 | 1.0 |
| 21. | Total Pesticides (mg/l) |  | 0.5 |  |  |  | 0.5 | 0.5 |
| 22. | Total Arsenic (mg/l) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 23. | Soluble Arsenic ( mg/l) | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |  |
| 24. | Alkalinity as CaC03 (mg/l) | 150 | 150 | 150 |  | 150 |  |  |
| 25. | Fluoride (mg/l) |  | 10 |  |  |  |  |  |
| 26. | Chloride (mg/l) | 250 | 250 | 250 | 250 | 250 | 250 | 250 |

SECTOR SPECIFIC EFFLUENT QUALITY GUIDELINES FOR DISCHARGES INTO NATURAL WATER BODIES

(MAXIMUM PERMISSIBLE LEVELS)

|  |  |  |
| --- | --- | --- |
|  |  | SECTORS |
|  | PARAMETER | Cement, Ceramics and Tiles Industry | Thermal Power Plant | Glass Industry | Hospitals and Clinics | Oil and Gas Exploration, Production and Refining | Mining and Minerals Processing | Metals Industry |
|  | pH | 6 - 9 | 6 - 9 | 6 - 9 | 6 - 9 | 6 - 9 | 6 - 9 | 6 - 9 |
|  | BOD5 (mg/l) | 50  | 50 | 50 | 50 | 50 | 50 | 50 |
|  | Oil & Grease (mg/l) | 5 | 5 | 5 | 5 | 10  | 10  | 5 |
|  | Total Dissolved Solids (mg/l) | 1000 |  |  | 1000 | 1000 | 1000 | 1000 |
|  | Total Suspended Solids (mg/l) | 50  | 50  | 50 | 50  | 50 | 50 | 50  |
|  | Cadmium (mg/l) | 0.1 |  |  |  | 0.1 | 0.1 | 0.1 |
|  | Total Phosphorus (mg/l) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
|  | Temperature increase | < 3oC above ambient | < 3oC above ambient | < 3oC above ambient | < 3oC above ambient | < 3oC above ambient | < 3oC above ambient | < 3oC above ambient |
|  | Colour (TCU) | 200 | 200 | 150 | 150 | 200 | 150 | 200  |
|  | COD (mg/l) | 250 | 250 | 250 | 250 | 250 | 250 | 250  |
|  | Chromium (+6) mg/l | 0.1 |  | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
|  | Sulphide (mg/l) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
|  | Phenol (mg/l) |  |  |  | 2 | 2 | 2 | 2 |
|  | Total Coliforms (MPN/100 ml) |  |  | 400 | 400  | 400 | 400 | 400 |
|  | E. Coli (MPN/100 ml) |  |  | 10 | 10 | 10 | 10 | 10 |
|  | Turbidity (N.T.U.) | 75 | 75 | 75 | 75 | 75 | 75 | 75 |
|  | Lead (mg/l) | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
|  | Nitrate (mg/l) | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
|  | Conductivity (μS /cm) | 1500 |  |  | 1500 | 1500 | 1500 | 1500 |
|  | Mercury (mg/l) |  |  |  | 0.005 | 0.005 | 0.005 | 0.005 |
|  | Zinc (mg/l) |  |  |  |  | 10 | 10 | 10 |
|  | Tin (mg/l) |  |  |  |  |  |  | 5 |
|  | Total Chromium (mg/l) |  |  |  |  | 0.5 | 0.5 |  |
|  | Total Iron (mg/l) |  |  |  |  | 10 | 10 | 10 |
|  | Free Cyanide (mg/l) |  |  |  |  |  | 0.2 |  |
|  | Cyanide as Weak Acid Dissociable (mg/l) |  |  |  |  |  | 0.6 |  |
|  | Total Cyanide (mg/l) |  |  |  |  |  | 1.0 |  |
|  | Aluminium (mg/l) |  |  |  |  |  |  | 5.0 |
|  | Total Antimony (mg/l) |  |  |  |  |  | 1.5 | 1.5 |
|  | Fluoride (mg/l) |  |  |  |  |  |  | 10 |
|  | Chloride (mg/l) |  |  |  |  |  |  | 250 |
|  | Alkalinity as CaC03 (mg/l) |  |  |  |  |  |  | 150 |
|  | Copper (mg/l) |  |  |  |  | 5 | 5 | 5 |
|  | Total Arsenic (mg/l) | 1.0 |  | 2 |  |  | 1.0 | 1.0 |
|  | Soluble Arsenic (mg/l) | 0.1 |  |  |  |  | 0.1 | 0.1 |