THE REPUBLIC OF UGANDA

MINISTRY OF WATER AND ENVIRONMENT

ENVIRONMENTAL IMPACT ASSESSMENT GUIDELINES FOR WATER RESOURCES RELATED PROJECTS IN UGANDA

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FOREWORD

Uganda is well endowed with fresh water resources in form of large lakes, rivers and wetlands, and groundwater from aquifers. This natural resource is, however, unevenly distributed both in time and space, with some areas of the country having too much water during certain times of the year resulting in floods, while other areas have too little water resulting in droughts. Thus, water resources availability in terms of quantity and quality in future could be a limiting factor to the socio-economic development processes. As the common saying goes "water is life" and thus water is a major factor in the socio-economic development of Uganda. However, the rapid growth in population with the resultant need for increased agricultural and industrial production, energy supply and domestic water supply will place considerable pressure on the country's water resources. Provision of water of adequate quantity and quality, where and when it is needed will therefore be key in meeting the various government development targets.

Realising the importance of water in the socio-economic transformation of our country, the National Environment Management Policy of 1994 set out an overarching policy objective which is to guide the management of water resources in Uganda as to "sustainably manage and develop the water resources in a coordinated and integrated manner so as to provide water of acceptable quality for all social and economic needs".

To achieve this objective, a number of guiding principles have been set out and one of these is that "water management guidelines should be developed and provided to the appropriate institutions and communities to enable them manage water resources efficiently". To-date, the water and sanitation sub-sector has devised a number of strategies to ensure sustainable delivery of water related services for national development. In view of this, the water and sanitation sub-sector, aware of the integral role of water resources in the larger development processes in the country and the need to ensure that these developments are carried out without affecting the integrity of the resource, stresses the need to subject major water resources related projects to Environmental Impact Assessment (EIA). In order for EIAs on water related projects to be responsive to the needs of the people and to address water resources related challenges in the sector, my Ministry took the initiative to prepare these EIA Guidelines which explain the EIA process specific to water resources related projects. An important purpose of these Guidelines is to aid all those involved in the EIA process to know what is required at each stage of a development project so that effective and better informed decisions are taken before approval and/or clearance is given for a proposed project.

Therefore, the main goal of these Guidelines is to streamline and standardize the EIA process for water related projects in Uganda and to provide a framework to facilitate environmental studies and reviews by the developers, EIA Practitioners and relevant agencies in the Water and Sanitation Sector, and the affected and interested parties. These Guidelines have been formulated in a participatory process, through gathering and assessing inputs from the key sector players and stakeholders.

My Ministry is therefore pleased to make these Guidelines available for use by various stakeholders. They will enormously help and guide all those responsible for conducting EIAs or reviewing EIA reports on water related projects; namely the Directorate of Water Resources Management (DWRM), the Directorate of Water Development (DWD), the National Environment Management Authority (NEMA) , the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), the Ministry of Energy and Mineral Development (MEMD), Ministry of Education and Sports, National Water and Sewerage Corporation (NWSC), Local Governments, Private Sector service providers, Non-Governmental Organizations (NGOs) and the general public.

I wish to emphasize that, these Guidelines are to facilitate implementation of new or planned developments in the water and sanitation sub-sector by providing practical guidance and a platform from which to encourage creative and constructive thinking on the complex issues that characterize water resources and related developments. It is therefore my sincere hope that these Guidelines will provide the much needed guidance on how to adequately assess the biophysical, social-economic, health and cultural impacts of water resources related projects.

I urge project developers, EIA practitioners and regulatory agencies to ensure that these Guidelines are used to ensure sustainable water related development projects. I also wish to request the Directorate of Water Resources Management in collaboration with the National Environment Management Authority to promote the use of the Guidelines among various stakeholders including building their capacity to effectively use them.

Thus, in accordance with Section 35 of the Water Act, Cap 152, I formally approve the Environmental Impact Assessment Guidelines for water resources related projects for use by various stakeholders.

For God and my country

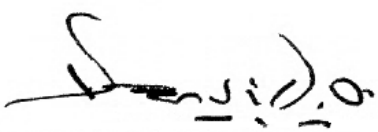
Hon. Maria Mutagamba
Minister of Water and Environment

ACKNOWLEDGEMENTS

The Ministry of Water and Environment would like to acknowledge the good work of the team that prepared these Environmental Impact Assessment Guidelines for Water resources related projects.

Special thanks go to all the stakeholders who provided support and relevant information, including participation in the stakeholders' consultative meetings. Their valuable input in the production of the document is highly appreciated.

The Ministry is very grateful to the Government of Denmark for providing the funds that financed the preparation and printing of these Guidelines



David O.O Obong
Permanent Secretary, Ministry of Water and Environment

EXECUTIVE SUMMARY

These EIA Guidelines for water resources related projects provide lead agencies, EIA practitioners and others involved in the Environmental Impact Assessment (EIA) process with practical guidance and a ready source of information about the process.
Specifically the Guidelines are intended to:

a. assist in carrying out preliminary screening of proposed plans, programmes, projects;

b. assist planners, developers and practitioners to prepare ToR for an EIStudy;

c. help better understanding of the kinds of environmental impacts that may be associated with water resources related projects, information that will be useful in reviewing and critiquing project briefs, ToRs, EIRs, EIStudies, and EISs; and

d. help all those involved in the EIA process to make it more effective and therefore lead to better informed decisions before approval and/or clearance is given for the proposed projects.

The Guidelines for EIA in Uganda 1997 recognize the need for sectoral Guidelines in addressing the specific sectoral environmental concerns. In view of this, the EIA Guidelines for water resources related projects were prepared based on the framework of the Guidelines for EIA in Uganda 1997, which give general procedures to be followed when conducting EIA as well as an outline of the main obligations for the planners, including developers and lead agencies.

The Guidelines have to a large extent covered pertinent issues relevant to water resources related projects in Uganda. Although water resources projects tend to be closely related, some tend to exhibit conflicts and others lack linkage with the wider water ecosystem. These Guidelines have a section on relevant legal and institutional framework as well as check lists of procedures and generic mitigation measures characteristic of water resources related projects. They also describe the role of the developer, NEMA, DWRM and other key stakeholders in the EIStudy, preparation and review of the EIS and decision making process in respect to the EIA of the water resources related projects.

The Guidelines are organised in seven chapters. Chapter one is a general introduction and background to the EIA process, Chapter two describes the policy, legislative and institutional framework, Chapter three describes the EIA process in project planning and implementation, Chapter four details the stages followed when conducting EIA. Chapter 5 describes Strategic Environmental Assessment (SEA). Chapter 6 provides a detailed literature/documentation of the various key sources of information used in the development of these Guidelines, and Chapter 7 has six appendices which give additional details of specific technical aspects and checklists for the various sections in the five main chapters.

Therefore, the EIA Guidelines are comprehensive and provide the required guidance on how to adequately conduct EIA. Thus all agencies active in Water resources related activities, developers and other stakeholders should refer to these Guidelines from the beginning of the project cycle to the end.

The Guidelines have to a large extent covered pertinent issues relevant to water resources related projects in Uganda. Although water resources projects tend to be closely related, some tend to exhibit conflicts and others lack linkage with the wider water ecosystem.

ACRONYMS

AEE:	Assessment of Environmental Effects
DWD	Directorate of Water Development
DWRM	Directorate of Water Resource Management
EA	Environmental Assessment
EAC	East African Community
EIA	Environmental Impact Assessment
EIR	Environment Impact Review
EIS	Environmental Impact Statement
EIStudy	Environmental Impact Study
EMP	Environmental Management Plan
IEE	Initial Environmental Evaluation
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MEMD	Ministry of Energy and Mineral Development
NEA	National Environment Act, Cap 153
NEMA	National Environment Management Authority
NGOs	Non-governmental Organizations
NWSC	National Water Sewage Cooperation
SEA	Strategic Environmental Assessment
ToR	Terms of Reference
TEA	Trans-boundary Environmental Assessment
WPC	Water Policy Committee

HOW TO USE THESE GUIDELINES

These Guidelines have procedures on the techniques for collecting, analysing and communicating information about the impacts of water resources related projects on the environment.

The Guidelines provide information on screening, scoping, and development of ToR, conducting impact assessments and review of EIA reports; they will also assist lead agencies to guide developers to prepare quality EIAs. The Guidelines are also a desk reference for EIA practitioners as they have examples of potential impacts, mitigation measures and a glossary of terms.

The Guidelines will be reviewed and updated, when necessary, based on the challenges that the development processes pose in the implementation of water resources related projects.

Steps in use of the Guidelines

Summary of the steps to monitor, participate in, or conduct an EIA. Following each step is a reference to the sections of the Guidelines:

1. Review the developer's project concept/brief or in the instance of government-initiated project, prepare the brief. Refer to Section 3.1 – 3.4 and Appendix 7.1;

2. Screen the proposed project to determine if it requires an EIA and, if so, the level of EIA required: Refer to Figure 3.1, Section 4.1 and Appendix 7.2;

3. After screening, consult the EIA-process flow chart to determine the anticipated disposition of the project proposal. Refer to figure 4.1;

4. Determine the major issues and concerns through scoping. Refer to section 4.2.1 and Appendix 7.3;

5. After scoping, review or, if a government-initiated project, prepare ToRs. Refer to Section 4.2.2 and Appendix 7.3;

6. Determine the initial boundaries (scope) of the study area for the proposed project. Refer to Appendix 7.3;

7. Begin collecting baseline data that relate to the important issues and concerns as they occur within the study area. Refer to Section 4.2.3;

8. Characterize the affected environments in the study area according to their relevant attributes (Refer to section 4.2.1, 4.2.2 and Appendix 7.3;

9. Identify environmental impacts by scrutinizing each development action against each environmental parameter, indicating the occurrence and character of the predicted impact in the intersecting cell. Refer to Section 4.2.3.2 and Appendix 7.5;

10. List the predicted environmental impacts identified in the matrix exercise, according to the environment in which they occur and to their anticipated character. Refer to Sections 4.2.3.1 and 4.2.3.2, and Appendices 7.4, and 7.5;

11. Determine the significance of the environmental impacts, according to their suspected magnitude, duration, and importance vis a vis the scoping results and the baseline status. Refer to Sections 4.2.3.3 and 4.2.3.4;

12. Decide upon the appropriate and sound measures to mitigate and/or enhance significant environmental impacts. Refer to Sections 4.2.3.4 and 4.2.3.5 and Appendices 7.5 and 7.6, and;

13. Determine the project development stages-design, construction, or operation-at which mitigation or enhancement is optimally implemented and the manner in which the measures are to be implemented. Refer to Sections 4.2.3.5 and Appendices 7.5, 7.6 & 7.7.

14. Prepare an EIA report (EIS). The Environmental Management Plan is part of the information to be included in the EIA report. Refer to Sections 4.2.3.5 and 4.2.4.

15. Submit 1 (one) copy of the EIA report to DWRM and 10 (ten) copies to NEMA for final review and decision making. Refer to Section 4.3.

16. If the EIA report has been approved, the certificate of approval of the EIA, the environmental management plan, monitoring and auditing plans should be included in the project documents as legally binding documents. Refer to Sections 4.2.3.5 and 4.4.

17. For a project that might have adverse environmental impact across international borders, the impact assessment may be incomplete if other countries are not consulted. Refer to Section 4.6.

18. For policies, legislation, strategies, plans or programmes. Refer to Section 5.

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1.0 INTRODUCTION

1.1 Background

The development of the Environmental Impact Assessment (EIA) Guidelines for water resources related projects was undertaken in line with the provisions of the Water Act Cap 152 and National Environment Act Cap 153. In particular, under Section 19, sub-section (8) of the National Environment Act, it states that: "*The Authority" (National Environmental Management Authority (NEMA) shall, in consultation with a lead agency, adopt Guidelines with respect to environment impact reviews, environmental impact evaluations and environmental impact studies on":*

a. their format and contents;
b. the procedure for conducting the assessments;
c. the participation of the public, especially those most affected by the project in the assessment; and
d. any other matter the authority considers relevant.

Furthermore, in the Water Act, Section 35 states that: "*the Minister may, on the advice of the Water Policy Committee, from time to time prescribe Guidelines to be followed by the director, authorized person or public authority while exercising their powers under this Part of the Act".*

The EIA Guidelines for the Water resources related projects have been prepared in a participatory and consultative process, through review of relevant secondary data, use of formal and informal discussions with key informants and stakeholders in the water and sanitation sector and expert opinion from other lead agencies.

1.2 Purpose and objectives of the Guidelines

The purpose of the EIA Guidelines is to assist stakeholders participating in or conducting EIA for water resources related projects to streamline and standardise the EIA process for water works and water resources related projects in Uganda.

The objectives of the Guidelines are:

a. to ensure that for all new water resources related projects, EIAs are carried out quickly and in an orderly way;

b. to provide stakeholders in the water and sanitation sector with a reference tool for assessing impacts of water resources related projects on the environment, and.

c. to assist planners, developers, EIA practitioners on how to play their specific roles in

safeguarding water resources through the EIA processes, and

d. to ensure integrated approach to sustainable management and development of water resources related projects.

1.3 Intended Users of the Guidelines

These Guidelines are intended to be a mandatory part of planning of water resources related projects of all sizes. However, the detail and the scope of the assessments will be different for each category, and will be determined by the stage of the project and the nature of the planned interventions.

The target audiences of these Guidelines are those involved in any part of the EIA process namely; screening, preparing project briefs, scoping and drawing up terms of reference for environmental studies, conducting environmental assessments, monitoring the studies and in evaluating the resulting EIA reports.

The institutional users will therefore include, but will not be limited to the DWRM which is a lead agency on water resources management; DWD which is responsible for providing overall technical oversight for the planning, implementation and supervision of the delivery of urban and rural water and sanitation services, and water for production across the country; NEMA which is the statutory agency on all matters of environment and EIA clearance, the Ministry of Agriculture,

Animal Industry and Fisheries (MAAIF), the Ministry of Energy and Mineral Development (MEMD), National Water and Sewerage Corporation (NWSC), Local Governments, Private Sector and Non-Governmental Organizations (NGOs). Individual users of the Guidelines will include: developers, EIA Practitioners, engineers, planners and others concerned with undertaking EIA studies, reviewers of EIAs and project development decision-makers. Environmental trainers and students will also find the Guidelines a useful summary of the key procedures. The Guidelines can also serve as a background document for planning public awareness-raising on sustainable water resources management.

1.4 Linkage to the National Guidelines for EIA in Uganda

The Guidelines for EIA in Uganda 1997, serve as a general guide in the EIA process for all development projects that are likely to have significant impacts on the environment. They provide a framework under which, EIA Guidelines for water resources related projects have been developed. Therefore, these Guidelines are linked to the general EIA Guidelines and likewise, they emphasise the early adoption and integration of environmental assessments in the planning, formulation, design as well as in the implementation of water resources related projects.

In implementing the EIA process for water resources related projects, DWRM, which has the required specialised sectoral knowledge, works in consultation with NEMA, which has the overall responsibility to coordinate, monitor and supervise the implementation of EIA in Uganda.

1.5 Structure of the Guidelines

The Guidelines are organised in seven chapters whose contents and structure is laid out in the order consistent with the stages followed when conducting EIA activities:

Chapter 1 describes the background, purpose and objectives, intended users and linkage to the national guidelines for EIA in Uganda;

Chapter 2 describes the policy, legal and institutional framework for EIA;

Chapter 3 describes EIA in project planning and implementation, and describes water resources related project requiring EIA.

Chapter 4 outlines the individual steps in the EIA process for water resources related projects in Uganda. These include screening, preparing project briefs, scoping and preparing terms of reference, impact assessment, analysis of alternatives and the environmental management plan, reporting, review of EIA reports, monitoring and evaluation, environmental audit and Trans-boundary EIA.

Chapter 5 describes Strategic Environmental Assessment.

Chapter 6 provides a detailed literature/documentation of the various key sources of information used in the development of these Guidelines.

Chapter 7 has seven appendices which give additional details of specific technical aspects and checklists for the various sections in the five main chapters.

2.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 Introduction

The overarching policy document for the EIA practice in Uganda is the ***National Environment Management Policy 1994*** whose overall goal is: sustainable social and economic development, which maintains and enhances environmental quality and resource productivity to meet the needs of present generations without compromising the ability of the future generations to meet their own needs. In addition, there are other sectoral and cross-sectoral policies, which have relevance to specific EIA activities. The ***National Water Policy 1999*** is for example a policy specific to water resources management and development. The policy advocates for the management and development of water resources in Uganda in an integrated and sustainable manner so as to secure and provide water of adequate quality and quantity for all social and economic needs for present and future generations with the full participation of all stakeholders.

In May 1995, the National Environment Statute, now the ***National Environment Act Cap 153,*** was passed which provides for the establishment of the National Environment Management Authority (NEMA) as the principal agency in Uganda for the management of the environment. NEMA was established in 1996 with the functions to coordinate, monitor and supervise the sustainable management of the environment. NEMA may delegate, by statutory instrument, any of its functions to a lead agency, a technical committee or any other public officer. The Act addresses national and district level environmental planning, environmental regulation and the establishment of environmental regulations and standards.

2.2 General EIA Guidelines and Regulations

In addition to the law, the environmental impact assessment (EIA) process in Uganda is governed by the following key reference documents, which apply to all sectors and collectively make up the overarching environmental impact assessment framework for Uganda.

- Guidelines for Environmental Impact Assessment in Uganda, 1997;
- Environmental Audit Guidelines for Uganda, 1999;
- *Environmental Impact Assessment Regulations, 1998*;
- *Reference Manual, Environmental Impact Assessment (EIA), 2002; and*
- *The National Environment (Conduct and Certification of Environmental Practitioners) Regulations, 2003*,

The EIA process is also guided or provided for by other sectoral laws and regulations as listed in ***Appendix 7.1a***. For example the objective of the ***Water Act, Cap 152*** is to promote rational

management and use of all water bodies in Uganda. This objective can only be achieved if water users and developers adequately predict and mitigate the project impacts on water resources. To do so requires that all developers with activities that might have significant impacts on water resources carry out EIA.

The ***Environmental Impact Assessment Regulations, 1998*** make it mandatory for all projects listed in the Third Schedule to the Act and any major repairs, extensions or routine maintenance of any existing project included in the Third Schedule of the Act to be subjected to EIA in accordance with the regulations before implementation. The Third Schedule includes "Dams, rivers and water resources including: storage dams, barrages and weirs; river diversions and water transfers between catchments; flood-control schemes; drilling for the purpose of utilising ground water resources including geothermal energy".

2.2 Institutional framework for the management of EIA

The parent Ministry responsible for environmental conservation in Uganda is the Ministry of Water and Environment (MWE). Within the Ministry, Directorate of Water Resources Management (DWRM) is the lead agency responsible for water resources management and is responsible for assessing, monitoring and regulating the use of water resources through issuing water use, abstraction and wastewater discharge permits to developers. DWRM also coordinates environmental issues related to water resources projects with NEMA.

The developer should become cognizant of the roles of the DWRM, the private sector, the donor community, non-governmental organisations (NGO) and community based organisations (CBO) and other stakeholders in the area where the project is to be established (***Appendix 7.1b***). These stakeholders supplement government-established institutions in environmental conservation. NEMA coordinates all lead agencies in managing the environment and should be consulted when environmental issues arise.

The policy advocates for the management and development of water resources in Uganda in an integrated and sustainable manner so as to secure and provide water of adequate quality and quantity for all social and economic needs for present and future generations with the full participation of all stakeholders.

3.0 EIA IN PROJECT PLANNING AND IMPLEMENTATION

3.1 EIA in Project planning

Water is a key strategic resource, vital for sustaining life and one of the decisive factors in all plans for development and and maintaining the environment in general. In connection with this, pursuance of national development generally recognizes that protection of the environment in general and water resources in particular, constitute one of the key and pivotal pre-requisites for attaining sustainable development. The application of EIA constitutes one of the precautionary principles applied in development planning where outcomes of interventions are not of certainty.

EIA is therefore intended to predict, assess and evaluate the impacts of proposed project interventions and to ensure that environmental requirements are included in project planning cycle. The aim of conducting EIA is to identify all the significant negative impacts of a project and to propose mitigation measures for the avoidance or enhancement of environmental benefits. The costs of these recommendations and the other implications for implementation - such as organisational and institutional requirements - also need to be assessed, in forms that can be readily used in the overall project designs and; financial and economic analysis. The characterisation of any residual and cumulative impacts is also vital.

It is important to point out that, the objective of EIA is not to disrupt or impede development, but to improve projects by ensuring that they are planned, constructed and operated in an environmentally sound manner. Unless there are other overriding considerations (e.g. protection of human life), projects should have no significant negative effects on the functioning of essential environmental processes - including the long-term sustainability of water resources and human well-being.

On the basis of these therefore, an EIA should:

a. describe the likely environmental conditions if the proposed project were not implemented (referred to as zero option);
a. assess the impacts (positive and negative) of the proposed project that might be expected to occur;
a. specify and cost the environmental measures needed to improve the beneficial impacts and reduce or eliminate the adverse impacts;
a. allow the incorporation of appropriate mitigation measures into the project and ensure that these are included in an Environmental Management Plan (EMP) to guide future project development stages;

a) proposing alternatives to the planned development (in terms of siting, technology, resources used, the design etc); and
b) enable the selection of optimal alternatives from the various relevant options available.

3.2 Project preparation

In addition to these EIA Guidelines, EIA practitioners must also consult and follow the relevant requirements of national regulations and guidelines, as well as those of bilateral or international funding agencies when applicable. All water resources related projects are governed by the national policies, laws and regulations related to the environment and water resources, and by international treaty obligations, some of which are summarised in ***Appendix 7.1a.***

3.3 EIA and Water resources related Project Cycle

The EIA process for water resources related projects are structured into six steps, namely screening phase (planning/project conception), scoping stage (pre-feasibility study); EIA study phase (Feasibility study); Contract procurement (compensation and resettlement); defects liability period (environment monitoring); and operation and maintenance phase (compliance audit). ***Figure 3.1*** shows the normal project cycle for a water resources related development project and how the EIA process should be integrated into the project cycle.

It is mandatory that the EIA process for any applicable water resources related development project conforms to the provisions of the *National Environment Act, Cap 153* and the accompanying Regulations.

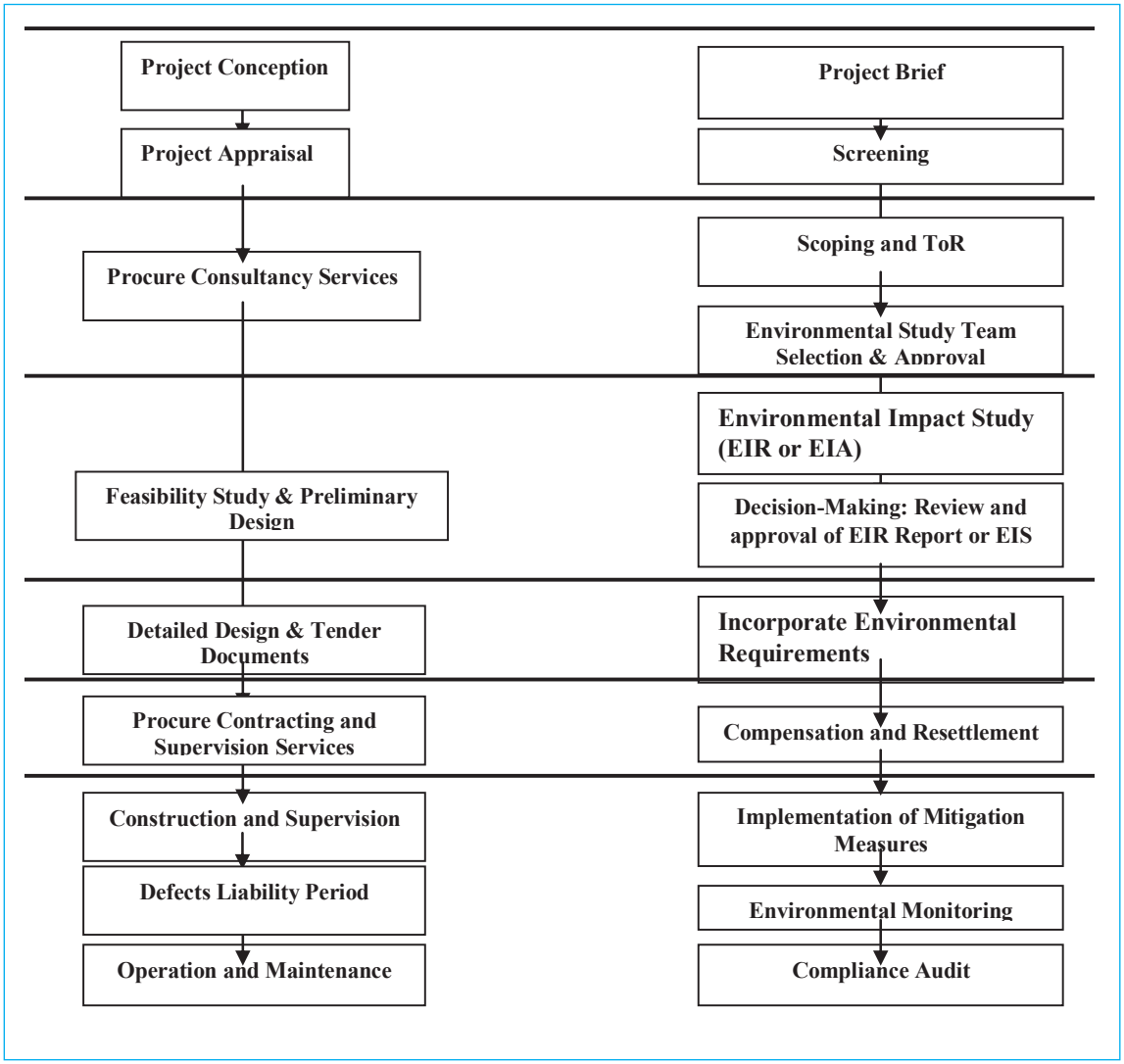


Figure 3.1: EIA and Water Project Cycle (Source: Adopted from EIA Guidelines for Road Projects, 2007)

3.4 Water resources related projects requiring EIA

The Third Schedule of the National Environment Act Cap 153 lists projects to be considered for environmental impact assessment. Under that categorization, most water resources related projects fall under two ground and surface water resources. These include projects that may have a focus different from water, but still have a considerable impact on the water resources. Such projects include, for instance manufacturing industries, forestry, agriculture and mining.

3.4.1 Groundwater resources projects

It is necessary that in order to avoid excessive abstraction or pollution of the available ground water resources, an assessment be carried out for all those water use projects that are likely to impact on such groundwater resources. These include rural and small towns' water supply projects (Box 3.1).

Box 3.1 Examples of ground water projects include:

(i) Borehole drilling and hand augured shallow wells;
(ii) Springs and shallow wells;
(iii) Shallow wells and valley dams;
(iv) Earth reservoirs and gravity flow schemes.

3.4.2 Surface water resources projects

Water resources estimates indicate that just over 15% of the total surface area of Uganda is covered by open water. The surface/open water resources are mainly in the form of rivers and lakes. Examples of surface water resources projects that require EIA include are illustrated in Box 3.2.

Box 3.2. Examples of surface water resources projects that require EIA include:

i. Industrial and commercial water supply and discharge projects, which use municipal water supply system or private supplies and waste disposal facilities relying on surface water resources. These include:- small scale industries that affect the water quality in the vicinity of their location e.g. garages, petrol stations and storage facilities for petroleum products, etc,

Agriculture and agricultural water supply projects, including irrigation; future developments of irrigation is likely to involve:- diversion of rivers on to farmlands; - pumping of water on to farmlands, and -construction of costly structures and irrigation infrastructures drawing water from lake and river sources.

ii. Water supply for fishing i.e. inland ponds and aquaculture; others include hydropower projects, mining sector, urban water supply project, Livestock watering, Wastewater disposal, Drainage, flood protection, hydraulic works and in-stream use and other activities.

4.0 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

Environmental Impact Assessment (EIA) should be linked with the project cycle as early as possible. This should be initiated at the project identification phase. When pre-feasibility studies are being undertaken, the screening process should also begin.

The basic components of the EIA Process in Uganda consist of three interconnected phases: **screening, environmental impact study,** and **decision making. The basic components of the EIA process, including outputs and inputs** are illustrated in **Figure 4.1**. The EIA process for the Water resources related projects adheres to this process. The three phases are:

4.1 Phase I: Screening

Screening is undertaken during project identification and pre-feasibility studies as explained in Chapter 3. The purpose of screening is to categorize whether or not a project requires a full EIA, partial EIA or no EIA at all This is important as it enables the application of an EIA only to those projects, which generate significant impacts. This is because certain projects may have less impact than others ***(Appendix 7.2).*** Water resources related projects have four screening categories namely:

Category 1: Small projects which do not have potential significant impacts and for which separate EIAs are not required, as the environment is the major focus of project preparation. These could include borehole drilling, hand augured shallow wells, protected springs and earth reservoir construction.

Category 2: Environmental analysis is normally unnecessary, as the project is unlikely to have significant environmental impacts. A project brief is enough. This could include project location in less sensitive areas or where many such schemes are in the same locality and their synergetic effects have potential impacts.

Category 3: A limited environmental analysis is appropriate, as the project impacts can be easily identified and for which mitigation measures can be easily prescribed and included in the design and implementation of the project. Projects in this category could include:

i. rural water supply,
ii. large earth reservoirs, but not located in very sensitive areas
iii. big gravity flow schemes
iv. all category one projects located in sensitive areas.
v. aquaculture,
vi. small industries, and

Category 4: An EIA is normally required because the project may have diverse significant impacts. Projects in this category could include:

i. water projects requiring water to a level more than 400m^3 in any period of twenty four hours, or projects requiring to use motorized pumps;
ii. storage dams, barrages, weirs, valley tanks and dams;
iii. river diversions and inter-basin water transfer;,
iv. flood control schemes, drilling e.g. for geothermal;
v. large reservoirs;
vi. irrigation and drainage schemes;
vii. water use industries e.g. pulp and paper, Breweries, etc.
viii. mining industry;
ix. sewage treatment plants;
x. small and large hydro power projects;
xi. urban water supply projects, and
xii. small to large gravity flow schemes.

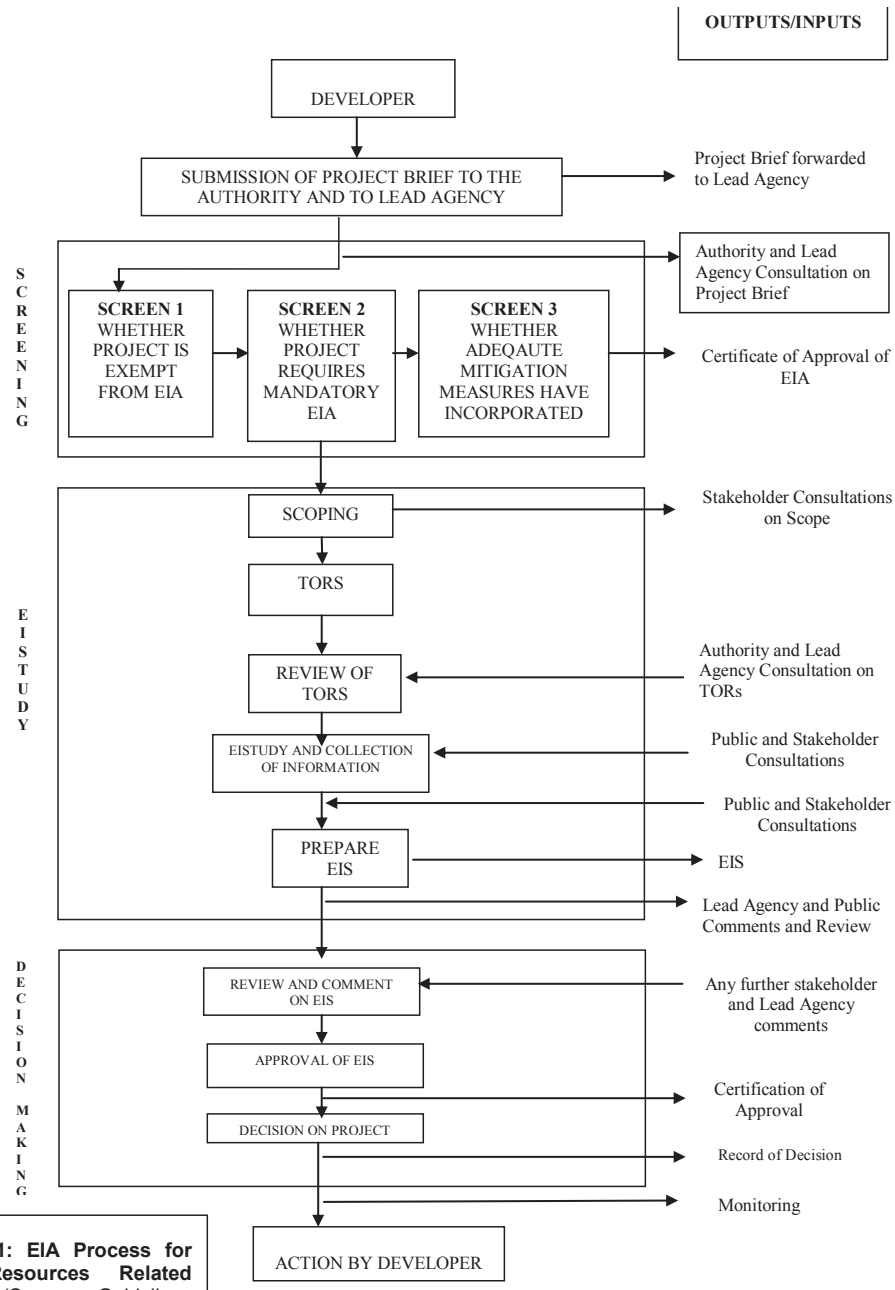


Figure 4.1: EIA Process for Water Resources Related Projects (Source: Guidelines for EIA in Uganda, 1997).

4.1.1 Project Brief

A project brief is necessary for some development projects that are listed in the Third Schedule of the National Environment Act (NEA) Cap 153, for NEMA to determine the category of the project. This arises out of the screening process which assesses the cost or benefit of the particular project. The developer has the responsibility to prepare a project brief which must provide the required information given in Box 4.1.

Box 4.1: Contents of a Project Brief

i. Name and address of the developer
ii. Name, purpose, objectives and nature of the water project in accordance with the categories identified in the Third Schedule of the NEA;
iii. Description of the project site and its surroundings where the project is to be located (including Global Positioning System (GPS) coordinates, village, parish, subcounty, county and district).
iv. Site location map;
v. Policies, laws, regulations governing such project;
vi. Description of project design and activities that shall be undertaken during and after the development of the project;
vii. Description of equipment to be installed and any buildings or related facilities;
viii. Description of the materials and input that the project shall use;
ix. Description of the products and by-products, including waste to be generated;
x. Description of any likely environmental impacts of the project, and how they will be eliminated or mitigated during the implementation of various phases/stages of the project;
xi. Description of any other alternatives, which are being considered (e.g. siting, technology, construction and operation procedures, sources of raw materials, handling of wastes etc.); and
xii. Any other information that may be useful in determining the level of EIA required by NEMA, and Decommissioning and restoration plans for closure and restoration of the site to productive post-closure use.

4.1.2 Review and approval of the Project Brief

t is a requirement that any developer intending to develop a water resources related project submits a project brief to NEMA, containing a prescription of the activity being considered. The project brief shall be screened by NEMA in consultation with DWRM. The review process shall remain the same as stated in the National Environment Act Cap 153 and EIA regulations 1998. After the review, NEMA shall make a decision whether:

i. the project is exempt from any further assessment through EIR or EIA and consequently;
ii. a conditional or unconditional approval for the project shall be granted; or
iii. where it is envisaged that the project is likely to lead to significant impact on the environment, it shall require that an EIR or a full EIStudy be carried out.

The EIA process is concluded when NEMA issues an EIA Certificate of Approval to the developer after paying an appropriate fee.

4.2 Phase II: The EIA study Phase

The EIStudy process for water resources related projects shall comply with the National Environment Act Cap 153 and EIA Regulations 1998.

The main steps to be followed in the EIStudy phase include:

i. Scoping which involves identification - what will happen as a result of the project?
ii. Prediction - what will be the extent of the changes?
iii. Evaluation - do the changes matter?
iv. Mitigation - what can be done about them?
v. Monitoring - how can critical impacts and the compliance of mitigation measures be monitored?
vi. Documentation - how can the decision makers be informed of what needs to be done?

4.2.1 Scoping for Water resources related Projects

Scoping is an important component in EIA process. It determines the extent and approach of the EIA at an early stage in the planning process.
If screening determines that a partial environmental assessment (Category 3) or a full EIA (Category 4) is required for a particular project, terms of reference (ToR) need to be developed for these studies. For Category IV projects, a scoping exercise ***(Appendix 7.3)*** will be carried out in order to identify issues and prepare the ToR for a full EIA Study. However, for Category 3 project, ToR can be inferred directly from the information provided in the project brief; therefore, a scoping exercise will not normally be required for the EIReview.

A guiding criterion for evaluating the significance of impacts and their effects is provided in ***Table 1.*** After identification of all possible significant impacts, describe the precise nature of the impacts on the affected environment (Box 4.2). In order to facilitate identification of the potential environmental impacts during scoping, project specific checklists covering key information, such as the one included in ***Appendix 7.3*** should be reviewed and used.

Box 4.2. Impacts can also be described as follows:

i. Direct or indirect impacts
ii. Temporary or permanent impacts
iii. Reversible or irreversible impacts
iv. Short term or long term impacts
v. Simple or complex impacts
vi. Primary or secondary impacts
vii. Local or regional or global impacts
viii. Cumulative or non-cumulative impacts
ix. Continuous or intermittent impacts

4.2.1.1 Consultation with the stakeholders during scoping

EIA is concerned with (i) information, (ii) participation and (iii) transparency of decision making. Public involvement consequently is a prerequisite for effective EIA and can take place at different levels: informing (one-way flow of information), consulting (two-way flow of information), or "real" participation (shared analysis and assessment).

The EIA team conducting the scoping shall consult and seek public opinion/ views on environmental aspects of the project. Such public involvement shall be during scoping and any other appropriate stages during the conduct of the study (Figure 7.1). This should preferably be initiated as early as possible in the project cycle to ensure that the concerns and views of the directly affected, especially the poor, minority and other highly vulnerable groups are not overshadowed by more influential groups.

The consultation process should accord the stakeholders every opportunity to comment on merits, demerits, and any other aspect of the proposed project (Appendix 7.4). In this consultation, the process shall usually involve the following stages:

i. The developer is required to provide information to DWRM and NEMA about the project and its location and solicit their views on the proposed project scope of the assessment.

ii. The developer prepares a draft scoping report and submits it to NEMA with copy to DWRM. NEMA in collaboration with DWRM will provide comments to the scoping report. The developer is also required to consult with other relevant environmental and natural resources organizations, the private sector and the general public during drafting of the report.

iii. NEMA may consult other interested organisations, technical experts and the general public to identify issues of concern and for their views on the proposed scope submitted by the developer.

iv. After obtaining input from DWRM and any other relevant stakeholders, NEMA will compile the comments and officially communicate them to the developer with copy to DWRM and other relevant stakeholders for information.

v. The developer incorporates stakeholders' views to prepare a final scoping report and submits to NEMA with a copy to DWRM.

vi. A finalised Scoping Report is approved by NEMA, and forms the basis for preparing the ToR for the subsequent EIA study phase.

vii. ToR is approved by NEMA in consultation with DWRM.

4.2.1.2 Scoping Report

Scoping is primarily focused on identifying the impacts to be assessed and, which of these are most significant. The Scoping report should be presented in the format given in Box 4.3.

Box 4.3: Format for the EIA Scoping Report

i. Cover page: log, name of developer, name of consultant;
ii. Executive summary;
iii. Description of the project under consideration and its alternatives;
iv. Applicable environmental legislation and institutional framework;
v. Key stakeholders and their concerns;
vi. Key environmental aspects to be addressed in the EIA;
vii. Scope of the environmental baseline and areas of project influence;
viii. Recommendations on specific impact identification and evaluation methodologies;
ix. Time frames and resources needed to carry out the EIA;
x. Technical appendices;
xi. Stakeholder engagement methodology;
xii. List of stakeholders/people and institutions consulted (including contact details);
xiii. Records of stakeholder engagement;
xiv. List of documents consulted.
xv. List of tasks undertaken by the consultant.

4.2.2 Terms of Reference for an EIA

The main output of the scoping exercise is to prepare the Terms of Reference (ToR). Taking into account findings from project scoping, the developer shall prepare ToR and submit to NEMA with a copy to DWRM. NEMA shall review the ToR in consultation with DWRM and any other relevant Lead Agencies before the EIStudy is conducted. The reviews ensure that the assessment will be conducted in an agreed-upon and focused manner.

Based on the tasks specified in the ToR, the developer shall then source and hire an experienced and multi-disciplinary team of EIA Practitioners and other relevant experts to undertake the different tasks specified in the ToR. Specifically, the ToR shall include among others:

a) Background

The National Environment Act Cap 153 requires an Environmental Impact Assessment (EIA) to be carried out for the formulation of the (***state the name/title of the proposed project***). The project is described as follows (***provide key information, such as objective, rationale for the project, location, duration, technologies to be employed, life-cycle of the project, etc.***). (***Mention other pertinent background information, such as potential or known projects envisaged in the same area, key stakeholders, and legal requirements in the sector).***

b) Objective

The objective of the EIA is to identify, assess and evaluate the potential likely adverse bio-physical and socio-economic impacts of the proposed project activities in the proposed area and propose mitigation measures. The EIA will provide decision-makers in NEMA, DWRM and the other stakeholders with sufficient information to justify, on environmental grounds, the acceptance, modification or rejection of the project. It will also provide the basis for guiding subsequent actions, which will ensure that the project is carried out taking into account the environmental, socio-economic, cultural and health issues and concerns identified.

c) Results of scoping findings

The scope of work to be undertaken is based on the information obtained during scoping study. A summary of the scoping findings will be included indicating the environmental and social issues that need to be addressed in the EIStudy, considering the specific context in which the project will be implemented.

d) Scope of work

To ensure that a thorough EIA is conducted, the study team will carry out the following task:

i. **Description of the proposed project**- A comprehensive description of the project will be provided, describing the locations, general layout and size, as well as pre-construction, construction and post-construction plans.

ii. Description of the environment – The consultant will be expected to identify, evaluate and present data on the environmental characteristics of the study area. Including any changes on:

- **Physical and chemical environment: topography**; soil; runoff characteristics; description of receiving environment; surface and ground water hydrology; existing sources of air emissions; existing water pollution discharges and related chemicals; and receiving water quality;
- **Biological environment:** biodiversity, sensitive habitats; including water resources, protected areas – forest or preserves;
- **Socio-economic and cultural environment:** public health; aspirations and attitudes and a description of the history and current status of the relations between developer and the surrounding communities.

iii. Legislative and Regulatory Considerations. Review and discuss Uganda's environmental policies, laws, regulatory and administrative frameworks that are relevant to the water resources related projects and make recommendations as appropriate. These include and are not limited to the legislative and regulatory considerations cited in these Guidelines.

iv. Identification of potential impacts- The major environmental, socio-economic, cultural and health issues and their relative importance to project design should be identified and assessed:

- identify issues of occupational health and safety of the workforce;
- evaluate impacts of the project with regard to public health concerns e.g. dust, noise levels and management of project and human wastes;
- assessing the impact on land use and landscape impacts of excavation and construction;
- solid waste disposal;
- assess hydrological concerns relating to the project sites;
- evaluate the impacts of the project activities in areas adjacent to natural resources.

v. Identification of mitigation measures - recommend appropriate mitigation measures for mitigating the negative impacts and identify opportunities from positive impacts and how they can be enhanced,

vi. Analysis of Alternatives. Conduct an economic analysis, and describe and analyze the alternatives available to the developer and other alternatives that would achieve the best practice. The alternatives should include human practices and technology selection. Also compare alternatives in terms of potential environmental impacts; capital and operating costs.

vii. Development of Environmental Management Plan (EMP)- The EMP includes actions needed to implement the EIA recommendations including:

- **Mitigation of environmental and social impacts**: Recommend feasible and cost effective measures to prevent or reduce significant impacts to acceptable levels. Estimate the costs of implementing the EMP. Consider compensation to affect parties for impact(s) which cannot be mitigated. The EMP should include proposed work programs, schedules, staffing and training requirements, and other necessary support services to implement mitigation measures:
- **Institutional Strengthening and training.** Identify institutional needs for effective implementation of the EIA recommendations and indicate how these will be provided for;
- **Monitoring and supervision.** Indicate how monitoring implementation of mitigation measures and the impact of the project will be done. Including an estimate of capital and operation costs and describe other inputs needed to carry it out.

e). Methodology

The EIA consultant should use relevant methods to get the required information:

i. Review all the relevant documents and information available to enable him/her carryout this task. This will include the drawings and reports with related information.
ii. Carry out physical-chemical and biological tests and analyses to get the baseline parameters.
iii. Carry out environmental (biophysical analysis, social analysis, economic analysis, and health analysis), and
iv. Visit the project site and consult and discuss with the relevant stakeholders (local community, local councils, District Water and Environment Officers and any other relevant agencies as identified during the scoping studies).

f). Time frame/ Work Schedule

Indicate time schedule (***Insert time schedule***).
The consultant should respond to this time schedule and indicate in their proposal how they intend to organize the work for this purpose. The time schedule can be revised according to the results of the scoping study.

g) Outputs

An Environmental Impact Assessment Report: Ten hard copies and an electronic copy will be submitted to NEMA by the developer. The report will include an appendix with items such as maps, site plans, the study team, photographs, ToR and an approval letter for the ToR, and any other relevant information that relates to the EIA study.

h) EIA Experts

Include a multi-disciplinary team of experts and specialties identified according to preliminary scoping studies (e.g. a hydrologist, an ecologist, archaeologist, social scientist, soil scientist, economist/ demographer, engineer, etc) to undertake the EIA and their profiles. One of the team members will be the team leader. For each specialist proposed, curriculum vitae will be provided, setting out their relevant qualifications and experiences.

4.2.2.1 Review of the Terms of Reference

NEMA in consultation with DWRM shall examine the ToR for the planned development and ascertain whether they address all pertinent issues on the basis of which, the developer shall be given a go-ahead to start on the EIStudy. In case the ToR is found to be deficient, NEMA shall point out the deficiencies and request the developer to revise and include them in the ToR.

4.2.3 Conducting Environmental Impact Study

Once the ToR are approved by NEMA in consultation with DWRM and other relevant lead agencies, the next step in the EIA process is to carry out a detailed study of the key impacts according to the scoping report and ToR. The EIStudy process for water resources related projects shall remain the same as stated in the National Environment Act Cap 153 and EIA Regulations 1998.

4.2.3.1 Involvement of stakeholders during Environmental Impact study

Stakeholder involvement and consultation is an important part of the EIA process. The consultant should identify key stakeholders (key groups and institutions, environmental agencies, NGOs, representatives of the public and others, including those groups potentially affected by the environmental impacts of implementing the programme, project or activities). Stakeholder consultations should be by notifying the public, soliciting their and experts' comments, holding public and community meetings, and asking specific individuals for their input ***(Appendix 7.4).***

4.2.3.2 Predicting Environmental Impacts

Predicting and describing significant environmental (biophysical, health, social-cultural and economic) of impacts of a proposed project is a fundamental stage in EIA. The impacts should always be included in the non-technical summary in a way that is understandable to the general public. Predicting environmental impacts involves two main elements of work:

i. anticipating, modeling, predicting or forecasting the changes that would be brought about by the project at all its life stages, often compared to baseline, and/or predicted changes without the project, and
ii. explaining, in a rational, consistent, impartial and transparent way, the significance of the changes.

The most common environmental impacts related to water related projects include:

- effects on existing land use (land value, ecologically sensitive sites, existing utilities e.g. roads),
- increased erosion and interference with local drainage patterns,
- increased access and its associated effects (from the water facility/project site),
- Pollution of ground water if it is sanitation facilities.

An environmental input at the design stage can help to reduce the above adverse environmental impacts and to enhance the positive impacts. Impacts on the environment can be minimized during

the construction and operational phases, by strictly adhering to the design and environmental guidelines. Potential environmental impacts associated with water resources related project are summarised in ***Appendix 7.5.***

4.2.3.3 Thresholds for water resources related projects

Threshold values for the water projects are necessary to provide guidance in determining the various sizes, scales and magnitudes of all proposed projects and their operations and processes. This will enable the projects implementers have a harmonized classification of the projects, particularly in terms of environmental impacts arising from the projects implementation in areas of different environmental sensitivities. At present, there are no such thresholds officially established by DWRM, although data and information necessary to establish the values is available through the already accomplished continuous water resources assessment initiative undertaken by DWRM. Additionally, the Water Resources Regulations, S.I. No. 33/1998 and the Water (Waste Discharge) Regulations, S.I. No. 32/1998 provides for sustainable management and specifies what quality is acceptable in terms of effluent discharge in aquatic and sewerage systems respectively.

4.2.3.4 Assessing the Significance of Impacts

The potential environmental impacts and risks from implementing the project must be identified, described and analysed for each alternative being studied, taking into account the views and concerns of stakeholders. Their significance should be determined according to their characteristics (e.g. duration, probability, magnitude, mitigability, reversibility) and the sensitivity of the environment.

A number of methods exist to assess the significance of impacts. These include matrices, questionnaires, checklists, overlays, networks, models and simulations, and expert judgment. The identification and evaluation of impacts are necessary for all alternatives under study, in order to compare them and provide recommendations on the selection of the most environmentally sound alternative. Those impacts which are significant should be assessed in detail taking into account:

- the views and concerns of stakeholders,
- the consistency with national and international commitments,
- the socio-economic consequences (especially on vulnerable groups and ethnic minorities),
- compliance with thresholds, environmental regulations and standards,
- all phases of the project, e.g. pre-construction, construction, operation and decommissioning.
- consistency with environmental objectives and policies, and their implications for sustainable development.

4.2.3.5 Assessment of project alternatives

EIStudy should also identify and assesses alternatives to the project. Analysis of alternatives should be taken in the context of and sometimes a combination of technological, economic, social and cultural dimensions. In all, the only the best alternative (one with the least adverse impacts) should be selected based on less negative impacts and cost-benefit analysis. An important alternative to

be analysed always is the "no project" option which helps the proponents to measure the impacts of the project against those which would have taken place if the planned project had not been implemented.

In all cases, alternatives based on different approaches to the realization of the project should be considered. In addition to no action, these might be choices on scale, appearance, technology, waste discharges and mitigation measures. In general the following alternative options may be considered:

i. no project option; this could be relative to the need of the project;
ii. alternative locations and routing alternatives for the project to obtain maximum benefit from the economical, planning and environmental points of views;
iii. different scales for the project and the flexibility of its size;
iv. different alternative technology to be used in the activity;
v. different alternatives for land use to reach the ultimate environmental performance;
vi. different alternatives for the construction process: day or night to avoid noise problem, i.e., suitable time for work with minimum impact.

4.2.3.6 Impact mitigation and enhancement

The mitigation measures are recommended after assessing and predicting the likely impacts. The purpose of mitigation is to look for alternatives and better ways of implementing the proposed project or associated activities, so that the negative impacts are eliminated or minimized, while benefits are enhanced. Impact mitigation, however, can only be possible when the full extent of the anticipated impacts is well understood. If the evaluation concludes that the impacts are significant, then the next step is for the EIA to propose measures to do one or all of the following: prevent adverse impact, reduce/decrease its magnitude, rectify impact or compensate for loss of resources. This can be achieved by many different measures which might include:-

» locating the project so as not to affect environmentally sensitive locations;
» using construction, operation and restoration methods or processes which reduce environmental effects;
» designing the whole project carefully to avoid or minimize environmental impacts; and
» Introducing specific measures into the project design, construction, decommissioning and restoration that will reduce or compensate for adverse effects.

Mitigation can be used to encompass measures intended to avoid, cancel or reduce adverse effects as in Box 4.4, and are determined by the type of resource to be affected as in ***Appendix 7.5.*** Successful impact mitigation means that mitigation measures are implemented at the correct time and in the correct way. This requires a clear and agreed upon environmental management and monitoring plan to ensure implementation of the mitigation proposals.

Box 4.4. Key information on mitigation, compensation and enhancement

Mitigating measures or mitigation are the measures taken to avoid, cancel or reduce adverse impacts of the project.

Avoidance measures eliminate or avoid any adverse impacts, and may include alternative or 'do nothing' options.

Cancellation measures nullify or cancel out the effects of a project before they can have a negative impact

Reduction measures minimise or at least reduce adverse impacts of the project that have not been avoided or cancelled out.

Remedial or Compensatory measures or compensation are other measures taken to (at least try to) offset or compensate for residual adverse effects which have not been avoided, cancelled out or reduced to insignificant levels or risks.

Enhancement/Net Benefit/New Benefit is the genuine enhancement of the environmental interest of a site or area because adverse effects are limited in scope and scale, and the project includes improved management or new habitats or features, which are better than the prospective management, or the habitats or features present at the time of the EIStudy. There is, therefore, a net or new benefit to the environment.

4.2.3.7 Environmental Management Plan

The Environmental Management Plan (EMP) is a document that details actions to be implemented by the Developer and stakeholders to minimise the adversity of impacts throughout the project cycles. It goes further to assign responsibilities and commitments proposed, time schedules and costs for the mitigation. The EMP is designed to ensure that the mitigation measures and recommendations of the EIA are implemented.

The EMP should include a table (logical framework) showing the project activities, potential impact description, mitigation/enhancement measures, cost of mitigation/enhancement in line with Polluter-Pays Principle, responsibility for the implementation of those activities, frequency

The Environmental Management Plan (EMP) is a document that details actions to be implemented by the Developer and stakeholders to minimise the adversity of impacts throughout the project cycles.

of implementation and verifiable indicators; monitoring and other components of environmental management (Table 4.1**).** These arrangements should include the duties of the lead agencies, but should also include provisions for local-level participation – e.g., by NGOs, local government authorities, local committees and individuals. Institutional support should be assured at two levels: Local support from the local level institutions and Central Government institutional support developed in close cooperation with DWRM.

In formulating the environmental management plan, focus should be on:-

a. Formulating an environmental health and safety policy and objectives taking into account legislative requirements and information about significant environmental impacts. The policy formulated should include a commitment to continual improvement of environmental quality and prevention of pollution, and should be documented and communicated to all employees and water users;

b. Determining environmental aspects in all activities to determine those that impact on the environment and subsequently implement, maintain and improve on the environmental management system. Aspects will include emissions (into air) of gases, releases to water, waste management, contamination of land, use of raw materials and natural resources, and other local environmental and community issues among others;

c. Determining priorities and set objectives and targets to be met by the environmental management plan. A reporting mechanism should also be established so as to determine whether the targets are met or not, and for record purposes;

d. Establishing environmental management programmes to be undertaken within given time frames and by particular persons/institutions to take corrective environmental measures and also for emergency preparedness and response. As such, roles and responsibilities shall be defined, documented and communicated for effective environmental management; and

e. Identifying training needs vis-à-vis the environmental health and safety policy, objective and targets, and put a plan in place for capacity building among staff.

Table 4.1: Sample format for EMP Matrix

Project Activities	Potential Impact	Mitigation/ Enhancement Measures	Cost of Mitigation & Enhancement	Responsibility	Frequency	Verifiable
1. Planning/design phase /Construction Phase						
» Clearing of project site » Excavation of site » Laying of pipes						
2. Operation and Maintenance Phase						
» Water abstraction » Discharge of effluent						
3. Decommissioning and Closure						
» Removing the infrastructure » Restoring the site						

4.2.4 Reporting

An EIA culminates in the preparation of an EIA report. The Environmental Management Plan is part of the information to be included in the EIA report. The EIA Regulations, 1998 specifies how environmental information should be presented in an Environmental Impact Statement (EIS). Presentation depends largely on the importance of the various issues in the EIS. Where no significant natural resource issues arise, the EIS may simply refer to them in a general chapter on other environmental effects or information. Where natural resources issues are significant they should be addressed to the extent necessary in the main body of the EIS, although larger EIS may have separate volumes containing detailed information about specific issues.

4.2.4.1 Contents of the EIA Report

The EIA report should contain as much information on the project and its effects on the environment in such a detail to allow the average reader to make an informed decision on the project. It should cover at least the following: overview of the project, existing characteristics of the project area, potential impacts of the project (comparison of alternatives), identification and quantification of impacts, techniques used to quantify the impacts, results of detailed impact quantification, mitigation measures including environmental budgets (compensation, resettlements, monitoring and auditing) and monitoring. The expected content of the EIS is outlined in Box 4.5.

Box 4.5 Format for the EIA report should include:

1. Executive summary
2. Background
    - 2.1 Project justification and purpose;
    - 2.2 Project location;
    - 2.3 Project description and associated activities;
    - 2.4 Alternatives.
    - 2.5. Environmental policy, legislative and institutional framework.
3. Approach and methodology

(This Chapter must set out the approach and methodology used in the EIA and how the data and information collected has been incorporated in the findings and recommendations):

- 3.1 General Approach
- 3.2 Geographical or mapping units
- 3.3 Environmental quality indicators
- 3.4 Assumptions, uncertainties and constraints

4. Environmental baseline study
5. Impact identification and evaluation.

(Cumulative effects and interaction between effects could form additional subject headings to ensure that these aspects are not overlooked. Tables and diagrams should be used to summarise and clarify findings in this Chapter).

6. Mitigation/optimisation measures and residual impacts
7. Environmental Management Plan.
8 Conclusions and recommendations

(This section must present a clear statement of the conclusions and recommendations on actions to be taken to ensure that environmental issues are adequately addressed in subsequent project preparation, implementation, monitoring and evaluation phases).

9. References
10. Technical appendices:

- Records of stakeholder engagement.
- List of stakeholders consulted or engaged.
- Terms of Reference.
- Other technical information and data, as required.

4.3. Phase III: Decision making

4.3.1 Review of the EIA Report

The developer then submits ten (10) hard copies (and a soft copy on a CD) of the EIA report to NEMA and one copy to DWRM.

NEMA after receiving the EIA report, reviews it, as well sends copies to DWRM and other key stakeholders for review and feedback, before either approving or rejecting it ***(Appendix 7.6).*** The review process shall remain the same as stated in the National Environment Act Cap 153 and EIA Regulations 1998. This notwithstanding, the following questions should be used by DWRM and other stakeholders to judge the adequacy of the EIS. They are adapted from draft materials of the organization for economic cooperation and development (OECD):

To what extent are both the beneficial and adverse environmental effects clearly explained?

i. How are the risks of adverse consequences evaluated and what are they?
ii. What is the scope of the EIA in terms of externalities and time–lag effect?
iii. What (If any) are the impacts on environmentally sensitive areas, endangered species and their habitats, and recreational/aesthetic areas?
iv. What alternatives are considered: No project? Other sites? Other technologies?
v. What lessons from previous similar projects are incorporated?
vi. How do the environmental effects change the costs and benefits of the project?
vii. What adverse effects are unavoidable?
viii. What public participation and review of the project plans or the EIA have occurred?
ix. What mitigation measures are proposed and who is responsible for implementing them?
x. What are the parameters to be monitored so that the state of the environment can be studied throughout the project?

4.3.2 Decision on project and record of decision

If the EIA report meets the conditions for that kind of project, NEMA will notify the proponent, the DWRM and other key stakeholders of their decision allowing the project to proceed, a description of the main measures to avoid, reduce and, if possible, offset the major adverse effects of the proposal (approval conditions) will be given. If the EIA report is found wanting, either of the two things can be done: the proponent will be asked to do further investigations on specified topics. If the EIA reveals major adverse impacts which cannot be mitigated, the project may be rejected. When rejected, reasons are given and can be appealed.

A copy of the decision, including any approval conditions imposed, must be kept with the developer, DWRM and other stakeholders responsible for the implementation of any aspect of the EIA recommendations and EMP.

4.3.3 Dispute settlement mechanisms

The Uganda EIA system provides for appeals where any party may not be satisfied with any decision taken as a result of the EIA approval process. Regulation 38 (1) of the EIA regulations provides that any person who is aggrieved by any decision of the Executive Director, NEMA with respect to EIA may, within 30 days of the decision, appeal to the High Court for arbitration.

4.4 Environmental Monitoring

The ***Environmental Impact Assessment Regulations 1998*** requires that the developer carries out environmental monitoring in order to ensure that recommended mitigation measures are incorporated into the project design and that these measures are effective so that unforeseen impacts may be mitigated.

Monitoring will be dependent on the type of environment involved and the degree to which they are affected. Key areas to be monitored should include implementation of mitigation measures as described in the EIA report and EMP; water quality changes in water bodies/flows quality; effluent and solid waste discharge; water levels, productivity (specific capacity in $m^3/m/day$ and water quality (electrical conductivity, pH, dissolved oxygen, nitrates, iron, manganese, trace elements and total coliform etc); health monitoring - occurrence of water related diseases in the community; number of water and facility users; extent of settlement or resettlement in and around the project area; number of public complaints etc (Oud & Muir, 1995).

Environmental monitoring recommendations are an essential part of the Environmental Management Plan. The monitoring activities should run through the construction, implementation and decommissioning stages of projects.
The Environmental monitoring should be carried out by the Project Proponent and supervised by DWRM, NEMA, Local Government authorities and other relevant agencies. However, the proponent may, after consultation with DWRM and other relevant authorities, decrease or increase the frequency and/or parameters of specific monitoring if circumstances are demonstrated that warrant such change.

The objectives and purpose of Environmental monitoring are to:

i. Measure the extent, changes and benefit/severity of environmental impacts on components predicted to be significantly affected;
ii. Ensure early detection of unexpected impacts and development of measures to deal with them;
i. Determine the efficacy of mitigation/enhancement measures to reducing/ improve impacts and to allow periodic review and adjustment of mitigation/enhancement programmes;
i. Describe the proposed sampling programmes, including the parameters to be measured; sampling strategies; frequencies, locations and times of sampling; personnel and equipment requirements and estimated costs.

i. Provide indications on assessment of the monitoring data and how this will be utilized technically and procedurally to improve mitigation and environmental management;
ii. Assess the adequacy of environmental monitoring such as selected monitoring locations, schedule, monitoring methods, as well as required supervision, and to suggest improvements, if appropriate, in the light of the results;
iii. Ensure that environmental management is being performed effectively in accordance with technical requirements and relevant laws and regulations.
iv. Identify training requirement at various levels

The proponent and/or monitoring team should make annual monitoring reports on implementation of the environmental monitoring program as described in the EIA report and submit to DWRM and NEMA. These reports could be considered at an annual review meetings where the relevant parties decide the effectiveness of the mitigation.

An environmental monitoring plan provides a delivery mechanism to address the adverse environmental impacts of a project during preconstruction, construction, operation and decommissioning phase of the project; to enhance project benefits, and to introduce standards of good practice to be adopted for all project works.

A format for an environmental monitoring plan is suggested (Table 4.2) to monitor environmental parameters during implementation.

4.5 Environmental Audit

The ***Environmental Impact Assessment Regulations 1998*** require that after the first year of operation, the developer must undertake an initial environmental audit. The purpose of the audit is to compare the actual and predicted impacts, and assess the effectiveness of the EIA, as well as its appropriateness, applicability and success. Thereafter, NEMA may require additional audits to be made as circumstances warrant.

The audit should be at three levels:
i. the EIA report,
ii. the environment management plan,
iii. and the institutional capacity to implement the mitigation plan.

Environmental audit will detect the weaknesses in the process or identify the procedures which need to be developed to ensure the protection of both the social and natural environment. The developer is also required to keep such records and reports for submission to the DWRM and NEMA inspectors.

Table 4.2: Format for Environmental Monitoring Plan

Source of Impact	Significant Impact on Environment	Indicators of Impact	Monitoring Objectives	Monitoring methods	Monitoring Location	Monitoring and Reporting Frequency	Institutions for environmental monitoring		
									Reporting
Surface water quality									
Site preparation (such as land clearing and development of access road.	The clearing of land for the water pipe or channel alignment may contribute to sedimentation if undertaken near water courses. .	Increased sediment load and turbidity in the receiving surface water due to soil erosion.	To evaluate compliance of water quality with the Water (Waste Discharge) Regulations, S.I. No. 32 of 1998 and the Water Resources Regulations, S.I. No. 33/1998.	Visual observation of Construction areas and surrounding areas, with particular attention to eroded areas and sites of standing water.	Sediment ponds outlet (once ponds become operational). Downstream of watercourse crossings (temporary and permanent).	Monitoring will commence at the start of the Preconstruction stage and continue through construction, operation and decommissioning stages.	Project proponent	Supervision Consultant or Contractor.	DWRM, District Water Officers, District Local Government Departments.
Hydrology (run off)									
Site preparation And development of access roads and quarries	Clearing required for heavy vehicle access via temporary roads may contribute to sedimentation if undertaken near watercourses	Amount of sediments in the water body which is closest to the activities location	To assess the effectiveness of environmental management programs designed to minimize surface water flow	Visual observation of construction areas and surrounding areas, with particular attention to eroded areas and sites of standing water.	Sensitive areas, such as wetlands during and immediately after periods of nearby active construction	Water quality monitoring will be carried out every three months following commencement of water works	Project proponent	Supervision Consultant or Contractor.	DWRM, District Water Officers, District Local Government Departments.

4.6 Trans-boundary Environmental Assessment

Almost all of Uganda's water resources are part of the River Nile system and hence are transboundary in nature and therefore shared with other countries of the Nile Basin. Thus, water related activities taking place in any of the upstream Nile Riparian countries (Kenya, Tanzania, Rwanda, Burundi and DR Congo) are likely to cause direct/indirect impacts on the shared water resources. Similarly, any water related activities taking place in Uganda are likely to have impacts on downstream Nile Riparians of Sudan and Egypt. Thus, while it is possible to assess the impact a project may have on the environment in a particular country a project might have adverse environmental impacts across borders since environmental threats do not respect national borders. Thus impact assessment would be incomplete if other countries are not consulted.

To represent Uganda's interests in trans-boundary water resources, Trans-boundary Environmental Assessment (TEA) should be undertaken. The TEA process shall remain the same as stated in the Regional Environmental Assessment Guidelines for Shared Ecosystems in East Africa, 2005.

Activities to be subjected to the TEA include those that are implemented in the transboundary water basins or ecosystem such as those around Lakes Victoria, Albert and Edward or Mount Elgon ecosystem. These activities could be include policies, plans, programs or projects in one neighbouring state or activities out of character with their surroundings involving major changes in land use and are likely to cause trans-boundary impacts either up or down stream of the scene of the activity in a neighbouring country. Such policies, plans, programs or specific activities could involve transportation and communication, mining, exploration for petroleum and minerals, hydropower development, tourism, large scale agricultural projects, irrigation and diversion of water courses as well as large weed and pest control programs (East African Community, 2005).

The TEA will therefore help to define whether a proposed policy, plan, program, project or activity will have significant positive or negative trans-boundary impacts and to categorize the level of significance. It should further, determine whether the adverse impacts can be avoided or mitigated and recommend measures to prevent or reduce adverse impacts or propose alternatives to the proposed policy, project or activity in the shared/trans-boundary ecosystems.

4.6.1 Criteria for determining Trans-boundary Environmental impacts

The criteria which may be used to determine whether a project or an activity will have trans-boundary impacts or not are:

- the activity falls within a core area or area of immediate impact.
- the activity falls outside the core and the immediate impact area but has trans-boundary effects.
- a policy, plan, program or an activity whose objective is to promote regional integration.
- an activity whose impact may promote regional integration.
- an activity with risks of any trans-boundary impacts.
- a policy, plan or program which will affect valuable or vulnerable areas including landscapes with a recognized national or international status.

4.6.2 Stages in the TEA process

The stages for conducting transboundary environmental assessment are:

i. Preparation of a project brief, screening and scoping;
ii. Preparation of the EIStudy;
iii. Conducting EIS review;
iv. Holding the public hearing;
v. Decision making, and
vi. Monitoring and auditing.

4.6.3 Procedure for conducting trans-boundary TEA

Once NEMA considers that there may be trans-boundary effects arising from a water resources related project for which they are the approving authorities, it will have to notify the Government of Uganda forthwith, who will then take any action necessary to undertake transboundary consultations with the neighbouring State. Similarly, in the event that the Government of Uganda receives a consultation from the neighbouring State about a project that may affect water resources in Uganda, it will consult the Ministry responsible for water resources management. The procedure for conducting TEA is summarised as follows:

i. the developer shall prepare and submit twenty (20) copies of the project brief or EIS to NEMA.
ii. NEMA will distribute copies of the project brief to DWRM, the head of environment lead agency in the country of impact and the EAC Secretariat.
iii. the environment lead agency in the country of impact will submit comments on the project brief to NEMA with copies to the EAC Secretariat.
iv. NEMA will aggregate and summarize the views of DWRM and the environment lead agency of the country of impact and submit a report with recommendations on the proposed project to the developer with copies to the environment lead agency in the country of impact and the EAC Secretariat.
v. the environment lead agency in the country of impact will respond to agree, or to dispute the findings and recommendation of NEMA. NEMA will communicate with the environment lead agency in the country of impact or call meetings to agree on the fate of the project brief or EIS after receiving notice of disagreement from the environment lead agency of the country of impact;
vi. NEMA will inform the EAC Secretariat of the decision they have reached with the environment lead agency of the country of impact;
vii. the EAC Secretariat will resolve the dispute through correspondence and or meetings and inform NEMA and the environment lead agency of the country of impact accordingly;
viii. NEMA will inform the developer with copies to DWRM to proceed with the project or revise the EIS.

5.0 STRATEGIC ENVIRONMENTAL ASSESSMENT

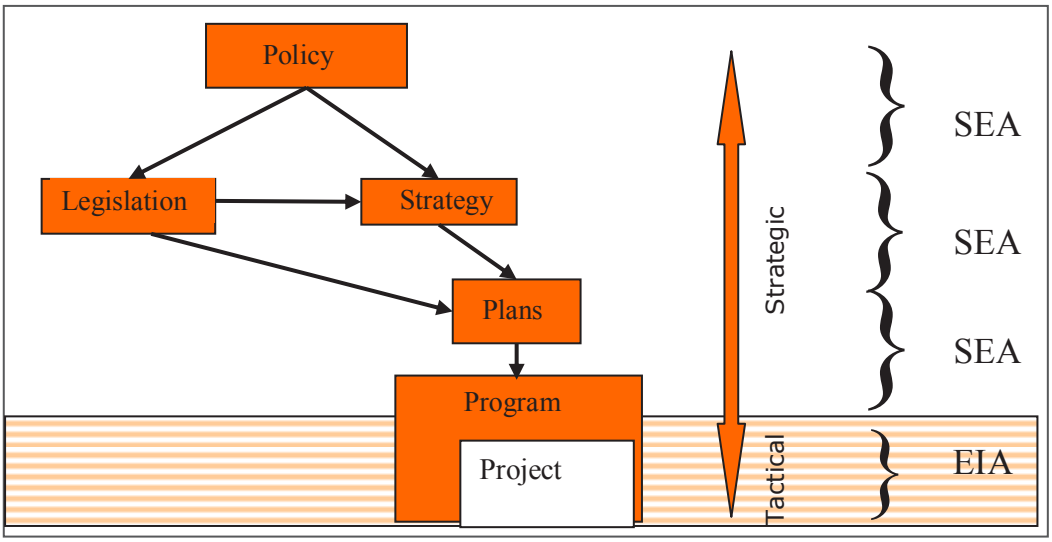
In Uganda, Environmental Impact Assessment (EIA) is used to integrate environmental concerns into the projects. As compared to individual projects, however, strategic-level interventions, notably at the policy-level, are much more influenced by political factors than by technical criteria (OECD, 2006). Moreover, the environmental effects associated with policy reforms are often indirect, occur gradually over the long term and are difficult to assess accurately. While still very valuable and relevant at the project level, established EIA procedures, methods and techniques have only limited application at the level of policies, plans and programmes, thus the need for Strategic Environmental Assessment (SEA).

SEA is a systematic ongoing process of analysing, at the earliest appropriate stage environmental effects of polices, legislation, strategies, plans and programmes (PLSPP) and their alternatives, ensuring full integration of relevant biophysical, economic, social and political considerations and the use of the findings in decision-making in many sectors, including the water sector (East African Community, 2005).

SEA provides an important pathway for introducing environmental concerns into water resources management at the strategic level of PLSPP (World Bank, 2007). SEAs complement EIAs by undertaking environmental assessments of PLSPPs. Thus, SEA both upstream (i.e. shift towards the strategic level) and mainstream (that is, weave directly into the decision making) environmental and social concerns. Strategic here refers to all the stages of decision making that precede the decision to go ahead with a specific project or a set of projects ***(Figure 5.1).***

SEA is a means of integrating environmental considerations into development policy-making and planning. SEA places environmental concerns at similar levels of importance as those aspects of (social, economic, political, technical) in decision-making. A good SEA process should inform the interested and affected parties on the sustainability of strategic decisions, identify best alternatives and ensure a democratic decision-making. Thus, a good SEA should be integrated, sustainability-led, focused, accountable, participative, and iterative.

Figure 5.1: The Relationship between policy, legislation, strategies, plans, programmes and projects. (Source; World Bank, 2005)

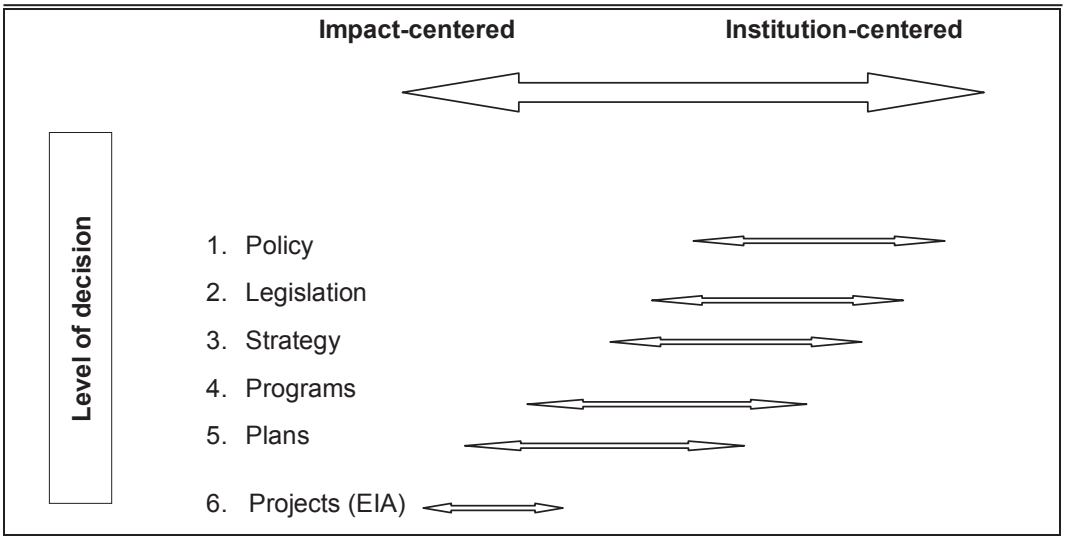


5.1 Types of Strategic Environmental Assessment

SEAs constitute a family of approaches that can be broadly classified on a continuum from ***impact-centered (Regional) SEAs*** to ***institution-centered (Sectoral) SEAs.*** The former assess likely environmental and social effects and propose mechanisms to avoid, mitigate or compensate these effects. In focusing on a proposed sector-wide investment or instrument, they share similarities with EIAs, although shifted upstream to the strategic decision making level. Impact-centered SEAs for programmes and plans are often carried out at the regional level.

Institution-centered SEAs focus on the analysis of institutions and governance structures and frameworks because of the non-linear and overtly political nature in which policies and their supporting legislations are developed (World Bank, 2005). Institution-centered SEAs are normally applied to policy and legislation because of the greater remoteness of these levels of decision-making from specific actions whose impacts can be assessed. ***Figure 5.2*** illustrates conceptually the shift from impact-centered to institution-centered SEAs at different levels of decision-making.

Figure 5.2: The Relationship between type of SEA and level of decision making. (Source, World Bank, 2007).



6.0 BIBLIOGRAPHY

1. EAST AFRICAN COMMUNITY (2005): Regional Environmental Assessment Guidelines for Shared Ecosystems in East Africa, 2005. The East African Community, Arusha Tanzania.

2. EUROPEAN COMMISSION: http://europa.eu.int/comm/environment/eia/eia-legalcontext.htm).

3. GOVERNMENT OF UGANDA (1995). Constitution of Uganda. Government printer.

5. GOVERNMENT OF UGANDA (1997). Ministry of Water, Lands and Environment. Guidelines for Environmental impact Assessment in Uganda. Government printer.

7. GOVERNMENT OF UGANDA (1999). Ministry of Water, Lands and Environment. National Water Policy. Government printer.

9. GOVERNMENT OF UGANDA. Ministry of Water, Lands and Environment. National Environment (conduct & certification of Environment practitioners Regulations S.I No.85. 2003. Government printer.

11. GOVERNMENT OF UGANDA (2004). Ministry of Water, Lands and Environment. The National Environment Act Cap 153. Government printer.

13. GOVERNMENT OF UGANDA (2004). Ministry of Water, Lands and Environment. The Water Act Cap 152. 2004. Government printer.

15. GOVERNMENT OF UGANDA (1998). Ministry of Water, Lands and Environment. The Environmental Impact Regulation. Government printer.

17. GOVERNMENT OF UGANDA. Ministry of Water, Lands and Environment. The Noise Pollution Regulation.1998. Government printer.

19. GOVERNMENT OF UGANDA (2000). Ministry of Water, Lands and Environment. The National Environment (Wetlands, River Banks & Lakeshores Management) Regulations. No.3. Government printer.

21. GOVERNMENT OF UGANDA (1998). Ministry of Water, Lands and Environment. Water Resources Regulations. Government printer.

23. NEMA (2002). Environmental Impact Assessment (EIA) – Reference Manual. .

25. GOVERNMENT OF KENYA (2007). Ministry Of Tourism and Wildlife Environmental Impact Assessment (EIA) Guidelines for the Tourism Sector in Kenya.

27. GOVERNMENT OF UGANDA. National Environmental Management Authority. Environmental Audit Guidelines for Uganda. Government printer.

29. OUD, E, &T. C. MUIR (1995). Engineering and Economic Aspects of Planning, Design, Construction and Operation of Large Dam Projects. 1995.

31. OECD 2006. Applying Strategic Environmental Assessment: Good Practice Guidance for Development Cooperation. 2006. Organisation for Economic Co-operation and Development (OECD)

33. SCOTTISH NATURAL HERITAGE (2009). A handbook on environmental impact assessment by. David Tyldesley and Associates. Edinburgh. 3rd Edition. 2009 DRAFT 2 (www.snh.gov.uk/docs/B460796.pdf)

35. EAST AFRICAN COMMUNITY (2002). The Treaty for East African Cooperation, (2002): EAC Arusha, Tanzania.

37. WORLD BANK, (1997). Introduction to Environmental and social Assessment requirements and procedures for World bank-financed Projects.

39. WORLD BANK (2007). Strategic Environmental Assessment: Enhancing Capacity for Integrated Water Resources Management and Development in Tanzania).

41. WORLD BANK (2005). Integrating Environmental Considerations in Policy Formulation: Lessons from Policy-Based SEA Experience. Report 32783. Environment Department, World Bank, Washington DC.

43. WOOD C. (2003). Environmental Impact Assessment: A Comparative Review. 2nd edition. Pearson Education Limited.

45. http://www.mde.state.md.us; Maryland Department of the Environment, Water Quality Infrastructure Programme dnr.wi.gov: State of Wisconsin, Department of Natural Resources: Eligibility Screening Checklist.

7.0 LIST OF APPENDICES

Appendix 7.1a: Legal, Regulatory and Institutional Framework

Water resources related projects fall under specific legislative and regulatory frameworks. Developers should thus ensure that these legislation and regulatory frames are consulted to ensure that the proposed water resources related project establishment, and activities therein, are in line with the national laws.

Relevant international conventions, treaties and protocols also need to be looked at in certain areas e.g. Ramsar Sites, World Heritage Sites, and transboundary water resources and ecosystems.

Below are some of the key legislations that apply to the water resources related projects.

LEGISLATION/POLICY	APPLICABILITY	INSTITUTION/ AGENCY RESPONSIBLE/ GOVERNMENT
Public Service Act, Cap 288	Responsibility for environmental policy, Regulation, coordination, inspection, supervision and monitoring of the environment and natural resources.	Directorate of Environment Affairs (DEA)
The National Wetlands Policy, 1995	Provides for conservation of Uganda's wetlands in order to sustain their ecological, social and economic functions for the present and future generations: Implementation of environment impact assessment procedures on all development activities sited in wetlands.	Wetlands Management Department
National Environment Act. Cap. 153.	Provides for projects to be considered for EIA Provides for EIA approval by NEMA EIA and Environmental Audit compliance.	NEMA

Water Act, Cap 152, 2000.	Management of water resources Regulation and issuing of water use, abstraction and wastewater discharge permits; Prevention of water pollution Managing and monitoring and regulation of water resources	DWRM
Health Act	Provision of clean and sanitary premises Protection of public health Prevention of public nuisance	Ministry of Health
Factories Act, Cap198	Provision of Occupation Health and Safety of workers Inspection of places of works	Ministry of Gender, Labor and Social Development
The Mining Act, Cap. 248, 2004	Regulates the acquisition of mining rights, prospecting for and extraction of minerals. Provides for decommissioning of mining works.	Department of Geology
National Environment (Conduct and Certification of Environmental Practitioners) Regulations, 2003	Registration and certification of EIA practitioners.	NEMA and Committee of Practitioners
The Environmental Impact Regulations S.I. No. 13/1998	Provides for preparation of project briefs ; Provides for conducting ElStudies in accordance with ToR developed by the developer in consultation with NEMA and the lead agency	NEMA
The Water Resources Regulations, S.I. No. 33/1998	Provides for sustainable management Provides for the protection of water sources.	DWRM

LEGISLATION/POLICY	APPLICABILITY	INSTITUTION/ AGENCY RESPONSIBLE/ GOVERNMENT
The Water (Waste Discharge) Regulations, S.I. No. 32/1998	Specifies what quality is acceptable in terms of effluent released into rivers. Water pollution prevention Provides for effluent discharge in aquatic and sewerage system standards	DWRM
The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, S.I., No. 3 /2000	Provides for protection of Wetlands, River Banks and Lakeshore zones	NEMA
Protocol on Environment and Natural Resources Management, 2006	Article 13. Provides for Management of Water Resources by the Partner States: Cooperate in the management of shared water resources, which may include the establishment of joint management mechanisms; Cooperate with regard to the management and execution of all projects likely to have an effect on hared water resources; Cooperate to respond to the needs or opportunities for regulation of the flow of the waters of shared water resources.	EAC
Agricultural and Rural Development Policy for EAC, 2006.	Promotes private sector and community participation in the development of irrigation, water management and maintenance of irrigation infrastructure in East Africa.	EAC

Appendix 7.1b: Roles of the Actors in the EIA Process for Water Resources related projects

INSTITUTION	KEY ROLES AND RESPONSIBILITIES IN EIA PROCESS
Ministry of Water and Environment	Development of legislation, policy formulation, sector coordination and guidance, and monitoring and evaluation.
Developers	i. Conduct screening during the early stages of project planning cycle. ii. Conduct scoping, develop terms of reference and submit to NEMA for review and approval. iii. Organize an inter-disciplinary EIA Team to conduct EIA. iv. Prepare and submit ten copies of the Project Brief and EIA report to NEMA for approval. v. Incorporate review comments from NEMA into the EIA report. vi. Present certificate of EIA approval for the proposed project to DWRM vii. Seek approval and/or license of the water project from DWRM. viii. Compensate local Project Affected Persons (PAP) for any loss or negative effect of the project before implementing the project. ix. Implement mitigation measures and actions to protect the environment. x. Monitor environmental aspects of the project in accordance with approval conditions.
EIA Practitioners	i. Team Leader to assign tasks to the EIA team ii. Conduct screening, scoping and EIStudy of the proposed project on behalf of the developer. iii. Consult members of the local communities and other relevant stakeholders directly or indirectly affected by the project. iv. Using standard data collection and procedures collect relevant data to address significant issues identified during scoping and EIStudy. v. Undertake baseline survey and collect background information on the project site; vi. Identify and quantify project impacts against threshold values. vii. Determine which alternative represents the most desirable balance between environmental and economic cost and benefits. viii. Propose appropriate mitigation measures to adverse impacts. ix. Collate data/information and draft EIA report(s) in the desired formats. x. Review the draft EIA report (Team Leader is responsible for editing the draft EIA report to ensure accuracy of data presented).

Directorate of Water Resources Management (DWRM)	The key responsibilities of the DRWM are twofold: i. To provide the technical inputs required to ensure that potential and existing Developers act and implement these EIA guidelines, with regard to water resources related project activities, specifically: » Publicise and extensively disseminate EIA guidelines for water resources related projects. » Advise practitioners, potential Developers and others on the purpose and procedure of the EIA; » Review Project briefs, scoping reports, ToRs, Environmental Reviews and EISs in compliance with these guidelines, and ensure that (a) the ToRs have been complied with and (b) that they will advance sound environmental management. » Propose necessary additional mitigation measures, where appropriate, to ensure minimal disruption to the environment; » Forward the review comments and recommendations to NEMA. » Ensure that local community recommendations are built into project designs and implementation. » Guide on the integration of SEA findings and recommendations into the water resources related plans and programmes. » Ensure that members of the EIA team are qualified in the water resources disciplines with which the EIA is concerned. » Determine the threshold values of the respective water sources based on the technical and legal provisions. ii. Ensure environmental compliance of large scale water resources related project activities that are initiated by national and local government and government agencies (including policies, plans, programmes and projects) with the water regulations, guidelines and procedures, specifically: » Provide clear descriptions of environmental needs and constraints on types and locations of projects and project components. » Monitor and supervise projects to ensure that recommended mitigation measures and actions are implemented. » Monitor and audit implementation of mitigation measures to ensure compliance with terms and EIA conditions of project approval. » Ensure that EIA and engineering design specialists respond to community concerns about the potential impacts of the project. » Grant permit(s) to developer(s) to implement water resources related projects in accordance with the mitigation measures stipulated in the project briefs and EIA reports and any other terms and conditions as in the certificate of EIA approval issued by NEMA.

National Environment Management Authority (NEMA)	i. Review Project Brief, scoping report, ToR and EIS in consultation with DWRM. ii. Approve or disapprove the environmental aspects of the project, or part thereof. iii. Issue certificate of approval of the EIA Report to enable DWRM grant licenses or permits for the implementation of proposed project.
Directorate of Environment Affairs (DEA)	i. Coordinate, inspect, supervise and monitor the environment and natural resources. ii. Ensure that environmental policies and laws are respected while implementing water resources related projects,
EIA reviewers	i. Review ToR and give feedback to NEMA. ii. Inspect project site(s) and review EIA reports and submit comments to NEMA.
Local Authorities	i. Facilitate and/or coordinate activities of the developer in their areas of jurisdiction. ii. Mobilize local communities and key stakeholders to participate in EIA consultations and/or public hearings.
Local Community	Participate and express their concerns and issues on the proposed project.
Non-Governmental Organisations	Mobilize local communities and key stakeholders to participate in EIA consultations and/or public hearings.

Appendix 7.2(a): Screening Checklist

The purpose of this Environmental Screening Checklist is to determine what effects, if any, the proposed project will have on the environment based on information currently available to the developer. Circle the categories below (if applicable) under which the project may potentially qualify exempt category for EIA.

PROJECT TITLE			
Project Location (include Plot and Block No.- if available - LC1, Sub-county, District)			
Project Contact	Mail address	Phone number	E-mail address (if available)

A. TYPE OF ACTIVITY – WILL THE PROPOSED PROJECT			
1	Support irrigation schemes?		
2	Support rural water and sanitation schemes?		
3	Involve urban water supply?		
4	Involve small-scale aquaculture?		
5	Involve food processing?		
6	Build or rehabilitate any structures or buildings?		
7	Involve mining and mineral processing?		
8	Be located within or adjacent to any protected or sensitive areas?		
9	Depend on water supply from an existing water body or from water diversion structures such as dams?		
10	Involve large scale groundwater abstraction?		
11	Involve a new surface/groundwater discharge or discharge relocation?		
If the answer to any questions above is **Yes**", check whether it follows in the Third Schedule of the Environmental Impact Assessment Regulations which require an EIA			
B. ENVIRONMENT – WILL THE PROPOSED PROJECT			
1	Cause an increase in flow or pollutant loading at an existing facility?		
2	Discharge water or generate runoff to any water bodies such as rivers, lakes, streams, bays, wetlands?		
3	Harvest or exploit a significant amount of water resources?		

4	Affect the quality and/or quantity of surface waters) e.g. rivers, streams, wetlands, lakes) or groundwater (e.g. wells)?		
5	Result in production of solid or liquid waste, or result in waste production, during construction or operation?		
6	Increase runoff or raise flood levels upstream or downstream and cause soil erosion?		
7	Remove or modify vegetation at the site or within 50 m of a water body?		
8	Channels a water body?		
9	Line a water body with impervious materials?		
10	Be located in or adjacent to any areas that are or may be protected by government (e.g. national park, forest reserve) or local tradition or that might be a natural habitat?		
11	Cause poor drainage and increase the risk of water-related diseases?		
12	Be located within 30 or 100 m from the highest water mark of a river?		
13	Alter the bed or bank of a water body?		
14	Divert water to or from a water body?		
15	Produce noise above ambient levels?		
16	Violate ambient air quality standards?		
17	Have a negative aesthetic effect?		
If the answer to any of the above is "**Yes**", suggest measures to eliminate, reduce, mitigate or reverse the adverse effect.			
C. SOCIO-ECONOMIC – WILL THE PROPOSED PROJECT			
1	Result in social changes for example in traditional lifestyles, demography or employment?		
2	Result in increased demands on services and facilities in local communities?		
3	Cause land use conflicts and displacement of existing user?		
4	Cause damage/destruction of cultural resources and historic sites		
5	Result in deterioration of security?		
6	Require that land (private or public) be acquired (temporarily/ permanently) for its development?		

7	Use land that is currently occupied or regularly used for productive purposes?		
8	Displace individuals, communities, businesses?		
9	Result in temporary, permanent loss of crops, household infrastructure such as granaries, latrines etc.		
If the answer to any of the above is "**Yes**", suggest measures to eliminate, reduce, mitigate or reverse the adverse effect.			
D. HUMAN AND OCCUPATIONAL HEALTH AND SAFETY – WILL THE PROJECT			
1	Result in water borne diseases due to poor sanitation facilities and poor waste disposal such as dysentery, cholera, malaria and other communicable diseases		
2	Result in increase in prevalence of communicable diseases such as HIV/AIDS and STIs?		
3	Lead to mechanical injuries at the workplace?		
4	Cause physical fatigue and backaches due to intensive labour		
5	Expose persons to fire risks?		
6	Expose people to excessive and persistent heat, noise and vibrations		
7	Expose people to traffic accidents		
If the answer to any of the above is "Yes", suggest measures to eliminate, reduce, mitigate or reverse the adverse effect.			

Appendix 7.2(b): EIA Screening Questionnaire

The questionnaire below provides guidance to decide if a Category B project requires an EIA.

1	Consider the following questions in order to assess whether the project is likely to have significant impacts. Reply «? » if you have no clear answer. Tick only one box per question and go to 2. Request the support of environmental service/expertise if available.			
	Will the project affect a Protected Area or other areas classified as vulnerable?	**Yes**	**?**	**No**
	Will the project require the acquisition or conversion of significant areas of land that are important for environmental services?			
	Will the project require (during or after construction) significant amounts of water, energy, materials or other natural resources?			
	Are the needs of the project likely to exceed the capacity of existing water supply, sanitation systems, transport or other infrastructure?			
	Will the project likely result in the production of significant quantities of wastes? Especially of hazardous or toxic wastes?			
	Will the project produce significant volumes of effluents or air pollutants?			
	Will the project affect important water bodies or significantly affect water regimes?			
	Will the project be located in a site where it can significantly affect surface waters or groundwater (quantity and/or quality)?			
	Will the project require significant accommodation or service amenities to support the workforce (during or after construction)?			
	Will the project require significant use of fertilizers, pesticides or other chemicals?			
	Will the project include the introduction of GMOs or alien species?			
	Will the project attract or displace a significant population and economic activities?			
	Is there a risk that the project creates suitable habitats for disease vectors or for pests?			
	Will the project be located in a densely populated area and likely to produce significant nuisances such as air pollution, noise, vibration and odours?			
	Is the project likely to cause important soil erosion or degradation, considering its activities and its location on steep slopes or vulnerable soils?			

	Will the project affect particular ecosystems, such as natural forests, wetlands, coral reefs, mangroves or habitats of endangered/threatened species? Will the project be located in or close to a site of high cultural or scenic value?			
	At this stage, can we identify that opportunities will exist to enhance significantly the project's positive impacts or reduce significantly negative impacts?			

2	Have all the right column boxes ("No") been Yes The project does not require an EIA ticked?	Yes	The project does not require an EIA
		No	Go to 3

3	Has at least one box in the middle column ("?") been ticked?	Yes	Go to 5
		No	Go to 4

4	At this stage can we already identify measures or changes in the project design or location in order to be able to tick all the right column boxes?	Yes	The project does not require an EIA but should be adapted
		No	Go to 6

5	Considering the number of ticked boxes in the right and middle column (under question 1), the scale of the project (how close it is to a typical Category A), the expected severity of potential negative impacts, and based on the advice of EC or Governmental environmental services, may we consider that addressing these issues in the technical feasibility studies will be sufficient without needing to undertake a more detailed assessment?	Yes	The project does not require an EIA but the environmental impacts should be addressed by the feasibility study
		No	The project requires an EIA

Appendix 7.3: Scoping Checklist

This scoping checklist is to aid developers, practitioners; DWRM and NEMA in assessing the adequacy of the scoping exercise and recommend additional information that may be required. This checklist is developed to address the broad and varied types of projects in the water sector. All environmental resources and considerations indicated are not meant to be applicable to every project. The scoping should find out the major relevant environmental issues:

- how issues will be addressed;
- sets the boundaries of the baseline data collection for each project in terms of:
- geographical area to be covered, and in what detail;
- seasons and years to be covered; accuracy of the data to be collected;
- who should be involved;
- whether external expertise is required;
- what input is required by each person;
- what further information is required;
- how EIA fits into the Project Planning Cycle; and
- the logistical and practical requirements of the study.

The significance/magnitude of the impact will be classified as given below:

++ Significant positive impact
+ Positive impact not significant
0 Negligible impacts
-- Significant negative impact unless mitigation measure is incorporated
- Impact not significant

Tick as appropriate (all answers must take into account the whole actions involved, including off-site as well as on-site, cumulative as well as project-level, indirect and direct as well as construction and operational impacts).

IMPACTS ON:	CHANGE FROM THE PRESENT SITUATION (Y/N)	MAGNITUDE OF IMPACT (++, +, 0, --, -)	PROPOSED IMPACT MEASURE
PHYSICAL ENVIRONMENT			
Geology, and soils			
Will the proposed project			
Expose people, structures or properties to major geological hazards e.g. earthquakes, landslides or ground failure			

Result in unstable conditions or changes in geological sub-structure			
Destroy cover or modify any geologic or physical feature			
Increase wind or water erosion of soils either on or as runoff of from the site			
Be located within a known active fault zone or an area characterized by surface rupture that may be related to a fault that may be activated by vibrations from project activities			
Display substrate consisting of material that is subject to liquefaction or other secondary seismic hazards in the event of ground shaking e.g. from drilling			
Result in changes in deposition or erosion or changes which modify the channel of a river stream or the bed of any bay, inlet or lake			
Hydrology, Hydrogeology and Water Quality			
Will the proposed project			
Result in changes in deposition or erosion or changes which may modify the channel of a river or stream or the bed of ant bay, inlet or lake			
Substantially degrade water quality			
Contaminate public water supply			
Substantially degrade or deplete groundwater			
Cause leakage or seepage of contaminants into groundwater or soil			
Cause substantial flooding, erosion or siltation			
Result in changes in absorption rates, drainage patterns or the rate and amount of runoff			

Alter the course of flow of flood waters			
Change the amount of surface water in any water body			
Discharge into surface waters, or result in any alteration of surface water quality			
Alter the direction of or rate of groundwater flow			
Cause change in the quantity of groundwater either through direct addition or withdrawals			
Substantially reduce the amount of water otherwise available for public water supplies			
Expose people or property to water related hazards such as flooding			
Interfere with other proposed facilities that would be located in flood-prone areas			
Enhance impact of the proposed facilities that would increase off-site flood hazard, erosion or sedimentation			
Result in lowered water table, resulting in land subsidence with damage to infrastructure			
Lower water levels and decreased groundwater discharge.			
Cause over-exploitation of the water resource.			
Result in saltwater intrusion resulting in poor water quality.			
Cause lowering of water table, resulting in sinkhole or and reduced flow and habitat for ecosystems			
Result in water table fluctuation and change in aquifer capacity			

BIOLOGICAL RESOURCES			
Will the proposed project			
Cause fish or wildlife population to drop below self-sustaining levels			
Threaten to eliminate a plant or animal community			
Substantially affect, reduce the number or restrict the range of unique, rare or endangered species of animal or plant or the habitat of the species			
Substantially diminish or reduce habitat for fish, wildlife or plants			
Change the diversity of species or number of any species of plants or animals			
Introduce new species of plants or animals into areas or become a barrier to the normal replenishment of existing species			
Cause reduction in acreage of any agricultural crop			
Increase the rate of any natural resource			
Adversely affect significant riparian lands, wetlands, marshes or other wildlife habitats			
VISUAL AND AESTHETIC QUALITY			
Will the proposed project			
Have a substantial, demonstrable negative aesthetic effect			
Result in the obstruction of any scenic view open to the public or result in the creation of an aesthetically offensive site open to public view			
Comply with local Guidelines or goals related to visual quality			

Significantly change the existing visual quality of the region or eliminate visual resources. Significantly increase light and glare in the project vicinity			
Significantly alter the existing natural view sheds, including changes in natural terrain			
Significantly reduce sunlight or introduce shadows in areas used extensively by the community			
LANDUSE			
Will the proposed project			
Conflict with adopted environmental plans and goals of community where located			
Disrupt or divide physical arrangement of an established community			
Conflict with established recreational, educational, religious or scientific uses of the area			
Convert prime agricultural land to non agricultural use or impair the productivity of prime agricultural land			
Conflict with existing land use polices			
Result in a substantial alteration of the present or planned land use of an area			
Result in the conversion of open space into urban or sub-urban scale uses			
Conflict with local general plans, community plans or zoning			
Affect high quality or scarce resources			

POPULATION, HOUSING AND EMPLOYMENT			
Will the proposed project			
Attract people to the project area and expose them to hazards found in the area			
Induce substantial growth or concentration of population			
Displace large number of people			
Alter the location, distribution, density or growth rate of the human population of an area			
Affect existing housing or create a demand for additional housing			
Conflict with the housing and population projections and policies set forth in the general plan			
Result in employment of children			
TRANSPORTATION AND TRAFFIC			
Will the proposed project			
Cause an increase in traffic which is substantial in relation to the existing traffic volume and capacity of the street system			
Generate substantial additional vehicular movement			
Affect existing parking facilities or demand for new parking			
Substantially impact existing transportation systems			
Alter present patterns of circulation or movement of people and/or goods			
Alter waterborne, rail or air traffic			

Increase traffic hazards to motor vehicles, cyclists or pedestrians			
Significantly impact intersection levels of service which are or will be below acceptable levels			
Provide parking and internal circulation capacity to accommodate project traffic so that neighbouring areas are adversely affected			
AIR QUALITY			
Will the proposed project			
Violate ambient air quality standards			
Result in substantial air emissions or deterioration of ambient air e.g. suspended dust			
Create objectionable odours			
Alter air movement, moisture or temperature or result in any change in climate either locally or regionally			
Provide toxic air contaminant (TAC) emissions that exceed Air Pollution Control threshold level for health risk			
Hamper visibility			
NOISE			
Will the proposed project			
Increase substantially the ambient noise levels for adjoining areas			
Expose people to severe noise levels			
Generate noise that would conflict with local noise standards			

Introduce land uses that substantially increase noise levels in the areas			
PUBLIC SERVICES			
Will the proposed project			
Result in an impact upon the quality or quantity of existing recreational opportunities			
Require additional law enforcement staff and equipment to maintain acceptable level of service (response time, equipment)			
Require expansion of the existing school system			
Affect or require designation of substantial additional parkland to remain in conformity with locally acceptable or adopted park standards			
UTILITIES			
Will the proposed project			
Breach published national or local standards relating to solid waste control			
Require extension of a sewer trunk line with capacity to serve new development			
Result in need for new systems or substantial alterations to the following utilities: power or natural gas communication systems water sewer or septic tanks storm water drains solid waste disposal			
Cause a significant increase in the consumption of potable water			

Require substantial expansion of water supply treatment and distribution capacity			
Require substantial wastewater disposal			
Produce solid waste in excess of available landfill capacity			
ENERGY			
Will the proposed project			
Result in significant irreversible environmental changes including use of non-renewable resources during the initial and continued phases of the project			
Result in significant effects on local and national energy supplies or on requirements for additional capacity			
Result in significant effects on peak and base period demands for electricity and other forms of energy			
Conflict with existing energy standards			
Result in significant effects on energy resources			
Encourage activities which result in the use of substantial amounts of fuel, water or energy			
Substantially increase demand upon existing sources or energy or require the development of new sources of energy			
PUBLIC HEALTH AND SAFETY			
Will the proposed project			
Attract people to a location that and expose them to hazards found there			

Create potential health hazards (including mental health) or involve use, production or disposal of materials which pose a hazard to people or animals or plant populations in the area affected			
Create risk of explosion or release of hazardous substances (including but not limited to oil, pesticides,, chemicals or radiation) in the event of an accident or upset conditions			
Expose people to potential health hazards			
Pose a public health and safety hazard through release of toxic emissions			
Result in unsafe conditions for employees, residents or surrounding neighborhoods			
Comply with all applicable laws regarding handling of hazardous waste materials			
CULTURAL			
Will the proposed project			
Disturb or destroy a resource which is associated with an event or person of recognised significance in Uganda history			
Disturb or destroy an archaeological resource which has recognised importance in pre-history			
Disturb or destroy an archaeological resource which can provide information which is both of demonstrable public interest and useful in addressing scientifically consequential and reasonable or archaeological research questions			

Disturb or destroy any human remains			
Disturb, alter or destroy a site that is currently used for religious, ceremonial or other sacred purposes			
Disturb, alter or destroy a site that is important in preserving unique ethnic cultural values			
GENERAL			
Will the proposed project			
Substantially degrade the quality of the environment			
Achieve short-term environmental goals to the disadvantage of long-term environmental foals			
Cause possible cumulative environmental effects that are individually limited but cumulatively considerable or foe which the incremental effects of an individual project are considerable when viewed in connection with: Past projects Current projects, and Probable future projects			
Cause substantial adverse effects on human beings either directly or indirectly			

Appendix 7.4: Public Participation and stakeholder involvement in the EIA

According to the Guidelines for EIA in Uganda, 1997 and EIA Regulations, 1998, consultation and public participation constitute an integral part of the EIA process. It is, therefore, a requirement that appropriate mechanisms for ensuring full involvement and participation of the public is accorded priority and should be a continuous process from screening, scoping, during EIA Study report preparation, draft EIA report, and during EIA finalisation and review.

7.4.1 Purpose and objectives of public consultation

The purpose of public consultation to promote a two way communication process, and helps to:

i. Identify public concerns and values and inform the public about proposed actions and consequences;
ii. Collect relevant social, economic and environmental information that will help improve the understanding of a proposed development, clarify issues and improve project design;
iii. Allow the participation of affected people in decision making process and foster a sense of local ownership;
iv. Develop and maintain transparent procedures for project implementation.

The specific objectives of people's participation are to:

» ensure that local people participate fully and have a recognised role in decision-making during project planning;
» raise environmental awareness among the local stakeholders and the implementing agencies involved with water resources management;
» enable a dialogue between project planners and local people on all project-relevant topics, such as social conditions, land values, resources usage, informal and customary rights, environmental concerns etc. - so that local knowledge and ideas inform the technical design and development of the project;
» ensure early detection of possible social conflicts arising from the proposed interventions, and explore ways to minimise them - e.g. through negotiation and education;
» ensure the establishment of organisations and procedures to enable local people to participate in the construction, operation, and maintenance – as well as non-structural elements – of water resources related projects.

7.4.2 How to involve the public in EIA process

There are several techniques and methods for consulting the public. Public meetings are often the principal form of consultation used in environmental assessment. However, there are other more interactive consultation and participation methods that may be applicable to water development projects. These include open houses, focus group meetings, persuasion, education, information feedback, and delegation of authority to an affected community. The public may also be appropriately involved in the EIA process through:

(i) Informing the public about the proposed project,
(ii) Participation in scoping exercises,
(iii) Open public meetings/hearings on the projects,
(iv) Inviting written comments on proposed projects from those who can put their comments in writing,
(v) Use of community representatives,
(vi) Review of Draft Environment Impact Statements,
(vii) Making relevant documents available to any interested members of the public.

Figure 7.1 outlines the general systematic process of engaging the stakeholders, which should be adopted in assessments of the water resources related projects.

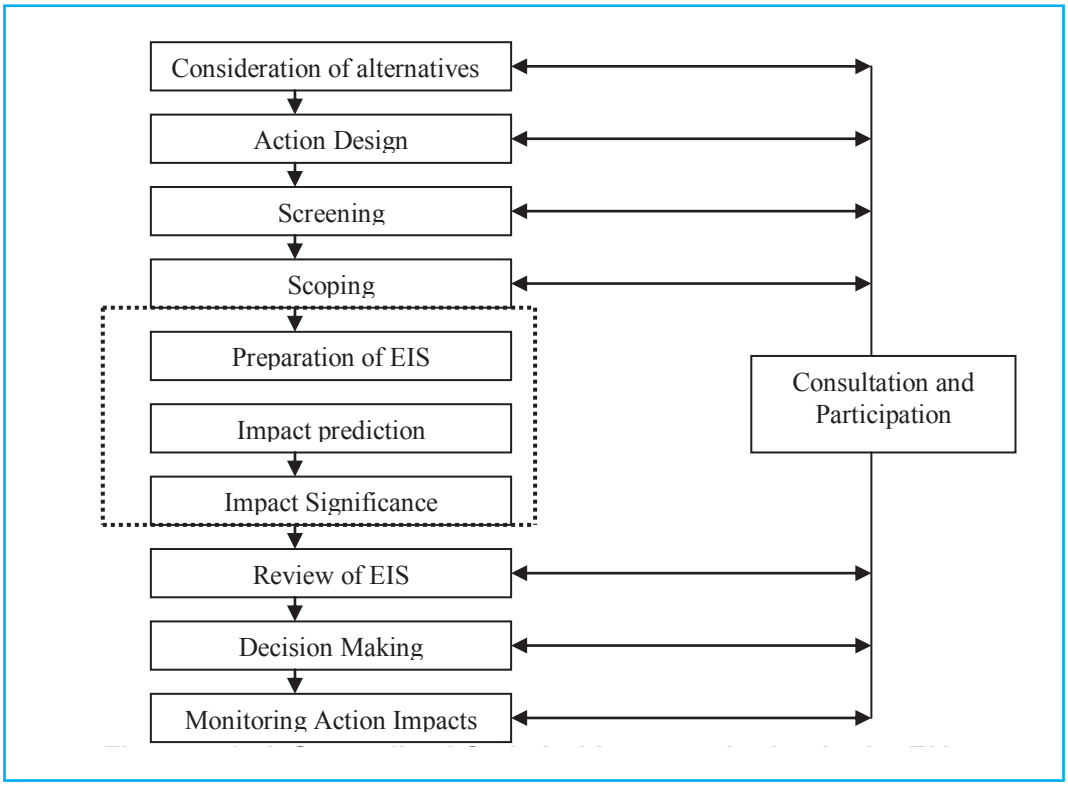


Figure 7.1: A Generalized Stakeholder consultation in the EIA process

7.4.3 Responsibility for Ensuring Public Participation and Involvement

One of the responsibilities of lead agency is to ensure that the public is fully involved in the EIA process for water development projects through overseeing the EIA process and reviewing the EIS. In turn, developers or project proponents are also obliged to effectively consult and involve the

public throughout the EIA process. In case the Water lead agency is the project proponent, NEMA takes over the responsibility for overseeing and ensuring public participation and involvement by the said lead agency.

7.4.4 Planning for Consultation and Public Participation

Planning for consultation and public involvement requires skilled professional advice, usually provided by a social scientist who is usually a member of the EIA consultancy team. The planning ought to start with informal consultations very early in the EIA process. The three key tasks here are to identify **WHO** will be affected, **HOW** and **WHEN** they are to be involved in the consultation process. Such planning will involve:

i. Clearly define objectives regarding the issues to be addressed, and the key decisions involved;
ii. Integration of consultation and participation within the EIA and project design process. The information and internal communication requirements of the EIA team and project designers should be taken into account;
iii. Allowing flexibility to adapt and change as new information comes up;
iv. Allocating adequate resources and scheduling work.

It is notable that consultation and participation is continuous throughout the EIA process. The iterative and continuous nature of the EIA process is set out in **Figure 4.1**.

7.4.5 Stages for public involvement in the EIA Process.

In its broadest sense, public involvement and participation is an on-going activity which takes place throughout the entire EIA process. The relevant stakeholders in the EIA process are:

» beneficiaries of the project - target groups making use of the water resources;
» affected people – i.e. those people that experience, as a result of the project, intended or unintended changes in water resources that they value;
» general stakeholders – i.e. formal or informal institutions and groups representing either affected people or biodiversity itself.
» future generations - 'absent stakeholders', i.e. those stakeholders of future generations, who may rely on water resources around which decisions are presently taken.

7.4.5.1 Public Consultation before EIStudy is Done.

If after receiving and screening/reviewing the developer's project, NEMA, in consultation with the Lead Agency, decides that it is necessary to consult and seek public comment, it shall, within 4 weeks from submission of the project brief and/or notice of intent to develop, publish the developers notification and other supporting documents in a public notice.
When the notification is accompanied by voluminous documentation, it is permissible to publish a summary of it in a public notice, indicating the nature and location of the project, characteristics of site and specifying the places where the documents of the developer can be consulted.

Objections and comments from the public and other stakeholders shall be submitted to the NEMA and to the Lead Agency with 21 days from the publication of the notice.

7.4.5.2 Public Consultation during the EIStudy

The team conducting the EIStudy shall consult and seek public opinion/views on environmental aspects of the project. Such public involvement shall be during scoping and any other appropriate stages during the conduct of the study.

7.4.5.3 Public consultation after EIStudy is done (EIS Review)

The Environment Impact Statement (EIS) shall be a public document and may be inspected at any reasonable hour by any person. Considering the scale and level of influences likely to result from the operation of the proposed water project or water resources related project, the Lead Agency, in consultation with NEMA, shall decide whether a public hearing shall be held and shall decide locations where it is necessary to make the contents of the draft EIS known to the public (EIA Manual 2002).

Within 2 weeks from the date of receiving the developers' EIS, NEMA shall, if it finds it necessary, publicise receipt of the EIS, identify the concerned region and concerned stakeholders, the places for inspection of the draft, and shall also make copies or summaries of the statement available for public inspection.

The public notice shall include a summary of assessment data indicating nature of the water resources related project, location, characteristics of site and the results of the assessment. It shall also specify the places where the draft EIS may be consulted, and a notification to copy /send any comments to the Authority and to Lead Agency.

NEMA shall also send copies of the developer's draft EIS within 14 days from the date on which it was received, to other relevant agencies and experts for comments on those aspects of the project impacts that fall under their jurisdiction. Public comments and/or objections shall be submitted to DWRM and to the NEMA within 3 weeks of the publication of the notice:

7.4.5.4 Presenting Opinions on the EIS

Those members of the public who may have opinions from points of view for environmental conservation on the draft EIS may present their written opinions to Lead Agency and to NEMA within 21 days from the day of publicity as required under the EIA Regulation for Uganda.

The Lead Agency, in cases where it is presented written opinions provided for in the preceding paragraph shall send copies of them to the developer soon after expiry of the 21 days. The developer shall take all necessary steps to address the issues raised.

7.4.6 Holding public hearings

Where the Lead Agency is of the opinion that it is necessary to hear opinions of the public in concerned areas regarding specific water resources related project shall hold public hearings on the days contained in a notice for public hearings.

The public in the concerned areas may present their opinions at the public hearings from points of view for environmental conservation and socio-economic considerations. The developer may explain or present his (her) opinions at the public hearings.

The developer, in case where public hearings are held, shall make a record of the opinions presented at the hearings, and shall take all necessary steps to address the issues raised.

7.4.6.1 Notification on Public Hearings.

Where it is necessary to hold public hearings on a proposed water resources related project, a notice for the public hearings must be made at least 10 days to the meeting. Such a notice may be:

i. posted in or near the affected community,
ii. Published in a daily newspaper in an official language;
iii. Published in a local newspaper in an appropriate local language,
iv. Notified to the public through any other suitable media.

The notice shall contain full information about the location, time of the proposed meeting, and the items to be considered by the meeting; and shall also announce that no decisions are to be made on matters not so noticed.

7.4.6.2 Where to hold public hearings

i. Project site.
ii. Meeting place within Lead Agency/DWRM quarters/boardroom.
iii. Any other facility with adequate capacity, and available for this purpose.
iv. Social centers.
v. Any other convenient place identified for this purpose.

Appendices 7.5(a) to 7.6(e): Potential impacts and mitigation measures

Appendix 7.5 (a): Planning/design phase

ITEM	ENVIRONMENTAL COMPONENT	POTENTIAL ENVIRONMENTAL IMPACT	POTENTIAL MITIGATION MEASURE
1.	**Soils**	Soil erosion/damage due to survey activities and vehicle tracks.	• Minimize number of tracks. • Avoid developing parallel tracks. • Use right angle intersections. • Avoid seasonally marshy areas, pans, floodplains.
		Soil contamination from drilling muds, oil and diesel spills.	• Provide lined sumps to contain drilling mud. • Secure area around all diesel tanks, oil drums and generators. • Train operators in correct fuel transfer techniques to avoid spillage. • Ensure regular maintenance of equipment to prevent diesel and hydraulic oil spills.
		Loss of soil fertility due to improperly planned Re-settlement of people from the site.	• Select a site for resettlement, which has a similar land capability to the previous location, so that the resettled people can continue with traditional agricultural practices.
2.	**Surface Water Resources**	Water consumption by survey camp.	• Use water sparingly. • Repair leaking taps and pipes. • Environmental awareness and training programmes.
		Stream flow disruption caused by access roads and tracks.	• Construct stream crossings at right angles. • Minimize number of crossings. • Avoid seasonally marshy areas. • Do not bulldoze soil into river courses. • Install culverts or construct concrete drifts.

3.	**Surface Water Quality**	Local siltation of rivers due to poorly constructed access tracks.	• Construct stream crossings at right angles. • Minimize number of crossings. • Avoid seasonally marshy areas. • Do not bulldoze soil into rivers. • Install culverts or construct concrete drifts
		Water pollution from fuel spillage and waste disposal.	• Prevent fuel and oil spillage as per 3 above. • Provide separate covered, animal-proof bins for refuse and hazardous waste disposal. • Empty bins on a regular basis at an approved disposal site.
4.	**Groundwater Resources**	Local lowering of water table levels, due to abstraction of groundwater for camp use.	• Undertake a hydrocensus of local boreholes to determine water table depths, borehole yields and local use of groundwater. • Provide compensation to any persons who can prove that their borehole has been adversely affected by survey activities.
5.	**Groundwater Quality**	The groundwater could become polluted as a result of pit latrines and incorrect waste disposal practices.	• Line all sumps, dams, stockpile sites ***etc.*** that may contain solids or liquids, which could pollute the soil and groundwater. • Do not develop pit latrines close to domestic supply boreholes or rivers. A minimum distance of between 50-100metres should be observed • Dispose of all hazardous waste in an approved disposal site.

6.	**Flora**	Disturbance or loss of protected/endangered plant species or communities (terrestrial, wetland, aquatic) due to survey activities.	Routine identification and eradication of problem species
		Introduction of problematic invasive/alien plants to site due to ground disturbance.	• Routine identification and eradication of problem species.
7.	**Terrestrial fauna**	Disturbance or loss of protected/endangered animal species/communities and their habitat.	• Consider need to trans-locate species. • Tape off important habitats. • Minimize vegetation clearance. • Protect water resources from pollution. • Protect soils from contamination. • Minimize soil stripping to essential areas only. • Stockpile topsoil separately in small mounds to maintain microbiological viability. • Impose strict penalties for poaching. • Rehabilitate all disturbed areas.
		Introduction of alien species.	• Do not allow domestic animals ***e.g.*** cats, dogs on site
8.	**Aquatic fauna**	Pollution of rivers, streams, dams and pans from organic, hydrocarbon, silt or microbiological sources.	• Ensure that all areas containing hazardous substances are lined, sealed, bunded or otherwise engineered to prevent pollution of surface water. • Install erosion protection works to prevent siltation. • Ensure pit latrines ***etc.*** are far from surface water resources.

9.	**Air quality**	Dust from vehicle movements, drilling.	• Avoid excessive vehicle movements. • Limit vehicle speeds on unsurfaced tracks. • Use water to suppress dust on all unsurfaced tracks. • Try to avoid dusty activities ***e.g.*** grading on windy days. • Rehabilitate disturbed areas as soon as possible.
		Fumes from drilling equipment, generators, vehicles.	Maintain vehicles and equipment in good order
		Fires from bush clearing activities	• Do not burn cleared vegetation. • Sell or give firewood away to staff and local communities. • Use brushwood to assist with erosion control and rehabilitation.
10.	**Noise and vibration**	Noise generated by survey activities, especially drilling, geophysical work and vehicles	• Prescribe noise reduction measures if appropriate ***e.g.*** restricted working hours and noise buffering. • Consult with the local community.
11.	**Cultural heritage (including archaeological, historical and spiritual sites)**	Disturbance/loss of heritage resources (sites and artefacts).	• Identify significant heritage resources and implement necessary protection/ survey measures in consultation with the local community.
12.	**Rural livelihoods**	Impact on the availability of natural resources traditionally used by local communities ***e.g.*** plants used for medicinal and nutritional purposes, fuel wood, water resources ***etc.***	• Allow continued access into non-sensitive, non dangerous survey areas. • Allow the local community to collect any timber that is felled as part of survey grid clearance.

13.	**Current land use**	Impacts on land use such as loss of grazing land, agricultural land, access to resources ***etc*** especially if people have to be resettled	• Evaluate advantages and disadvantages that would result from various land use changes. • Select a resettlement site, which has a similar pre-development land capability.
14.	**Local economy**	Impacts on the local economy due to increased employment levels, influx of people to the area, land use changes, increased purchasing.	• Try to maximize local spending and employment.
15.	**Local infrastructure services**	Loss/disruption of important communal pathways, public services and utilities ***e.g.*** sewerage, electricity, water supply, health care	• Determine impacts in advance and implement appropriate mitigation measures such as access and compensation payments.
		Burden on existing local infrastructure and services ***e.g.*** roads, hospitals.	• Plan for and/or construct supplementary services/infrastructure or enhance existing services/ infrastructure.
16.	**Health and safety**	Risk of accidents and ill health as a result of the project.	• Ensure that appropriate health and safety measures are applied in all activities. • Fence all dangerous areas. • Place warning signs. • Consult with the local community and health workers. • Enforce maximum traffic speeds through villages
17.	**Public nuisance**	General nuisance such as noise and dust.	• Undertake all survey activities in a manner, which is sensitive to the life of the local community and exploration staff.
18.	**Aesthetic and amenity values**	Possible small visual impact.	• Rehabilitate the site on departure. • Minimise disturbance. • Consult with the local community and tourist industry.

Appendix 7.5(b): Construction Phase

ITEM	ENVIRONMENTAL COMPONENT	ENVIRONMENTAL IMPACT	MITIGATION MEASURE
1.	**Geology**	Loss/modification of geological sites of scientific importance due to development of borrow pits and quarries, and large scale dams.	• Identify and evaluate significance and degree of protection required.
2.	**Soils**	Soil erosion/damage due to survey activities and vehicle tracks.	• Minimize number of tracks. • Avoid developing parallel tracks. • Use right angle intersections. • Avoid seasonally marshy areas, pans, floodplains.
		Soil contamination from oil and diesel spills from construction vehicles.	• Provide bonding around all diesel tanks, oil drums an generators. • Train operators in correct fuel transfer techniques to avoid spillage. • Ensure regular maintenance of equipment to prevent diesel and hydraulic oil spills.
		Soil compaction due to heavy equipment and bulk earthworks.	• Remove topsoil prior to earthworks and stockpile for later use in rehabilitation.
		Disturbance/loss of pedagogical features of sensitivity importance ***e.g.*** hydro orphic (wetland) soils.	• Identify, evaluate significance and determine degree of protection required.
		Loss of soil under overburden and waste rock dumps	• Remove topsoil prior to dumping any materials and save for later rehabilitation.
		Loss of soil fertility due to improperly planned resettlement of people from the site.	• Select a site for resettlement, which has a similar land capability to the previous location, so that the resettled people can continue with traditional agricultural practices.

3.	**Surface water resources**	Water consumption by construction personnel and construction activities.	• Use water sparingly. • Repair leaking taps and pipes. • Environmental awareness and training programmes.
		Local disruption of surface water runoff due to presence of borrow pits, quarries and other excavations.	• Divert 'clean' storm water around excavations and overburden and waste rock dumps.
		Stream flow disruption caused by access roads and tracks.	• Construct stream crossings at right angles. • Minimize number of crossings. • Avoid seasonally marshy areas. • Do not bulldoze soil into river courses. • Install culverts or construct concrete drifts.
4.	**Surface water quality**	Local siltation and pollution of rivers due to poorly constructed access tracks, topsoil removal and stockpiles, spoils created by bulk earthworks, borrow pits and quarries.	• Divert 'clean' storm water around excavations and waste rock and overburden dumps. • Minimize area disturbed. • Rehabilitation on completion. • Construct stream crossings at right angles. • Minimize number of crossings. • Avoid seasonally marshy areas. • Do not bulldoze soil into rivers. • Install culverts or construct concrete drifts
		Water pollution from fuel spillage and waste disposal.	• Protect surface water resources from contaminated runoff from workshops and plant construction areas by providing storm water drains, sumps, and linings. • Prevent fuel and oil spillage as per 3 above. • Provide separate covered, animal-proof bins for refuse disposal. • Empty bins on a regular basis at an approved disposal site.

5.	**Groundwater resources**	Local lowering of water table levels, which could impact on ground stability, rural water supply, and vegetation, due to abstraction of groundwater for camp and construction use.	• Undertake a hydro census of local boreholes to determine water table depths, borehole yields and local use of groundwater. • Provide compensation to any person who can prove that their borehole has been adversely affected by construction activities.
6.	**Groundwater quality**	The groundwater could become polluted as a result of construction activities, pit latrines and incorrect waste disposal practices.	• Line all sumps, dams, stockpile sites ***etc.*** which may contain solids or liquids which could pollute the soil and groundwater. • Do not develop pit latrines close to domestic supply boreholes or rivers. • Dispose of all hazardous waste in an approved disposal site.
7.	**Topography and Geomorphology**	Local alteration in topography due to borrow pits, quarries and bulk earthworks and alteration/loss of features of geomorphological importance (***e.g.*** gorges, waterfalls, hills) due to water infrastructure development.	• Select sites carefully to avoid important / sensitive landscape features where possible. • Try and balance cut and fill. • Rehabilitate all cut and fill slopes as soon as possible.
8.	**Palaeontology**	Disturbance/loss of sites of palaeontological interest due to site development.	• Determine importance/sensitivity of site and degree of protection/survey work required

9.	**Flora**	Disturbance or loss of protected/endangered plant species or communities (terrestrial, wetland, aquatic) due to construction activities.	• Identify issues and protection measures required ***e.g.*** examine feasibility/need for translocation of specimens to alternative sites. • Minimize vegetation clearance by clearly demarcating work areas. • Provide environmental awareness training to all employees. • Rehabilitate all disturbed areas. • Position waster infrastructure to avoid as far as possible sensitive plant communities
		Illegal felling of trees for firewood and the illegal collection of plant specimens.	• Impose penalties for illegal cutting of trees or illegal possession of plant specimens.
		Introduction of problematic invasive/alien plants to site due to ground disturbance.	• Routine identification and eradication of problem species.
10.	**Terrestrial fauna**	Disturbance or loss of protected/endangered animal species/communities and their habitat due to construction activities (noise, dust, fumes, pollution, vehicles)	• Consider need to translocate species. • Tape off important habitats. • Minimize vegetation clearance. • Protect water resources from pollution. • Protect soils from contamination. • Minimize soil stripping to essential areas only. • Stockpile topsoil separately in small mounds to maintain microbiological viability. • Impose strict penalties for poaching. • Rehabilitate all disturbed areas.
		Introduction of alien species.	• Do not allow domestic animals ***e.g.*** cats, dogs on site
		Interference with animal migration routes due to linear infrastructure ***e.g.*** pipelines, canals.	• Select routes carefully, based on the results of the EIA.
		Illegal poaching of game and killing wild animals.	• Impose strict penalties for poaching and unlawful killing.

11.	**Aquatic fauna**	Pollution and siltation of rivers, streams, dams and pans.	• Install erosion protection works to prevent siltation. • Ensure pit latrines ***etc.*** are far from surface water resources.
		Interference with fish migration routes.	• Provision of fish ladders and other means of passage.
12.	**Air quality**	Dust from vehicle movements, construction.	• Avoid excessive vehicle movements. • Limit vehicle speeds on unsurfaced tracks. • Use water to suppress dust on all unsurfaced tracks. • Try to avoid dusty activities ***e.g.*** grading on windy days. • Rehabilitate disturbed areas as soon as possible.
		Fumes from generators, and vehicles.	Maintain vehicles and equipment in good order.
		Fires from bush clearing activities.	• Do not burn cleared vegetation. • Sell or give firewood away to staff and local communities. • Use brushwood to assist with erosion control and rehabilitation.
13.	**Noise and vibration**	Noise generated by construction activities, especially vehicles, earthmoving equipment, excavation of construction materials, contractor's camp, and general construction activities.	• Prescribe noise reduction measures if appropriate ***e.g.*** restricted working hours and noise buffering. • Consult with the local community.
14.	**Cultural heritage (including archaeological, historical and spiritual sites)**	Disturbance/loss of heritage resources (sites and artifacts).	• Identify significant heritage resources and implement necessary protection/survey measures in consultation with the local community.

15.	**Local communities: composition, structure and social functioning**	Social impact of resettlement and immigration of work force for construction ***e.g.*** introduction of diseases, increased crime levels, interference with local community structures.	• Undertake Social Impact Assessment, including full consultation with local communities, to determine issues and prescribe appropriate mitigation measures.
		Influx of job seekers.	• Only recruit labour through approved manpower offices in the main towns. • Adopt the policy of no 'at-the-gate' casual employment. • Make your recruitment policy well known in the region.
16.	**Rural livelihoods**	Impact on the availability of natural resources traditionally used by local communities ***e.g.*** plants used for medicinal and nutritional purposes, fuel wood, water resources ***etc.***	• Allow continued access into non-sensitive, non dangerous construction areas.
17.	**Current land use**	Impacts on land use such as loss of grazing land, agricultural land, access to resources ***etc*** especially if people have to be resettled.	• Evaluate advantages and disadvantages that would result from various land use changes. • Select a resettlement site, which has a similar pre-development land capability.
18.	**Future land use options**	Lack of rehabilitation could preclude future land use.	• Rehabilitate to the former, or better, land capability.
19.	**Local economy**	Impacts on the local economy due to increased employment levels, influx of people to the area, land use changes, increased purchasing.	• Try to maximize local spending and employment.
20.	**Regional and national economy**	Construction of large water infrastructure projects will have an impact on the regional and national economy.	• Try to maximize regional and national benefits.

21.	**Local infrastructure and services**	Loss/disruption of important communal pathways, public services and utilities ***e.g.*** sewerage, electricity, water supply, health care.	• Determine impacts in advance and implement appropriate mitigation measures such as access and compensation payments.
		Burden on existing local infrastructure and services ***e.g.*** roads, hospitals.	• Plan for and/or construct supplementary services/infrastructure or enhance existing services/infrastructure.
22.	**Health and safety**	Risk of accidents and ill health as a result of the construction activities.	• Ensure that appropriate health and safety measures are applied in all activities. • Fence all dangerous areas. • Place warning signs. • Consult with the local community and health workers. • Enforce maximum traffic speeds through villages.
23.	**Public nuisance**	General nuisance such as noise and dust as a result of construction activities.	• Undertake all construction activities in a manner, which is sensitive to the life of the local community and exploration staff.
24.	**Aesthetic and amenity values**	Visual impacts of construction on scenic views, tourist routes and destination and sense of place.	• Rehabilitate all areas disturbed by construction and landscape with trees, grass and shrubs. • Minimize disturbance. • Consult with the local community and tourist industry.
		Litter from construction camp and waste dump.	• Fence waste dump. • Environmental awareness and training. • Impose fines for littering. • Organize weekly clean-ups.

Appendix 7.5(c) (i) Operational Phase – (large and small dams

ITEM	ENVIRONMENTAL COMPONENT	ENVIRONMENTAL IMPACT	MITIGATION MEASURE
1.	**Climate**	Modification of local climate ***e.g.*** increased humidity due to evaporation from water body causing discomfort.	• Monitor local climatic changes.
2.	**Geology**	Possible seismic events.	• Monitor seismicity.
3.	**Soils**	Soil erosion/ damage from increased river flow due to water releases and dam uses for other purposes.	• Implement erosion control measures. • Ensure proper planning, control and timing of water releases. • Develop a dam use management plan.
		Soil contamination from oil and diesel spills	• Provide bunding around all diesel tanks, oil drums and generators. • Train operators in correct fuel transfer techniques to avoid spillage. • Ensure regular maintenance of equipment to prevent diesel and hydraulic oil spills.
4.	**Surface water resources**	Water consumption by employees (very minimal).	• Use water sparingly. • Repair leaking taps and pipes. • Environmental awareness and training programmes.
		Modification in river flow, especially with water releases affecting: ecology, fishing, water supply, irrigation and livestock watering, channel scouring and erosion ***etc***.	• Undertake evaluation of In stream Flow Requirements (IFR). • Control downstream release of water from the dam to accommodate IFR.

5.	**Surface water quality**	Growth of nuisance algal blooms (including toxic blue-green algae) due to eutrophication (nutrient enrichment).	• Incorporate eutrophication prevention measures. • Check upstream land use to determine nutrient inputs (sewage, cattle, and fertilizers). • Ensure proper catchments management. • Monitor and control dam operations. • Monitor water quality on a continuous basis.
		Siltation of dam, which decreases its storage capacity and impacts on downstream water quality.	• Check upstream land use and implement silt and erosion control measures. • Stabilise soil in dam catchments area. • Ensure proper management of vegetation in the catchments area. • Establish a liaison committee with other catchments users/stakeholders.
		Water pollution from fuel spillage and waste disposal.	• Protect surface water resources from contaminated runoff from workshops by providing storm water drains, sumps, and linings. • Prevent fuel and oil spillage as per 3 above. • Provide separate covered, animal-proof bins for refuse disposal. • Empty bins on a regular basis at an approved disposal site.
6.	**Groundwater resources**	Modification of groundwater, such as water table levels, which could impact on ground stability, agricultural practices, water logging and salinisation of soils, ecosystem functioning ***etc***.	• Undertake groundwater study to determine impacts of dam on groundwater and implement necessary mitigation measures.
7.	**Flora**	Introduction of problematic invasive / alien plant species to site due introduction of a body of standing water.	Routine identification and eradication of problem species.

8.	**Terrestrial fauna**	Disturbance or loss of protected / endangered species and their habitat due to the presence of the dam and recreational activities surrounding the dam.	Consider need to translocate species. • Tape off important habitats. • Prevent entry to the site of large herbivores and problem animals. • Minimize vegetation clearance. • Develop a dam use management plan.
9.	**Aquatic fauna**	Pollution and siltation of rivers, streams and dams.	• Install erosion protection works to prevent siltation. • Ensure pit latrines ***etc.*** are far from surface water resources.
		Interference with fish migration routes.	• Provision of fish ladders and other means of passage.
		Depletion of fish stock due to over fishing	• Develop a dam use management plan.
10.	**Air quality**	Odors produced by gas emissions from dam ***e.g.*** methane and hydrogen sulphide from anaerobic sediment	Implement monitoring programmes
		Odors produced by the decay of algal and macrophytes biomass as a result of eutrophication.	• Incorporate eutrophication prevention measures in dam design parameters ***e.g.*** minimize hydraulic retention time, reduce nutrient input from catchments, ***etc***.
11.	**Noise and vibration**	Noise generated by dam operations, such as pumps and turbines.	• Prescribe noise reduction measures if appropriate ***e.g.*** restricted working hours and noise buffering. • Consult with the local community.
12.	**Local communities: composition, structure and social functioning**	Social impact of immigration of people/ development into the area stimulated by the increased availability of freshwater for irrigation, industrial, municipal and tourist industry growth.	• Conduct a Social Impact Assessment. • Basin-wide integrated planning to avoid overuse, misuse and conflicting uses of water and land resources.
13.	**Rural livelihoods**	Water releases could impact on local natural resources used by the community.	• Timing, duration and volume of water releases should be negotiated with downstream users.

14.	**Current land use**	Flooding or disturbance of land as a result of water releases.	• Ensure proper management, planning and control of water releases.
		Development of a dam may introduce alternative land use activities in the area ***e.g.*** agriculture, fisheries, conservation, tourism and recreation.	• Evaluate land use changes to ensure that positive impacts are maximizes and properly managed and adverse impacts are minimized.
15.	**Future land use options**	Change in future land use options due to presence of dam.	• Discuss with the local authorities and the local community as to the future land options.
16.	**Local economy**	Impacts on the local economy due to increased employment levels, influx of people to the area, land use changes, increased purchasing.	• Try to maximize local spending and employment.
17.	**Regional and national economy**	Construction of large water infrastructure projects will have an impact on the regional and national economy.	• Try to maximize regional and national benefits.
18.	**Local infrastructure and services**	Loss/disruption of important communal pathways, public services and utilities ***e.g.*** sewerage, electricity, water supply, health care.	• Determine impacts in advance and implement appropriate mitigation measures such as access and compensation payments.
		Burden on existing local infrastructure and services ***e.g.*** roads, hospitals.	Plan for and/or construct supplementary services/ infrastructure or enhance existing services/infrastructure.
19.	**Health and safety**	Risk of accidents as a result of the project and ill health (***e.g.*** malaria) as the standing body of water creates a more favorable habitat for insect disease vectors (***e.g.*** mosquito, tsetse fly)	Risk of accidents as a result of the project and ill health (***e.g.*** malaria) as the standing body of water creates a more favorable habitat for insect disease vectors (***e.g.*** mosquito, tsetse fly).
20.	**Public nuisance**	General nuisance such as pumping activity noises, increased humidity and odors.	• Ensure pumping is conducted in a manner, which is sensitive to the life of the local community. • Undertake project in a manner sensitive to the quality of life of local communities and project staff.

21.	**Aesthetic and amenity values**	Visual impacts of dam on scenic views, tourist routes and sense of place.	• Minimize disturbance. • Consult with the local community and tourist industry.
		Litter from recreational dam users and dam Employees.	• Environmental awareness and training. • Impose fines for littering. • Organize weekly clean-ups.

Appendix 7.5(c) (ii) Operation Phase - Reservoirs

ITEM	ENVIRONMENTAL COMPONENT	ENVIRONMENTAL IMPACT	MITIGATION MEASURE
1.	**Soils**	Impact of leaking reservoir and associated pipelines creating waterlogged/ unstable soils and erosion hazard.	• Ensure routine reservoir inspection and repair **3. Soils** of leaks.
		Scouring, resulting in erosion and sedimentation when silt captured in the associated pipelines is released into rivers or streams.	• Implement erosion control measures ***e.g.*** gabions placed across the pathway where water is released.
2.	**Surface water quality**	Growth of nuisance algal blooms (including toxic blue-green algae).	• Prevent light from reaching stored water. • Conduct routine monitoring for algal growths. • Ensure proper treatment of water
		Possible pollution resulting from treatment of reservoir water.	• Establish regular monitoring programmes of reservoir water. • Ensure routine reservoir inspection and repair of leaks.
3.	**Aquatic fauna**	Possible impacts due to scouring operations.	• Do not scour during critical periods ***e.g.*** fish spawning and migration.

4.	**Air quality**	Odours produced by decay of algal blooms and chlorine from water treatment plant.	• Ensure appropriate controls measures are installed.
5.	**Noise and vibration**	Noise generated by dam operations, such as pumps and turbines.	• Prescribe noise reduction measures if appropriate ***e.g.*** restricted working hours and noise buffering. • Consult with the local community.
6.	**Local communities: composition, structure and social functioning**	Social impact of immigration of people/ development into the area stimulated by the increased availability of freshwater for irrigation, industrial and municipal growth.	• Conduct a Social Impact Assessment.
7.	**Current land use**	Changes in the current land use ***e.g.*** changes in agricultural practices due to increase availability of water.	• Ensure proper management, planning and control of water resource.
8.	**Future land use options**	Increase in water supply could increase future land use options	• Ensure proper management, planning and control of water resource.
9.	**Local economy**	Impacts on the local economy due to land use changes and increased employment (minimal).	• Try to maximize local spending and employment.
10.	**Regional and national economy**	Construction of large water infrastructure projects will have an impact on the regional and national economy.	• Try to maximize regional and national benefits.
11.	**Local infrastructure and services**	Loss/disruption of important communal pathways, public services and utilities ***e.g.*** sewerage, electricity, water supply, health care.	• Determine impacts in advance and implement appropriate mitigation measures such as access and compensation payments.
		Burden on existing local infrastructure and services ***e.g.*** roads, hospitals.	• Plan for and/or construct supplementary services/ infrastructure or enhance existing services/infrastructure.
12.	**Health and safety**	Risk of accidents and ill health as a result of the project ***e.g.*** contamination of stored water.	• Ensure that appropriate health and safety measures are applied. • Fence all dangerous areas. • Place warning signs. • Consult with the local community and health workers.

13.	**Public nuisance**	Noise nuisance from pumping activities.	• Ensure pumping is conducted in a manner which is sensitive to the life of the local community.
14.	**Aesthetic and amenity values**	Visual impacts of reservoir on scenic views, tourist routes and destination and sense of place, especially since reservoirs are often placed on higher ground.	Minimise disturbance. Consult with the local community and tourist industry.

Appendix 7.5(c) (iii) Operation phase - Bulk & minor river abstraction, bulk & rural groundwater supply

ITEM	ENVIRONMENTAL COMPONENT	ENVIRONMENTAL IMPACT	MITIGATION MEASURE
1.	**Climate**	Significant reductions in river flow, or groundwater level due to excessive abstraction, may result in localised climate change downstream due to drying of wetlands ***etc***.	• Undertake evaluation of in stream flow requirements (IFR) for river downstream of works. • Monitor local climatic changes. • Consider reduction in abstraction rates during low rainfall months when rainfall and aquifer recharge is low
		Flooding of plant ***e.g.*** by rising sea level near coastal desalinisation plants.	• Determine flooding risk and select site and/or design plant as appropriate.
2.	**Geology**	Implications of groundwater abstraction on physical integrity of geology e.g. risk of land and borehole sidewall subsidence etc.	. • Undertake a geotechnical study and implement appropriate mitigation measures.
3.	**Soils**	Soil contamination from oil and diesel spills resulting from operations.	• Provide bunding around all diesel tanks, oil drums and generators. • Train operators in correct fuel transfer techniques to avoid spillage. • Ensure regular maintenance of equipment to prevent diesel and hydraulic oil spills.

4.	**Surface water resources**	Water consumption by employees (very minimal).	• Use water sparingly. • Repair leaking taps and pipes. • Environmental awareness and training programmes.
		Decrease in river flow as a result of abstraction, affecting: ecology, fishing, water supply, irrigation and livestock watering, *etc*.	• Undertake evaluation of In-stream Flow Requirements (IFR).
5.	**Surface water quality**	Possible water pollution from plant operation activities, chemical spillages (e.g. chlorine, flocculants, biocides), waste sludge from filter beds, fuel spillage and waste disposal. Water pollution from fuel spillage and waste disposal (domestic and plant).	• Protect surface water resources from contaminated runoff from workshops and plant operation areas by providing storm water drains, sumps, and linings. • Contain sludge disposal sites. • Bunded areas for chemical storage. • Prevent fuel and oil spillage. • Provide separate covered, animal-proof bins for refuse disposal. • Empty bins on a regular basis at an approved disposal site.
		Impacts from accidental discharges of hazardous materials (chlorine, biocides, metals).	• Accident prevention and clean-up procedures. • Personnel training to avoid accidents and to ensure that procedures are followed.
6.	**Groundwater resources**	Abstraction of groundwater could lead to the lowering of water table levels, which could impact on ground stability, rural water supply and vegetation.	• Monitor groundwater levels and yields in surrounding farmer's and community boreholes. If necessary drill and equip additional monitoring boreholes. • Provide compensation to any person who can prove that their borehole has been adversely affected.

7.	**Groundwater quality**	Possible water pollution from plant operation activities, chemical spillages (e.g. chlorine, flocculants, biocides), waste sludge from filter beds, fuel spillage and waste disposal (domestic and plant).	• Protect ground water resources from contaminated runoff from workshops and plant operation areas by providing storm water drains, sumps, and linings. • Contain sludge disposal sites. • Bunded areas for chemical storage. • Prevent fuel and oil spillage.
		Risk of pollution of groundwater from external sources ***e.g.*** surrounding industrial and agricultural activities, pit latrines, use of borehole by domestic stock, ***etc***.	• Strategically locate boreholes to avoid contamination from external sources. • Undertake groundwater quality monitoring. • Community awareness and training to prevent pollution. • Provide excess water spillways and concrete sumps around boreholes.
8.	**Flora**	Disturbance or loss of protected/ endangered plant species due to river water abstraction	. • Consider need to translocate species.
		Reduction in flow downstream can result in macrophyte and phytoplankton growth.	• Conduct regular monitoring.
		Increased resettlement around boreholes could result in deforestation.	• Community awareness and training programmes. • Place boreholes in existing communities where possible to prevent 'village sprawl'.
9.	**Terrestrial fauna**	Disturbance or loss of protected/ endangered animal species and their habitat due to river water abstraction.	• Consider need to translocate species.
		Provision of boreholes could increase stock concentrations, which could result in overgrazing.	• Community awareness and training programmes regarding the use of domestic supply boreholes for stock.

10.	**Aquatic fauna**	Interference with fish migration if a weir is formed in the river.	• Provision of fish ladders and other means of passage.
		Killing of marine organisms due to intake of feed water.	• Consider using beach wells or infiltration galleries.
		Injury of fauna (***e.g.*** fish) drawn into works via water drawn from river.	• Minimise entrainment by appropriate design of abstraction inlet ***e.g.*** incorporation of screens/ grates.
11.	**Air quality**	Odours produced by waste products (***e.g***. sludge from sand filters) and chlorine from water treatment plant.	• Appropriate disposal of waste away from developed areas ***etc***.
		Emissions from distillation, air ejector and degassifier systems ***etc*** (if present). Increased emissions due to energy production to run plant.	• Use emission clean-up technology and/or alternative plant processes. • Use of alternative energy sources to minimise air emissions. • Use energy-saving and recycling methodologies in plant operation.
12.	**Noise and vibration**	Noise generated by plant operations, such as pumps and turbines.	• Prescribe noise reduction measures if appropriate ***e.g.*** restricted working hours and noise buffering. • Consult with the local community.
13.	**Local communities: composition, structure and social functioning**	Social impact of immigration of people/ development into the area stimulated by the increased availability of freshwater for irrigation, industrial and municipal growth	• Conduct a Social Impact Assessment. • Basin-wide integrated planning to avoid overuse, misuse and conflicting uses of water and land resources.
17.	**Rural livelihoods**	Water abstraction could impact on local natural resources used by the local communities.	• Abstraction volumes should be negotiated with downstream and groundwater users.
18.	**Current land use**	Changes in current land uses due to increased availability of fresh water.	• Ensure proper management, planning and control of water resource.

19.	**Future land use options**	Increase in water supply could increase future land use options	• Ensure proper management, planning and control of water resource.
20.	**Local economy**	Impacts on the local economy due to increased employment levels, influx of people to the area, land use changes, increased purchasing.	• Try to maximize local spending and employment.
21.	**Regional and national economy**	Construction of water infrastructure projects will have an impact on the regional and national economy.	Try to maximize regional and national benefits.
22.	**Local infrastructure and services**	Loss/ disruption of important transport routes and their operation (***e.g.*** footpaths, roads, river navigation, and shipping lanes) public services and utilities (***e.g.*** temporary interruption of existing water supply).	• Determine impacts in advance and implement appropriate mitigation measures such as access and compensation payments.
		Burden on existing local infrastructure and services ***e.g.*** roads, hospitals.	• Plan for and/or construct supplementary services/ infrastructure or enhance existing services/infrastructure.
23.	**Health and safety**	Risk of accidents and ill health as a result of the project	• Ensure that appropriate health and safety measures are applied. • Fence all dangerous areas. • Place warning signs. • Consult with the local community and health workers.
24.	**Public nuisance**	General nuisance such as pumping activity noises and odours.	• Ensure pumping is conducted in a manner which is sensitive to the life of the local community. • Undertake project in a manner sensitive to the quality of life of local communities and project staff.
25.	**Aesthetic and amenity values**	Impact on important / sensitive landscapes.	• Minimise disturbance. • Consult with the local community and tourist industry.

Appendix 7.5(c) (iv) Operation Phase - Canals, bulk and rural water transfer

ITEM	ENVIRONMENTAL COMPONENT	ENVIRONMENTAL IMPACT	MITIGATION MEASURE
1.	Climate	Risk of flooding and overflow of open channels due to rainfall	• Ensure adequate floodwater capacity in channel design
		Loss of water during conveyance due to evaporation.	• Examine evaporation data and calculate whether or not water losses could be significant. • Consider mitigation measures, such as reducing surface water exposed to atmosphere by deepening the channel profile.
2.	Soils	Disturbance of pedological features of sensitivity and importance ***e.g.*** hydromorphic (wetland) soils.	• Identify, evaluate significance and determine degree of protection required ***e.g.*** it may be necessary to carry pipeline above ground on plinths over sensitive areas or alter route.
		Impact of leaking channels creating waterlogged / unstable soils and erosion hazard.	• Ensure routine monitoring and repair of leaks.
		Scouring, resulting in erosion and sedimentation when silt captured in the canals is released into rivers or streams.	• Implement erosion control measures ***e.g.*** gabions placed across the pathway where water is released.
3.	Flora	Translocation of algae and plants from one area to another in intra/inter-basin transfer schemes causing ecological and water management problems.	• Undertake specialist study on the impacts of the inter-basin transfer of problem species ***e.g.*** weeds such as ***Azolla*** and ***Eichhornia.***
		Clogging of canals by weeds.	• Design and mange canals to minimise weed growth. • Line canals with concrete. • Have planned cleaning programme for the canals.

4.	**Terrestrial fauna**	Animals get trapped in channels due to smooth sides of trapezoidal channel ***etc***.	• Appropriate channel design to allow exit of animals from channel.
		Interference with animal migration routes.	• Provide animal migration corridors.
5.	**Aquatic fauna**	Translocation of fauna from one catchment to another in inter-basin transfer schemes causing ecological and water management problems.	• Undertake specialist study on the impacts of the transfer of problem species and devise appropriate mitigation measures ***e.g.*** routine eradication/ control of problem species.
6.	**Noise and vibration**	Noise generated by plant operations, such as pumps and turbines.	• Prescribe noise reduction measures if appropriate ***e.g.*** restricted working hours and noise buffering. • Consult with the local community.
7.	**Local communities: composition, structure and social functioning**	Social impact of immigration of people/ development into the area stimulated by the increased availability of freshwater for irrigation, industrial and municipal growth	• Conduct a Social Impact Assessment. • Basin-wide integrated planning to avoid overuse, misuse and conflicting uses of water and land resources.
8.	**Current land use**	Changes in current land uses due to increased availability of fresh water.	• Ensure proper management, planning and control of water resource.
9.	**Future land use options**	Increase in water supply could increase future land use options	• Ensure proper management, planning and control of water resource.
10.	**Local economy**	Impacts on the local economy due to increased employment levels, influx of people to the area, land use changes, increased purchasing.	• Try to maximize local spending and employment.
11.	**Regional and national economy**	Construction of water infrastructure projects will have an impact on the regional and national economy.	Try to maximize regional and national benefits.

12.	**Local infrastructure and services**	Loss/ disruption of important transport routes and their operation (***e.g.*** footpaths, roads, river navigation, shipping lanes) public services and utilities (***e.g.*** temporary interruption of existing water supply).	• Determine impacts in advance and implement appropriate mitigation measures such as access and compensation payments.
		Burden on existing local infrastructure and services ***e.g.*** roads, hospitals.	• Plan for and/or construct supplementary services/ infrastructure or enhance existing services/infrastructure.
13.	**Health and safety**	Risk of accidents and ill health as a result of the project	• Ensure that appropriate health and safety measures are applied. • Fence all dangerous areas. • Place warning signs. • Consult with the local community and health workers.
14.	**Public nuisance**	General nuisance such as pumping activity noises and odours.	• Ensure pumping is conducted in a manner which is sensitive to the life of the local community.
15.	**Aesthetic and amenity values**	Impact on important/ sensitive landscapes, which may be formerly protected.	• Identify sensitive landscapes and degree of protection conferred upon them. • Ensure appropriate pipeline routing and screening using indigenous vegetation ***etc***.

Appendix 7.5(c) (v) Operation Phase - Irrigation and drainage schemes

ITEM	ENVIRONMENTAL COMPONENT	ENVIRONMENTAL IMPACT	MITIGATION MEASURE
1.	**Geology**	Loss/modification of geological sites of scientific importance due to development of channels and large reservoirs.	• Identify and evaluate significance and degree of protection required.
2.	**Soils**	Degradation of irrigated land	• Design irrigation and drainage operation to match demand both 'how much & when' • Analyse soils and monitor changes so that potential problems can be managed
		Soil contamination from oil and diesel spills from agricultural equipment and vehicles.	• Train operators in correct fuel transfer techniques to avoid spillage. • Ensure regular maintenance of equipment to prevent diesel and hydraulic oil spills.
		Erosion and siltation of neighbouring land	• Provide drainage including disposal of excess water to evaporation ponds • Maintain channels reduce inefficiencies resulting from siltation and weeds. • Allow for access to channels for maintenance in design.
		Disturbance/loss of pedagogical features of sensitivity importance ***e.g.*** hydro orphic (wetland) soils.	• Identify, evaluate significance and determine degree of protection required.
		Loss of soil due to excavation of channels.	• Remove topsoil prior to dumping any materials and save for later rehabilitation.
		Loss of soil fertility due to improperly planned resettlement of people from the site.	• Select a site for resettlement, which has a similar land capability to the previous location, so that the resettled people can continue with traditional agricultural practices.

3.	**Surface water resources**	Water consumption by personnel at project site and irrigation of land.	• Use water sparingly. • Repair leaking taps and pipes. • Environmental awareness and training programmes.
		Stream flow disruption caused by drainage channels.	• Construct stream crossings at right angles. • Minimize number of crossings. • Avoid seasonally marshy areas. • Do not bulldoze soil into river courses.
4.	**Surface water quality**	Impairment of water quality by irrigation water and agrochemicals.	• Define and enforce return water quality levels (including monitoring). • Minimize area disturbed. • Educate for pesticide or sewage contamination dangers • Monitor irrigation water quality
		Reduction in irrigation water quality	• Liaise with concerned authorities to regulate industrial development.
		Water quality problems for downstream users caused by irrigation return flow quality	• Protect surface water resources from contaminated runoff from workshops and irrigated farmland • Designate land for saline water disposal; build separate disposal channels
5.	**Groundwater resources**	Local lowering of water table levels, which could impact on ground stability, rural water supply, and vegetation, due to abstraction of groundwater for irrigation and domestic use.	• Undertake a hydro census of local boreholes to determine water table depths, borehole yields and local use of groundwater. • Define and enforce abstraction regulations as defined in abstraction permit • Monitor ground water levels.

6.	**Groundwater quality**	The groundwater could become polluted as a result of agrochemicals, pit latrines and incorrect waste disposal practices.	• Do not develop pit latrines close to domestic supply boreholes or rivers. • Dispose of all hazardous waste including agrochemicals in an approved disposal site. • Monitor groundwater quality.
7.	**Topography and Geomorphology**	Local alteration in topography due to drainage channels and alteration/loss of features of geomorphological importance (***e.g.*** hills).	• Select sites carefully to avoid important / sensitive landscape features where possible. • Rehabilitate all excavated areas as soon as possible.
9.	**Flora**	Disturbance or loss of protected/endangered plant species or communities (terrestrial, wetland, aquatic) due to excavation for drainage channels.	• Identify issues and protection measures required ***e.g.*** examine feasibility/need for translocation of specimens to alternative sites. • Minimize vegetation clearance by clearly demarcating work areas. • Provide environmental awareness training to all employees. • Rehabilitate all disturbed areas. • Position waster infrastructure to avoid as far as possible sensitive plant communities
		Introduction of problematic invasive/alien plants to site due to ground disturbance.	• Routine identification and eradication of problem species.
		Damage to downstream ecosystems due to reduced water quantity and quality	• Regulate land for flood plains, wetlands, watersheds; drainage water disposal and river corridors.
10.	**Terrestrial fauna**	Disturbance or loss of protected/endangered animal species/communities and their habitat due to excavation activities	• Consider need to translocate species. • Avoid important habitats. • Minimise vegetation clearance. • Protect water resources from pollution. • Protect soils from contamination. • Stockpile topsoil separately in small mounds to maintain microbiological viability. • Rehabilitate all disturbed areas.
		Interference with animal migration routes due to linear infrastructure ***e.g.*** pipelines, canals.	• Select routes carefully, based on the results of the EIA.

11.	**Aquatic fauna**	Pollution and siltation of rivers, streams, dams and pans.	• Install erosion protection works to prevent siltation. • Ensure pit latrines ***etc.*** are far from surface water resources.
		Interference with fish migration routes.	• Provision of fish ladders and other means of passage.
		Fires from bush clearing activities.	• Do not burn cleared vegetation. • Sell or give firewood away to staff and local communities. • Use brushwood to assist with erosion control and rehabilitation.
13.	**Noise and vibration**	Noise generated by excavation activities, especially earthmoving equipment.	• Prescribe noise reduction measures if appropriate ***e.g.*** maintaining and operation of earth moving equipment/vehicles according to manufacturer's specifications. • Consult with the local community.
14.	**Cultural heritage (including archaeological, Historical, palaeontological and spiritual sites)**	Disturbance/loss of heritage resources (sites and artifacts).	• Identify significant heritage resources and implement necessary protection/survey measures in consultation with the local community. • Operate water reservoirs to suit downstream requirements and encourage wildlife around the project site • Ensure that agricultural intensification does not preclude other economic or subsistence activity
15.	**Local communities: composition, structure and social functioning**	Loss of weaker community infrastructure	• Carry out extensive public consultations to ensure that plans are optimal, that all sections of affected society are considered particularly in respect of land and water rights. • Ensure that agricultural intensification does not preclude other economic or subsistence activity • Provide short-term support and/or skills for an alternative livelihood if irrigation removes existing livelihood.

16.	**Rural livelihoods**	Impact on the availability of natural resources traditionally used by local communities ***e.g.*** plants used for medicinal and nutritional purposes, fuel wood, water resources ***etc.***	• Allow continued access into non-sensitive, non dangerous construction areas.
17.	**Current land use**	Impacts on land use such as loss of grazing land, agricultural land, access to resources ***etc*** especially if people have to be resettled.	• Evaluate advantages and disadvantages that would result from various land use changes. • Select a resettlement site, which has a similar pre-development land capability.
19.	**Local economy**	Impacts on the local economy due to increased employment levels, influx of people to the area, land use changes, increased purchasing.	• Try to maximize local spending and employment.
21.	**Local infrastructure and services**	Loss/disruption of important communal pathways, public services and utilities ***e.g.*** sewerage, electricity, water supply, health care.	• Determine impacts in advance and implement appropriate mitigation measures such as access and compensation payments.
22.	**Health of workers and local communities**	Increased incidence of water related disease e.g. malaria, schistosomiasis	• Manage irrigation and drainage to prevent disease spread • Educate public about causes of disease
23.	**Public nuisance**	General nuisance such as noise and dust as a result of excavation activities.	• Undertake all construction activities in a manner, which is sensitive to the life of the local community and exploration staff.
24.	**Aesthetic and amenity values**	Visual impacts of construction on scenic views, tourist routes and destination and sense of place.	• Rehabilitate all areas disturbed by excavation and landscape with grass and shrubs. • Minimize disturbance. • Consult with the local community and tourist industry.

Appendix 7.5(d) Decommissioning and Closure

ITEM	ENVIRONMENTAL COMPONENT	ENVIRONMENTAL IMPACT	MITIGATION MEASURE
1.	**Soils**	Re-use of soils in rehabilitation and re-instatement of pre-project capability.	• Replace subsoil and overburden first and then cover with saved topsoil. • Do not use heavy equipment to replace topsoil because this can cause compaction. • Take soil samples to determine soil fertility and apply soil amendments and conditioners as necessary.
		Residual soil contamination from under the desalinisation or treatment plants and waste dumps.	• Take soil samples from the entire site to determine the extent and significance of any soil contamination. • Formulate and implement a plan to pick up and remove any contaminated soil to an approved disposal site.
		Soil erosion from denuded areas and demolition activities.	• Maintain erosion protection works. • Rehabilitate or stabilise all disturbed areas.
2.	**Surface water resources**	Cessation of water use and consumption by project employees.	Cessation of water use and consumption by project employees.
		Dam draining.	• Control the release of water to accommodate the IFR as far as possible.
3.	**Surface water quality**	Pollution of water bodies from erosion of unconsolidated materials, contaminated soil, wastes (solid and liquid), ***etc.***	• Rehabilitate all areas. • Take regular samples of the discharge water and the receiving water quality and ensure that it is in compliance with legal limits. • Remove all contaminated soil identified and dispose of it in an approved site. • Close any waste disposal facility on site and make provision for drainage in such a way as to prevent future pollution.

4.	**Topography and geomorphology**	Reinstate the topographic profile to as close to the pre-project Land form as possible.	• Backfill, contour and landscape.
5.	**Flora**	Disturbance or loss of protected/endangered plant species or communities (terrestrial, wetland, aquatic) due to dust fall-out onto leaves and soil, dump erosion.	. • Rehabilitate or stabilise all cleared areas using indigenous vegetation where possible and maintain the rehabilitated areas until handover of the site.
		Proliferation of problematic invasive/alien plants to site due to ground disturbance.	• Routine identification and eradication of problem species on a regular basis after closure until handover of the site.
6.	**Terrestrial fauna**	Disturbance or loss of protected/endangered animal species/communities and their habitat due to the lack of rehabilitation, land contamination ***etc.***	• Fence waste disposal sites to prevent animal access, especially if they contain toxic substances. • Rehabilitate or stabilise all cleared areas using indigenous vegetation where possible. • Pick up and dispose of all contaminated soils in an approved dump.
7.	**Aquatic fauna**	Siltation and pollution of rivers, streams, dams, and lakes from erosion of cleared areas and waste dumps.	• Ensure that all areas containing hazardous substances are lined, sealed, bunded or otherwise engineered to prevent pollution of surface water after closure. • Maintain erosion protection works to prevent siltation. • Pick up and dispose of all contaminated soil in an approved dump.
8.	**Air quality**	Dust from unrehabilitated sites and demolition activities.	• Try to avoid dusty activities ***e.g.*** loading and dumping on windy days. • Rehabilitate or stabilise all disturbed areas. • Continue to monitor dust emissions in the surrounding areas at sensitive receptor sites ***e.g.*** schools, clinics ***etc.***
		Odours from waste dump.	Odours from waste dump.
9.	**Noise and vibration**	Noise generated by demolition equipment and earth moving equipment	• Prescribe noise reduction measures if appropriate ***e.g.*** restricted working and transport hours and noise buffering.

10.	**Cultural heritage (including archaeological, historical and spiritual sites)**	No impact from closure activities.	• Allow access to preserved heritage sites again once all closure activities have been completed and the site made safe.
11.	**Local communities: composition, structure and social functioning**	Movement of people away from project area.	• Undertake social impact assessment of closure, including full consultation with local communities, to determine issues and prescribe appropriate mitigation measures.
12.	**Rural livelihoods**		• Allow the community access to the site after official site handover, but ensure that all voids and dangerous areas are fenced and warning signs erected. • Inform and educate the local community about the risks and hazards that may remain on site.
13.	**Current land use**	Major land use change with closure of water infrastructure.	• Discuss changes in land use options with the authorities and local communities.
14.	**Future land use options**		• Rehabilitate the site according to the agreed closure plan and discuss with the local community and authorities. • Allow the community access to the site after official site handover, but ensure that all voids and dangerous areas are fenced and warning signs erected. • Inform and educate the local community about the risks and hazards that may remain on site. • Leave buildings, workshops, houses, ***etc*** for use by the local authority or communities.
15.	**Local economy**	Impacts on the local economy (minimal) due to decreased employment levels, movement of people away from the area, land use changes, decreased purchasing power, loss of income and job opportunities.	• Provide retrenchment training for employees. • Pay retrenchment costs. • Provide local skills and business training opportunities.

16.	**Regional and national economy**	Closure of the water infrastructure project will have an impact on the regional and national economy.	Integrate the planned closure into the other ongoing economic activities
17.	**Local infrastructure and Service**	Loss of water supply.	Plan for alternative sources of water supply before closure to avoid the water supply gap
18.	**Health and safety**	Risk of accidents and ill health as a result of the project	• Ensure that appropriate health and safety measures are applied in all activities. • Fence all unsafe and dangerous areas such as voids, polluted water, and place warning signs. • Enforce maximum traffic speeds through villages during closure operations. • Continue to monitor environmental health (air quality, water quality, vegetation, noise) at all main receptor points around the site until site handover.
19.	**Public nuisance**	General nuisance such as noise, odours, dust.	• Hold regular meetings to discuss closure issues with local community representatives. • Implement noise abatement measures, fugitive dust control measures during closure operations
20.	**Aesthetic and amenity values**	Improvement of the visual impact of the site on scenic views, tourist routes and destinations, sense of place.	• Rehabilitate with trees, grass and shrubs where possible. • Consult with the local community and tourist industry.

Appendix 7.5(e)(i): Potential impacts & mitigation, mining – Exploration phase

ITEM	ENVIRONMENTAL COMPONENT	ENVIRONMENTAL IMPACT	MITIGATION MEASURE
1.	**Soils**	Soil erosion/damage due to survey activities and vehicle tracks and establishment of base camps.	• Minimize number of tracks. • Use existing tracks as far as practicable. • Preferably construct access tracks during dry season • Use right angle intersections. • Avoid seasonally marshy areas, pans, floodplains.
		Soil contamination from drilling muds, oil and diesel spills.	• Provide lined sumps to contain drilling mud. • Provide bunding around all diesel tanks, oil drums and generators at site. • Train operators in correct fuel transfer techniques to avoid spillage. • Ensure regular maintenance of equipment to prevent diesel and hydraulic oil spills.
		Disruption and impairment of soil during cutting and clearing of survey lines, geochemical sampling, augering, pitting, trenching and drilling.	• Restrict clearance only to areas where survey is to be carried out. • Use wooden pegs and biodegradable tape to mark survey lines. • Cap and fill all surface holes dug for the purpose of exploration and make them safe after completion. • Replace soil in pits and trenches in the reverse order to which it was extracted and made safe
		Loss of soil fertility due to improperly planned re-settlement of people from the site.	• Select a site for resettlement, which has a similar land capability to the previous location, so that the resettled people can continue with traditional agricultural practices.
		Disturbance of ground colonised by weed species from cutting of survey lines.	• Roughen surface of soil cover to encourage seeds from surrounding vegetation to lodge and germinate.

2.	**Surface Water Resources**	Water consumption by survey camp.	• Use water sparingly. • Environmental awareness and training programmes.
		Stream flow disruption caused by access roads and tracks.	• Construct stream crossings at right angles. • Minimize number of crossings. • Avoid seasonally marshy areas. • Do not bulldoze soil into river courses.
3.	**Surface Water Quality**	Local siltation of rivers due to poorly constructed access tracks.	• Remove suspended materials using settling sumps. • Construct stream crossings at right angles. • Minimize number of crossings. • Do not place removed soil near water courses. • Avoid seasonally marshy areas. • Do not bulldoze soil into rivers. • Install culverts or construct concrete drifts
		Water pollution from fuel spillage and waste disposal.	• Ensure regular maintenance of equipment to prevent diesel and hydraulic oil spills. • Fuel vehicles away from drainage areas. • Provide separate covered, animal-proof bins for refuse and hazardous waste disposal. • Empty bins on a regular basis at an approved disposal site.
		Water pollution from wastewaters and sewage from site	• Direct wastewaters to earth drains. • Put in place sanitation facilities in place.
		Compromised water quality	• Sample and analyse water from site to ensure that the quality complies with pollution standards.
4.	**Groundwater Resources**	Local lowering of water table levels, due to abstraction of groundwater for camp use.	• Undertake a hydrocensus of local boreholes to determine water table depths, borehole yields and local use of groundwater. • Provide compensation to any persons who can prove that their borehole has been adversely affected by survey activities.

5.	**Groundwater Quality**	The groundwater could become polluted as a result of pit latrines and incorrect waste disposal practices.	• Line all sumps, dams, stockpile sites ***etc.*** that may contain solids or liquids, which could pollute the soil and groundwater. • Do not develop pit latrines close to domestic supply boreholes or rivers. A minimum distance of between 50-100metres should be observed • Dispose of all hazardous waste in an approved disposal site.
		Pollution of groundwater by oil and grease and from vehicles and drilling fluids	• Fuel vehicles away from
6.	**Flora**	Disturbance or loss of protected/endangered plant species or communities (terrestrial, wetland, aquatic) due to survey activities.	• Identify and in consultation with relevant authorities relocate any protected/endangered plant species. • Avoid surveying is sensitive habitats.
		Introduction of problematic invasive/alien plants to site due to ground disturbance.	• Routine identification and eradication of problem species.
		Introduction of exotic weeds by traffic	• clean vehicles and machinery before entering new area of exploration.
7.	**Terrestrial fauna**	Disturbance or loss of protected/endangered animal species/communities and their habitat.	• Consider need to translocate species. • Minimize vegetation clearance. • Protect water resources from pollution. • Protect soils from contamination. • Minimize soil stripping to essential areas only. • Stockpile topsoil separately in small mounds to maintain microbiological viability. • Rehabilitate all disturbed areas.
		Introduction of alien species.	• Do not allow domestic animals ***e.g.*** cats, dogs on site

8.	**Aquatic fauna**	Pollution of rivers, streams, dams and pans from organic, inorganic, silt or microbiological sources.	• Ensure that all areas containing hazardous substances are lined, sealed, bunded or otherwise engineered to prevent pollution of surface water. • Install erosion protection works to prevent siltation. • Ensure pit latrines ***etc.*** are far from surface water resources.
9.	**Air quality**	Dust from vehicle movements, trenches, pits and drilling may pollute surface water.	• Avoid excessive vehicle movements. • Limit vehicle speeds on unsurfaced tracks. • Use water to suppress dust on all unsurfaced tracks. • Try to avoid dusty activities ***e.g.*** grading on windy days. • Rehabilitate disturbed areas as soon as possible.
		Contamination of surface eater by fumes from drilling equipment, generators, vehicles.	• Maintain vehicles and equipment in good order • Fit diesel and petrol powered equipment with effective pollution control devices and control the emission of hydrocarbon vapour at fuel transfer points.
		Siltation of surface water by ash from fires from bush clearing activities.	• Do not burn cleared vegetation. • Sell or give firewood away to staff and local communities. • Use brushwood to assist with erosion control and rehabilitation.
10.	**Noise and vibration**	Noise generated by survey activities, especially drilling, geophysical work and vehicles.	• Prescribe noise reduction measures if appropriate ***e.g.*** restricted working hours and noise buffering. • Consult with the local community.
11.	**Cultural heritage (including archaeological, historical and spiritual sites)**	Disturbance/loss of heritage resources (sites and artifacts).	• Identify significant heritage resources and implement necessary protection/survey measures in consultation with the local community.

12.	**Rural livelihoods**	Impact on the availability of natural resources traditionally used by local communities ***e.g.*** plants used for medicinal and nutritional purposes, fuel wood, water resources ***etc.***	• Allow continued access into non-sensitive, non dangerous survey areas. • Allow the local community to collect any timber that is felled as part of survey grid clearance.
13.	**Current land use**	Impacts on land use such as loss of grazing land, agricultural land, access to resources ***etc*** especially if people have to be resettled.	• Evaluate advantages and disadvantages that would result from various land use changes. • Select a resettlement site, which has a similar pre-development land capability.
14.	**Local economy**	Impacts on the local economy due to increased employment levels, influx of people to the area, land use changes, increased purchasing.	• Try to maximize local spending and employment.
15.	**Local infrastructure services**	Loss/disruption of important communal pathways, public services and utilities ***e.g.*** sewerage, electricity, water supply, health care	• Determine impacts in advance and implement appropriate mitigation measures such as access and compensation payments.
		Burden on existing local infrastructure and services ***e.g.*** roads, hospitals.	• Plan for and/or construct supplementary services/infrastructure or enhance existing services/infrastructure.
16.	**Health and safety**	Risk of accidents and ill health as a result of the project.	• Ensure that appropriate health and safety measures are applied in all activities. • Fence all dangerous areas. • Place warning signs. • Consult with the local community and health workers. • Enforce maximum traffic speeds through villages
17.	**Public nuisance**	General nuisance such as noise and dust.	• Undertake all survey activities in a manner, which is sensitive to the life of the local community and exploration staff.
18.	**Aesthetic and amenity values**	Possible small visual impact.	• Rehabilitate the site on departure. • Minimise disturbance. • Consult with the local community and tourist industry.

Appendix 7.5(e) (ii): Potential impacts & mitigation – Mining & quarry operation

ITEM	ENVIRONMENTAL COMPONENT	ENVIRONMENTAL IMPACT	MITIGATION MEASURE
1.	**Soils**	Soil erosion/damage due to mining activities and vehicle tracks.	• Minimize number of tracks. • Treat mine drainage • Identify and segregate toxic rock materials • Where disturbance cannot be avoided, require use of sediment control structures/practices. • Treat mine drainage.
		Soil contamination from oil and diesel spills from construction vehicles.	• Provide bunding around all diesel tanks, oil drums an generators. • Store the minimum quantity of lubricating oil and fuel on site. • Train operators in correct fuel transfer techniques to avoid spillage. • Promptly cleanup any spills. • Treat soil before dumping. • Ensure regular maintenance of equipment to prevent diesel and hydraulic oil spills.
		Soil compaction due to heavy equipment and bulk earthworks.	• Remove topsoil prior to earthworks and stockpile for later use in rehabilitation.
		Disturbance/loss of pedagogical features of sensitivity importance ***e.g.*** hydro orphic (wetland) soils.	• Identify, evaluate significance and determine degree of protection required.
		Loss of soil under overburden and waste rock dumps	• Remove topsoil prior to dumping any materials and save for later rehabilitation.
		Loss of soil fertility due to improperly planned resettlement of people from the site.	• Select a site for resettlement, which has a similar land capability to the previous location, so that the resettled people can continue with traditional agricultural practices.

3.	**Surface water resources**	Water consumption by construction personnel and mining activities.	• Use water sparingly. • Repair leaking taps and pipes. • Environmental awareness and training programmes.
		Local disruption of surface water runoff due to presence of borrow pits, quarries and other excavations.	• Divert 'clean' storm water around excavations and overburden and waste rock dumps.
		Stream flow disruption caused by, blasting, mining activities, access roads and tracks	• Construct stream crossings at right angles. • Reduce suspended solids (e.g. by filtration systems, settlement sumps) • Place overburden on an impermeable surface. • Do not bulldoze soil into river courses. • Install culverts or construct concrete drifts.
4.	**Surface water quality**	Local siltation and pollution of rivers due to poorly constructed access tracks, topsoil removal and stockpiles, spoils created by bulk earthworks, borrow pits and quarries.	• Divert 'clean' storm water around excavations and waste rock and overburden dumps. • Minimize area disturbed. • Rehabilitation on completion. • Construct stream crossings at right angles. • Minimize number of crossings. • Do not bulldoze soil into rivers. • Install culverts or construct concrete drifts
		Water pollution from fuel spillage and waste disposal.	• Protect surface water resources from contaminated runoff from workshops and plant construction areas by providing storm water drains, sumps, and linings. • Provide separate covered, animal-proof bins for refuse disposal. • Empty bins on a regular basis at an approved disposal site.
		Water pollution from sewage, toxic mineral residues and beneficiating chemicals.	• Reduce toxic chemicals. • Reduce chemical and biological oxygen demand. • Ensure treatment of wastes of both mining and on-site mineral processing. operations as well as sewage before discharge into drainage. • Reduce chemical and biological oxygen demand. • Empty bins on a regular basis at an approved disposal site.
		Pollution resulting from radon concentration at vent stacks from underground mines	• Use adequate technology to ensure emissions are kept at acceptable levels

5.	**Groundwater resources**	Local lowering of water table levels (dewatering), which could impact on ground stability, rural water supply, and vegetation, due to blasting, abstraction of groundwater for camp and mining use.	• Undertake a hydro census of local boreholes to determine water table depths, borehole yields and local use of groundwater. • Identify boreholes likely to be impacted and provide alternative sources of water. • Control blasting to limit impacts
6.	**Groundwater quality**	The groundwater could become polluted as a result of mineral and processing activities, discharge of contaminants via mine de-watering activities, pit latrines and incorrect waste disposal practices.	• Line all sumps, dams, stockpile sites ***etc.*** which may contain solids or liquids which could pollute the soil and groundwater. • Avoid or minimise penetration of aquifers below the strata being mined • Do not develop pit latrines close to domestic supply boreholes or rivers. • Dispose of all hazardous waste in an approved disposal site.
7.	**Topography and Geomorphology**	Local alteration in topography due to borrow pits quarries and bulk earthworks, and alteration/loss of features of geomorphological importance (***e.g.*** gorges, waterfalls, hills) as well as instability from steep quarry faces and waste heaps.	• Select sites carefully to avoid important / sensitive landscape features where possible. • Try and balance cut and fill. • Rehabilitate all cut and fill slopes as soon as possible. • Reuse the waste rock and tailings to refill pits. • Ensure safe slope angles for quarry faces and waste heaps.
		Land instability due to surface subsidence in underground mining	• Monitor subsidence at historic sites to identify possible subsidence areas
8.	**Palaeontology**	Disturbance/loss of sites of palaeontological interest due to site development.	• Determine importance/sensitivity of site and degree of protection/survey work required
9.	**Flora**	Disturbance or loss of protected/endangered plant species or communities (terrestrial, wetland, aquatic) due to construction activities.	• Identify issues and protection measures required ***e.g.*** examine feasibility/need for translocation of specimens to alternative sites. • Minimize vegetation clearance by clearly demarcating work areas. • Provide environmental awareness training to all employees. • Rehabilitate all disturbed areas. • Position waster infrastructure to avoid as far as possible sensitive plant communities
		Illegal felling of trees for firewood and the illegal collection of plant specimens.	• Impose penalties for illegal cutting of trees or illegal possession of plant specimens.
		Introduction of problematic invasive/alien plants to site due to ground disturbance.	• Routine identification and eradication of problem species.

10.	**Terrestrial fauna**	Disturbance or loss of protected/endangered animal species/communities.	• Consider need to translocate species. • Tape off important habitats. • Minimize vegetation clearance. • Protect water resources from pollution. • Protect soils from contamination. • Minimize soil stripping to essential areas only. • Stockpile topsoil separately in small mounds to maintain microbiological viability. • Impose strict penalties for poaching. • Prohibit or restrict disturbance of significant habitats. • Rehabilitate all disturbed areas.
		Introduction of alien species.	• Do not allow domestic animals ***e.g.*** cats, dogs on site
		Interference with animal migration routes due to linear infrastructure ***e.g.*** pipelines, canals.	• Select routes carefully, based on the results of the EIA.
		Illegal poaching of game and killing wild animals.	• Impose strict penalties for poaching and unlawful killing.
11.	**Aquatic fauna**	Pollution and siltation of rivers, streams and other water courses.	• Install erosion protection works to prevent siltation. • Ensure mine wastes and pit latrines ***etc.*** are far from surface water resources.
		Interference with fish migration routes.	• Provision of fish ladders and other means of passage.
12.	**Air quality**	Dust from vehicle movements, blasting and crushing	• Avoid excessive vehicle movements. • Limit vehicle speeds on unsurfaced tracks. • Use water to suppress dust on all unsurfaced tracks. • Use wet crushing methods to minimise dust. • Use blasting techniques e.g. delayed detonation to minimise blasting impact. • Try to avoid dusty activities ***e.g.*** grading on windy days. • Use dense vegetative screening. • Rehabilitate disturbed areas as soon as possible.
		Fumes from generators, and vehicles.	Maintain vehicles and equipment in good order.
		Fires from bush clearing activities.	• Do not burn cleared vegetation. • Sell or give firewood away to staff and local communities. • Use brushwood to assist with erosion control and rehabilitation.

13.	**Noise and vibration**	Noise generated by mining activities, especially blasting, crushing, vehicles and excavation equipment.	• Prescribe noise reduction measures if appropriate ***e.g.*** restricted working hours and noise buffering. • Locate noisy equipment away from populated areas. • Use conveyors instead of trucks for on-site movement. • Limit noisy operations to specific times of the day. • Consult with the local community.
14.	**Cultural heritage (including archaeological, historical and spiritual sites)**	Disturbance/loss of heritage resources (sites and artifacts).	• Identify significant heritage resources and implement necessary protection/ survey measures in consultation with the local community.
15.	**Local communities: composition, structure and social functioning**	Social impact of resettlement and immigration of work force for construction ***e.g.*** introduction of diseases, increased crime levels, interference with local community structures.	• Undertake Social Impact Assessment, including full consultation with local communities, to determine issues and prescribe appropriate mitigation measures.
		Influx of job seekers.	• Only recruit labour through approved district offices or in consultation with local authorities. • Adopt the policy of no 'at-the-gate' casual employment. • Make your recruitment policy well known in the area.
16.	**Rural livelihoods**	Impact on the availability of natural resources traditionally used by local communities ***e.g.*** plants used for medicinal and nutritional purposes, fuel wood, water resources ***etc.***	• Allow continued access into non-sensitive, non dangerous construction areas.
17.	**Current land use**	Impacts on land use such as loss of grazing land, agricultural land, access to resources ***etc*** especially if people have to be resettled.	• Evaluate advantages and disadvantages that would result from various land use changes. • Select a resettlement site, which has a similar pre-development land capability.
18.	**Future land use options**	Lack of rehabilitation could preclude future land use.	• Rehabilitate to the former, or better, land capability.

19.	**Local economy**	Impacts on the local economy due to increased employment levels, influx of people to the area, land use changes, increased purchasing.	• Try to maximize local spending and employment.
20.	**Regional and national economy**	Construction of large water infrastructure projects will have an impact on the regional and national economy.	• Try to maximize regional and national benefits.
21.	**Local infrastructure and services**	Loss/disruption of important communal pathways, public services and utilities ***e.g.*** sewerage, electricity, water supply, health care.	• Determine impacts in advance and implement appropriate mitigation measures such as access and compensation payments.
		Burden on existing local infrastructure and services ***e.g.*** roads, hospitals.	• Plan for and/or construct supplementary services/infrastructure or enhance existing services/infrastructure.
22.	**Health and safety**	Risk of accidents and ill health as a result of the mining activities.	• Ensure that appropriate health and safety measures are applied in all activities. • Fence all dangerous areas. • Place warning signs. • Consult with the local community and health workers. • Enforce maximum traffic speeds through villages.
23.	**Public nuisance**	General nuisance such as noise and dust as a result of construction activities.	• Undertake all construction activities in a manner, which is sensitive to the life of the local community and exploration staff.

Appendix 7.6: Review sheet for assessment of environmental effects

1.0	Description of the proposed activity and its setting	Review Remarks
1.1	How clearly, preferably in non-technical language, is the proposal described?	Adequate
1.2	How clearly, preferably in non-technical language, is the environmental setting described?	Detail required
	To what extent…	
1.3	…are the likely direct links between the proposal and the environment clearly identified in the description? (E.g. discharges to the environment; use of local resources, labour, etc.)	Yes
1.4	…is a distinction made (if appropriate) between the construction, operation, and/or decommissioning phases of the proposed activity?	Yes
1.5	…does the ***assessment of environmental effects*** (AEE) refer to any environmental assessment provisions of the district and/or regional plans?(this would include noting that there are no particular provisions, if that was the case)	Not applicable
2.0	**The approach to, and coverage of, the assessment of environmental effects…**	
2.1	Should alternative locations, or methods, for the proposed activity be considered in the AEE (i.e. significant effects are likely)" [If yes, go to 2.1.1 If no, skip to 2.2]	Yes
2.1.1	To what extent have alternatives been considered in the AEE?	Not considered
	To what extent…	
2.2	…is there evidence of the early and meaningful involvement of affected people, groups and communities in the assessment of environmental effects of the proposal?	No
2.3	…is there evidence that a rational approach to scoping, and especially to impact identification, has been used in the EIA?	No
2.4	…is the coverage of the AEE appropriate for the type and scale of proposal (i.e. there are no obvious, unexplained gaps in coverage)?	Gaps in coverage
2.5	…is there an appropriate balance between the biophysical (e.g. effects on water or air quality) and the social and cultural impacts of the proposal (e.g. effects on the neighbourhood or the wider community, and/or health and safety issues)?	Adequate
2.6	…has baseline data been collected? [If not, skip to 2.7]	Inadequate
2.6.1	…has baseline data collection been directed by the scoping process? (As opposed to a wide, unfocused collection strategy?	No

2.7	…is there evidence of careful selection of indicator variables, both for impact prediction and for monitoring, should the latter be necessary?	Inadequate
2.8	If risk assessment is appropriate for the proposal, to what extent has it been provided in the AEE?	Not assessed
2.9	If hazard assessment is appropriate for the proposal, to what extent has it been provided in the AEE?	Not assessed
3.0	**Prediction, mitigation, and monitoring of effects.**	
	To what extent…	
3.1	…are clear and sound predictions made about possible impacts?[If no predictions are made, skip to 3.10]	Gaps in coverage
3.2	…(assuming predictions are made), is the basis of the prediction clearly stated (including methods, supporting data etc., as appropriate)?	Adequate
3.3	…do the predictions generally provide sufficient information about the nature, severity, likelihood and spatial extent of the impacts such that the implications of the impact can be understood?	Variable
3.4	…is there an appropriate balance between adverse and beneficial impacts?	Yes
3.5	…do the predictions take account of indirect impacts?	No
3.6	…do the predictions take account of cumulative impacts?	No
3.7	…do the predictions take account of long term impacts?	No
3.8	…does the AEE consider possible mitigation measures for the likely impacts?	Yes
3.9	…does the AEE seek to link, and integrate, impacts on different parts of the environment, to provide an overall picture of the impact of the proposal?	No
3.10	Is monitoring appropriate for the proposal? [If yes, go to next question If no, skip to 4.1]	Yes
	To what extent has monitoring been dealt with, to a level appropriate for the proposal?	Gaps in coverage
4.0	**Significance evaluation**	
4.1	To what extent is there evidence in the AEE of a systematic approach to evaluating the significance of the identified impacts/effects of the proposed activity?	No
4.2	How well, overall, are the attitudes of the affected individuals, groups and communities towards the identified impacts recognised in the AEE	Not stated

4.3	To what extent does the AEE avoid undue reliance on the valued judgments of the impact assessors?	Not stated
4.4	Have technical methods been used in the AEE to evaluate the social significance of the identified impacts? [If yes, go to 4.4.1 If no, skip to 5.1]	No
4.4.1	If technical methods have been used to evaluate the social significance of predicted impacts, to what extent have the methods been clearly explained?	
4.4.2	If technical methods have been used to evaluate the social significance of predicted impacts, to what extent have the people affected by the proposal been involved in the evaluation process?	
5.0	**Communication of impact information**	
	To what extent…	
5.1	…is the EIA clearly and simply organised, providing a coherent and useful study?	Yes
5.2	…is the impact information summarised in a form that non-technical people can understand?	Yes
5.3	…is the overall impact of the proposed activity on the environment (including reference to both beneficial and adverse impacts) clearly set out, in an understandable form?	Yes
5.4	…is the discussion of the predicted impacts free from obvious bias (e.g. emphasis on benefits, downplaying negative aspects)?	Yes
5.5	…is the assessment free of superfluous material (that can hide important information)?	Yes
5.6	…have photographs and/or other graphics been used to aid the understanding of information in the assessment?	Yes
	Overall AEE conclusion:	**Further Information required**

Appendix 7.7: Glossary of Terms

EIA Definitions as adapted from the National Environmental Act Cap 153; with additional definitions of terms used in Environmental Impact Assessments Regulations 1998 and EIA Guidelines1997.

"**Analysis**" means the testing or examination of any matter, substance or process or the purpose of determining its composition or qualities or its effect (whether physical, chemical or biological) on any segment of the environment or examination of emissions or recording of noise or sub-sonic vibrations to determine the level or other characteristics of the noise or sub-sonic vibration or its effect on any segments of the environment.

"**Biodiversity"** or biological diversity" means the variability among living organisms from all sources including, terrestrial ecosystems, aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, among species, and of ecosystems.

"Beneficiary" Any individual or group who, in one way or another is favourably influenced by a water resource project is a beneficiary.

"**Chemical"** means a chemical substance in any form whether by itself or in a mixture or preparation, whether manufactured or derived from nature and for the purpose of the Act includes industrial chemicals, pesticides, fertilizers and drugs.

"Cumulative Impacts" Those impacts that result from incremental impacts of the proposed action added to the impacts of other past, present and foreseeable future action.

"Developer" Means a person, group of persons or agency developing a new project or proposing to extend an existing project, which is subject to an EIA process.

"Direct Impacts" Those impacts that are caused by the action and which generally occur at the same time and place as the action.

"Economic analysis" means the use of analytical methods, which take into account economic, socio-cultural, and environmental issues in an integrated manner in the assessment of projects.

"**Ecosystem'** means a dynamic complex of plant, animal, micro-organism communities and their non-living environment interacting as a functional unit.

"**Effluent"** means gaseous waste, water or liquid or other fluid of domestic, agricultural, trade or industrial origin treated or untreated and discharged directly or indirectly into the aquatic environment.

"EIStudy" the study conducted to determine the possible environmental impacts of a proposed policy, project, plans or activity, and measures to mitigate any such impacts.

"Environment" The physical factors of the surroundings of abiotic and biotic including land, water, atmosphere, climate, sound, odour, taste, the biological factors of animals and plants and the social factor of aesthetics and includes both the natural and the disturbed environment.

"**Environmental audit**" means a systematic evaluation of activities and process of an ongoing project to determine how far these activities and programmes conform to the approved environmental management plan of that specific project and sound environmental management practices.

"Environmental Economic Analysis": An analysis of the expected environmental impacts of projects from an economic perspective.

"**Environmental impact assessment**" means a systematic examination conducted to determine whether or not a project, programme or activity will have any adverse impacts on the environment.

"Environmental impact statement" means the written report that presents the results of an EIStudy.

"Environmental management plan" means all details of project activities, impacts, mitigation measures, time schedule, costs, responsibilities and commitments proposed to minimize environmental impacts of activities, including monitoring and environmental audits during implementation and decommissioning phases of a project.

"Environmental management" includes the protection, conservation and sustainable use of the various elements or components of the environment.

"**Environmental monitoring"** means continuous or periodic determination of actual and potential effects of any activity or phenomenon of the environment whether short term or long-term.

"**Environmental resources"** includes the resources of air, land, flora, fauna and water together with their aesthetical qualities.

"**Guidelines**" means the Guidelines describing the methodology for implementation of Environmental impact assessment requirements adopted by the Authority under the Act.

"**Hazardous waste**" means any waste which has been determined by the Authority to be hazardous waste or to belong to any other category of waste provided for in the statutory instruments.

"Impact" Is the effect of any action that affects one or more elements of the natural, Social, political or economic environment, either adversely or beneficially, including land, water, atmosphere, climate,

sound, odour, taste, the biological factors of animals and plants and the social factor of aesthetics and includes both the natural and the built environment.

"Indirect Impact" Those impacts that include changes in the natural environment, population, economic growth, and land use, as a result of actions not directly linked to the project in question.

"**Lead agency**" means any Government ministry, department, parastatal, state corporations or local authority, in which any law vests functions of control or management of any element of the environment or natural resource.

"Local stakeholders" Inhabitants of an area who are directly or indirectly affected by water management are referred to as "local stakeholders".

"Mitigation measures" Actions, which reduce, avoid or offset the potential adverse environmental consequences of a project, and include engineering works, technological improvements, management measures and ways and means of ameliorating effects to the environment and losses suffered by individuals and/or communities, including compensation and resettlement.

"**Natural resources**" include resources of the air, land, water, animals and plants including their aesthetic qualities.

"**Noise**" means any undesirable sound that is intrinsically objectionable or that may cause adverse effects on human health or the environment.

"Participation" A process through which stakeholders influence and share control over development initiatives and decisions on resources that affect them.

"**Pollutant**" includes any substance whether liquid, solid or gaseous which – (a) may directly or indirectly alter the quality of any element of the receiving environment; (b) is hazardous or potentially hazardous to human health or the environment; and includes objectionable odours, radioactivity, noise, temperature change or physical, chemical or biological change to any segment or element of the environment.

"**Polluter-pays principle**" means that the cost of cleaning up any element of the environment damaged by pollution, compensating victims of pollution, cost of beneficial uses lost as a result of an act of pollution and other costs that are connected with or incidental to the foregoing, is to be paid or borne by the person convicted of pollution under this Act or any other applicable law.

"**Pollution**" means any direct or indirect alteration of the physical, thermal, biological, or radio-active properties of any part of the environment by discharging, emitting, or depositing wastes so as to affect any beneficial use adversely, to cause a condition which is hazardous or potentially hazardous

to public health, safety or welfare, or to animals, birds, wildlife, fish or aquatic life, or to plants or to cause contravention of any condition, limitation, or restriction which is subject to a license under this Act.

"Practitioner" An expert in conducting the EIStudy and preparation of the EIS.

"Project Affected Person" Any individual or group who is adversely affected by the intervention of a water resource development project is known as a Project Affected Person.

"Project Brief" A summary statement of the nature of the project, it's proposed environmental setting and the likely environmental impacts and mitigation measures thereto.

"Project" A set of planned activities designed to achieve specific objectives within a given area and time frame.

"**Proponent**" means a private, government, any organisation or person proposing or executing a project, activity, programme or an undertaking specified in the Third Schedule of the National Environment Act.

"Review" means a process of checking the adequacy of an environmental impact study to ensure that it meets the legal requirement and ensure wide acceptance of the environmental impact study to ensure that it meets the legal requirement and ensure wide acceptance of the environmental impact study findings.

"Scoping" Early, open identification of potentially significant environmental impacts and de-emphasis or elimination of insignificant impacts or impacts which have already been covered by other EIAs.

"Screening" Determination of which level of EIA is required.

"Significance" An expert evaluation/judgment of the magnitude of impact(s) or the degree to which a proposed activity or project may (potentially) impact on the environment if implemented.

"Significant impact" A substantial, or potentially substantial, adverse change in any of the physical factors of the surroundings of the human beings including land, water, atmosphere, climate, sound, odour, taste, the biological factors of animals and plants and the social factor of aesthetics including both the natural and the disturbed environment.

"**Social analysis**" means assessing or estimating in advance the social consequences from specific policy actions or project development including social justice and equity, social uncertainty, social cohesion, social networks and interactions, social status and gender desegregation.

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