



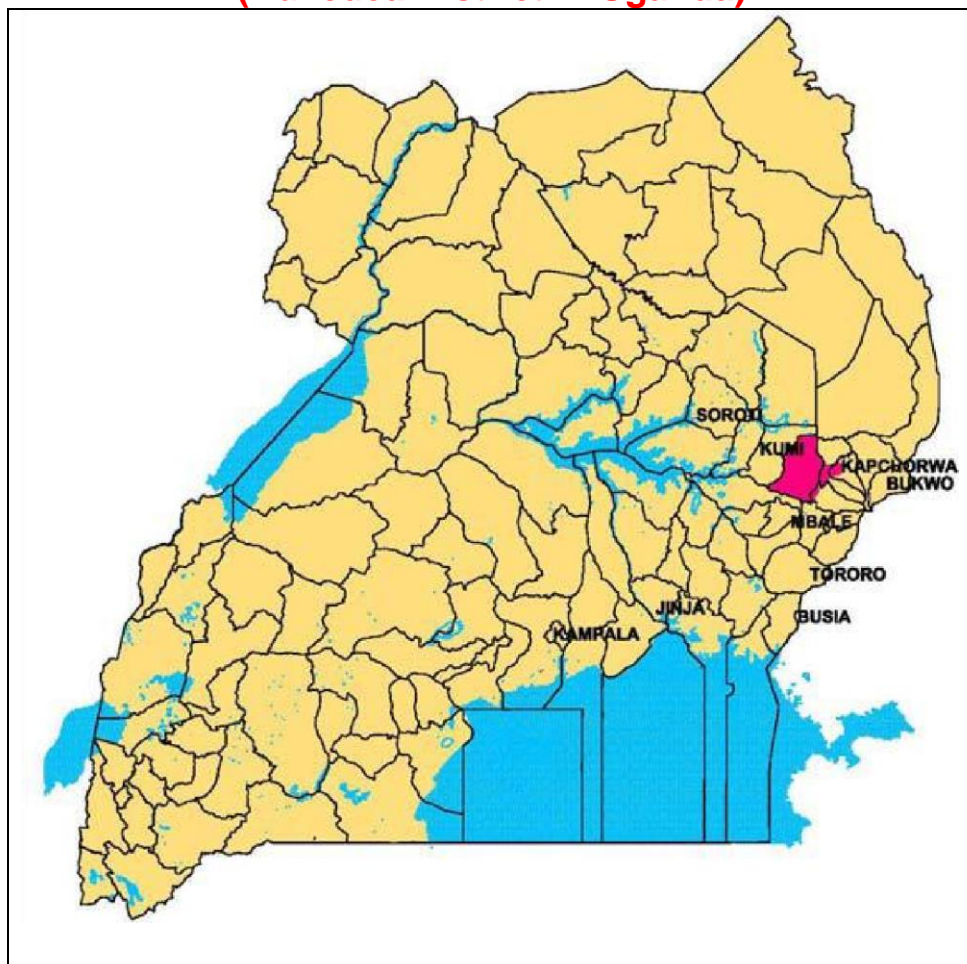
THE REPUBLIC OF UGANDA

MINISTRY OF WATER AND ENVIRONMENT

Feasibility Study and Detailed Engineering Design for Bukedea Water Supply and Sanitation System in Bukedea District in Uganda

Proposed Bukedea Gravity Flow Water Supply Sanitation System

(Bukedea District in Uganda)



ENVIRONMENT AND SOCIAL IMPACT

STATEMENT

Environment and Social Impact Statement

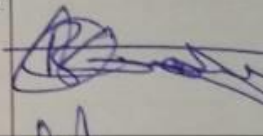
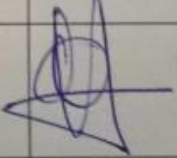
Bukedea Water Supply & Sanitation System in Bukedea District in Uganda

Client Ministry of Water and Environment

Assignment: Feasibility Study and Detailed Engineering Design for Bukedea Water Supply & Sanitation System in Bukedea District in Uganda.

Report Title: Environment and Social Impact Statement

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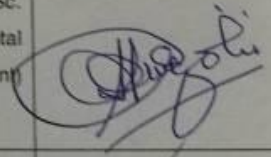


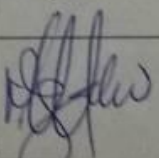
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ABBREVIATIONS

BOD	Biochemical Oxygen Demand
CFU	Coliform Units
C	Centigrades
DWD	Department of Water Directorate
ESIA	Environment and Social Impact Assessment
ESMP	Environment and Social Management Plan
HIV/AIDS	Human Immuno
NEMA	National Environment Management Authority
NDP	National Development Plan
TSU	
Mg	Milligramme
OP/BP	Operational Policies/Bank Policies
MI	Milliliters
RAP	Resettlement Action Plan
UGX	Uganda Shillings

NON-TECHNICAL SUMMARY

Introduction

The Ministry of Water and Environment through the Directorate of Water Development (DWD) is responsible for managing and developing the water resources of Uganda in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs of the present and future generations with the full participation of all stakeholders. Furthermore, the Directorate is responsible for providing sustainable safe water within easy reach and hygienic sanitation facilities, based on management responsibility and ownership by the users to 77% of the population in rural areas and 100% of the urban population by the year 2015, with a minimum of 80% effective use and functionality of facilities. As of June 2013, access to safe water to the rural population was at 64% and to the urban population was at 70%. The biggest challenge is how to serve the water stressed areas where the traditional rural water supply sources cannot be implemented coupled with depletion of cheaper water resources in some areas.

Bukedea District and the surrounding areas are water stressed and lie within the flood prone zones and hence face a major challenge of accessing to clean and safe water for its rapidly growing population amidst diminishing water resources both in quantity and quality. Ground water resources have proved inadequate to meet the district's potable water demand. Therefore, reliable and sustainable water supply options have to be developed if meaningful achievements are to be made. Accordingly, a prefeasibility study was done in 2013 by the Ministry of Water and Environment, which established that the project area under consideration could be served by a bulk gravity flow scheme with the water source as Sipi and Chebonet Rivers which originate from the slopes of Mt. Elgon in Kapchorwa District.

The ESIA Study

Environmental and social assessments are necessary with a view to evaluating the current ground environmental and social status, opinion of the local communities; establish the potential social and economic benefits or negative impacts of the project. Appropriate remedial actions will also need to be identified and integrated in the project design and implementation. The EIA/EA Regulations provides a clear guideline on basic considerations for harmonized impacts studies for projects undertaken in Kenya. On the global level, the World Bank environmental and social safeguards that target potential interactions of the project with environment and social settings such as to include physical environment forest, biodiversity cultural and indigenous peoples among others.

Environmental impact assessment studies are designed to identify the positive and negative impacts and establish appropriate mitigation measures. The study was undertaken to ensure that the project benefits are enhanced while negative impacts are mitigated or eliminated all together. On the other hand RAP process (on a separate assignment) identified the affected populations and advises on the most acceptable mode of relocation and compensation.

Proposed Project Objectives

The main objective of the consultancy is to carry out a feasibility study, detailed engineering design, and Environmental and Social Impact Assessment (ESIA) for the proposed Bukedea Water Supply and Sanitation System to meet the future demand for the feasible service area of Malera, Kidongole, Kachumbala, Kolir, and Bukedea Sub-Counties in Bukedea District. The consultancy shall also investigate the possibility of serving parts of the Sub Counties of Kawowo (in Kapchorwa), Bukhalu and Bunambutye (in Bulambuli), Bukhulo and Bukiyi (in Sironko) along the way to Bukedea. In addition, the consultancy shall provide training and capacity building in all aspects of project development for the Client's counterpart staff including district and TSU staff. The specific objectives include:-

- (i) To establish the existing water supply and sanitation situation in the proposed project areas;
- (ii) To develop technical proposals for increasing safe water access in the proposed water stressed areas;
- (iii) To propose hygiene and sanitation improvements in the proposed project areas;
- (iv) To propose improvements to management, operations and maintenance of the proposed water supply and sanitation system;
- (v) To provide training and capacity building in project development for the Client's counterpart staff

The Project Location

Among the key activities towards realization of a sustainable project include undertaking an environmental and social impact assessment study not only for the approval by NEMA but also to provide an environment and social management plan for integration into the project implementation. The general project area is located between 1° 10' N and 1° 34' N and 33° 35' E and 34° 17' N in eastern Uganda and is accessible by approximately 258km of tarmac road from Kampala followed by a network of gravel roads off Mbale – Soroti and Mbale – Kapchorwa/Moroto highways. The project area may be considered in two parts comprising basically of the intake and the distribution areas.

- (i) The intake is proposed to be situation at the confluence of Sipi River and Chebonet River a short distance from the edges of Mt. Elgon Forest. It is situated within Kapsabuko parish to the south and Cheptura Parish to north with Sengwel Paris to the east in Tingeyo County of Kapchorwa District. The approximate coordinates are 01° 22' 00"N and 034° 21' 06"E at an elevation of 1,262m a.s.l.
- (ii) The distribution areas covers a vast demand zone comprising of parts of the lower Kapchorwa District, Bulabuli District, Siroko District and Bukedea District.

The project area stretches from the Mt. Elgon Highlands at the water intakes in Kapchorwa district to the low lying areas in Bukedea District, a distance of approximately 100km to the termination of the project. The whole project area is approximately 1,217km² and covers eleven sub-counties namely Kapsinda, Kawowo, Bunambutye, Bukhalu, Bukhulo, Bukiyi, Kolir, Kachumbala, Kidongole, Bukedea and Malera with an estimated total population of 262,343 inhabitants according to the 2014 National Population and Housing Census Provisional Results. The number of households is estimated to be 48,126.

Project Activities

The project implementation is expected to run from planning through to commissioning stages, with the bulk of activity being the construction.. The construction process will be undertaken at three levels namely;

- (i) Development of the intake facility comprising of the weir arrangement and a sedimentation tank unit. The works will involve excavation of the river banks followed by masonry construction of the weir. This activity will also involve temporarily deviate the main river stream for a short distance to allow for the construction and re-channel it back to fill the weir upon completion. The sedimentation tank will also involve excavation and masonry construction as per design such as to receive water from the weir channel.
- (ii) Construction of the water treatment plant area will mainly involve excavations and masonry works as per the design specifications. Other construction components will include operations support buildings including an offices and store, security perimeter fence and sentry, access pavements and parking areas, sanitation facilities and security lighting.
- (iii) The premises will also be provided with a storage tank also through excavation and masonry works. Part of this level of construction will be provision for connectors to the incoming raw water and outgoing treated water,
- (iv) Construction tanks at the service points will also go through excavations and masonry works to specification and to include perimeter fencing, drainage of spills and washouts as well as connectors to the inlets and outlet pipes,
- (v) Trenching and laying of pipelines from the intake to the treatment plant, treatment plant to the storage tanks and all distribution pipeline networks as per the design network,.
- (vi) Treatment structures) and lying of pipes and necessary accessories.
- (vii) Commissioning that is the official opening of the works to the beneficiaries.

Stakeholder and Public Consultations

Stakeholders' consultations were undertaken in two phases. The first phase involved rapid interviews of the public, water users and Government Officers in the proposed service areas and at the District Offices in Kapchorwa, Bulambuli, Sironko and Bukedea Districts. A consultative meeting was also held with NEMA and Uganda Wildlife Authority in Kampala. The following were contacted during the rapid interviews,

- (i) The Senior Chief and staff for Kapsinda sub-County
- (ii) District Water Office for Kapchorwa District
- (iii) District Water Office Bulambuli District
- (iv) District Water Office Sironko District
- (v) District Water Office for Bukedea District
- (vi) Uganda Wildlife Authority in Kampala
- (vii) NEMA Office in Kampala
- (viii) Members of public at the new intake and along the service area

The second phase of consultation involved formal stakeholders and public meetings held on the 26th and 27th January 2016 as follows;

- (i) Public and Stakeholders Meeting at Kapsinda sub-county attended by residents drawn from Kapsinda, Kangowo, Kapsabuko, Chemwaram, Kiring, Cheptuya Kapchebangana, Nganta, Towei, Kapkwebe, Sengwel, Lulwo, Towei and Kaptokolo among other Parishes,

- (ii) Stakeholder Meeting at Bukedea District Water Office with representatives drawn from Bukedea, Kachumbala, Kindongole, Malera and Kolil Parishes.

The main issues arising from the consultation interactions include the following;

- (i) The project is generally acceptable to a majority of the residents both at the source areas of Kapchorwa District and the supply areas including Sironko, Bukedea and Bulambuli Districts,
- (ii) The community at the source District expressed strong opinion that the water should not benefit other Districts if they themselves are not considered. In this regard, they demanded that a component be integrated into the project to serve the local communities. The water supply for the source community be commenced along the main water project system to Bukedea District and other beneficiary Districts,
- (iii) The residents at the source tended to resist paying for water despite being sensitized

- on the cost of water development and supply. However, the supply districts residents are not opposed to paying for water as long the tariffs are developed to suit the ability to pay,
- (iv) The water supply system construction may require limited land acquisition. In this connection, the stakeholders indicated that compensation should be finalized before the project commences construction,
 - (v) The existing water sources including wetlands, rivers and ground water should be conserved and protected for other purposes such as washing, irrigation, livestock, etc. to allow the piped water for domestic purposes,
 - (vi) The community water management committees are given basic training on management for sustainable operations of the system once completed. Educate and sensitize the users and public on water use to reduce wastage, contamination and equity. This will involve training of selected members of public and community leaders on management basic skills,
 - (vii) Other views included;
 - ✓ Social involvement is enhanced to raise the level of ownership. Among the involvements would include employment, constant information and consultations as well as adopting the most cost effective accessibility to the water supply by the communities,
 - ✓ The communities at the source and supply area require intensive campaign on education and awareness on sanitation and hygiene. This will ensure sustainable utilization of the treated water while the available alternative sources are applied for washing, livestock watering and irrigations,
 - ✓ Initiate programmes on catchment management for Sipi and Chebonet Rivers for soil erosion control and reduction of silt discharging into the proposed intake. The public should be involved in this initiative,

Potential Impacts and Corrective Measures

Abstraction and transmission of water has got direct and indirect interactions with the environmental and social setting of the affected areas and downstream of the source streams. Among the broad linkages include the following,

- (i) Abstractions reduces the flows in the target rivers and streams effectively denying the ecosystems and social requirements downstream the opportunity for the associated values,
- (ii) On the other hand, transmission involves trenching, physical installations (pipelines, tanks, treatment works and support structures). Transmission of water is perhaps the one with most social linkages including at times limited displacement of people and livelihoods,
- (iii) Finally, operations water supply reticulation has attached risks to social aspects such as water accessibility conflicts, wastage of water, economic factors associated with water (e.g. the concepts and modalities of paying for water).

Management Issues

The proposed Water Supply project is geared towards enhancing social and economic benefits through sustainable water supply. Development of the proposed Water Supply Project would be expected to comply with the environmental conservation requirements in accordance with the

established Ugandan laws and regulations. To realize these goals, acceptability by a majority of the beneficiaries and stakeholders as well as ensuring minimal effects to the physical environment will require to be ensured through participation in the project and continuous consultations, evaluations and review of the design aspects throughout project implementation cycles.

It is also recommended that the environmental management guiding principles specific to this project improvement and water resources management be established to allow integration of environmental management considerations during construction and operations.

In order to implement the management plan, it is recommended that an expert be identified to oversee the environmental and social management aspects including the water source conservation, soil erosion control, re-vegetation whenever appropriate, water conservation and equity in distribution, enhanced sanitation and hygiene measures throughout project area to match the water supply initiatives.

The Management Plan guide towards among other areas environmental management programmes, standard operation procedures, compliance monitoring schedules and environmental audit schedules as required by the law. Social harmony of the intake, treatment works, storage tanks and associated component will be achieved through the collaborations with the stakeholders or community management committees introduced at various water consumption points.

A comprehensive environment and social management plan (ESMP) has been prepared as part of this report. This matrix will provide the reference handbook for the Contractor and the supervision of the works during the construction and subsequent operations of the water supply system.

Conclusions and Recommendations

Conclusions	Recommendations
<p>The proposed project is well justified to meet the desires of the People living in the water stress areas</p>	<ul style="list-style-type: none"> ✓ There should be a continuous consultation and involvement of the beneficiaries throughout the project implementation to ensure their desires and expectations are met to a large extent. ✓ Intensive public awareness and education is required to enhance ownership and involvement in the project implementation and operations for long term sustainability, reduced social conflicts and ecological conservation.
<p>The proposed project is acceptable to a majority of the source and beneficiary Communities. However, there are important issues of concern to a section of the community to be addressed including;</p> <ul style="list-style-type: none"> ✓ Land to be acquired for the intake, water treatment works and the storage tanks ✓ Land to be partially acquired for the water distribution pipeline, ✓ Plan for connections to homesteads in the service areas, 	<ul style="list-style-type: none"> ✓ The parcels of land to be acquired for the project should be compensated for. This will enhance acceptability of the project by the people. ✓ In the absence of direct connections to the homesteads, water kiosks will be situated at reasonable distances from the beneficiaries. ✓ Homesteads who can afford may be guided to connecting to water supply system

The current status of the water is intact with appropriate vegetation cover, insignificant sources of pollution and acceptable water quality. However, encroaching cultivations to the intake location is a threat to the future of the new intake.	Engage the landowners in the immediate neighbourhood of the intake site on continuous basis to control the level of encroachment for the safety of Sipi River and the intake.
The biggest beneficiaries of the proposed project will be the women (who are still responsible of fetching water among other domestic chores) and children (who have to assist their mothers and still go to school and do their homework).	The orientation and distribution of the water kiosks and other water access points shall be based on the convenience of women and children as the main determining factors (accessibility, safety, etc.).
Conclusions	Recommendations
The time spent in fetching water may reduce from an average of 1 – 2hrs down to an average of 30min.	
The preparedness to pay for water is very low among the community. For the water supply to be sustainable, the willingness to pay by the beneficiary consumers should be enhanced.	There is need for comprehensive awareness creation to the beneficiary community on the value for clean water and their responsibility in the cost of sustaining the water supply system. A programme in this regard should be initiated at the commissioning stage.
A section of the community living in the upstream of the intake may not benefit from the new intake	The existing intake should be rehabilitated and enhanced to provide water for the communities in Kapchorwa living upstream of the new intake to ensure full benefits and acceptability by all.
It was observed that the source stream has limits to supply all the current destinations desired by the beneficiaries as well as sustaining the covered areas in the long term.	<ul style="list-style-type: none"> ✓ As indicated earlier, a long strategy should be developed to conserve the catchment in collaboration with the members of public and landowners. ✓ Alternative sources of water should be encouraged in the area for sustainability. These are to include rainwater harvesting and ground water abstraction. ✓ Small dams may also be considered to retain storm water for use in the supply areas during the dry conditions
There is a high possibility of social conflicts over access of water among the beneficiary communities itself. For instance, the community living where intakes are located feels that the consumer communities downstream owes them returns on the value of the water.	<ul style="list-style-type: none"> ✓ The Directorate of Water should intervene to streamline the community water management committees, build management capacity and harmonize revenue collection and accountability, ✓ Review on a continuous basis demand variations and access to water to ensure equity and less conflicts

CHAPTER 1: INTRODUCTION

1.1 Project Overview

Water and Sanitation Sector in Uganda has evolved over the past 10 to 15 years through several reforms and national instruments all geared towards increasing efficiencies in implementation and effectiveness in delivery of services. This continuous change has enabled appropriate adaptation of sector policies and strategies to be incorporated into emerging national and international development agenda including the country's Poverty Eradication Project Plan, now transformed into the National Development Plan (NDP) and also aligned towards the achievement of the Millennium Development Goals.

The Ministry of Water and Environment through the Directorate of Water Development (DWD) is responsible for managing and developing the water resources of Uganda in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs of the present and future generations with the full participation of all stakeholders. Furthermore, the Directorate is responsible for providing sustainable safe water within easy reach and hygienic sanitation facilities, based on management responsibility and ownership by the users to 77% of the population in rural areas and 100% of the urban population by the year 2015, with a minimum of 80% effective use and functionality of facilities. As of June 2013, access to safe water to the rural population was at 64% and to the urban population was at 70%. The biggest challenge is how to serve the water stressed areas where the traditional rural water supply sources cannot be implemented coupled with depletion of cheaper water resources in some areas.

Consequently both sub-sectors, are lagging behind and considerable efforts and strategies have to be devised to ensure that progress is attained and sustained. One of the strategies to meet the service gap in rural areas is the bulk water transfer strategy that aims at bulk transfer and supply of water to water stressed areas. This strategy involves among other activities, the development of new large gravity flow schemes and rehabilitation and extension of old large gravity flow schemes to water stressed areas in rural areas and rural growth centers.

Bukedea District and the surrounding areas are water stressed and lie within the flood prone zones and hence face a major challenge of accessing to clean and safe water for its rapidly growing population amidst diminishing water resources both in quantity and quality. Ground water resources have proved inadequate to meet the district's potable water demand. Therefore, reliable and sustainable water supply options have to be developed if meaningful achievements are to be made. Accordingly, a prefeasibility study was done in 2013 by the Ministry of Water and Environment, which established that the project area under consideration could be served by a bulk gravity flow scheme with the water source as Sipi River which originates from the slopes of Mt. Elgon in Kapchorwa District.

The bulk water system would serve Bukedea district and parts of the sub counties of Kawowo (in Kapchorwa District), Bukhalu and Bunambutye (in Bulambuli District), Bukhulo and Bukiyi (in Sironko District). The target beneficiary districts fall along the planned main supply pipeline to Bukedea district. This would in addition augment other water supply systems that have been planned for the above districts.

1.2 Project Objectives

The main objective of the consultancy is to carry out a feasibility study, detailed engineering design, and Environmental and Social Impact Assessment (ESIA) for the proposed Bukedea

Water Supply and Sanitation System to meet the future demand for the feasible service area of Malera, Kidongole, Kachumbala, Kolir, and Bukedea Sub-Counties in Bukedea District. The consultancy shall also investigate the possibility of serving parts of the Sub Counties of Kawowo (in Kapchorwa), Bukhalu and Bunambutye (in Bulambuli), Bukhulo and Bukiyi (in Sironko) along the way to Bukedea. In addition, the consultancy shall provide training and capacity building in all aspects of project development for the Client's counterpart staff including district and TSU staff. The specific objectives include:-

- (i) To establish the existing water supply and sanitation situation in the proposed project areas;
- (ii) To develop technical proposals for increasing safe water access in the proposed water stressed areas;
- (iii) To propose hygiene and sanitation improvements in the proposed project areas;
- (iv) To propose improvements to management, operations and maintenance of the proposed water supply and sanitation system;
- (v) To provide training and capacity building in project development for the Client's counterpart staff

Among the key activities towards realization of a sustainable project include undertaking an environmental and social impact assessment study not only for the approval by NEMA but also to provide an environment and social management plan for integration into the project implementation.

1.3 The ESIA Study

1.3.1 ESIA Objectives

Reliable supply of water constitutes a major component in the economic and social development of any society. The benefits from efficient clean water of adequate quantities is felt far to the lowest levels of the society, directly or indirectly, such as to include public and personal health, sanitation and hygiene, improved income, wealth and job creation and general services provision. However, development of water supply infrastructure and operations thereafter also have the potential to impart negative effects to the physical environment and social well being of the communities as well as natural resources.

While appreciating the benefits from water supply infrastructure, it will also be necessary to recognize the associated potential negative impacts of the development projects to the ecological and social settings. Among the negative impacts associated with water resources related project may include land take and hence related loss of vegetation cover, landscape changes, and potential social conflicts with the surrounding residents and landowners. In view of these observations, environmental and social assessments are necessary with a view to evaluating the current ground environmental and social status, opinion of the local communities; establish the potential social and economic benefits or negative impacts of the project. Appropriate remedial actions will also need to be identified and integrated in the project design and implementation.

Environmental Impact Assessment Guidelines, 1997 and Environmental Impact Assessment Regulations, 1998 which together prescribe the EIA process in Uganda. On the global level, the international environmental and social safeguards that target potential interactions of the projects with environment and social settings such as to include physical environment forest, biodiversity and culture among others. Environmental impact assessment studies are designed to identify the positive and negative impacts and establish appropriate mitigation measures. The process is also

meant to develop environmental and social management plans (ESMP) as a handbook for integration of environment and social aspects into the project as well as relevant monitoring plan as a technical tool to implement the ESMP.

1.3.2 ESIA Scope of Work

Due to environment and social challenges associated with the proposed water resources development and management activities including water supply projects, comprehensive environmental and social impact assessment study (ESIA) is necessary to evaluate the current environmental and social status (baseline conditions), establish potential impacts, establish the potential for social and economic benefits and estimate the project cost, obtain opinion of the stakeholders and the local communities and develop appropriate mitigation and remedial actions for integration in the project design and implementation.

According to the Third Schedule of the National Environment Act (Cap 153), water projects are scheduled to undergo ESIA before implementation. The environmental and social impact assessment study would also be to comply with the international safeguards.

1.3.3 ESIA Methodology

The following are the key issues considered during study;

- (i) A comprehensive description of the proposed project including its objectives, preliminary designs, proposed implementation (from the feasibility or other report) and anticipated by-products among others,
- (ii) Description of the project areas such as to cover the location, environmental setting, social and economic issues, corporate development strategies as well as national development plans, etc. linkages were established between the information so gained and the role of the proposed project,
- (iii) Key social linkages including land ownership, potential displacements and compensation issues as well as social disruptions in terms of accessibility of common resources and amenities,
- (iv) Policy, legal and institutional framework within which the proposed project will operate, were also include the corporate policy and strategic planning,
- (v) An overview of the anticipated impacts from the project to physical environment, social status and general benefits to the national economy. Appropriate mitigation measures and plans would also be suggested,
- (vi) Establish an outline on the mitigation action plans to be incorporated in the overall final design, implementation and operations thereafter.

Environmental and social impact study reports on the water project was developed on the basis of available information and submitted to the National Environmental Management Authority (NEMA) in accordance to the Regulations. In addition to the physical environmental assessment, the communities within the projects' areas were involved through interviews and consultation forums to give their views and opinions as beneficiaries as well as the potentially negatively affected persons. In this regard, selected and random members of the public were approached for interview, particularly those whose parcels of land touch or are within water service areas. Liaison with the Client, local leadership and the administration facilitated this process while the presence of the Client's representative at this stage would be necessary in order to clarify certain policy issues that may arise during the meetings.

To accomplish the task, this assessment was undertaken through the following key stages;

Reconnaissance Visits

A reconnaissance tour of the project areas was undertaken such as to involve the Study Team followed by a review of the preliminary documentary overview, among them the available project documents. The reconnaissance also achieved the following;

- (i) The diversity on physical environment, climatic conditions, demographic trends as well as the hydro-geological patterns in the projects' areas,
- (ii) Discuss the design criteria as a basis for identifying the linkages,
- (iii) Appreciate the social setting and related linkages to enable identify relevant implications and preventive measures,
- (iv) Share experiences on environmental resources and social issues in each project area with specific focus on the infrastructure,
- (v) Report and coverage structure, terms of reference, procedure and an overview on the timeframes.

Documentary Review

Various relevant documents were reviewed for an understanding of the terms of reference, environmental status, data on demographic characteristics of the project area, land use practices, development strategies and plans (local and national) as well as the policy and legal documents.

Site Assessment

A comprehensive physical evaluation of the project area was undertaken taking into consideration physical and biological environmental status, human settlement and socioeconomic activities. Field visits also involved interviews of selected persons, groups of persons or institutional officials. Interviews were arranged at pre-determined locations and time schedules.

The proposed project site is a well defined feature defined on the ground and this enabled determination of the exact physical environmental features to be affected. However, the effects may be felt on a wider area from the area. The fieldwork session, therefore, was designed to establish the anticipated positive and negative impacts over this impact zone in terms of physical environment, social and economic trends, population trends, hydrology and climatic patterns. Among the objectives of the detailed fieldwork included;

- (i) Obtain any available information and data from the public offices including Government Offices, Environment, Water, Lands, Tourism, Forest Department and Agriculture.
- (ii) Construction material sites with respect to land use and loss, proximity to human settlements, relationship with the hydrology and drainage, potential health and safety of the residents, size and ownership among other issues,
- (iii) Evaluate proposed construction camp site and their effects to the surrounding social and economic conditions,
- (iv) Available sources of surface water and their potential in regard to utilization during the construction process and upon commissioning. Alternatives would also be investigated,
- (v) Physical observations focused on the topography, land use trends, surface water sources, public amenities, wetlands, settlements, forests, soils, etc.,
- (vi) Carry out rapid assessments of population densities, human settlement trends, social and economic activities and presence of any important cultural sites within the impact radius,
- (vii) Identify climatic and land cover characteristics of the project areas,

Public Consultations

In order to capture the wishes and desires of the stakeholders and the local communities, consultations were undertaken in the project areas. The main objectives of the consultation meetings included;

- (i) Describe the project details, coverage and concepts to the public and stakeholders,
- (ii) Explain key anticipated benefits and negative impacts and outlining proposed mitigation measures,
- (iii) Seek the stakeholders and public opinions and suggestions on how to improve acceptability and suitability of the project
- (iv) Receive memoranda and submissions from the stakeholders and communities on their desires and expectations.

Reporting

The process of report writing involved participation of the team members through analysis of respective data and information. This translated into findings and anticipated impacts. It also provided a basis for development of mitigation measures and an Environment Monitoring Plan for incorporation into the project implementation and other investigation.

1.4 Study Experts

- (i) Environmentalist/team leader
- (ii) Sociologist
- (iii) Water Engineer
- (iv) Support team

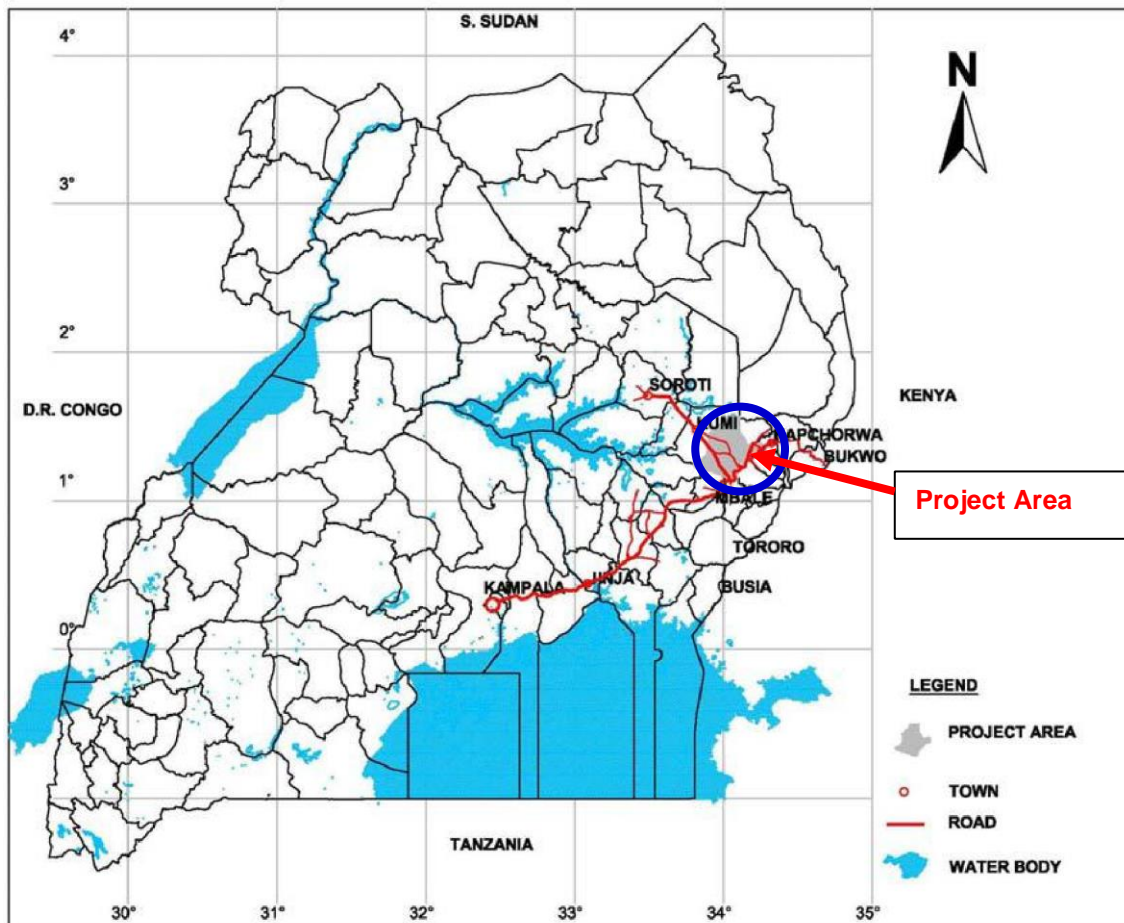
CHAPTER 2: PROJECT DESCRIPTION

2.1 Project Location

The general project area is located between 1° 10'N and 1° 34'N and 33° 35'E and 34° 17'N in eastern Uganda and is accessible by approximately 258km of tarmac road from Kampala followed by a network of gravel roads off Mbale – Soroti and Mbale – Kapchorwa/Moroto highways. The project area may be considered in two parts comprising basically of the intake and the distribution areas.

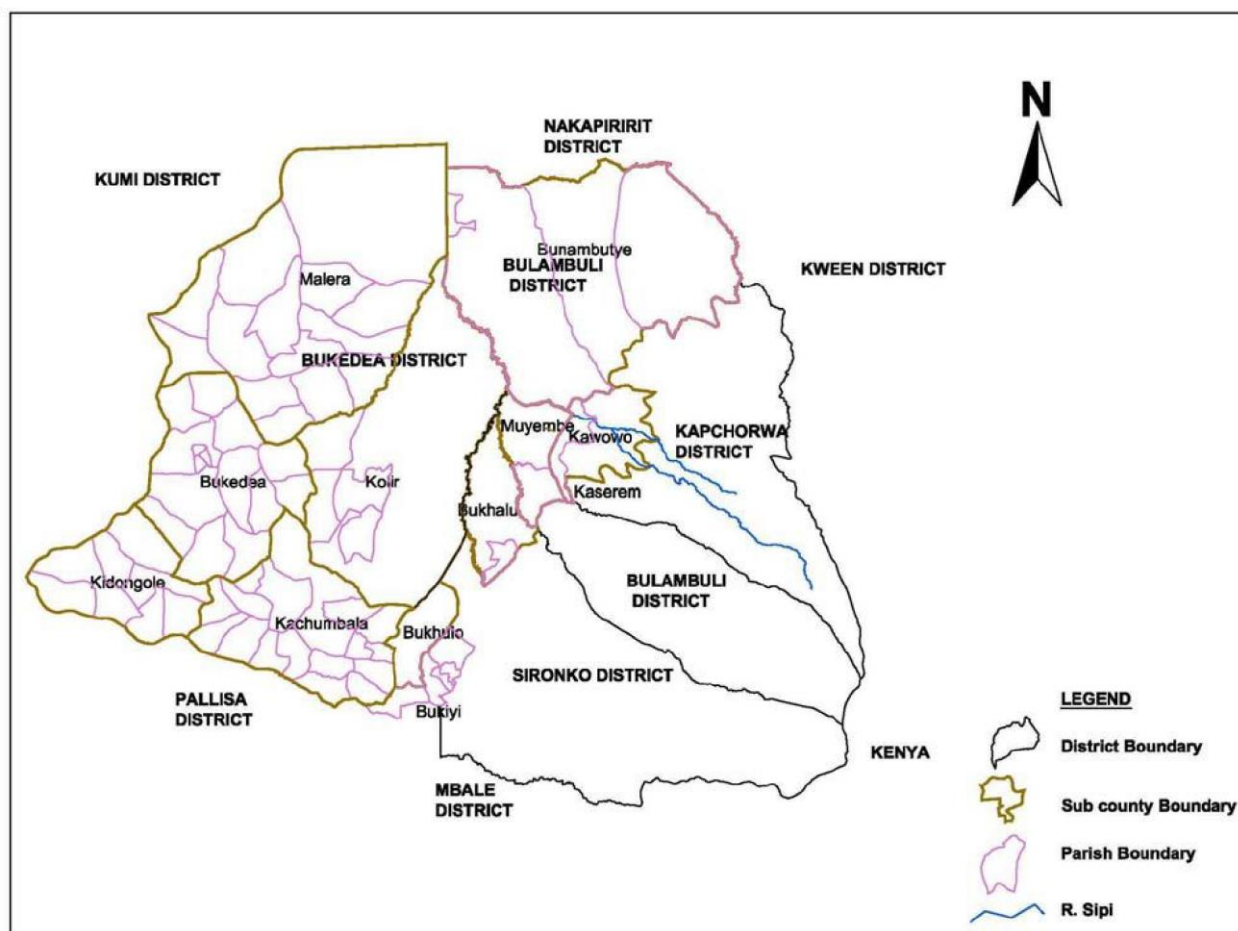
- (i) The intake is proposed to be situation at the confluence of Sipi River and Chebonet River a short distance from the edges of Mt. Elgon Forest. It is situated within Kapsabuko parish to the south and Cheptura Parish to north with Sengwel Paris to the east in Tingeyo County of Kapchorwa District. The approximate coordinates are 01° 22' 00"N and 034° 21' 06"E at an elevation of 1,262m a.s.l.
- (ii) The distribution areas covers a vast demand zone comprising of parts of the lower Kapchorwa District, Bulabuli District, Siroko District and Bukedea District as illustrated in the figure below.

Figure 1: Location Map of the Project Area



Sources: Feasibility Study

Figure 2: Districts Covered by the Project



Sources: Feasibility Study

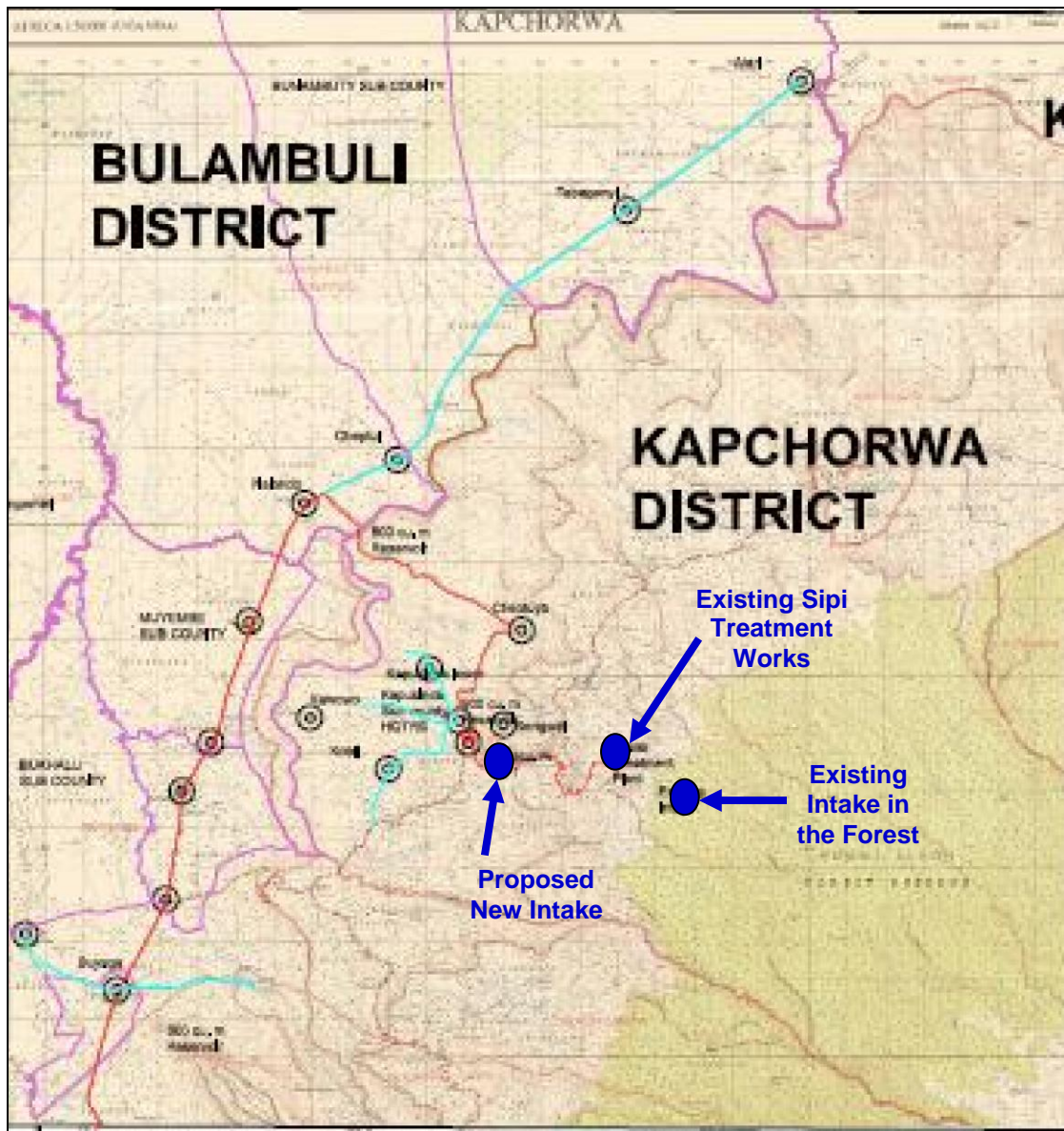
2.2 The Proponent and Key Stakeholders

The Ministry of Water and Environment through the Directorate of Water Development (DWD) is responsible for managing and developing the water resources of Uganda in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs of the present and future generations with the full participation of all stakeholders. Furthermore, the Directorate is responsible for providing sustainable safe water within easy reach and hygienic sanitation facilities, based on management responsibility and ownership by the users, to 77% of the population in rural areas and 100% of the urban population by the year 2015, with a minimum of 80% effective use and functionality of facilities.

2.3 Project Area Description

The project area stretches from the Mt. Elgon Highlands at the water intakes in Kapchorwa district to the low lying areas in Bukedea District, a distance of approximately 100km to the termination of the project. The whole project area is approximately 1,217km² and covers eleven sub-counties namely Kapsinda, Kawowo, Bunambutye, Bukhalu, Bukhulo, Bukiyi, Koir, Kachumbala, Kidongole, Bukedea and Malera with an estimated total population of 262,343 inhabitants according to the 2014 National Population and Housing Census Provisional Results. The number of households is estimated to be 48,126. The figure below illustrates the project area coverage.

Figure 3: Relative Locations of Water Source and a Section of the Service Areas



Sources: Feasibility Study

Figure 4: Site Images



A View of the Proposed Project Location



The Existing Intake on Sipi River



A Section of Chebonet River



A View of the Proposed Services Area



2.4 Current Status

The existing water sources include; protected wells/springs, boreholes, open wells and rivers/streams with 38.2% of the population using protected wells/springs and 35.2% using boreholes as the most dominant sources of water. The rest of the people depend on open wells (8.4%) and rivers (17.4%), while a very small number use pipe water (0.8%). During the dry season the borehole yields reduce, with some boreholes drying up, forcing people to move long distances in search for water. On the other hand in Kolir and Malera sub-counties the boreholes get submerged during heavy rains and the quality of water deteriorates as a result of this inundation, which also cuts off physical access to the boreholes and the population takes up to fetching the flood waters directly. Bukhalu in Bulambuli, Kapsinda and Kawoowo in Kapchorwa and Kolir in Bukedea are the most affected sub counties in regard to safe water supply. It is against this background that the project was formulated.

The majority of the households (88%) have pit latrines. However, it was observed that the latrines were unhygienic, poorly designed, constructed and maintained. Usually the atmosphere around most of these latrines is very smelly. Over three quarters (~87%) of the households discharge grey water into the open areas and drains, ~4% into the road drains, while ~9% into household gazetted disposal areas. Further is indicated that ~61% of households dispose of solid waste into garbage pits, ~1% into gazetted collection points while ~38% into open areas. As already noted above, observation of household practices revealed some undesirable practices, such as using very poor latrine and bathroom structures, and the habit of not washing hands after using the latrine. The communities were reported to be reluctant at participating in maintaining general cleanliness and hygiene around their water sources.

2.5 Alternative Selection

Consideration of sources of water was based on flow capacity and gravity facilitation (terrain). Among the sources in the lower areas of the project area comprises of springs whose flows are

very low and could not meet the demand. However, the only rivers with notable flows within the gravity oriented zone were Sipi and Chebonet Rivers. However, none of the two could satisfy the requirement on their own, among the reason being other dependant such as the touristic requirements of Sipi Falls, hence the selection of the intake site downstream of their confluence. Selection of the pipeline routing and reach was also determined by the terrain and efficient gravity facilitation in the project coverage areas.

2.6 Design Concepts

2.6.1 General Principle

The preliminary design considers the design criteria to be adopted, water demand for the project area, water supply source for the proposed scheme, identification and evaluation of various scheme options, general layout plan of the scheme options and preliminary design of the scheme components. The design criteria described below was adopted following the Consultants review of the criteria recommended in the recent and previous Water Supply Design Manual and international experiences with respect to the following applicable aspects;

- (i) Design horizon,
- (ii) Population projection,
- (iii) Unit consumption rates,
- (iv) Water demand estimation,
- (v) Pipeline design,
- (vi) Intake design,
- (vii) Water treatment design, (viii) Reservoir capacities.

Water Demand

The considerations made in the estimation of the water demand included, design horizon, water user number projection, consumer categories and consumption rates, firefighting water requirement, nonrevenue water, peak day demand and peak hour factor.

Design Horizon

The design horizon was adopted as 30 years as stipulated in the terms of reference for this assignment. The present (base) year is 2015, initial year is 2020, future is 2030 and the ultimate year is 2045.

Population Growth Rates

The population growth rates were derived from the UBOS census records as shown in the table below.

Table 1: Population Growth Rates

District/SubCounty	Period			
	1980 – 1991	1991 – 2002	2002 – 2014	Average
Bukedea	-0.1	4.17	3.61	2.56
Sironko	1.3	1.97	2.36	1.88
Kawowo	4.2	3.62	2.85	3.56

The average figures were adopted for the population projections. Apart from health facilities, mosques, petrol stations, washing bays, abattoirs, milk plants, dry processing mills and markets, the growth of the other consumer categories was assumed to grow proportionately as the population.

2.6.2 Intake Site Plan

The following factors will be considered in the selection of a concept and design of the intake,

- (i) Water availability implying the flow of the sources at the point of intake;
- (ii) Bathymetry, i.e. the biophysical status of the water;
- (iii) Sediment transport illustrating the level of silt loading from the catchment;
- (iv) Environmental regulations with regard to river natural flows and balances,
- (v) Climatic conditions illustrating the natural recharge of the source rivers;
- (vi) Constructability implying the status of the site with respect to the design components
- (vii) Initial and maintenance requirements; and
- (viii) Operation and maintenance

2.6.3 Raw Water Main

The water treatment works, comprising of settlement tanks, filtration arrangements and disinfection will be installed within the intake locality. This implies the raw water transmissions will perhaps be less than 1km long. The exact location of the water treatment works had not been identified by the time of this assessment.

2.6.4 Treatment Works

The water treatment process shall be based on the results arising from the water quality analysis and tests in the laboratory.

Table 2: Design Criteria For The Water Treatment.

Design Components and Considerations	Design Criteria
Sedimentation Tank	
<i>Surface Overflow</i>	0.1 – 0.5m ³ /m ² /h
<i>Density of particles</i>	1,700kg/m ³
<i>Density of water</i>	1,000kg/m ³
<i>Dynamic viscosity of water</i>	0.001002 Ns/m ² at 20°C
<i>diameter of particle</i>	0.2mm
<i>horizontal velocity</i>	<0.3m/s
Hydraulic Flocculation	
<i>Velocity gradient</i>	
<i>Detention time</i>	900 – 1,200sec.
<i>GT</i>	30,000 – 100,000
<i>Head loss through orifices</i>	
Sedimentation Chambers	
<i>Detention time</i>	1.5 – 3.0hr
<i>Surface overflow rate</i>	<2.5m/h
<i>Horizontal velocity</i>	<0.00254m/s

<i>Inlet flow velocity</i>	<0.2m/s
<i>Outlet flow velocity</i>	<0.5m/s
<i>Effective depth</i>	2m
<i>Length/width</i>	3:1 to 6:1
Rapid Sand Filters	
<i>Filtration rate</i>	5 – 10m/h
<i>filter bed thickness</i>	0.8m
<i>effective grain size</i>	0.5 1.0mm with uniformity coefficient of <1.5
Clear Water Well	
<i>Reaction and contact time</i>	0.5hr

2.6.5 Water Distribution Network

There will be 2No. sets of distribution networks. The upper set for the local community drawing water from the rehabilitated and improved existing intake. The lower network is the proposed new water supply system. The water demands were estimated using the water user numbers and the unit consumption rates presented in the design criteria. In addition for the domestic demand the ability to pay analysis findings was applied to the domestic population to estimate the water demand for each consumption level. During the study the areas affected by water supply were established together with their corresponding water user numbers.

2.6.6 Storage tanks

Reservoirs

Reservoir capacities shall be 50% of the maximum day water demand for the area they serve. The locations for the consumer reservoirs had not been established at the time of this scoping process. There will also be a set of storage tanks within Kapsinda and Kawowo sub-counties for the local communities.

Break Pressure Tanks (BPTs)

The capacity of the break pressure tanks shall be such that the detention time is 2 minutes but the size should be of minimum dimensions to enable operations such as repairs, washing, etc; inside the tank. The tanks would be established during detailed design process such as to be appropriately located in accordance with the terrain and volume of water available for delivery.

2.7 Project Activities

2.7.1 Planning and Feasibility Studies

This is an important ground activity and also the least disruptive. It looks at the desired project and prepares the requirements for design considerations. This is a process that determines the viability of the project to justify the investment as well as the associated social and environmental disruption. This has largely been achieved through the design process and planning of the water distribution pipeline networks.

2.7.2 Design Work

This is also a soft activity that puts the desired concepts into paper for implementable proposals. It involves studies of the site characteristics, the sources characteristics, water quality, consumer evaluations and water transmission corridor terrain trends. The design provides among other key components;

- (i) Rehabilitation and improvement proposals for the existing intake facility,

- (ii) The Water Treatment works including the upper one to serve the local community and the proposed new one for the main project
- (iii) Water Tanks (storage tanks, consumer tanks, pressure break tanks, etc.) (iv) Water transmission pipeline and associated components.
- (v) User points including connection points, water kiosks and communal stand points.
- (vi) Support installations at pre-determined locations such as to include operation offices (preferably at the water treatment plant and a branch in every District) and limited residential quarters for the operators and caretakers. The support facilities will also be provided with utilities such as water supply, sanitation, lighting, security, access roads, etc.

2.7.3 Construction Phase

The construction process will be undertaken at three levels namely;

- (i) Rehabilitation and improvement of the existing water intake on Sipi River in Mt. Elgon Forest of Kapchorwa District and a water treatment plant to serve communities living in Parishes of Kapsinda and Kawowo Sub-Countries. Rehabilitation will involve works on the intake structure and improving its capacity. The water treatment plant will include sedimentation units, chemical dosing units and storage tanks for distribution.
- (ii) Development of the new intake facility comprising of the weir arrangement and a sedimentation tank unit slightly downstream of the confluence of Sipi and Chebonet Rivers. The works will involve excavation of the river banks followed by masonry construction of the weir. This activity will also involve temporarily deviate the main river stream for a short distance to allow for the construction and re-channel it back to fill the weir upon completion. The sedimentation tank will also involve excavation and masonry construction as per design such as to receive water from the weir channel.
- (iii) Construction of the water treatment plant area will mainly involve excavations and masonry works as per the design specifications. Other construction components will include operations support buildings including an offices and store, security perimeter fence and sentry, access pavements and parking areas, sanitation facilities and security lighting. The premises will also be provided with a storage tank also through excavation and masonry works. Part of this level of construction will be provision for connectors to the incoming raw water and outgoing treated water,
- (iv) Construction tanks at the service points will also go through excavations and masonry works to specification and to include perimeter fencing, drainage of spills and washouts as well as connectors to the inlets and outlet pipes. Other installations will include Pressure Break Tanks on locations to be identified by the Design Engineer,
- (v) Consumer facilities including connection points, service lines, communal water kiosks and stand pipes. Livestock water facilities may be designed for construction at strategic locations identified in consultation with the communities.
- (vi) Trenching and laying of pipelines from the intake to the treatment plant, treatment plant to the storage tanks and all distribution pipeline networks as per the design network described above.

2.7.4 Catchment Protection

Development of catchment Management Plans and protection measures will be commenced with the facilities commissioning since the function will be long term and comprising multisectoral players including Agriculture, Forest, Lands and Wildlife Authorities in addition to conservation stakeholders. Among the immediate and long term initiatives will include tree planting (preferably

indigenous species) in collaboration with the local community. It is expected that a comprehensive Catchment Management Plan will be developed as a separate activity.

2.7.5 Commissioning

There will be formal hand-over and operationalization of the Water Supply upon completion. There will be physical evaluation of the facility that will involve the Contractor, the Ministry of Water and Environment and the Design Consultant. This will involve; supervision of acceptance test, preparation of completion report, preparation of A's built drawings, preparation of operation and maintenance manual as well as testing the function ability of the system. Among other activities, the contractor and the client will ensure that there are no unresolved social concerns and the facility has been completed to design details,

2.7.6 Decommissioning Phase

Decommissioning will be split into 2 levels as follows;

- (i) Decommissioning of the construction works that will take place shortly upon commissioning of the water reticulation. The process will involve removal of construction camps including fixed structures, equipment and any excess materials. This will include clean-up, removal of wastes, closure of sanitation facilities, rehabilitation, landscaping and restoration of vegetation.
- (ii) The second level will involve closure of the water reticulation or part of it at the end of its lifespan or part of it. This is mainly preceded by a decommissioning audit to develop a decommissioning plan.

2.7 Project Estimated Cost and Implementation Schedule

The project cost at the detailed stage is about **UGX. 125,610,900,845 (Uganda Shillings One Hundred Twenty Five Billion Six Hundred Ten Million Nine Hundred Thousand Eight Hundred Forty Five)** only. This is to cover among other costs;

- (i) Modification of existing intake and water treatment works to serve the local communities
- (ii) Construction of the new proposed water intake
- (iii) Construction of the new water treatment plant works (iv) Transmission and Distribution
 - ✓ Kapusinda area
 - ✓ Bulambuli
 - ✓ Sironko
 - ✓ Kolir
 - ✓ Kachumbala and Bukedea
- (v) Contingency (Sanitation facilities)

The Construction works are expected to take 36 months from the date of commencement.

CHAPTER 3: POLICY AND LEGAL FRAMEWOK

3.1 An Overview

Key legislation governing an ESIA study in Uganda includes the National Environmental Act (Cap 153) and the Environmental Impact Assessment Regulations (1998). The National Environmental

Act established the National Environment Management Authority and entrusted it with the responsibility to ensure compliance with ESIA process and procedures in planning and execution of development projects. The procedures require that a project proponent prepares an ESIS with a clear assessment of relevant potential impacts, based on Terms of Reference (ToRs) developed from the scoping exercise. This requires that the ESIA addresses potential direct and indirect socio-environmental impacts during the pre-construction, construction, operation and decommissioning phases together with attendant Environmental Social Management Plan (ESMP).

Policies, legal and institutional framework considered relevant to this proposed project are discussed in this section. Various laws here reviewed relate to minimum acceptable construction operational requirements, environmental quality, land use, public health, occupational safety, labour standards and international legal obligations.

3.2 Policy Provisions

3.2.1 The National Environment Management Policy, 1994

The overall goal of this policy is the promotion of sustainable economic and social development heedful of the needs of future generations and the ESIA is one of the vital tools it considers necessary to ensure environmental quality and resource productivity on a long-term basis. It calls for integration of environmental concerns into development policies, plans and projects at national, district and local levels. Hence, the policy requires that projects or policies likely to have significant adverse ecological or social impacts undertake an ESIA before their implementation. This is also reaffirmed in the National Environment Act, Cap 153 which makes ESIA a requirement for eligible projects (Third Schedule).

At the national policy level, environment and development are interrelated and this policy requires that environmental aspects are considered in all development projects such as the proposed water supply and sanitation project.

3.2.2 National Water Policy, 1999

The National Water Policy is one of the fundamental policies for the governance of water resources in Uganda. The overall policy objective is to manage and develop the water resources in a sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs, with the full participation of all stakeholders, and so as not to leave the future generations any worse off than ourselves. The leading institution on water issues in Uganda is the Ministry of Water and Environment, which implements a Water Action Plan and the National Wetlands Policy (1995). The policy ensures sustainable management of water resources.

This policy is relevant because it guides water resources development in Uganda. The Bukedea water supply and sanitation project should conform to this policy.

3.2.3 The National Policy on Conservation and Management of Wetland Resources, 1995

The National Policy on conservation and management of wetland resources aims at curtailing loss of wetland resources and ensuring that benefits from wetlands are equitably distributed to all people of Uganda. In general, the policy calls for sustainable use, environmental sound

management of wetlands, equitable distribution of benefits and application of ESIA procedures on activities to be carried out in wetlands. In order to operationalize the policy and to provide a legal framework for its implementation, wetland related issues have been adequately incorporated into the National Environmental Act, Cap153.

This policy is relevant since the water supply distribution pipes are likely to cross some wetlands. Therefore the ESIA prepared should conform to the policy's requirement of conservation and sustainable use of wetland resources.

3.2.4 The National HIV/AIDS policy

This policy provides the overall policy framework for the national HIV/AIDS response. It also recognizes special groups which include migrant workers and acknowledges the existence of commercial sex workers. It also recommends the need to identify strategies to address migrant workers in view of the challenges posed by their mobility and vulnerability to HIV/AIDS. It anticipated that during the implementation of the different phases of the project, there will be an influx of people into the project area that will result into interaction and may pose a danger of HIV/AIDS spread.

This policy provides measures which can be used to reduce impact of spread of HIV/AIDS.

3.3 Legal Framework

3.3.1 Constitution of the Republic of Uganda, 1995

The Constitution of the Republic of Uganda of 1995 provides among its National Objectives, (Objective No. XXVII) That:

- (i) Utilization of natural resources shall be managed in such a way as to meet the development and environmental needs of the present and future generations of Uganda, particularly taking all measures to prevent or minimize damage and destruction to land, air, water resources resulting from pollution or any other kind of natural resource degradation.
- (ii) The state shall promote sustainable development and public awareness of the need to manage land, air and water resources in a balanced manner for present and future generations.

Article 39 provides that every Ugandan has a right to a clean and healthy environment. Article 237(b) in turn, provides that the government or Local Government as determined by Parliament by law shall hold in trust for the people and protect natural lakes, rivers, wetlands, forests, game and forest reserves, National Parks and any land to be reserved for ecological and to touristic purposes for the common good of all citizens. This right carries with it the duty of the citizen to protect the environment.

The constitution is the cardinal law in Uganda upon which all environmental laws and regulations are founded. All environmental impact actions of the Bukedea water supply and sanitation project are therefore meant to conform to the broader objectives of the Constitution which requires a health environment for all citizenry.

3.3.2 National Environment Act, Cap 153

Section 4 of the National Environment Act (Chapter 153 of Laws of Uganda) establishes and defines functions of NEMA as a body responsible for management, monitoring and supervision of all environmental conservation activities. This Act provides for various strategies and tools for environment management, which also includes the Environmental Impact Assessment for projects likely to have significant environmental impacts. The Act also mandates NEMA with a leading role to review environmental impact statements.

NEMA sets Environmental Standards (Sections 24 – 32) to prevent contamination of air, water and soil resources. Sections 42 and 43 highlight that NEMA has the responsibility for in-situ and ex-situ conservation of biological fauna and flora resources either on land or in water. Section 48 empowers NEMA, district environment committees and local environment committees to be responsible for monitoring of local land-use plans, which should be in conformity with national land-use plan. Section 106 outlines provisions to enable compliance with obligations of international environmental conventions. Section 35 entrusts NEMA, lead agencies and local government environment committees with powers to protect the environment from human activities that could adversely affect it. Section 56 prohibits discharge of hazardous substances, chemicals, oil, etc. into the environment except in accordance with guidelines prescribed by NEMA.

The Act outlines principles of environmental management and rights to a decent environment and also sets out principles for:

- (i) Institutional arrangements;
- (ii) Environmental planning;
- (iii) Environmental regulations;
- (iv) Environmental standards;
- (v) Environmental restoration orders and easements;
- (vi) Records, inspection and analysis;
- (vii) Financial instruments;
- (viii) Offences;
- (ix) Judicial proceedings; and (x) International obligations.

The Third Schedule of the National Environment Act (Cap 153) lists water projects under scheduled projects that require ESIA before implementation. This Act also formed the basis for enactment of the Environmental Impact Assessment Guidelines, 1997 and Environmental Impact Assessment Regulations, 1998 which together prescribe the EIA process in Uganda. The process is schematically presented in NEMA's Environmental Impact Assessment (EIA) Reference Manual.

The Act is governs and guides environmental management in Uganda. This ESIA is prepared to conform to the Act's requirement that projects likely to have significant Environmental Impact such as the Bukedea water and sanitation project undertake EIA before they are implemented.

3.3.3 Local Governments Act, Cap 243

This Act provides for decentralized governance and devolution of Central Government functions, powers and services to local governments that have own political and administrative set-ups. Section 9 of this Act provides that a local government is the highest political and administrative authority in its area of jurisdiction and shall exercise both legislative and executive powers in accordance with the Constitution.

The project will be under jurisdiction of Kapchorwa, Bulabuli, Sironko and Bukedea Districts. The respective District Environmental Officers are mandated to inspect and monitor environmental considerations for development projects in their areas of jurisdiction.

3.3.4 Public Health Act, Cap 281

The Public Health Act aims at avoiding pollution of environmental resources that support health and livelihoods of communities. Section 103 gives local authorities powers to prevent pollution of watercourses in interest of public good.

This Act relates to disposal of waste from the proposed water and sanitation project in so far as improper handling, disposal of waste and effluent some of which will be potentially impact the public health. The water treatment plant will have some effluent that needs to be handled well so as not to contaminate other water resources downstream.

3.3.5 The National Environment (Wetlands, Riverbanks and Lake-Shore Management) Regulations, No.3 of 2000

Provisions of the ESIA under these regulations are contained in Part IV. These provide that a developer desiring to put up a project which may have a significant impact on a wetland riverbank or lakeshore, is required to carry out an ESIA; The developer shall carry out annual audits and monitoring of such activities that may impact on the environment and submit reports to the Executive Director and the Lead Agency; the Executive Director shall require that a wetland, riverbank or lakeshore which has been degraded be allowed to regenerate or issue an environment restoration order; Where an inspector has reasonable cause to believe that any person is violating the provisions as stated in these regulations, he or she may issue against such a person an improvement notice or take any measures as may deem appropriate; Anyone who reclaims or drains a wetland: creels, constructs or demolishes any structure that is fixed in or over a wetland; disturbs a wetland, deposits in or under a wetland a substance in a manner likely to have an adverse effect on it; destroys or damages a wetland or fails or neglects to protect a lake shore or a river bank from environmental degradation, commits an offence.

These provide guidelines for the management of the water intake point and any other activities likely to be carried out at the river banks.

3.3.6 The Water Statute, No.9 of 1995

This Statute does not expressly deal with ESIA but has some provisions that are related to ESIA. These are contained in Division 4 of the statute and are laid out as follows: Section 22 provides for the suspension or variation of a water permit by the Executive Director where the water available in an area is or is likely to become insufficient in quality or quantity for the needs of the people using or seeking to use it. This may be done by notice in writing to the holder of the water permit for that area.

Where the holder of the permit fails to comply with the provisions of the statute; fails to make beneficial use of the permit within the preceding two years; uses water for purposes other than those for which the permit was issued or more water than he is entitled to; the Director may cancel such a permit (Section 25).

This Act provides guidance to the developer of the Bukedea water supply and sanitation system to obtain a water permit and abide by all its conditions.

3.3.7 The Water Act, Cap 152

Chapter 152 of the Laws of Uganda provides for the use, protection and management of water resources and supply. The Act provides for the management of water in Uganda and is under the mandate of Directorate of Water Development (DWD) in the Ministry of Water, Lands and Environment. Section 31, provides for prohibition of pollution to water resources. This Act can be implemented through promoting the rational management and use of the water; provision of a clean, safe and sufficient supply of water for domestic purposes; Division (6); orderly development and use of water resources for all objective uses in ways which minimize harmful effects to the environment; control of pollution and promote the safe storage, treatment, discharge and disposal of waste; and Providing compensation due to any damage caused by water resources management interventions.

This Act provides for conservation and sustainable use of water resources in Uganda.

3.3.8 The Land Act, 1998

It provides for the ownership and management of land. It gives power for the compulsory acquisition of land for public purposes that are taken to include land required for public water and wastewater facilities. Sections 43, 44 and 45 (1) and (2) of the Land Act (1998), Government or local government may acquire land in accordance with the provisions of Article 26 and clause (2) of Article 237 of the Constitution of the Republic of Uganda.

This Act will guide the project during land acquisition for the different components of water supply and sanitation such as water reservoirs.

3.3.9 National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999

Section 6 (2) details maximum permissible limits for 54 regulated contaminants which must not be exceeded before effluent is discharged into water or on land. For this project, this standard is appliance to liquid waste.

Table 3: National Discharge Standards For Selected Pollutants

Parameter	National discharge standards
BOD5 (mg/l)	50
Suspended solids (mg/l)	100
Faecal coliforms	10,000 counts/ 100ml
Chlorine residual (mg/l)	1 mg/l
pH	8-Jun
Phenols (µg/l)	0.2 mg/l
Oil and grease (mg/l)	10 mg/l
Total Phosphorus (mg/l)	10 mg/l
Temperature	20-35oC

Source: The National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999.

Effluent discharged from the water treatment plant should conform to these regulations.

3.3.10 National Environment (Noise Standards and Control) Regulations, 2003

Part III of Section 8 (1) requires facility operators, to use the best practicable means to ensure that the emission of noise does not exceed the permissible noise levels. The regulations require that persons to be exposed to occupational noise exceeding 85dBA for eight hours in a day should be provided with personal protective gear.

Table 4: Regulatory noise limits

Facility	Noise limits dB (A) (Leq)	
	Day*	Night*
Construction sites	60	50
Mixed residential (with some commercial and entertainment)	55	45
*Time frame: Day 6.00 a.m. – 10.00 p.m.; Night 10.00 p.m. – 6.00 a.m.		

Source: *The National Environment (Noise Standards and Control) Regulations, 2003.*

Both during construction and operation of the water and sanitation project, noise generated should not exceed limits prescribed by these regulations.

3.3.11 National Environment (Waste Management) Regulations, 1999

These regulations require waste disposal in a way that would not contaminate water, soil, and air or impact public health.

These regulations apply to both construction and operation-phase waste which should be managed in a way such as to avoid environmental and public health impact.

3.3.12 Employment Act, 2006

Employment Act, 2006 repeals Employment Act (Cap 219) enacted in 2000. This Act is the principal legislation that seeks to harmonize relationships between employees and employers, protect workers interests and welfare and safeguard their occupational health and safety through:

- (i) Prohibiting forced labour, discrimination and sexual harassment at workplaces (Part II; Part IV).
 - (ii) Providing for labour inspection by the relevant ministry (Part III).
 - (iii) Stipulating rights and duties in employment (weekly rest, working hours, annual leave, maternity and paternity leaves, sick pay, etc. (Part VI).
 - (iv) Continuity of employment (continuous service, seasonal employment, etc. (Part VIII).
- This Act is relevant to the project both during the construction and operational phase.

The Act will govern labour type and conditions under which person hired by the project work. It prohibits Child labour (a condition the contractor must comply with) as well as providing guidance on work rights during the post-construction phase.

3.3.13 Occupational Safety and Health Act (2006)

The Act replaces the Factories Act (1964). It departs from the original listing of “don’ts” and adopts a scientific approach in which technical measures required for protection of workers are prescribed, hence taking on a “preventive approach”. The Act provides for prevention and protection of persons at all workplaces from injuries, diseases, death and damage to property. It covers not just the “factory” (as did the Factories Act) but also any workplace where persons are employed and its provisions extend not just to employees but to any other persons that may be legitimately present in a workplace and are at risk of injury or disease. Employers must protect workers from adverse weather and provide clean and healthy work environment, sanitary conveniences, sanitary and protective gear.

The Act is applicable relation to protection of the construction workers against secondary injuries during execution of their duties or work.

3.3.14 The Water Supply Regulations, 1999

The Water Supply Regulations, 1999 manage the water supply works including:

- (i) Permits requirements and procedures for water supply works by authority or connection to land owner (Division 1, clauses 4 to 6);
- (ii) Application, examination and approval of Water supply plan (Division 2, clauses 7 to 11);
- (iii) Cost of works, security deposit, inspection of works and penalty for violation (Division 2, clauses 12 to 18);
- (iv) Metering system and charging rates (Part III, clauses 19 to 21).

These will guide the entire water supply exercise especially during project operation.

3.3.15 Guidelines for Environmental Impact Assessment in Uganda, 1997

National Environment Management Authority (NEMA) issued Guidelines for Environmental Impact Assessment, on July 1997. The Guidelines list the projects, which are subject to a detailed EIA study. The projects are classified into projects that in the proposed location have negligible environmental impacts, and projects that likely to have significant environmental impacts. The Guideline lists the key features of EIA including Environmental screening, Scoping, Guidelines for public participation, and Guidelines for monitoring plan and EIA approval process.

This provided general guidance to the preparation of the ESIA have been adhered to.

3.3.16 Environmental Impact Assessment Regulations, 1998

In these regulations, the National Environment Management Authority (NEMA) has the major responsibility of managing all environmental related issues in Uganda. NEMA works with lead agencies to ensure a proper environmental management. A lead agency can be any ministry, department, local government system, public officer in which or whom any law vests function of control or management of any segment of the environment. The Environmental Impact Assessment Regulations includes clauses covering provisions, definitions, environmental impacts studies review processes, schedule, approval requirements and fees.

This provided general guidance to the preparation of the ESIA have been adhered to.

3.4 Institutional Structure of the Water Sector

3.4.1 The Ministry of Water and Environment

The Ministry of Water and Environment is responsible for the management of water resource development project in Uganda. The ministry also has the overall responsibility for initiating national policies and for setting national standards and priorities for water resources management and environmental regulation. A multidisciplinary team representing stakeholders and constituting the Water Policy advises the Minister on the above functions and is mandated to initiate revisions to legislation and regulations. The key functions of the MWE are to promote the rational and sustainable utilization and/or development of the water resources while conserving relevant surrounding watershed environment in Uganda. They are several divisions within the MWE and these are:

- (i) The Directorate of Water Development (DWD) which is in charge of the promoting the rational management and use of water resources of Uganda by coordinating and regulating activities that may impact water quality and quantity.
- (ii) Quality and quantity of water in water courses is monitored and regulated by the Directorate of Water Resources Management (DWRM), which also issues permits for water abstraction and effluent disposal.

The Ministry of Water and Environment's Directorate of Water Development is the proponent/developer of this project. It is responsible for overseeing the entire ESIA process up to completion. It will also be responsible for implementing the Environmental Management Plans and Monitoring to ensure compliance. It will also be responsible for reviewing of the ESIA document before submission to NEMA.

3.4.2 National Environment Management Authority (NEMA)

NEMA works with District Environment Officers and local environment committees at local government levels who also undertake inspection, monitoring and enforce compliance on its behalf. In Government ministries, NEMA works with Environmental Liaison Units to ensure incorporation of environmental issues in their activities, policies and programs.

NEMA will review and approve the ESIA report (ESIS) and undertake environmental monitoring during project implementation.

3.4.3 Ministry of Gender, Labour & Social Development

This ministry sets policy direction and monitoring functions related to labour, gender and general social development. Its OHS Department in the ministry is responsible for inspection and mentoring of occupational safety in workplaces and this could be during project construction and operation of the Bukedea Water supply and Sanitation Project facilities.

The OHS Department in this Ministry will be responsible for undertaking inspections of construction sites to ensure safe working conditions.

3.4.4 District Local Administration Structures

The proposed project is within the jurisdiction Bukedea and surrounding Districts' Local

Government headed by a Local Council V (LC V) Chairman and Chief Administration Officer (CAO) who are the political head and technical head respectively. Various district offices whose functions would be relevant to the project include offices of Natural Resources/Environment, District Health Inspector, District Planner, Community Development Officer, District Director of Health Services, District Water Officer and District Engineer. Equally important are village level local council administration (LC I and LC III). Leaders at these levels of local administration are closer to residents and therefore important in effective community mobilization, sensitization and dispute resolution given that the laboratory is also going to serve cross-border communities.

Local government structures are important for mobilizing support for the project as well as monitoring its social-environmental impacts both during construction and operation phases.

3.5 The World Bank Safeguards

3.5.1 OP/BP 4.01 (Environmental Assessment)

The World Bank has well-established environmental assessment procedures, which apply to its lending activities and to the projects undertaken by borrowing countries, in order to ensure that development projects are sustainable and environmentally sound. Although its operational policies and requirements vary in certain respects, the World Bank follows a relatively standard procedure for the preparation and approval of an environmental assessment study, which;

- (i) Identifies and assesses potential risks and benefits based on proposed activities, relevant site features, consideration of natural/human environment, social and transboundary issues
- (ii) Compares environmental pros and cons of feasible alternatives
- (iii) Recommends measures to eliminate, offset, or reduce adverse environmental impacts to acceptable levels (siting, design, technology offsets)
- (iv) Proposes monitoring indicators to implement mitigation measures
- (v) Describes institutional framework for environmental management and proposes relevant capacity building needs.

The environmental assessment evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. The assessment takes into account: the natural environment (air, water, and land); human health and safety) social aspects (involuntary resettlement, indigenous peoples, and physical cultural resources); and trans-boundary and global environmental aspects. Preventive measures are favoured over mitigation or compensatory measures, whenever feasible. This approach is universally applied in many institutional projects.

The World Bank considers environmental impact assessment (EIA) as one among a range of instruments for environmental assessment. Other instruments used by the World Bank include regional or sectoral environmental assessment, strategic environmental and social assessment (SESA), environmental audit, hazard or risk assessment, environmental management plan (EMP) and environmental and social management framework (ESMF). The Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type

of environmental assessment. Proposed projects are classified into one of three categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts:

- (i) **Category A:** the proposed project is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. For a Category A project, the Proponent is responsible for preparing an EIA report.
- (ii) **Category B:** the proposed project has potential adverse environmental impacts on human populations or environmentally important areas such as wetlands, forests, grasslands, and other natural habitats - but these are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases, mitigation measures can be designed more readily than for Category A projects. Like Category A the environmental assessment examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance.
- (iii) **Category C:** the proposed project is likely to have minimal or no adverse environmental impacts. Beyond screening, no further environmental assessment action is required for a Category C project.

Environmental Assessment is used in the World Bank to identify, avoid, and mitigate the potential negative environmental associated with Bank lending operations. The purpose of Environmental Assessment is to improve decision making, to ensure that project options under consideration are sound and sustainable and that potentially affected people have been properly consulted.

3.5.2 OP/BP 4.04 (Natural Habitats)

The policy is designed to promote environmentally sustainable development by supporting the protection, conservation, maintenance and rehabilitation of natural habitats and their functions. The policy seeks to ensure that World Bank-supported infrastructure and other development projects take into account the conservation of biodiversity, as well as the numerous environmental services and products which natural habitats provide to human society. The policy strictly limits the circumstances under which any Bank-supported project can damage natural habitats (land and water area where most of the native plant and animal species are still present). This project has only limited interaction with natural habitats mainly associated with localized riverine aquatic systems.

3.5.3 OP/BP 4.11 (Physical Cultural Resources)

This policy is meant to assist in preserving physical cultural resources including the movable or immovable (above or below ground, or under water) objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance including sites and unique natural values. Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. The objective of this policy is to avoid or mitigate adverse impacts on physical cultural resources from development projects. No cultural resources and sites were identified in the project coverage.

3.5.4 OP/BP 4.12 (Involuntary Resettlement)

The policy states that “Where large-scale of population displacement is unavoidable, a detailed resettlement plan, timetable, and budget are required. Resettlement plans should be built around a development strategy and package aimed at improving or at least restoring the economic base for those relocated. Experience indicates that cash compensation alone is normally inadequate. Voluntary settlement may form part of a resettlement plan, provided measures to address the special circumstances of involuntary resettlers are included. Preference should be given to land-based resettlement strategies for people dislocated from agricultural settings. If suitable land is unavailable, non land-based strategies built around opportunities for employment or self-employment may be used”.

Involuntary resettlement is triggered in situations involving involuntary taking of land and involuntary restrictions of access to legally designated parks and protected areas. The objective of this policy is to avoid or minimize involuntary resettlement, though participation in resettlement planning and implementation and, where this is not feasible, to assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher. The policy prescribes compensation and other resettlement measures to achieve its objectives and requires that borrowers prepare adequate resettlement planning instruments prior to Bank appraisal of proposed projects. There are potential displacements by sub-projects such as solid waste disposal sites, wastewater treatment plants, markets and parks that are all space intensive. Arising from the limited landtake RAP process will be necessary.

3.5.5 OP/BP 4.36 (Forests)

The policy on forest safeguards seeks to realize the potential of forests to reduce poverty in sustainable manner, integrate forests effectively into sustainable economic development and protect the vital local and global environmental services and values of forests. Among the principles is to screen as early as possible for potential impacts on forest health and quality and on the rights and welfare of the people who depend on them. The intake and transmission of the water will be through intensive but human habited vegetation cover areas though outside the main forested area. However, the sources of the water are in full forested zones upstream, though the site identified for the intake as well as the pipeline corridor are not likely to require removal of any trees. However, the inter-phase triggers need for caution for conservation.

3.5.6 OP/BP 4.10 (Indigenous Peoples)

This policy contributes to the Bank’s mission of poverty and sustainable development by ensuring that the development process fully respects the dignity, human rights, economies and cultures of indigenous peoples. For all projects that are proposed for Bank financing and affect indigenous peoples, the Bank requires the borrower to engage in a process of free, prior, and informed consultation.

3.5.7 OP/BP 4.09 (Pests Control Management)

The policy is meant to minimize and manage the environmental and health risks associated with pesticides use and promote and support safe, effective and environmentally sound pest management. This being partly an Agricultural based project, this policy is potentially relevant due to the potential application of pesticides and herbicides. At the time of this study, there was no notable use of pesticides and herbicides in the project area and hence the policy is not triggered.

3.5.8 Activities Triggering World Bank Safeguards

The schedule below justifies the extent to which the World Bank safeguards apply to the implementation of the proposed project implementation. This implies, further investigations may be necessary to ensure compliance with the World Bank requirements.

Table 5: Safeguards Triggering Matrix

Policy	Criteria in the Project	Discussions
Environmental Assessment (OP 4.01, BP4.01, GP 4.01)	Yes	The project components will trigger EA safeguards and is Category B due to the intense interaction with the physical, biological and social setting within the immediate surroundings and direct and indirect influence social and ecosystems
Forestry (OP4.36, GP 4.36)	Yes	The area falls within forested areas though highly encroached by settlements. There are notable interactions with habitats.
OP/BP 4.04 (Natural Habitats)	No	There are no notable Natural habitats haboured in the project area considering the entire system is outside the forested zone
Policy	Criteria in the Project	Discussions
Involuntary Resettlement (OP4.12, BP 4.12)	Yes	No habitations or structures will be displaced but limited land take is anticipated. World Bank Safeguards, therefore, are triggered to an Abbreviated Resettlement level.
Physical Cultural Resources (OP/BP 4.11)	No	Subjected to additional investigation. There are no notable cultural features in the project areas. However, conservation of the water catchments is an important factor.
Indigenous Peoples Policy (OP/BP 4.10)	No	There are no indigenous peoples in the project areas.
OP/BP 4.09 (Pests Control Management)	No	There is no significant modern agriculture in the catchment and supply areas. It may be relevant in future.

CHAPTER 4: ENVIRONMENTAL BASELINE CONDITIONS

4.1 Topography and Physiography

The highest project area elevation shall be at the intake site along the slopes of Mt. Elgon and the lowest elevation is 1,040m in the northern part of the project area towards Lake Okolitorom rising to over 2,300m above sea level on the fringes of Mt. Elgon Forest. Most of the project area gently slopes to the west and southwest. The topography is highly influenced by Mt. Elgon to the east and the low lying central Uganda zones to the west. The slopes of Mt. Elgon at the water source are characterized by deep valleys and steep terrain while the water supply areas of the project area is a generally flat terrain

Figure 5: Land Topography Outlook



4.2 Drainage and Hydrology

4.2.1 Drainage

The project area is within Lake Victoria catchment with the general surface slope to the southeasterly direction. Due to the deep valleys and steep terrain in the project area, the ground is well drained. The geology also comprises of loose weathered rock in most places favouring infiltration of surface runoff further enhancing easy surface drainage. At no place around the project area are there any risks of flooding.

On land surface drainage, observations shows that due to heavy vegetation cover, there is minimal soil erosion and hence insignificant trenching by the surface runoff (this is contrary to areas outside the forested zones that shows notable erosion galleys). Due to this situation in the forested areas, the streams shows low levels of silt, though this could changes as more land is reclaimed for food production and settlements.

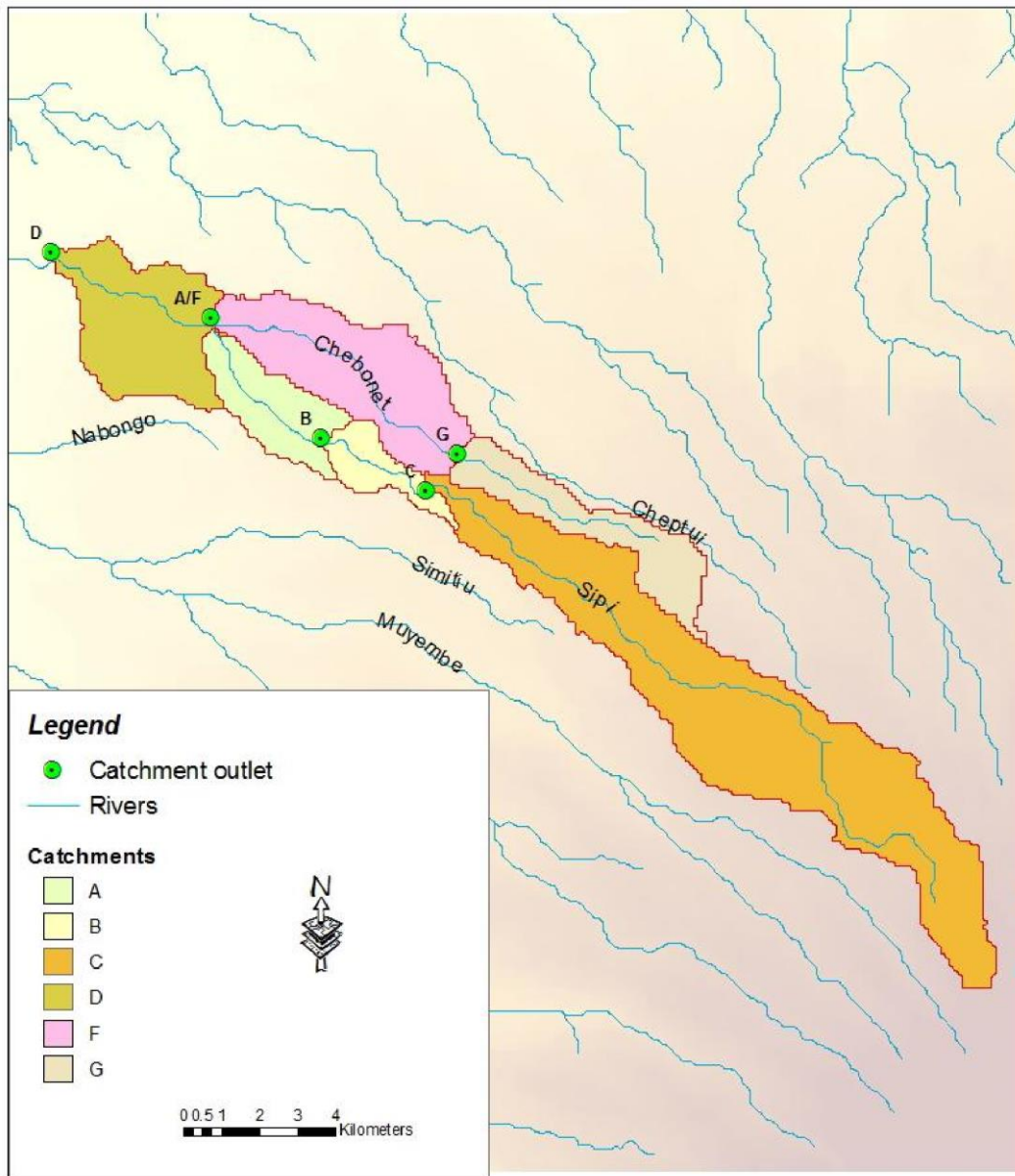
4.2.2 Hydrology

The primary watershed characteristics governing stream flow can be divided into four categories namely:

- (i) Precipitation characteristics and basin area;

- (ii) Characteristics that affect hydrologic abstractions and runoff volumes such as land use and vegetation (land cover), soils, and antecedent moisture conditions;
- (iii) Topographic characteristics that affect runoff response time, such as watershed shape, drainage pattern, watershed slope, and stream channel slope and Characteristics that affect the subsurface base flow, such as soils, soil moisture, vegetation, channel bed materials, stream channel length, geology and groundwater.

6: Hydrological and Catchment Layout at Water Shed Area



Source: Feasibility Report

Figure 7: Sample Surface Drainage Features



A Section of Sipi River Drainage Basin



A Section of Chebonet River Basin

4.3 Water Resources

4.3.1 Surface Water Sources

The larger project area (and Central and Southern Uganda in general) is endowed with large areas of wetlands that in turn constitute numerous springs and small rivers. However, observations show that almost all have been converted into rice paddies and hence not available for domestic water. This situation has created a virtual water scarcity in the project districts. The perennial Sipi and Chebonet rivers have their sources from Mt. Elgon that constitutes the main watershed in the area. Other rivers include Cheptui, Simitu, Muyembe and Nabongo. The flow characteristics are influenced by Lake Kioga in Central Uganda into which the rivers flows.

Figure 8: Status of Water at Source



Current Water Intake (Sipi River in Forest)



Proposed Intake Site

4.3.2 Rainwater

The project area is characterized with high and regular rainfall throughout the year (reaching upto >1,300mm/yr) providing high opportunities for rainwater harvesting. However, exploitation is also very low associated with the abundance of surface water sources in the high altitude areas, the nature and capacity of building roof surfaces as well as full appreciation by the local communities. It is highly recommended as a reliable alternative source of water for the community.

4.3.3 Ground Water

Ground water abstraction in the area is limited due to the high depths of the aquifers. However, shallow wells are potentially viable though the current exploitation is also relatively low, perhaps due to the availability, relative proximity to alternative surface water sources as well as the poor quality suitability for drinking water. Protected wells or springs and boreholes are the most dominant source of water but their yields reduce during the dry season forcing people to move long distances in search for water. On the other hand in Kolir and Malera the water sources get submerged during heavy rains leading to deterioration of water quality and physical inaccessibility to the sources as the population resorts to fetching the flood waters directly. The lower areas on Bukedea District and parts of Bulabuli districts and the neighbouring districts lies within flood prone zones (with wetlands) have access to shallow wells that, however, are also potentially contaminated. There is limited data on the well depths, water quality and intensity of the wells.

9: Sample Ground Water Sources



Springs in the Catchment



Protected Spring in the Catchment



Hand Pumped Shallow Well in Bukedea District

The water in the upper reaches of the rivers is relatively clear and chemically fresh. It has low dissolved materials (~27.4 – 31.4mg/l), low suspended matter (17 – 22mg/l) and relatively neutral (pH 7.18). It also displays very low content of nutrients (N, P and K) due to low level agricultural activities at the intake site areas. However, downstream the confluence of Sipi and Chebonet Rivers, the quality significantly changes with suspended solids rising to 73mg/l, turbidity increasing to 73.5NTU and colour to 150PtCo. The river water also displays elevated levels of faecal coliforms with 20CFU/100ml at the old source (in the forest), 50CFU/100ml at the Sipi Falls and 200CFU/100ml at the downstream of Sipi and Chebonet Rivers confluence.

Figure
Figure 10: Catchment Degradation from Cultivation




Water quality results of samples from the water Source Rivers are presented below;

Figure

11: Water Quality at Sipi and Chebonet Rivers Confluence

Figure



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 E-mail: waterquality@nWSC.co.ug

CERTIFICATE OF ANALYSIS

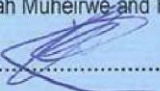
CLIENT: ACES CONSULTING GROUP LTD	Ref No: LS058/INV/2015/414
Address: P.O Box 28018, Kampala	Sampled by: Client
Tel: 0772-389662	Type of container: Plastic/Glass
Email: spngabo@gmail.com	Sample Source: Raw water
Date Sample Received: 14-May-2015	Date of Report: 20-May-2015

Table of Analytical Results

Parameters	Units	Sipi and Chebonet Confluence	National Standards for potable water.
WS Sample Nr	--	K1949/15/C	
pH	--	7.03	6.5 – 8.5
Electrical Conductivity (EC)	µS/cm	369	2500
Colour: apparent	PtCo	150	<15
Total Dissolved Solids (TDS)	mg/L	236.2	1200
Total Suspended Solids (TSS)	mg/L	73	0
Turbidity	NTU	73.5	10.0
Alkalinity: total as CaCO ₃	mg/L	60	500
Hardness: total as CaCO ₃	mg/L	72	500
Bicarbonate (HCO ₃ ⁻)	mg/L	73.2	500
Calcium: Ca ²⁺	mg/L	11.2	75
Fluoride: F ⁻	mg/L	0.0	<1.0
Magnesium: Mg ²⁺	mg/L	10.56	50
Iron: total	mg/L	0.661	<1.0
Sulphate: SO ₄ ²⁻	mg/L	0	200
Chloride: Cl ⁻	mg/L	1.3	250
Nitrate-N	mg/L	0	5.0
Bacteriological: E-coli	CFU/100mL	0	0
Bacteriological: Faecal Coliforms	CFU/100mL	200	0

Remarks:
 With the exception of colour, turbidity and TSS which were high, the sample showed good physio-chemical characteristics which conformed to the National standards for potable water. Bacteriological analysis however showed high fecal contamination.

ANALYSED BY: Robinah Muheirwe and Hawa Nakitende

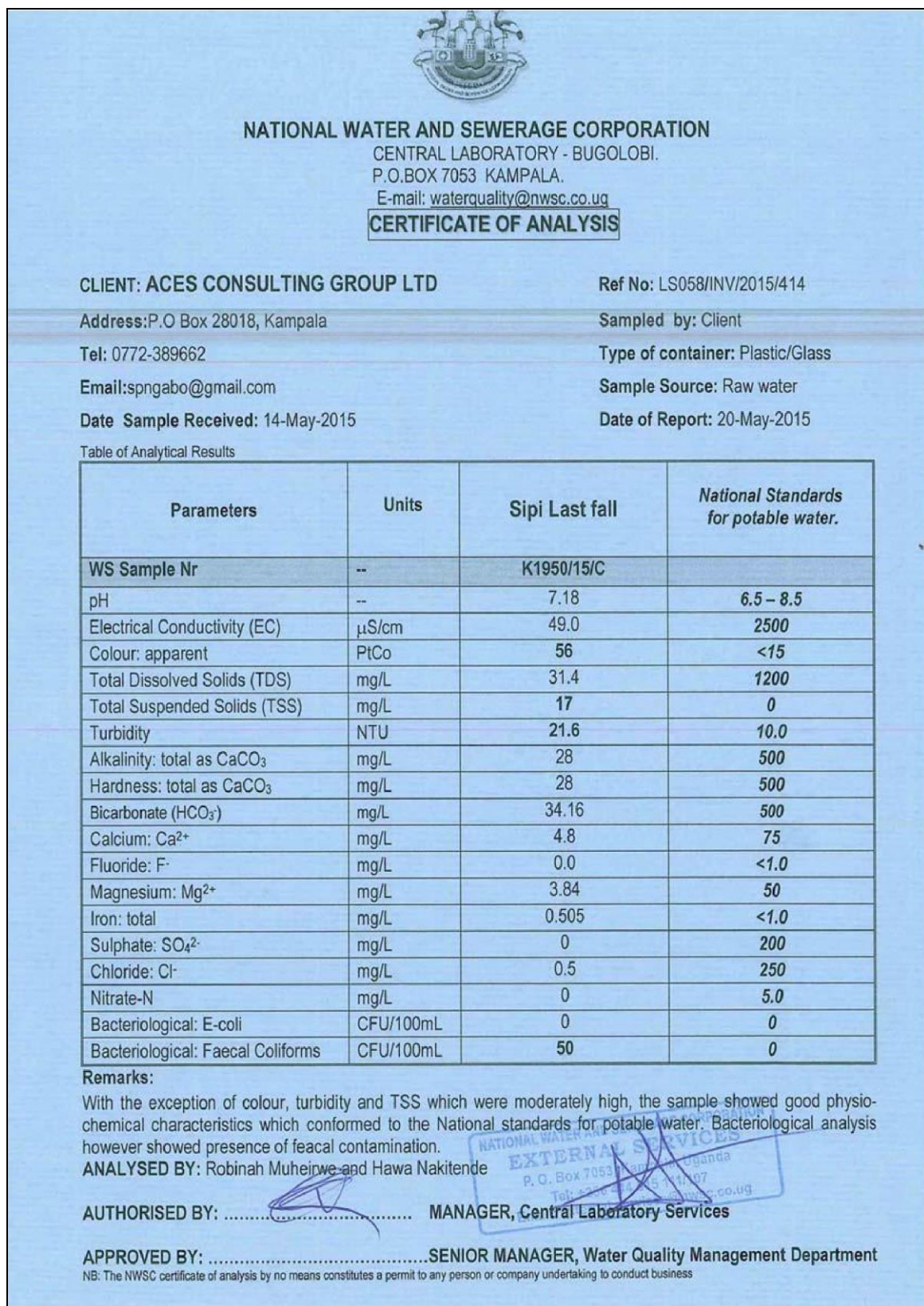
AUTHORISED BY:  **MANAGER, Central Laboratory Services**

APPROVED BY: **SENIOR MANAGER, Water Quality Management Department**

NB: The NWSC certificate of analysis by no means constitutes a permit to any person or company undertaking to conduct business

Figure


12: Water Quality on Sipi River at Sipi Falls



Figure

13: Water Quality of Sipi River at Current Intake

Figure



NATIONAL WATER AND SEWERAGE CORPORATION
 CENTRAL LABORATORY - BUGOLOBI.
 P.O.BOX 7053 KAMPALA.
 E-mail: waterquality@nWSC.co.ug

CERTIFICATE OF ANALYSIS

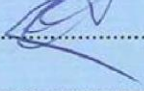
CLIENT: ACES CONSULTING GROUP LTD	Ref No: LS058/INV/2015/414
Address: P.O Box 28018, Kampala	Sampled by: Client
Tel: 0772-389662	Type of container: Plastic/Glass
Email: spngabo@gmail.com	Sample Source: Raw water
Date Sample Received: 14-May-2015	Date of Report: 20-May-2015

Table of Analytical Results

Parameters	Units	Sipi Existing Intake	National Standards for potable water.
WS Sample Nr	--	K1951/15/C	
pH	--	7.19	6.5 – 8.5
Electrical Conductivity (EC)	µS/cm	42.8	2500
Colour: apparent	PtCo	48	<15
Total Dissolved Solids (TDS)	mg/L	27.4	1200
Total Suspended Solids (TSS)	mg/L	22	0
Turbidity	NTU	14.0	10.0
Alkalinity: total as CaCO ₃	mg/L	24	500
Hardness: total as CaCO ₃	mg/L	28	500
Bicarbonate (HCO ₃ ⁻)	mg/L	34.16	500
Calcium: Ca ²⁺	mg/L	6.4	75
Fluoride: F ⁻	mg/L	0.0	<1.0
Magnesium: Mg ²⁺	mg/L	2.88	50
Iron: total	mg/L	1.6	<1.0
Sulphate: SO ₄ ²⁻	mg/L	0	200
Chloride: Cl ⁻	mg/L	0.5	250
Nitrate-N	mg/L	0	5.0
Bacteriological: E-coli	CFU/100mL	0	0
Bacteriological: Faecal Coliforms	CFU/100mL	20	0

Remarks:
 With the exception of colour, turbidity and TSS which were moderately high, the sample showed good physio-chemical characteristics which conformed to the National standards for potable water. Bacteriological analysis however showed presence of faecal contamination.

ANALYSED BY: Robinah Muheirwe and Hawa Nakitende

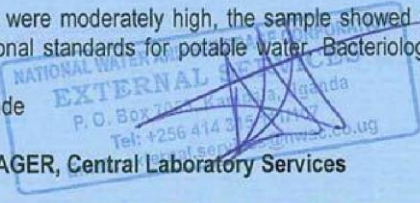
AUTHORISED BY: 

MANAGER, Central Laboratory Services

APPROVED BY:

SENIOR MANAGER, Water Quality Management Department

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Figure

4.4 Biodiversity

4.4.1 Animal Species – Fauna

The gazetted Mt. Elgon forest is host to a diverse number of wildlife like leopard (*Panthera pardus*, a threatened species), giant forest hog (*Holochoerus meinertzhageni*), waterbuck (*Kobus ellipsiprymnus*), bushbuck (*Tragelaphus scriptus*), duiker (*Sylvicapra grimmia*), black and white colobus monkey (*Colobus guereza*), blue monkey (*Cercopithecus mitis*). Heavy mammals such as elephants and buffaloes are reportedly absent.

Animal species in the catchment zones are influenced by Mt. Elgon system that harbours among other animal species monkeys, snakes and varieties of birds. Animal presence in the entire basin, however, has been interfered with by human activities and settlements. On the lower altitudes there is restriction of wildlife prominence due to human settlements and the locals have settled to rearing of cattle, goats and sheep. The road projects, therefore, won't have any direct interaction with wildlife or their habitats.

4.4.2 Vegetation and Flora

The vegetation comprises savannah grasslands. Biodiversity of the project area is influenced by Mt Elgon forest located to the east. The protected forest belt forms the upper catchment area for Sipi and Chebonet Rivers among others. The project area is under Montane forest vegetation with *Olea capensis* and *Aningeria adolfi – friedericii* grading into *Olea – Podocarpus falcatus* forest, a zone of mixed *Podocarpus* and bamboo *Arundinaria alpina*, and the *Hagenia abyssinica* zone with Giant Heath *Erica arborea* and *E. trimeraelgonensis*.

Other notable tree species on the lower altitudes and commonly intercropped as agro forestry are *robusta*, *Casuarina equisetifolia*, *Spathodea nilotica*, *Suna didimotria*, *Juniperus procera* *Grivellia robusta* or the *Eucalyptus species* and cypress trees in addition to scattered indigenous species such as Elgon Teak, Elgon Olives, Bamboos and the palm tree. On the other hand since the area is primarily an agricultural zone with notable food crops in the area including sugar cane, maize, cassava, bananas, vegetables and beans, millet and sunflower. There are also varieties of fruits like guavas, mangoes and avocados.

With human settlements, exotic tree species has been introduced in the areas including *Eucalyptus ssp.*, *gravelia*, *Cypress ssp.* and pine among others with specific commercial or social values to the communities. This puts at risks the forest zones that are also the source of the water for this water supply project.

Figure 14: Vegetation Cover



Typical Vegetation Cover of the Catchment of Sipi River Basin



Riverine Vegetation Cover at proposed intake



Agricultural Crop Cover on Chebonet River Basin



Mt. Elgon Forest Vegetation Cover at Existing Intake



Mt. Elgon Forest Vegetation Cover at Existing Intake



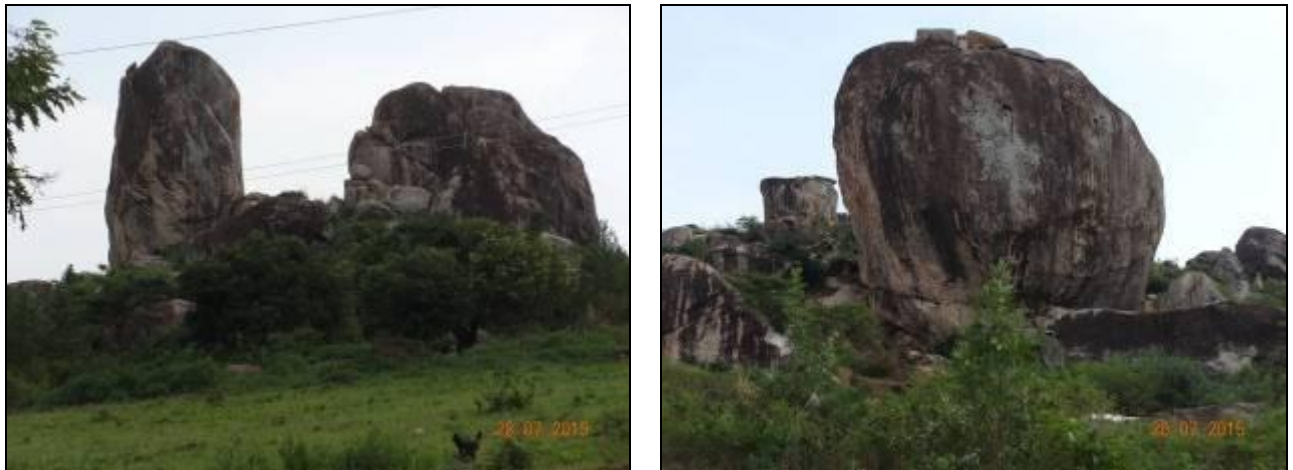
Exotic Trees Cover

4.5 Geology and Soils

4.5.1 Geology Characteristics

The geology along the mountain slopes is described as Tertiary: Volcanic rocks and associated sediments while the geology of the rest of the project area is Archean Gneissic-Granulite Complex. The geology of area is extensively dominated by granites of the Precambrian age. Some granites sections are of true origin, while others are products of granitization processes that caused the alteration of the original sediments to granitic rocks. The geological systems are represented by epidiorites, gray waxes, mudstones and phyllites. Remote from granite contacts the sediments are un-metamorphosed, but adjacent to the contacts they are thermally metamorphosed.

Granites from the basement system underlie the proposed project area. Granitic sheet and vein intrusions and pegmatite veins are common in the area. Dips are usually steep and the foliation planes parallel the original stratification. Pleistone and recent deposits are illustrated by the river terrain and plateau gravels, black valley soils, laterite and an often deep soil cover. The geological characteristics significantly contribute to the silt levels into the Basin Rivers.

Figure 15: Rock Outcrops in Bukedea District

4.5.2 Soils

The soils of the basin area are mainly of the low upland soils, which have developed on granites. This group consists of well drained to very deep, reddish brown to yellowish brown or dark brown clay ferrasols and Acrisols. This includes an association of soils with low fertility and gravel cuirass soils. Soils on the low lands mainly to the west, southwest and northwest of the basin area consist of soils developed from undifferentiated basement system rocks. They include complex, poorly drained, very deep and dark grey to dark brown clay soils. The area has high soil erodability as can be evident from gullies developed on roadsides, footpaths as well as some farms when it rains. Again this contributes to high sediment loads in the rivers and hence the attraction to sand harvesting downstream.

4.6 Climatic Conditions

The project area experiences two rainy seasons i.e. the long rains which start in March and continue to July and short rains experienced from August to October. The annual average rainfall varies from 1,250mm to 1,800mm with heaviest rains falling in April and May and it is during this time that most farming activities such as planting take place. In the north, northwest and southern part of the county receive heaviest amount of rain than the amount received in the central and eastern parts.

The mean annual temperatures in the area vary between 21°C – 25°C due to different level of altitude. Although variations in temperatures are not significant in the county, the months between April and July tend to have lower temperatures while December to February tend to have higher temperatures.

CHAPTER 5: SOCIAL AND ECONOMIC SETTING

5.1 Administrative Location

The project area is approximately 1,217km² and covers eleven sub counties namely Kapsinda, Kawowo, Bunambutye, Bukhalu, Bukhulo, Bukiyi, Kolir, Kachumbala, Kidongole, Bukedea and Malera with an estimated total population of 262,343 inhabitants according to the 2014 National Population and Housing Census Provisional Results. The number of households is estimated to be 48,126.

5.1.1 Water Intake Site

The proposed new water intake will be located at the confluence of Sipi and Chebonet Rivers that also forms the boundary between Kapsambo Parish, Cheptuya Parish and Sengwel Parish in Tuineyi County of Kapchorwa District. The old intake in Mt. Elgon will be rehabilitated to continue serving the residents upstream of the new intake.

5.1.2 Service Areas

The service areas are spread out in four beneficiary districts namely parts of Kapchorwa District, Bulabuli District, Sironko District and Bukedea District. Target areas are mainly on key markets among them the water stressed areas of Kapsinda, Bukhalu, Kawoowo and Kolir Sub-Counties such as to serve approximately 143,126 people in about 48,126 households. The key market centers to benefit will include Sironko, Bunambutye, Kachubala and Bukedea towns among others.

5.2 Political Location

The project area is bordered by Kumi district to the west and north, Nakapiripirit district to the north, Kween District to the northeast and east, the Republic of Kenya to the east and Mbale and Pallisa districts to the south.

5.3 Population Trends

Population density of all the four districts has risen sharply between the 2002 and 2014 census leading to a steep fall in farm holding and increased vulnerability of the farming population. Increasing population density affects all the districts negatively in many aspects among them, incessant land disputes and farm size reduction with diminishing agricultural productivity. The table 3 – 2 below shows very high population density.

All the districts have a population density higher than the national average of 174 (NPHC 2014 provisional results). Over the past decade, Sironko District population density doubled from 266 to 552 people per square kilometer, while Bukedea's increased substantially from 112 to 179. Overall, the settlements around the Elgon National Park (Bulambuli, Sironko and Kapchorwa) are known to have high dense population. The current population densities stand at 180 for Bukedea District, 552 for Sironko District, 272 for Bulambuli District and 292 for Kapchorwa District. As the Elgon population continues to grow swiftly, migrations into Bukedea district will increase.

5.4 Land Ownership and Settlements Patterns

The study area can be categorized into rural and urban areas characterized by different features.

5.4.1 Rural Areas

In all the four districts people live on clan land. Much of rural Bukedea is still customary; dotted with traditional Teso settlements. These settlements consist of scattered homesteads, each organized around a stockade and several granaries. Each homestead usually comprises of a number of households or members of the extended family. The observed homesteads were temporary structures consisting of grass thatched huts and granaries. People usually live in small and round huts with mud walls and grass thatched roofs, although some houses were observed to have iron roofs. Each homestead has on average four households. The homesteads are dispersed and separated by relatively big spaces of undeveloped Savannah grassland usually used for farming or grazing cattle.

It is known that land shortage is a particular problem in the 3 Elgon districts because of dense population coupled with land fragmentation practices. As a result the distance between homesteads is much less. In Kapchorwa specifically, some small holder farmers are settled along the mountain terrain, on steep slopes and river banks. In addition, the majority of houses in the 3 districts are semi-permanent, roofed with iron sheets.

5.4.2 Urban Areas

Throughout the study area, trading centres and sub-centres have two distinct settlement patterns: a core zone, with urban characteristics such as permanent commercial buildings lining the district roads; as well as fringe areas, with more or less rural characteristics in terms of settlement patterns. In the core zone the houses are usually big, close to each other and designed for commercial use. The front rooms are bigger and normally used for business while the behind rooms are smaller, usually rent out for accommodation purposes. The commercial buildings in the core areas are mostly built of brick with iron sheet roofs. Behind these permanent houses lining the district roads, are usually a mix of permanent and many semi permanent houses, some with grass thatch roofs. These core areas have shops and bars which are important social and recreation centres.

The houses in the fringe areas are also of a mixed pattern ranging from permanent to temporary structures. While in the Elgon areas the houses are relatively closer, in Bukedea they are dispersed and separated by relatively bigger spaces of idle or cultivated land. Most trading centres were observed to have only one street (the district road). A number of planned roads or streets were yet to be opened. These centres are typically low income unplanned settlements whose population is projected to rapidly increase due natural growth and to a lesser extent ruralurban migration.

5.5 Education

89% of household heads have had at least some minimum exposure to formal education with more than half (54%) having attained primary education, 25% secondary education and 10% tertiary education.

5.6 Water Supply

From the study findings, the existing water sources include; protected wells/springs, boreholes, open wells and rivers/streams with 38.2% of the population using protected wells/springs and

35.2% using boreholes as the most dominant sources of water. The rest of the people depend on open wells (8.4%) and rivers (17.4%), while a very small number use pipe water (0.8%). During the dry season the borehole yields reduce, with some boreholes drying up, forcing people to move long distances in search for water.

On the other hand in Kolir and Malera sub-counties the boreholes get submerged during heavy rains and the quality of water deteriorates as a result of this inundation, which also cuts off physical access to the boreholes and the population takes up to fetching the flood waters directly. Bukhalu in Bulambuli, Kapsinda and Kawoowo in Kapchorwa and Kolir in Bukedea are the most affected sub counties in regard to safe water supply.

Overall, there is minimal or no harvesting of rainwater from roof runoff to supplement domestic supplies, save for 3% of households in Kapchorwa during the wet season. Low quantities of rain water are usually collected because of the limited capacity of storage materials used, mostly jerry cans and saucepans.

A number of water point surveys in the underserved areas of Bukedea district were completed with dry wells, while the other districts are characterized by varied water supply challenges. The affected areas in Kapchorwa are remote or not reached by existing pipe water supply. The mountainous nature of the terrain makes safe water points located in the valleys hard to access for some households. In Bulambuli there is excessive dependence on dug wells close to households, while non-maintenance of boreholes and irregular supply from Buwalasi GFS limits access to safe water in Sironko's Bukiyi sub-county.

Over half of the households (56%) cover a distance over 500 meters to get water as shown in the figure 3-19 below. Of these the majority (73%) walk a distance over 1km to a water source. About 23% of the households cover a short distance of less than 250m. Another 1% is within 250 to 500 meters of the water source.

Figure 16: Water Sourcing



Washing by Chebonet River Banks



Water Transmission Pipeline from Existing Intake on Sipi River



Shallow Well for Watering Livestock



Fetching Water for Domestic Use for various distant sources

5.7 Health

5.7.1 Health facilities

The health facilities in the project area include 16 Health Centre IIIs and 10 Health Centre IIs. Health centre IIs target population of about 5,000 offering preventive, promotive and outpatient curative health services, outreach care and emergency deliveries while health centre IIIs target populations of 20,000 and offer preventive, promotive, outpatient curative, maternity, inpatient health services and laboratory service.

5.7.2 Sanitation and Hygiene

From the study findings, the majority of the households (88%) have pit latrines however it was observed that the latrines were unhygienic, poorly constructed and maintained. Usually the atmosphere around most of these latrines is very smelly. Over three quarters (87%) of the households discharge grey water into the open areas, 4% into the road drains, while 9% into household gazetted disposal areas. The survey findings further indicate that 61% of households dispose of solid waste into garbage pits, 1% into gazetted collection points while 38% into open areas. As already noted above, observation of household practices revealed some undesirable practices, such as using very poor latrine and bathroom structures, and the habit of not washing hands after using the latrine. The communities were reported to be reluctant at participating in maintaining general cleanliness around their water sources.

5.8 Diseases

The most common water-borne diseases in the project area are typhoid and diarrhea affecting about 9% and 4% of the population respectively. Kapchorwa is the most affected district, followed by Bulambuli while Sironko had the least cases of infection in the last 30 days before the survey. This data signals a primary public health concern with respect to water and sanitation services interventions in Kapchorwa and Bulambuli.

None of the primary schools treat water for drinking purposes using chemicals or boiling. Due to scarcity of water in the area there is limited use of hand washing facilities at the schools. Students are unable to wash hands correctly with soap at the critical times; after defecation and before handling food or eating. They are learning and practicing unsafe hygiene behaviours and this, places the students' health at risk from the transmission of water and sanitation related diseases.

Improved hygiene practices with access to appropriate water and sanitation facilities are essential if transmission routes of water and sanitation related diseases are to be reduced or prevented in the study area.

5.9 Livelihoods

The employment status of household members is important for the assessment of ability to pay for improved water services facilities. Survey findings indicate that the majority of people access

their livelihoods from farming (peasantry). However the population in the urban area is also engaged in a number of business activities including trading and markets. The occupation of household heads varied, with peasants (79%) constituting the largest single occupational group in the study area. Other occupational categories identified are public servants (7%), traders (5%), casual labourers (4%), NGO employees (1%), petty retail traders (3%), while other occupations constituted 1%. Included among other occupations are motor cycle riding, church ministry, artisanship, tailoring, guarding, vending and crafts making. Public servants include local government employees, teachers, police and medical staff.

5.10 Economic Setting

Economic activities in the project area are characterized by mixed farming which consists mainly of livestock and subsistence farming, small business and tourism.

5.10.1 Natural Resources

Land is the primary natural resource in the area seconded by surface and sub –surface water (permanent straeams and springs/wells). In addition, the project area has forest resources which are natural and also manmade which provide fuel, raw materials for wood products, soil conservation and prevention of water catchment areas.

5.10.2 Poverty and Income Levels

The average monthly income of the households is about UGX 148,479 with most households (95%) spending more than one USD per day and can generally be considered to live above the extreme poverty level. The majority of families (70%) reported monthly incomes less than UGX 100,000, 17% had incomes between UGX 100,000 and UGX 300,000 and about 13% of all households reported a monthly income above UGX 300,000.

5.10.3 Economic Occupation

Agricultural Production

The major food crops grown include maize, Irish potatoes, beans and vegetables. The project area experiences bimodal type of rainfall where long rains fall between Mid-March to May followed by a cool season usually with drizzles and frost during June to August and the short rains mid-October to November. Thus Agriculture is predominantly the main economic activity and main source of livelihood for the majority of the population. The agricultural sector in the area is faced with many challenges including poor infrastructure, fluctuating commodity prices and, high cost of inputs.

Figure 17: Agricultural Features



Maize Growing



Banana Growing



Tomato Production

Livestock

The main livestock enterprises are dairy cattle, poultry and sheep. This sub-sector has been encouraged by a ready urban market in the nearby towns, Mbale, Jinja and parts of the neighbouring country as well as several trading centres in the area.

Trade

The population is engaged in a number of business activities which include selling of household items, motorcycle riding, tailoring, bars, restaurants, lodging, tourism, carpentry, drug shops, etc. The peasants sell their produce individually to local traders who supply various markets in the country.

Figure 18: Sample Livestock



Tourism

Sipi Falls on Sipi River upstream of the proposed intake but outside the forest provide a notable source of livelihood to the community through provision of tour guide services to the visiting local and internal tourists.

Figure 19: Sipi Falls



5.11 Infrastructure and Communication

Most of the areas are accessible by a network of gravel roads off the Mbale – Soroti and Mbale – Kapchorwa – Moroto highways. In addition most of the area is covered by the satellite telecommunication network. The national electricity grid traverses the project area with the major trading centres connected through step down transformers.

5.12 Sources of Energy

The majority of households use the tadooba, a small cheap paraffin lamp fashioned out of soldered tin cans and fitted with a wick, which is the principal source of domestic illumination in areas without connection to the electricity grid or households which cannot afford connection to where electricity grid exists. Charcoal and firewood remain the main source of fuel for households.

5.13 Cross Cutting Issues

5.13.1 Gender

49% of the population is male and 51% female but with the majority (78%) of the household heads being male and aged more than 35 years.

5.13.2 Cultural Issues

The project area is made up of different ethnic groups with varying customs and norms. These play a major role in shaping the behaviours and ways of life of the people. The Iteso are the most dominant in Bukedea district, while other tribes include few Bagisu and Sabinyi (or Sabei). The Iteso speak Ateso which is the common language throughout the district. Kapchorwa is home to one large tribe, the Sabinyi and their language is Sabei. The Bagisu, also known as the 'Bamasaba' are the most dominant inhabitants of Sironko and Bulambuli districts. The Bagisu speak Lugisu or Lumasaba language.

Some of the traditional values have changed due to the integration of the people as a result of migration and/or intermarriages. The Iteso are headed by a traditional chief who is not politically elected but has an indirect role in community governance and moral build up.

CHAPTER 6: STAKEHOLDER AND PUBLIC CONSULTATIONS

6.1 The Consultation Forums

Stakeholders' consultations were undertaken in two phases. The first phase involved rapid interviews of the public, water users and Government Officers in the proposed service areas and at the District Offices in Kapchorwa, Bulambuli, Sironko and Bukedea Districts. A consultative meeting was also held with NEMA and Uganda Wildlife Authority in Kampala. The following were contacted during the rapid interviews,

- (ix) The Senior Chief and staff for Kapsinda sub-County
- (x) District Water Office for Kapchorwa District
- (xi) District Water Office Bulambuli District
- (xii) District Water Office Sironko District
- (xiii) District Water Office for Bukedea District
- (xiv) Uganda Wildlife Authority in Kampala
- (xv) NEMA Office in Kampala
- (xvi) Members of public at the new intake and along the service area

The second phase of consultation involved formal stakeholders and public meetings held on the 26th and 27th January 2016 as follows;

- (iii) Public and Stakeholders Meeting at Kapsinda sub-county attended by residents drawn from Kapsinda, Kangowo, Kapsabuko, Chemwaram, Kiring, Cheptuya Kapchebangana, Nganta, Towei, Kapkwebe, Sengwel, Lulwo, Towei and Kaptokolo among other Parishes,
- (iv) Stakeholder Meeting at Bukedea District Water Office with representatives drawn from Bukedea, Kachumbala, Kindongole, Malera and Kolil Parishes.

6.2 Preliminary Stakeholders Consultations

A limited interaction with the Stakeholders extracted the following general opinions;

6.2.1 The General Public Opinion

Sample members of public at the proposed source indicated the following;

- (i) There is a very high level of resource ownership and desire for benefits at the source areas. The residents at the sources also are agreeable that the water should help the people in the downstream districts since in any case the water flows continuously,
- (ii) It was the opinion of the residents, however, that they should be considered to benefit from the project and the intake, therefore, should be upstream of the proposed source. In this connection, they were informed that the existing intake on Sipi River in the forest will be upgraded to attain a capacity that will serve the communities upstream of the proposed intake,
- (iii) There are numerous wetlands and springs with rich water discharge to an extent that if protected and managed could supply the source communities with clean water
- (iv) With this intervention, then the source communities would be at peace with the downstream districts residents benefiting with the water,

- (v) There was also an early concern on whether they will be required to pay for the water considering at the moment, they freely obtain the water from the rivers.

Residents sampled in the downstream districts expressed appreciation on the possibility of improved access to good water quality. However, they need to be informed that the water is meant for domestic use and limited livestock watering AND NOT for food production. It would beat the purpose of improving water quality by treatment then use for irrigation. Initiatives for supplying production water would be considered in future projects.

6.2.2 Water Office at Kapchorwa District

The District Water Officer Mr. David Olal had the following observations;

- (i) While appreciating the fairly clean water in Sipi River, Chebonet River brings in heavy loads of silt to the proposed intake point due to the intensive cultivation in the catchment. Other pollutants in Chebonet River include possible agro-chemical residuals from the farms. This has a serious implication on the cost of treating the water,
- (ii) It will be necessary to initiate an integrated land use intervention in the catchments of both rivers for long term water treatment sustainability. He noted the intervention on Sipi River catchment by the IUCN could be extended onto Chebonet River catchment as well.
- (iii) The community in Kapsinda considers the sources as their resources and should be benefiting before the lower communities could get the water. He was of the view that to satisfy the community and avoid social conflicts, the project integrate a component to serve the local community.

6.2.3 Water Office at Bunabulye Market – Bulambuli District

The Officials contacted were Mr. Fabian Mulala and Mr. Okerenyang Joseph where the following remarks were made;

- (i) It was the opinion of the District Water Officer that the water quality downstream of the confluence of Sipi and Chebonet Rivers is highly turbid and may require significant costs for treatment. This is as a result of the siltation arising from Chebonet River whose catchment has highly eroded. Sipi River catchment is generally protected. However, this cost of treatment may be balanced with the desire to intercept the highest possible water volume, a situation that may require intervention efforts on the Chebonet River catchment management,
- (ii) The District Water Officers in Bulambuli and Sironko Districts appreciated that there are no surface water sources in the downstream districts and what is available does not meet the water quality levels required for drinking purposes. The intervention project is therefore welcome,
- (iii) Rainwater harvesting has not been fully embraced by the communities despite the high potential,
- (iv) Ground water in the district is obtained from shallow wells and requires purification through boiling or disinfection. However, a majority of the residents may not be able to undertake this treatment and therefore exposing them to water borne diseases,
- (v) There is also high demand for production water, but the current water supply can only meet domestic demand and limited livestock watering,

- (vi) The proposed project design and implementation should talk to other ongoing and proposed intervention projects in the area to avoid conflicts and duplication of efforts. For instance, the Water Facility East under the National Water Corporation (an initiative for water supply and sanitation for small towns) with its source in Mbigi River has been surveyed and designed such as to serve Bunambutye Market that is also a target of the proposed project. This should be avoided.
- (vii) The current water shortage situation has far reaching effects to the children (whose learning time is wasted fetching water) and women whose valuable family time is wasted fetching water from far distances.
- (viii) The proposed projects (and others) should consider minimal interference with private land and property including structures. In this regard, water transmission pipelines should run along the existing roads to the extent possible. Any conflicts on private land should be addressed through appropriate compensation process.

6.2.4 Sironko Water Office

A meeting with the District Water Officer for Sironko District Mr. Gidudi Alex recorded the following issues;

- (i) There are no clean surface water sources in Sironko District and its neighbouring districts, a situation that leads to rising cases of water borne diseases. He observed that growing urban areas, including Sironko Market are not provided with sanitation system and hence discharging wastewater into the available water sources,
- (ii) Alternative water sources including rainwater harvesting and deep ground water sources as well as protected springs are yet to be fully exploited. Strategies may be necessary to enhance these alternative sources,
- (iii) Like Bulambuli District, there is high demand for water for production though the current project is only designed to supply domestic water only,
- (iv) The target service areas are diverse and low lying implying challenges of water flows and accessibility. However, it is expected that the project water pipelines will run along the roads and hence limited demand for land acquisition,
- (v) In order to create high accessibility of water, several modes of distribution should be adopted such as to include direct connections to the homes, water kiosks or public stand pipes.

6.2.5 Uganda Wildlife Authority (UWA)

The major concern of the UWA is any water intake to be done within the forested areas. For full involvement, UWA would expect a disclosure of the report by NEMA on which formal comments would be filed. It was also indicated that UWA is not liable for any risks associated to entries into the forest park. Regarding the rehabilitation of the existing Sipi Intake, the following conditions should be adhered to;

- (i) That a permit will be obtained from UWA prior to construction works commencement. This would ensure that UWA Regional is informed on the works programme for purposes of monitoring,
- (ii) It is expected that the Client will arrange for an awareness meeting with the UWA field staff to also discuss on the approved allowances for the Forest Rangers on ensuring safety of the construction workers,
- (iii) There will be no waste left in the forest. All solid waste wastes, sewage and food remains and construction debris should be removed from the forested zones,

- (iv) No camp should be constructed within the forest,
- (v) No forest materials including plants, soils, animals or minerals should be removed from the forest without approval from UWA,
- (vi) The construction workers are expected to pay requisite park entrance fee for the entire period of the construction.

6.2.6 National Environment Management Authority (NEMA)

The process being undertaken on the proposed water supply was appreciated by NEMA. Water related projects are not expected to have significant impacts and challenges and so an assessment at the EIA Scoping stage may suffice. Emphasis, however, was laid on the following issues;

- (i) There is need to balance on the needs and requirements of the communities upstream and downstream of the proposed intake to avoid possible social conflicts,
- (ii) Care and caution be taken during the construction and laying of the water infrastructure to ensure the following;
 - (iii) No social and economic disruptions
 - (iv) Control pollution into the water bodies including the source rivers,
 - (v) Ensuring minimal or no losses of water through the transmission and distribution networks,
 - (vi) Undertake impact assessment of construction camp sites if any will be constructed for the works,
 - (vii) All wastes generated from the construction works should be well management to avoid nuisance and environmental pollution,
 - (viii) All pipes traversing sensitive areas be identified and necessary protection identified;
 - (ix) Appropriate measure is adopted for social issues including security, HIV/AIDS and lawlessness.

6.3 Public Consultations Forums

The public consultations were held on the 26th and 27th January 2016 in Kapchorwa and Bukedea Districts. There is a general acceptance of the project by the residents both at the water source as well as the beneficiary Districts. While appreciating the project, the communities at the source district expressed strong desire to benefit with the resource before downstream residents. In this regard, a component of the project should be integrated. On the other hand, the downstream communities are ready to pay for the water as long they are assured of accessibility to water.

6.3.1 Main Concerns and Fears

The table below presents the main concerns and fears expressed by the Participants as well as responses on the same. Sample questionnaires and a list of attendance are in annex for ease of reference.

Table 6: Key Concerns, Fears and Responses

Issues	Concerns and Fears	Responses
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Benefits	The communities in Kapsinda County expressed concern that the water will benefit residents in other districts at their expense, yet they are the “Owners” of the resource.	<ul style="list-style-type: none"> ✓ The residents were assured that a component has been integrated into the project such as to commence and be implemented at the same time. ✓ Downstream beneficiaries were in agreement that the source communities should also benefits to ensure social harmony and safety of the water.
Employment	<ul style="list-style-type: none"> ✓ There was concern that the Contractor might bring construction workers from other places and ignore the local youth wishing to benefit from the project. ✓ This concern was expressed in all the project areas. 	<ul style="list-style-type: none"> ✓ The participants were assured that the Contractor will be required to engage not less than 60% of the construction employees from the area. However, all skilled labour may be hard to obtain locally. ✓ However, those engaged should be ready to work since the Contractor is expected to complete the works within the stipulated period.

Issues	Concerns and Fears	Responses
Land Acquisition	<p>Land owners expressed fears on loosing sections of their land and development to water pipelines corridors.</p> <p>This also raised issues of interactions with sensitive cultural and ecological areas, e.g. grave yards.</p>	<ul style="list-style-type: none"> ✓ The pipeline corridors are expected to run along the road reserves. ✓ However, should it become necessary for any sections of the project run on private or institutional land, then appropriate compensation arrangements will be undertaken before commencement of the project.
Public Safety	There was concern on the safety of the public especially children and the aged during the construction.	The water pipeline trenches will be secured and be covered within the shortest period possible.
Cross Cutting Social Issues	Concern on cross cutting issues associated with the project implementation at construction phase. Among the issues include HIV/AIDS, Gender Mainstreaming, Environment protection, Poverty and Employment	This will be tasked to the Project Management Committees and the Contractor
Project Ownership	The residents wondered mechanisms in place to enhance ownership by the community	<ul style="list-style-type: none"> ✓ Involvement of the communities in the construction and operations of the project including employment and access to water. ✓ A section of the communities at source and supply area will have their management capacity improved for effective participation.

Water Connections	Most residents may not have the ability to connect water to their homes and therefore may require Government assistance.	<ul style="list-style-type: none"> ✓ The water pipelines will be brought to the nearest points possible but it still remains the residents' responsibility to connect to their homes. ✓ However, communal points in form of water kiosks and/or stand pipes will be provided at strategic locations.
Paying for water	<ul style="list-style-type: none"> ✓ The community in Kapsinda indicated unwillingness to pay for water and hoped that the Government meets cost of water for its residents. ✓ Residents in Bukedea and other beneficiary Districts are prepared to pay for water. 	<ul style="list-style-type: none"> ✓ It was explained to the community that supplying water and system operations and maintenance has a cost. Whether the payment is made from the users or the Government, the water cost has to be met. ✓ It was proposed that additional forums will be planned to sensitize and create awareness on cost of water to the residents and the need for cost sharing and ownership of the water reticulation.
Irrigation	Some residents felt that they be allowed limited irrigation of crops with the water	Clarification was made that the water is meant for domestic use and limited livestock watering only. It also does not make any economic sense to irrigate farms with treated water.
Safety of the Pipelines	<ul style="list-style-type: none"> ✓ Landowners along the pipeline corridors wondered how they will co-exist with the pipes and other land use activities ✓ The residents in the supply areas also worried about illegal connections 	<ul style="list-style-type: none"> ✓ The residents were advised that the pipeline way-leave will be clearly defined for limited utilization. Among the limitations will include no putting up structures, no trees should be planted and form of excavations. ✓ Strict surveillance will be set up by the Ministry of Water and Environment.
Issues	Concerns and Fears	Responses
		However, the residents should support this and ensure that connections are only done upon approval and by qualified personnel. This will assist in reducing interference with water flow.
Project implementation	Residents in Kapsinda (source of water) feared that the project may commence with Bukedea section of the project and that they might be forgotten.	The community was assured that both portions of the project will commence and implemented at the same time.
System Management	The role of the community in the system management was not clear.	The communities were advised to form Community Committees for the system management but within the provisions of the laws governing water resources management. The District Offices will assist in this regard.

6.3.2 Key Suggestions

The following suggestions were presented by the stakeholders for consideration during the construction and operations of the project.

- (i) Social involvement is enhanced to raise the level of ownership. Among the involvements would include employment, constant information and consultations as well as adopting the most cost effective accessibility to the water supply by the communities,
- (ii) The water payment tariffs be worked out in conjunction with the water users to ensure matched ability to pay status, willingness to pay as well as awareness creation on cost of water,
- (iii) The communities at the source and supply area require intensive campaign on education and awareness on sanitation and hygiene. This will ensure sustainable utilization of the treated water while the available alternative sources are applied for washing, livestock watering and irrigations,
- (iv) Landowners affected by the project are compensated accordingly to ensure acceptability and safety of the pipelines,
- (v) Initiate programmes on catchment management for Sipi and Chebonet Rivers for soil erosion control and reduction of silt discharging into the proposed intake. The public should be involved in this initiative,
- (vi) The water supply for the source community be commenced along the main water project system to Bukedea District and other beneficiary Districts,
- (vii) Residents in Kapsinda County requested that the Government subsidize the water payments for the poor users,
- (viii) Educate and sensitize the users and public on water use to reduce wastage, contamination and equity. This will involve training of selected members of public and community leaders on management basic skills,
- (ix) The communities should be encouraged to continue preserving and utilizing alternative sources of water including rainwater harvesting and available wetlands and shallow wells.

Figure 20: Sample Stakeholder Meetings



Site Visits with the Community Members



Stakeholder Consultation Meeting in Kapsinda



Stakeholder Meeting at Bukedea District Water Office

CHAPTER 7: ANTICIPATED IMPACTS AND MITIGATION MEASURES

7.1 General Overview

Abstraction and transmission of water has got direct and indirect interactions with the environmental and social setting of the affected areas and downstream of the source streams. Among the broad linkages include the following,

- (i) Abstractions reduces the flows in the target rivers and streams effectively denying the ecosystems and social requirements downstream the opportunity for the associated values,

- (ii) On the other hand, transmission involves trenching, physical installations (pipelines, tanks, treatment works and support structures). Transmission of water is perhaps the one with most social linkages including at times limited displacement of people and livelihoods,
- (iii) Finally, operations water supply reticulation has attached risks to social aspects such as water accessibility conflicts, wastage of water, economic factors associated with water (e.g. the concepts and modalities of paying for water).

7.2 Environmental Impacts and Mitigation Measures

7.2.1 Sedimentation

Construction

The target stream source of water for the project (Sipi River at the old intake and Sipi River downstream of Chebonet River confluence) is among the largest rivers arising from the forest. The specific point of abstraction for the new intake is outside the forested areas while the rehabilitation of the old intake remains in the forest). In both cases, top soil is tightly held together by the vegetation cover and, therefore, the water is fairly clear and free of suspended matter other than dry plant matter. However, it was noted that the immediate riparian areas along Chebonet River are gradually being eroded from cultivation effectively exposing the stream to siltation and other pollutants, especially at the proposed site for the new intake.

Construction of the water intake will involve installation of a weir across the river channel, an intake channel arrangement and sedimentation tank a short distance downstream the intake weir. The installation will involve excavation to the specified sizes and depths, masonry works for the components followed by a restoration of the sites (to also involve earth works in the process of landscaping). All this activity has high risks of discharging silt into the river channel directly or through rainfall storm water such as to have temporary impacts immediately downstream and the dependants far.

Construction of the water treatment works will also involve significant excavations and earth works for the components including the reception tanks, filters, storage tanks and exit pipe outlets. The works has potential release of soil into Sipi River downstream. Landscaping activities upon completion of the works may also discharge more soils into the river bed.

Similarly, cutting and laying the water pipelines tunnels has a potential to discharge soils into natural drains and streams. Other areas with excavations in the service areas include consumer tanks at each service point, observation chambers and pressure break tanks (PBTs) where found necessary. The pipelines channels are in numerous zones in the project areas.

Mitigation Measures

- ✓ At this early stage, encourage the landowners on both sides to keep the cultivation at least 30m from the river banks. The cultivation practices should also avoid soil erosion into the river bed,
- ✓ Excavations for the weir construction are undertaken with all due care avoiding silt from flowing downstream. It would be preferable to do the excavation and construction during the dry weather conditions to prevent soil transport downstream the river bed,
- ✓ Similarly, the excavations for the intake channel and sedimentation tanks should also be undertaken with due care,

- ✓ To ensure prevention of silt into the river bed from the excavation for the intake channel and the sedimentation tank, appropriate barriers will be provided to contain storm water siltation,
- ✓ Excavations of the water pipeline channels will also be undertaken such as to prevent soil transport into the adjacent river streams,

Operations

Potential impacts arising from operations are associated with the following;

- (i) Cleaning activities of the intake weir and the sedimentation tanks will generate solid materials that will potentially discharge into Sipi river bed downstream of the intake points,
- (ii) Washout activities of the water treatment facility including backwashing of the filters and washout of the storage tanks will generate sediments and solid materials likely to be disposed off into Sipi river and its tributaries,
- (iii) Washout valves from the distribution network will be channeled into the open drains and streams with a risk of silt transport.
- (iv) Water consumer points with (stand pipes and households) will generate surface runoff into open drains and perhaps streams transporting silt,
- (v) Clearing more land for settlements and cultivation by additional population will lead to increased soil erosion and hence siltation of the rivers and streams.

Mitigation Measures

- ✓ Provide containment of washout residuals and silt at the locations to prevent the solid materials discharging directly into Sipi River. Similar actions will be taken at the water treatment plant. The silt and solid materials so obtained should be disposed off onto, being neutral and inert,
- ✓ Potential sources of silt including consumer tanks, inspection chambers and washout valves shall be provided with cutoff drains to control silt transportation by spilling water,
- ✓ Initiate a partnership programme for catchments and Mt. Elgon forests ecosystem conservation for sustainable sources of water,

7.2.2 Water Quality

Construction

The construction activities are not expected to cause significant effects to the water quality of the affected rivers and streams (mainly Sipi River). Main pollution factor will only be;

- (i) Elevated turbidity from discharging soils and silt from the construction activities.
- (ii) Potential but limited pollutants may arise from masonry works rendering the affected water alkaline,
- (iii) Oil and grease spills from construction machinery

Mitigation Measures

- ✓ Ensure construction of the intake facility takes the shortest time possible to minimize turbid effects of Sipi River,
- ✓ Control discharges of oil and grease from construction equipment

Operations

There will also be limited impacts during operations including;

- (i) More people will be attracted into the project area for settlement and economic activities with potential for increased domestic discharges (sewage, solid wastes, etc.),
- (ii) Clearing of more land cover will expose the rivers to siltation, turbidity and humic organic matter.
- (iii) More cultivation of land may potentially lead to a higher nutrient (N, P, K and Ca) into the receiving rivers and streams.

Mitigation Measures

Encourage sustainable land use practices (agriculture, settlement and institutional development) to ensure safety of water bodies.

7.2.3 Water Loss

There are no possibilities of water losses during the construction phase. However, there is tendency of misuse of water at service points from an attitude that the water comes easily and may be at no cost. Other avenues of water loss include burst pipes, leaking taps and overflowing storage tanks.

Mitigation Measures

Water loss can be controlled through incentives and disincentives including among others;

- ✓ Educate and create awareness to the source and beneficiary Community on the cost and value of water and water resources for enhanced conservation,
- ✓ Consult on reasonable water tariffs to sustain the water supply as well as creating a sense of value for water to the beneficiary community,
- ✓ Ensure optimum maintenance of the water supply system components including pipelines, valves and consumer taps,
- ✓ Synchronize the water treatment output with the consumption to prevent overflows at the service points.

7.2.4 Air Quality

Impacts during the construction are mainly associated with dust (from earth works) and emissions from construction equipment (hydrocarbons, NO_x, SO_x and Particulate Matter). The effects of the impacts (not measured), however, are fairly low arising from the high vegetation covers and high dispersal rates. No significant impacts are anticipated from the operations of the system.

Mitigation Measures

- ✓ Undertake earthworks under damp conditions to reduce dusty conditions
- ✓ Ensure construction equipment are well maintained to minimize or eliminate emissions.

7.2.5 Biodiversity

Construction

The construction works are not expected to significantly affect the biological diversity components (plants and animals) where the activities will be confined within the component locations. Impacts are mainly anticipated at the intake site, water treatment works site and the respective tanks location sites. The construction phase will not have any notable effects to the wildlife in the area. This is because none of the works is getting deep into the forest where wildlife habitats are found. Specific limited impacts will arise as follows;

- (i) Removal of riverine vegetation at the intake locations including indigenous trees (some exotic trees including old *Eucalyptus ssp.*) shrubs and ground cover grasses (the immediate landowners had already removed part of the vegetation). The site selected for the intake, however, can be maneuvered such as to minimize the trees to be removed,
- (ii) The construction of intake channel and the sedimentation tank is on an already cultivated land,
- (iii) The proposed site for the water treatment plant is on a clear private land covered with grass and no trees are to be removed.
- (iv) All the tanks anticipated to be construction are to be located on identified public land within active premises and no trees are expected to be removed,
- (v) The water pipeline (from the intake to treatment plant and from Treatment plant to service points) will various affect the vegetation. However, service lines will follow established access roads and are confined within clear corridor with minimal need for removal of trees.

Mitigation Measures

- ✓ Orient the intake facility such that minimal or no indigenous or other tree is removed.
- ✓ The water pipeline should be aligned such as to minimize direct interaction with trees along the corridor. To avoid future conflicts with trees, the pipelines should run at least 2m from a tree and the corridor maintained so,
- ✓ All the storage and service point tanks shall be positioned such that no trees will need to be removed,
- ✓ Appropriate landscaping at the intake, water treatment plant and all tank locations shall be done upon completion of the construction works ensuring replanting of trees and re-introducing ground cover. In this regard, a record should be maintained of the tree species removed for compensation through planting upon project completion.

Operations

There are no significant impacts anticipated from operation activities. Limited effects may arise to aquatic life in Sipi River system downstream if there is a significant effect on the river flows. However, potential immigration and land reclamation for settlements and cultivation may impact negatively on biodiversity.

Mitigation Measures

Ensure the water abstraction complies with the Water rules for sustained aquatic life downstream Sipi River system,

7.2.6 Impacts on Hydrology

There is no significant effect to the hydrology of Sipi River of other streams in the area from this project. The construction is only focused on the source river and no notable river crossings are anticipated to affect the various stream flows. The required 600m³/d is negligible compared to the estimated 6,900m³/d. This is on assumption that the demand will remain the same and the base flows of Sipi River remaining the same.

7.3 Social Impacts and Mitigation Measures

7.3.1 Positive Impacts

The main positive aspect is the improved access to water by Community living in water stressed areas and envisaged under the project concept. Close to an estimated 200,000 residents will benefit as follows;

- (i) Improved hygiene at the family level, especially the women and children who for many years have to rely on the little water obtained from a distance,
- (ii) Saving time spent accessing water (especially by women and children) from 1 – 2hr down to 0.5hrs after the project. The distance covered will also be significant. The time saved will go to other productive use including income generation engagements for the women and studying for the children,
- (iii) Less risks from water borne infections and especially for young children, who are exposed to ailments such as typhoid, diarrhea and skin infections,
- (iv) Women and children (girls) will also be saved from potential injuries (spinal and pelvic complications) arising from carrying heavy burdens of water for long distances,
- (v) Easy access of water by the larger community will contribute towards protection of the rivers and streams from haphazard abstraction of water.

Other benefits will include

Direct and Indirect Employment

Both skilled and unskilled labour will be employed during the construction and operation phase. Indirect employment will include indirect economic opportunities created through persons selling different wares to the construction staff domestic requirements. In both cases, these will improve economic situation in the project area and reduce unemployment levels. To enhance these benefits to the local population, the proponent should emphasize the use of local unskilled labour by the engaged contractor.

Development of Marketing Opportunities

Implementing the project will create increased demand for various construction materials input including cement, reinforcement iron bars, fine and course aggregates etc. These will translate into expanded market for suppliers of the inputs at national and international levels.

Knowledge Transfer

Those employed as unskilled workers will benefit from on-the-job training through which they will be trained to becoming skillful artisans. This will release more artisans to the local community thereafter project construction.

Poverty Reduction and Gender Empowerment

Women in the neighboring community to the project sites start small income generating activities such as: sale of food and other basic necessities to the construction staff. This will have an overall impact of reducing poverty and gender empowerment. This will increase and diversify income streams for the communities hosting the project and improve socio-economic status of their families.

Improved Health and Water Supply

Enhanced water supply is the main aim of the project. The town's water supplies are extremely depressed and the proposed project will ensure improved water provision to the residents after full implementation. In addition, increased water supply to the town will improve public sanitation, hygiene and general public health.

7.3.2 Potential Displacements of People

There are no anticipated displacements of people or settlements by either of the project components (implying that all current population will fully enjoy the benefits). However, limited land take will be affected for the following;

- (i) Intake components (weir, intake channel and the sedimentation tank) will need at least 0.5ha. There are no settlements or structures at the site and only the cost of land and a few trees. The Landowners on both sides of the banks may be compensated for the limited loss of land,
- (ii) The pipeline way-leave from the intake and to the distribution network will be confined to public land the extent possible. Where the way-leave encroached private land, it was an agreed land acquisition process will be discussed with the specific landowners,
- (iii) The service point tanks will be located with public land to the extent possible. Where such a site falls within private land, necessary procedures should commence for land acquisition and the land sections converted for public use,

Mitigation Measures

- ✓ Complete the Resettlement Action Plan (RAP) such as to address all project affected persons (PAPs),
- ✓ Prepare a clear and workable Complaint Redress Mechanism to provide a tool for dissatisfactions arising from the implementation of the RAP process,
- ✓ All the PAPs shall be compensated in full before the commencement of the project,

7.3.3 Potential Social Disruptions

Immigration into the area by construction and operation workers will lead to increase in population and thereby create more pressure on the existing social utilities such as schools and medical centres in the project area.

Mitigation Measures

- ✓ Monitor the trend of immigration during the project implementation and expand the required utilities accordingly.
- ✓ Encourage even distribution of schooling children and referrals for patients

7.3.4 Potential Cultural Disruption

There are no observed cultural disruptions from the project. However, interaction of the construction workforce and the local community could compromise the cultural values. While no direct impacts are anticipated from the project to any cultural sites, the community has a right to “cleanse the water sources and the water”. The project implementation, therefore, should allow for this function. The Elders should be convened to work out their modalities and budget for integration into the project implementation.

Mitigation measures

- ✓ The contractor should sensitize all staff on local cultures and discuss with local community on the same.
- ✓ The contractor should in liaison with traditional leaders and the National Museum of Kenya, develop and implement a chance find procedure in case archaeological sites are found during the construction process.

7.3.5 HIV/AIDS and Other Sexually Transmitted Infections

Migration into the area during construction will bring in a significant population and thereby increase the chances of social delinquency and STI rates. The workers and traders who have money and are willing to spend it to attract women from the project and thereby create avenues for spread of HIV/AIDS and STIs.

Mitigation Measures

- ✓ The proponent should incorporate HIV/AIDS prevention measures as part of the contractual requirement;
- ✓ The Contractor shall, through a qualified and approved HIV/AIDS service provider undertake measures to reduce the risk of the transfer of the HIV virus between and among the Contractor's Personnel and the local community;
- ✓ The contractor, should twice a month create awareness to all the staff and labour and the immediate local communities, concerning the risks, dangers and impact, and appropriate avoidance behavior with respect to Sexually Transmitted Infections (STI) and HIV/AIDS in particular;
- ✓ Provision of Male or Female Condoms for all Site staff and labour as appropriate.

7.3.6 Safety Issues

Safety issues are associated with the construction phase, especially where excavated areas are in conflict with the people's movement and livestock grazing. Safety risk points include the intake sites, water treatment plant sites, the tank sites and the pipeline corridor. Such risks will remain during the operations, especially the public safety aspects at the intake, safety challenges at the treatment plant and all tanks at service points.

Mitigation Measures

- ✓ All construction sites shall be isolated from the public and their livestock. This will be done through temporary fencing and fixing appropriate safety signage and information. Involve the local people for enhanced ownership and management,
- ✓ Provide construction workers will appropriate safety gear and enforce application of the same at all times,
- ✓ The contractor to ensure the minimal time on site (construction period) in order to reduce potential safety risks to the residents,
- ✓ Upon completion and commissioning of the works, public safety in regard to water quality will be important. Security to be ensured for the intake, treatment plant and all storage tanks. Involvement of the local community will be inevitable in this regard.

7.3.7 Safety Issues

There will be potential safety aspects arising as follows;

- (i) Risks of drowning into the dam during the construction of the intake facility. The risk is mainly on the construction workers,
- (ii) Occupational safety of the workers also during construction of the water treatment works,
- (iii) Risks to public safety along the open pipeline trenches, especially along high population sections.

Mitigation Measures

- ✓ Institute appropriate occupational safety provisions in all construction work areas. Among them reflective jackets, helmets, overalls, safety ropes,
- ✓ Erect safety guard rails and signage tapes at the dam areas and cut trenches,
- ✓ Install safety signage and information including safety tapes in all work areas, especially within public areas and roadside corridors,

7.4 Economic Impacts and Mitigation Measures**7.4.1 Positive Impacts**

Availability of clean water for the community will enhance their economic productivity in the following ways;

- (i) More time will be available for productive use. It will take ~0.5hrs down from 1 – 2hrs to fetch water,
- (ii) The children who often assists their parents in fetching water will have more time to study and do homework
- (iii) The improved situation in accessing water, will reduce safety risks to women and children (and especially girls),
- (iv) Improved access to clean water implies improved sanitation and hygiene and hence reduced cases of water borne diseases. In this case, therefore, the residents will spend less on drugs and medicines and effectively better value to income,
- (v) With improved water supply, the value of land may appreciate to the benefit of the local landowners and residents,
- (vi) Temporary and/or permanent direct increases in employment arising from construction activities and operation;
- (vii) Social inclusion and accessibility to community facilities through the provision of better linkages including access roads;
- (viii) Stimulation of Local Economy during the construction phase of the project that will stimulate local economic activities through creation of job opportunities for the construction workers and demand for goods and service.

7.4.2 Negative Impacts

There is potential for immigration of more people into the area effectively exerting pressure on the natural resources and available amenities. Otherwise there are no significant negative economic impact anticipated from the project implementation and operations.

CHAPTER 8: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN**8.1 Management Plan Principles**

The project is geared towards enhancing social and economic benefits through sustainable water supply. Development of the proposed Water Supply Project would be expected to comply with the environmental conservation requirements in accordance with the established Ugandan laws and

regulations. To realize these goals, acceptability by a majority of the beneficiaries and stakeholders as well as ensuring minimal effects to the physical environment will require to be ensured through participation in the project and continuous consultations, evaluations and review of the design aspects throughout project implementation cycles.

It is also recommended that the environmental management guiding principles specific to this project improvement and water resources management be established to allow integration of environmental management considerations during construction and operations. Among the factors that need to be considered in this particular project implementation will include;

- (i) The design of the water supply system should be ensure low maintenance costs for sustainability,
- (ii) Control of soil erosion and siltation of water sources (rivers and streams), incorporation of project components sustainability and operational provisions and the associated components,
- (iii) Enhancing integration of environmental, social and economic functions in the project implementation,
- (iv) The contractors and other players in the project activities be prevailed upon to implement the EMP through a sustained supervision and continuous consultations
- (v) Involvement of the community in the project implementation to enhance ownership and capacity building for long term operations of the facility,
- (vi) Compensation of any land or property that may be affected by the project in accordance to the laid down regulations and/or agreements with the affected sections of the community,
- (vii) Consult with the beneficiary community and inputs from the Ministry of Water and Environment on determining sustainable tariffs to ensure revenues for maintenance and also instill a sense of value for water to the beneficiaries.

8.2 Management Responsibilities

In order to implement the management plan, it is recommended that an expert be identified to oversee the environmental and social management aspects including the water source conservation, soil erosion control, re-vegetation whenever appropriate, water conservation and equity in distribution, enhanced sanitation and hygiene measures throughout project area to match the water supply initiative. The expert would also be required to coordinate and monitor environmental management activities during construction and post-monitoring audits. Other recommended participants include;

- (i) The Ministry of Water and Environment will be responsible for coordination of all the activities and liaisons, particularly in regard to the quality control of the works and social issues.
- (ii) Local Water Resources Management Committees will have the responsibility to enforce water quality monitoring and efficient maintenance systems, procedures to minimize interruptions to water supply and ensure accessibility by all consumers. In this regard appropriate capacity building and skills will be necessary,
- (iii) National Environmental Management Authority (NEMA) through the District offices shall be responsible of surveillance of environmental and social aspects of the project implementation,
- (iv) The District Water and Environment Offices

8.3 Environmental Management Guidelines

The guidelines will include among other areas environmental management programmes, standard operation procedures, compliance monitoring schedules and environmental audit schedules as required by the law. Social harmony of the intake, treatment works, storage tanks and associated component will be achieved through the collaborations with the stakeholders or community management committees introduced at various water consumption points

8.4 Institutional Framework Management

The Policy on Water Resources Management and the Water Act are the guiding tools on water resources management. The policy goal is to facilitate the provision of water in sufficient quantity and quality and within a reasonable distance to meet all competing uses in a sustainable, rational and economical way. It also separates policy formulation, regulation and services provision and defines clear roles for sector actors within a decentralized institutional framework and includes private sector participation and increased community development.

The Ministry in-charge of Water is responsible for policy development, sector co-ordination, monitoring and supervision to ensure effective Water and Sewerage Services in the Country, sustainability of Water Resources and development of Water resources for production, and domestic uses.

The key functions of NEMA include policy direction, setting national goals and objectives and determining policies and priorities for the protection of the environment, promotion of cooperation among public departments, local authorities, private sector, non-governmental organizations and such other organizations engaged in environmental protection programmes and performing such other functions as contained in the act.

8.5 Environmental Education and Awareness Raising

The Ministry of Water and Environment together with the the water supply beneficiaries need to understand the basic environmental, water use sanitation and hygiene principles. In this regard therefore the following steps may be considered;

- (i) Creation of liaisons on all matters related to environment, health and safety,
- (ii) Encourage contribution of improvement ideas on specific issues related to the management of the facilities,
- (iii) Establish initiatives that would instill a sense of ownership of the facilities and related components to all beneficiaries,

8.6 HIV/AIDS Issues

The contractor would be expected to incorporate HIV/AIDS programmes during construction phase. Awareness, prevention and training on HIV/AIDS and other social diseases is important during project construction and operation phase. The awareness creation should be improved through putting up of banners, posters and training should be facilitated within the project area to the construction workers and the community.

8.7 The Management Plan Matrix

Complying with the national laws and regulations, the ESMP will include;

- (i) The RAP including support to development of affected people;
- (ii) The monitoring plan
- (iii) The institutional and managerial arrangement for implementation of the ESMP
- (iv) The cost of the implementation programme during pre-construction, construction and post-construction and operations if applicable.

The ESMP matrix below outlines the action plans and responsibilities on the key negative impacts anticipated from the project activities.

Table 7: ESMP Matrix

Project Activity and Issues	Key Impacts	Areas of Concern	Management Action Plans and Responsibilities	Timeframe and Cost Estimates (UX.)
<p>Preparatory Activities</p> <ul style="list-style-type: none"> ✓ Site Surveys ✓ Setting up construction camp site(s) ✓ Setting up materials holding sites 	<ul style="list-style-type: none"> ✓ Social conflicts on construction ✓ Loss of trees and ground cover ✓ Delivery of materials to the work areas 	<ul style="list-style-type: none"> ✓ Intake construction site and Sipi Riverine zone ✓ Water treatment Plant site ✓ Storage Tanks Locations ✓ Proposed water transmission pipeline corridor, ✓ Camp site location ✓ Access passages to construction works sites 	<ul style="list-style-type: none"> ✓ Give prior notification to the community on expected disruptive activities related to the project ✓ Involvement of Administration Office <p>Responsibilities</p> <ul style="list-style-type: none"> ▪ Ministry of Water and Environment ▪ Contractor ▪ Supervision 	<p>Pre-construction</p> <p>No direct costs anticipated (cost integrated in the construction costs)</p>
<p>General preliminary Construction Activities</p> <ul style="list-style-type: none"> ✓ Land acquisition and securing target sites, ✓ Compensation to landowners 	<p>Potential disruption of project affected persons,</p>	<ul style="list-style-type: none"> ✓ Project area ✓ Part of affected catchment system under project area, 	<ul style="list-style-type: none"> ✓ Preparation and implementation of compensation and resettlement action plan ✓ Ensure adequate compensation with current land market value, ✓ Creation of awareness to PAPs on alternative land use practices, <p>Responsibilities</p> <ul style="list-style-type: none"> ▪ Ministry of Water and Environment ▪ Contractor ▪ Supervision 	<p>Pre-construction</p> <p>Costs as outlined in the RAP Report (verification through valuation process)</p>

<p>Site clearing</p> <ul style="list-style-type: none"> ✓ Vegetation removal for the intake site, ✓ Access to the river banks ✓ Mapping deviation 	<ul style="list-style-type: none"> ✓ Limited loss of riverine vegetation and a few trees ✓ Potential disruption of riverine bio-diversity in Sipi river ✓ Temporary siltation to the water Sipi River downstream ✓ Water pollution (increased turbidity) 	<ul style="list-style-type: none"> ✓ Intake Site ✓ Sipi river water quality downstream ✓ Local Sipi river banks 	<ul style="list-style-type: none"> ✓ confine vegetation clearing to the required site only ✓ Ensure proper disposal of waste generated (vegetation/trees species) ✓ Ensure minimal interference with local watering points 	<p>Pre-construction</p> <p>No direct costs anticipated (cost integrated in the construction costs)</p>
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Project Activity and Issues	Key Impacts	Areas of Concern	Management Action Plans and Responsibilities	Timeframe and Cost Estimates (UX.)
	<ul style="list-style-type: none"> ✓ Degradation of the local banks for Sipi river 		<p><u>Responsibilities</u></p> <ul style="list-style-type: none"> ▪ Ministry of Water and Environment ▪ Contractor ▪ Supervision 	
<p>Construction Works and related components</p> <p>Earth moving</p>	<ul style="list-style-type: none"> ✓ Air pollution (exhaust and dust emissions), ✓ Potential soil erosion and siltation to downstream water, ✓ Oil spills from contractors machinery 	<ul style="list-style-type: none"> ✓ Downstream Sipi River ✓ Contractors camp site, workshops and service areas, ✓ Residential premises near the work areas 	<ul style="list-style-type: none"> ✓ Construction to be carried out during dry seasons to the extent possible, ✓ Sprinkle water on the excavated sections to abate dust emissions, Practice soil control measures(terracing) <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> ▪ Ministry of Water and Environment ▪ Contractor ▪ Supervision 	<p>During construction</p> <p>~UGX. 1,500,000.00 for monitoring</p>

<p>Construction Works and related components</p> <p>Social interactions</p>	<ul style="list-style-type: none"> ✓ Potential threat to safety of the workers, ✓ Risk to safety of the residents, e.g. access routes and grazing areas) ✓ Possible intrusion to the local communities privacy by construction workers, ✓ Possible immigration into the project area by construction workforce 	<ul style="list-style-type: none"> ✓ Construction sites (intake, treatment plant and storage tanks), ✓ Settlements within the project vicinity, ✓ Public access routes 	<ul style="list-style-type: none"> ✓ Limit construction to day time, ✓ Ensure adequate provision of the personal protective equipment, ✓ Ensure regular maintenance of contractors machineries and vehicles, ✓ Provide adequate signage and reflective tapes for restricted zones. <p>Responsibility</p> <ul style="list-style-type: none"> ▪ Ministry of Water and Environment ▪ Contractor Supervision 	<p>Throughout the construction phase</p> <p>No direct costs (integrated into the project cost)</p>
<p>Construction Works and related components</p> <p>Economic Issues</p>	<ul style="list-style-type: none"> ✓ Opportunities for employment to the local youth ✓ Opportunity for locally available construction supplies 	<ul style="list-style-type: none"> ✓ Entire project area ✓ Neighbouring market centres 	<ul style="list-style-type: none"> ✓ Provide opportunities for local labour (upto 60%) ✓ Enhance benefits from supplies procurements to the local communities <p>Responsibility</p> <ul style="list-style-type: none"> ▪ Ministry of Water and Environment ▪ Contractor ▪ Supervision 	<p>Throughout Construction period</p> <p>~UGX. 6,000,000.00 to boost local economic opportunities</p>

Project Activity and Issues	Key Impacts	Areas of Concern	Management Action Plans and Responsibilities	Timeframe and Cost Estimates (UX.)
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<p>Water Supply Operations</p> <ul style="list-style-type: none"> ✓ Water use trends ✓ Accountability ✓ Sustainability and equity 	<ul style="list-style-type: none"> ✓ Disruption of access of water by the local communities ✓ Potential water wastage and leakage along the transmission lines, ✓ Potential uneven distribution of water, ✓ Illegal water abstraction for illegal connections, ✓ Illegal water vending (especially if obtained from the water supply) 	<ul style="list-style-type: none"> ✓ Entire project area ✓ Neighbouring market centers 	<ul style="list-style-type: none"> ✓ Come up with guidelines regarding water abstraction and use, ✓ Support the communities form a WRUA for support in the use of the water resources including the water supply system, ✓ Sensitize the community on sustainable water use, ✓ Collaborate with other players in the region on sanitation, health and hygiene awareness creation. <p>Responsibility</p> <ul style="list-style-type: none"> ▪ Ministry of Water and Environment ▪ Community Committees 	<p>Initiate action upon commissioning and then continuous</p> <p>~UGX. 3,000,000.00</p>
<p>Water Supply Operations</p> <p>Health and Sanitation</p>	<ul style="list-style-type: none"> ✓ Potential contamination from construction activities, ✓ Risks from water borne diseases and vectors thrive, ✓ Potential water pollution from surrounding land-use activities (catchment), 	<ul style="list-style-type: none"> ✓ All Water Service Points ✓ Potential water kiosks ✓ Transmission water pipelines 	<ul style="list-style-type: none"> ✓ Ensure regular water quality monitoring and maintenance of the water supply system, ✓ Influence the land-use activities in the catchment areas, ✓ Creation of awareness on water resource management and conservation, ✓ Ensure proper water treatment plant installation at the site. <p>Responsibility</p> <ul style="list-style-type: none"> ▪ Ministry of Water and Environment ▪ Community Committees 	<p>Continuous process</p> <p>Allow ~UGX. 60M on water quality protection including catchment management</p>
<p>Water Supply Operations</p> <p>User Safety and risks downstream,</p>	<ul style="list-style-type: none"> ✓ Potential injuries to the operators and visitors, ✓ Safety risks to settlements and farmlands along the transmission pipeline (pipe bursts and leakages), 	<ul style="list-style-type: none"> ✓ Entire project area ✓ Water abstraction points 	<ul style="list-style-type: none"> ✓ Maintain a fence around the water intake and treatment areas with provision for limited and/or controlled access to the unauthorized persons, ✓ Enhance close surveillance by the community, especially those living near the main tanks. 	<p>Continuous process</p> <p>Allow ~UGX. 30M for</p>

Project Activity and Issues	Key Impacts	Areas of Concern	Management Action Plans and Responsibilities	Timeframe and Cost Estimates (UX.)
			✓ Sensitize the communities on safety issues associated with the water storage tanks. Responsibility <ul style="list-style-type: none"> ▪ Ministry of Water and Environment ▪ Community Committees 	safety interventions
Water Supply Operations ✓ Social and economic issues, ✓ Downstream dependants, ✓ Water use trends and accountability, ✓ Facility Ownership	✓ Creation of employment to locals, ✓ Introduction of new economic activities in the area, ✓ Potential illegal water connections, ✓ Potential vandalism of water pipelines infrastructure, ✓ Potential wastage of water and leakages at consumer points,	✓ Project area ✓ Settlements around the project area and transmission pipelines	✓ Sensitization on water resource management and conservation ✓ Local communities should also participate in water resource management and planning ✓ Impose heavy penalties on illegal water connection and vandalism ✓ Development of water resources use guidelines for all consumers and beneficiaries Responsibility <ul style="list-style-type: none"> ▪ Ministry of Water and Environment ▪ Community Committees 	Continuous process Allow ~UGX. 60M on water quality protection

<p>Water Supply Operations, Institutional Aspects</p>	<ul style="list-style-type: none"> ✓ Potential non-compliance with water abstraction regulations, ✓ Natural Resources Utilization, ✓ Water use linkages among the beneficiary communities. 	<ul style="list-style-type: none"> ✓ Water intake source ✓ Entire water service scheme 	<ul style="list-style-type: none"> ✓ Comply to the provisions of the Water Authority, ✓ Organize communities for effective and sustainable utilization of natural resources associated with the water supply system. Community Committees will be necessary ✓ Establish appropriate water user associations in the water service areas, ✓ Establish a specific monitoring system for the water supply scheme <p>Responsibility</p> <ul style="list-style-type: none"> ▪ Ministry of Water and Environment ▪ Community Committees 	<p>Initiate action during construction and enhance during operations</p> <p>No direct costs estimates</p>
Project Activity and Issues	Key Impacts	Areas of Concern	Management Action Plans and Responsibilities	Timeframe and Cost Estimates (UX.)

<p>Catchments' Management</p> <ul style="list-style-type: none"> ✓ Pollution control from the watershed into the intake, ✓ Enhancing efficient runoff interception into Sipi and Chebonet River without compromising on the water quality, ✓ Soil erosion control and reduced silt transportation ✓ Provide leadership in tree planting of the catchment areas. 	<ul style="list-style-type: none"> ✓ Enhanced vegetation cover ✓ Changed land use practices, ✓ Changes agricultural practices, including controlled application of agro-chemicals ✓ Enhanced vegetation, ✓ Influenced sanitation trends in the neighbouring homesteads around the project area site ✓ Silt interception in the catchment 	<p>Sipi and Chebonet River catchment areas,</p>	<ul style="list-style-type: none"> ✓ Immediate landowners to be motivated into maintaining buffer zones along the river and the intake facility, ✓ Collaborate in guide landowners towards changing their land use practices including mode of agricultural and irrigation methods as well as application of agrochemicals. ✓ Collaborate on afforestation programmes of slopes and other steep sections of the watershed area in collaboration with landowners, ✓ Consider sand interception dams along the main tributaries in the catchments for control of silt discharge into the dam, ✓ Undertake a comprehensive catchment management plan for the Sipi and Chebonet Rivers involving all landowners and all stakeholders, ✓ Integrate a comprehensive Land Use Management Plan, Pesticides Control Management Plan and a Water Use Plan. <p>Responsibility</p> <ul style="list-style-type: none"> ▪ Ministry of Water and Environment ▪ Community Committees 	<p>A continuous activity</p> <p>Allow ~UGX. 150M mainly for Catchment Management Plan</p>
<p>Other Water Sources</p> <ul style="list-style-type: none"> ✓ Springs and streams ✓ Shallow wells ✓ Wetlands ✓ Rivers 	<ul style="list-style-type: none"> ✓ Potential negligence of other sources of water ✓ Wastes of water as a natural resource 	<p>Kapchorwa District</p> <p>Bulambuli District</p> <p>Sironko District</p> <p>Bukedea District</p> <p>All neighbouring Districts</p>	<ul style="list-style-type: none"> ✓ Initiate an inventory of all other sources of water by Districts ✓ Sensitize residents on importance and conservation of the same ✓ Initiate a programme of protection and conservation of all other sources for non-domestic uses by the communities, 	<p>Immediately</p> <p>No direct cost on this project.</p>

Project Activity and Issues	Key Impacts	Areas of Concern	Management Action Plans and Responsibilities	Timeframe and Cost Estimates (UX.)
<p>Decommissioning</p>	<ul style="list-style-type: none"> ✓ Removal of construction sites (stores, toilets, waste dumps, etc.), ✓ Removal of construction residual material holding sites, ✓ Disposal effects of wastes and construction debris 	<p>Construction camp sites</p>	<p>The contractor to prepare a decommissioning plan of all construction installations and associated sited at least 3 months prior to end of construction.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> ▪ Ministry of Water and Environment ▪ Community Committees 	<p>End of construction</p> <p>Allow UGX. 6,000,000 for decommissioning audit</p>
	<ul style="list-style-type: none"> ✓ Remove part of all of the water intake and sedimentation tank ✓ Removal of part or all of the water treatment plants ✓ Removal of the transmission pipeline ✓ Demolition of the water distribution tanks, 	<p>Permanent water supply components</p>	<ul style="list-style-type: none"> ✓ Notify NEMA at least one year before the intention to decommission ✓ Undertake a decommissioning audit at least six months before the activity and provide a decommissioning plan, ✓ Undertake the decommissioning following the decommissioning plan and under supervision by NEMA, ✓ Rehabilitate the affected locations to the satisfaction of NEMA and other stakeholders. <p><u>Responsibility</u></p> <ul style="list-style-type: none"> ▪ Ministry of Water and Environment ▪ Community Committees 	<p>At decommissioning stage and surveillance thereafter (could be upto 20 years upon)</p>

(Scoping Report)

CHAPTER 9: CONCLUSIONS AND RECOMMENDATIONS**Table 8: Conclusions and Recommendations**

Conclusions	Recommendations
<p>The proposed project is well justified to meet the desires of the People living in the water stress areas</p>	<ul style="list-style-type: none"> ✓ There should be a continuous consultation and involvement of the beneficiaries throughout the project implementation to ensure their desires and expectations are met to a large extent. ✓ Intensive public awareness and education is required to enhance ownership and involvement in the project implementation and operations for long term sustainability, reduced social conflicts and ecological conservation.
<p>The proposed project is acceptable to a majority of the source and beneficiary Communities. However, there are important issues of concern to a section of the community to be addressed including;</p> <ul style="list-style-type: none"> ✓ Land to be acquired for the intake, water treatment works and the storage tanks ✓ Land to be partially acquired for the water distribution pipeline, ✓ Plan for connections to homesteads in the service areas, 	<ul style="list-style-type: none"> ✓ The parcels of land to be acquired for the project should be compensated for. This will enhance acceptability of the project by the people. ✓ In the absence of direct connections to the homesteads, water kiosks will be situated at reasonable distances from the beneficiaries. ✓ Homesteads who can afford may be guided to connecting to water supply system
<p>The current status of the water is intact with appropriate vegetation cover, insignificant sources of pollution and acceptable water quality. However, encroaching cultivations to the intake location is a threat to the future of the new intake.</p>	<p>Engage the landowners in the immediate neighbourhood of the intake site on continuous basis to control the level of encroachment for the safety of Sipi River and the intake.</p>
<p>The biggest beneficiaries of the proposed project will be the women (who are still responsible of fetching water among other domestic chores) and children (who have to assist their mothers and still go to school and do their homework).</p> <p>The time spent in fetching water may reduce from an average of 1 – 2hrs down to an average of 30min.</p>	<p>The orientation and distribution of the water kiosks and other water access points shall be based on the convenience of women and children as the main determining factors (accessibility, safety, etc.).</p>
<p>The preparedness to pay for water is very low among the community. For the water supply to be sustainable, the willingness to pay by the beneficiary consumers should be enhanced.</p>	<p>There is need for comprehensive awareness creation to the beneficiary community on the value for clean water and their responsibility in the cost of sustaining the water supply system.</p> <p>A programme in this regard should be initiated at the commissioning stage.</p>

<p>A section of the community living in the upstream of the intake may not benefit from the new intake</p>	<p>The existing intake should be rehabilitated and enhanced to provide water for the communities in Kapchorwa living upstream of the new intake to ensure full benefits and acceptability by all.</p>
<p>It was observed that the source stream has limits to supply all the current destinations desired by the beneficiaries as well as sustaining the covered areas in the long term.</p>	<p>✓ As indicated earlier, a long strategy should be developed to conserve the catchment in collaboration with the members of public and landowners.</p>

(Scoping Report)

<p>Conclusions</p>	<p>Recommendations</p>
	<ul style="list-style-type: none"> ✓ Alternative sources of water should be encouraged in the area for sustainability. These are to include rainwater harvesting and ground water abstraction. ✓ Small dams may also be considered to retain storm water for use in the supply areas during the dry conditions
<p>There is a high possibility of social conflicts over access of water among the beneficiary communities itself. For instance, the community living where intakes are located feels that the consumer communities downstream owes them returns on the value of the water.</p>	<ul style="list-style-type: none"> ✓ The Directorate of Water should intervene to streamline the community water management committees, build management capacity and harmonize revenue collection and accountability, ✓ Review on a continuous basis demand variations and access to water to ensure equity and less conflicts

ANNEXES

Annex 1: Terms of Reference

Part 2: Section 6. Statement of Requirements

Annex 1: Terms of Reference for Environmental and Social Impact Assessment (ESIA) Studies

Terms of Reference for Environmental & Social Impact Assessment (ESIA) Studies

1.0 Introduction

1.1 General Background and Rationale

Gravity Flow Scheme development is among the technologies used for improved water supply in rural areas. Enormous potential for the technology is in hilly/mountainous terrain, where water sources in form of rivers and springs are tapped at high altitude, stored and gravitated to serve the low lying areas. Over the past 10-25 years, spring based gravity flow schemes have been developed near to full potential owing to ease of construction and maintenance. Such schemes with small capacities serving in the range of 500-5,000 persons are mainly developed by local governments with financial support from Central Government. Most of these schemes are about to outlive their design life and cannot therefore meet the fast growing water demand, in addition most of the yields have dwindled probably due to climatic change effects, leading to taps running dry on a number of schemes.

High yielding permanent rivers in mountainous terrain areas offer a solution for tapping GFS potential to serve large communities with settlements across local government boundaries, bringing in the benefits of economies of scale offered by piped water infrastructure. The river waters are typically turbid, with high silt loads requiring conventional treatment processes. This technology though not new has not been applied due to high capital investments and high operational skills as compared to the spring based GFS type. Large rural water schemes serving 5,000-100,000 persons are a bigger undertaking beyond the local government's capacity in terms of technical, financial and post construction management arrangements. The level of funding at district level and low capacities for community based management of the large type of GFS left local governments to plan and develop the simpler spring based GF schemes only.

The Ministry of Water and Environment thru DWD has secured funding towards supporting districts in planning and development of large gravity flow schemes. Under the programme MWE shall meet the capital investment costs for the schemes.

1.2 Background

One of the strategies to meet the service gap in rural areas is the bulk water transfer strategy that aims at bulk transfer and supply of water to water stressed areas. This strategy involves as one of the activities the development of large gravity flow schemes to serve water stressed areas in rural areas and rural growth centres. MWE/DWD has planned to carry out feasibility studies and detailed designs for Bukedea Water Supply and Sanitation System as one of such large gravity flow schemes planned in the current financial year 2013/14.

The Ministry of Water and Environment therefore, invited Engineering Consultants to carry out a feasibility study, Environmental Impact Assessment and detailed

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engineering design for Bukedea Water Supply and Sanitation System. The consultant shall propose a specialist for ESIA in his proposal. The Consultant will therefore undertake preparation of the environmental project brief, environmental and social scoping, baseline studies, environmental and social impact assessment & report compilation, preparation of ESIS report and submission of the final ESIA report to the employer as part of the study.

2.0 Environmental and Social Impact Assessment (ESIA)

The Environmental and Social Impact Statement (ESIS) will serve as reference document to inform the project design and implementation of the Environment and Social Management Plan (ESMP) of the project in a socially and environmentally sound manner and in line with national laws and National and Environmental Management Authority (NEMA) guidelines.

The National Environment Act Cap 153 in its Third Schedule articulates the various categories of development projects which require mandatory environment Impact Assessment (EIA) to be undertaken and approved by the NEMA before their implementation. Specifically, Section 2 of its Third Schedule provides for an EIA to be conducted on projects of the nature of the proposed facilities.

The ESIA will assess the impacts due to the implementation of the Bukedea Water Supply and Sanitation System in Bukedea. The activity will be carried out in accordance with the existing environmental and social requirements of Uganda such as the EIA Guidelines of 1997 as well as EIA Regulations of 1998, amongst other requirements. Specific attention will be paid to the Environmental and Social assessment guidelines for NEMA.

2.1 Objectives of the ESIA

The aim of the ESIA study will be to assess the potential environmental and social impacts of the proposed project activities.

2.2 Specific Objectives of ESIA

In principal the scope of the ESIA will be to:-

- i) Establish the baseline environmental and social conditions in the project area relevant to the proposed Bukedea Water Supply and Sanitation System in Bukedea. This will involve amongst others, the use of maps at appropriate scales, site plans, photographs and other graphic aids and images as appropriate;
- ii) Outline activities to be undertaken during implementation of Bukedea Water Supply and Sanitation System in Bukedea;
- iii) The description of the project activities should include its objectives, information on the nature, general layout and size of facilities including any ancillary buildings, preconstruction activities, construction methods, works and duration and post construction plans will all be discussed;
- iv) A description of the raw materials inputs, technology, processes to be used and by-products to be generated will be outlined in the ESIA study; Carry out consultations with relevant stakeholders, including potentially affected

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- persons, to obtain their views, concerns and suggestions regarding the environmental and social impacts of the proposed project activities;
- v) Carryout Environmental and Social Analysis to identify and assess the potential environmental and social impacts, and make recommendations for their mitigation and monitoring;
 - vi) Outline health and safety measures to be instituted in the implementation of the project;
 - vii) Outline pertinent policy, legal and institutional framework under which the project will be implemented. Reference to the relevant NEMA safeguard policies that are likely to be triggered by the project should be made in the ESIA study;
 - viii) Propose measures for the management of associated impacts from the project works.
 - ix) Prepare a comprehensive checklist of environmental and social issues related to the planned project which should clearly indicate potential impact, their source(s), nature and magnitude.
 - x) Prepare an Environmental and Social Management Plan (ESMP) outlining actions and roles as well as resource needs for effective implementation of the mitigation measures;
 - xi) Prepare an Environmental Monitoring Plan with clear monitoring indicators and monitoring roles for the project.

The outcome of ESIA will inform the final design and implementation as appropriate through integration of the mitigation measures into the Bills of Materials (BoMs) for the project works.

2.3 Scope of the Environmental and Social Impact Assessment

The tasks under the assignment have been further elaborated for clarity as follows.

2.3.1 Description of the project

Provide a comprehensive description of the project and its surrounding environment specifying any information necessary to identify and assess the environmental effects of the project.

2.3.2 Description of the Environment

The study area/geographical boundaries, and methodology to be utilized for baseline data will be described. This task involves the generation of baseline data which is used to describe the project area such as physical environment, biological environment, socio-economic and cultural environment.

1. A detailed description of the existing soil and geology, landscape, aesthetic appeal, topography, and hydrology will be made.
2. Climatic conditions in the area of influence including dust emissions from the project sites, wind speed and direction, precipitation, relative humidity and ambient temperatures.
3. The current/baseline noise levels of the proposed sites and the ambient noise in the area of influence.

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4. Availability of solid waste (construction waste, domestic waste from workers) management facilities.
5. A detailed description of flora and fauna of the area, with special emphasis on rare, threatened, endemic, protected and endangered species.
6. Present and projected area population; land use and planned development activities; community structure; economic base/employment; distribution of income; goods and services; utilities; public health and safety; cultural peculiarities; aspirations and attitudes will be explored. Material assets of the area shall be explored.
7. Present land use planning or zoning and management and how it relates to the proposed development, existing land uses and any planned land uses within the proposed project area.

2.3.3 Policy, Legislative and Regulatory Considerations

A description will be given of the pertinent policies, regulations, standards and regulatory bodies governing environmental quality, safety and health, protection of sensitive areas, protection of biodiversity, siting and land use control or zoning at the national and local levels. The examination of the legislation will include inter alia legislation such as the National Environment Act, the Water Act, the Physical Planning Act, the Local Government Act and the Public Health Act. Other relevant laws and regulations such as the Environment Impact Assessment regulations as well as the appropriate international conventions/protocols and treaties, where applicable. The socio-economic impacts to be identified and considered include.

2.3.4 Identification and Analysis of Potential Impacts

The individual consultant will:

- a) Identify the significant environmental and public health/safety issues of concern and indicate their relative importance
- b) Identify the nature, severity, size and extent of potential direct, indirect and cumulative environmental impacts during the pre-construction, construction and operational phases of the proposed development as they relate to, (but not restricted to) the following:
 - Waste generation and management, including both construction waste and waste generated during operation of the water supply systems
 - Soil erosion and associated off-site impacts.
 - Water and sanitation issues.
 - Impact on ground and surface water sources.
 - Landscape impacts of materials excavation and general cut to fill or cut to spoil
 - Planned or future land use change.
 - The carrying capacity of the proposed projects.
 - Usage of utility infrastructure within and around the project sites
- c) Identify the nature, severity, size and extent of potential direct, indirect and cumulative social economic impacts during the pre-construction, construction

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and operational phases of the proposed development as they relate to, (but not restricted to) the following:

- Water and sanitation issues
- Human health and safety
- Fire safety requirements
- Noise and vibration
- Unemployment
- Fire safety requirements
- Occupational health and safety of the workers
- Impacts of land use change

The ESIA will distinguish between significant positive and negative impacts, reversible or irreversible, direct and indirect, long term and immediate impacts as well as unavoidable impacts.

2.3.5 Mitigation and Management of Negative Impacts

Prepare guidelines for avoiding or reducing as far as possible, any adverse impacts due to the proposed usage of the site and utilizing of existing environmental attributes for optimum development. Recommendations will be made for feasible and cost-effective mitigation measures to prevent or reduce significant negative impacts to acceptable levels. Measures to enhance positive impacts of the proposed development will also be recommended and discussed in order to ensure maximum benefit.

2.3.6 Emergency Response Management Plan

Recommendations will be made for the development of an Emergency Response Plan to ensure that procedures are in place to handle any emergency.

2.3.7 Monitoring

Prepare an environmental management and monitoring plans to ensure that the mitigation and environmental management measures identified and recommended through the ESIA are adhered to and implemented.

Identify and include monitoring indicators under the main thematic areas of social and ecological impacts; impacts related to the set up and operational phases including off-site impacts and impacts related to post operational phase. Recommendation will be made to ensure implementation of the mitigation measures and long-term minimization of negative environmental impacts.

2.3.8 Project Alternatives

Examine alternatives to the project including both the 'Action'; that is, issues relating to developing the project on the current location, development and 'No-Action' alternative.

2.3.9 Stakeholder Consultation

The Consultant will undertake a public consultation exercise with regard to the project to:

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- Promote transparency and understanding of the proposed project and its potential environmental impacts;
- Assist in identifying potential environmental impacts associated with the proposed development;
- Encourage co-regulation, shared responsibility and a sense of ownership for all stakeholders during project planning period; and
- Assist in agency coordination and participating in public consultation through meetings and interviews to obtain views regarding project

2.3.10 Environmental Impact Statement

The Environmental Impact Assessment report will be concise and limited to the significant environmental issues. It will focus on findings, conclusions and recommended actions, supported by summaries of the data collected and citations for any references used in interpreting the data. The report shall contain, but not limited to the following major contents:

- a) Executive summary
- b) Introduction disclaimer
- c) Description of the proposed project
- d) Description of the Baseline Environment
- e) EIA study methodology
- f) Policy, Legal and Administrative Framework
- g) Analysis of Alternatives
- h) Significant Environment impacts and proposed mitigation measures
- i) Environmental and Social Management Plan –ESMP Environmental and Social Monitoring Plan
- j) Conclusion
- k) Annexes:
 - Minutes of the meetings
 - List of references
 - Photographs and Maps
- l) Appendices

2.3.11 Consultant Qualifications

The Environment and Social Impact Assessment will be undertaken by a specialist with the qualifications stated in **4.0 of the ToR above**

Part 2: Section 6. Statement of Requirements

3.0 Duration of the Assignment

The study will be accomplished within the time frame of the overall consultancy and below are the summarized guidance for the consultant:-

TABLE 1 SUMMARY OF TIME FRAME AND ACTIVITY SCHEDULE FOR THE EIA

Activity No.	Activity	Week	Deliverables
1	Preparation of the Environmental Project Brief	2 nd	Project Brief Submitted to NEMA for Approval
2	Environmental and Social Scoping	4 th	ToR for the ESIA study approved by NEMA
3	Baseline Studies	6 th	None
4	Environmental and Social Impact Assessment & Report Compilation	8 th	Draft ESIA report
5	Review of draft ESIS report and further consultation with lead agencies and stakeholders	10 th	Draft ESIS addressing lead agencies and stakeholders concerns for Client's comments
6	Submission of the final ESIA report to Client	12 th	Client Submits final ESIA report to NEMA

4.0 Timing

The study is part of the feasibility study, Environmental Impact Assessment and detailed engineering design for Bukedea Water Supply and Sanitation System in Bukedea, which are expected to be completed within the period of nine (9) months, which include a minimum of 3 months for presentation and approval processes.

5.0 Data, Services and Facilities to be Provided by the Client

The Client shall provide all reasonable assistance and provide any available data to the Consultant in carrying out the work.

- a) Client shall provide the Consultant with the following:-
 - A full description of the project, covering all the project components and the proposed operation mode of the facilities.
- b) The Client will assist in the facilitation for the co-operation of other Government Ministries and Departments and other agencies including the design consultant as required for carrying out the services and in liaison as necessary for the same purpose.
- c) The Client will give the Consultant assistance to gain access to all information required for the proper conduct and completion of the studies.
- d) The client will also be responsible for organizing scoping meetings, and any other meetings that are statutory requirements according to the EIA Guidelines and EIA regulations

RFP for Consultancy Services following publication of a notice of Expression of Interest issued by PPDA, March 2014

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Part 2: Section 6. Statement of Requirements

- e) In liaison with the consultant, the client will highlight key stakeholders that need to be consulted; though this does not take away the responsibility of the consultant to identify and engage other relevant stakeholders during the entire EIA study process

5.1 Obligations of the Consultant

The Consultant's obligations shall include, but not limited to the following:-

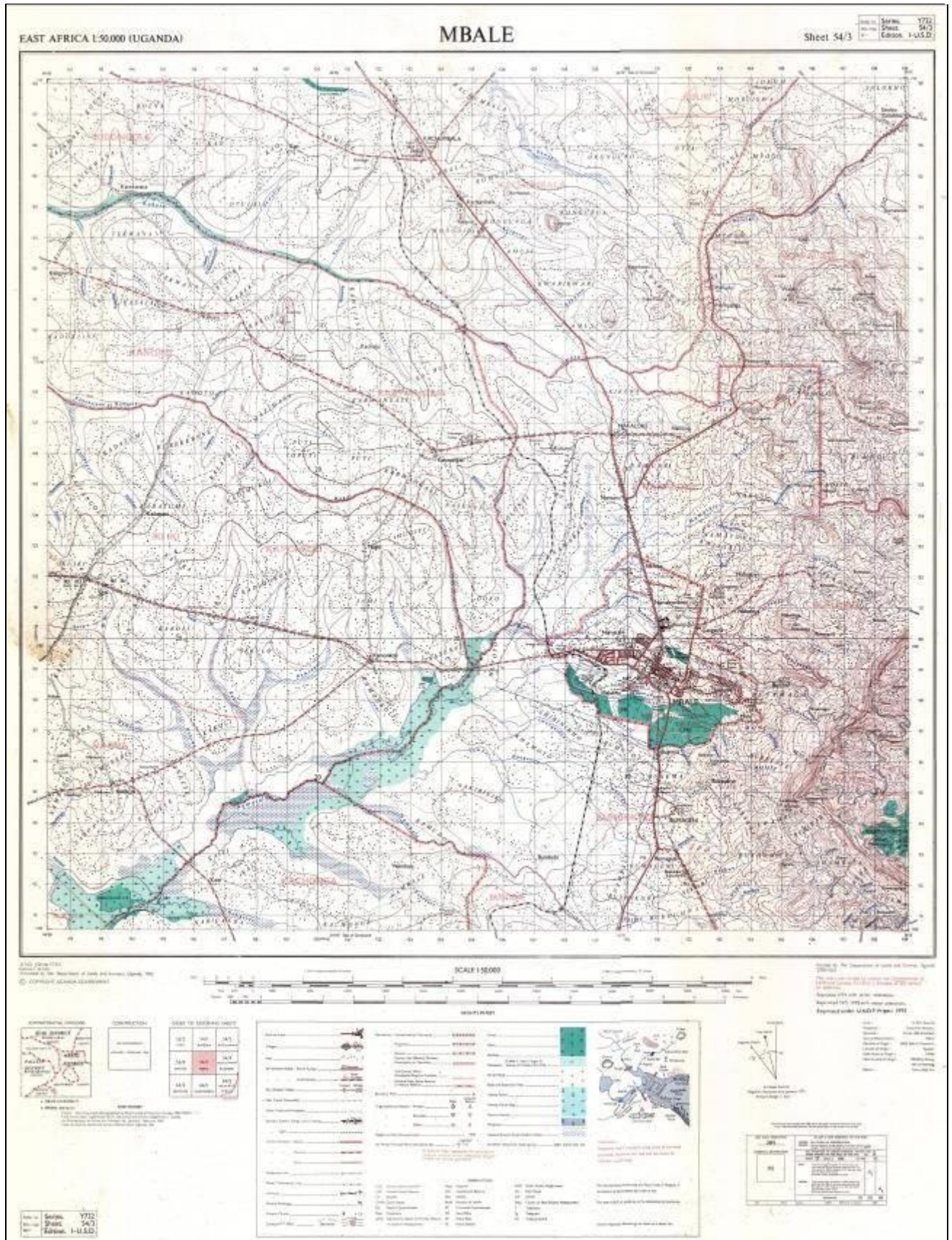
- The Consultant shall make his own arrangements for all necessary office and living accommodations, local transportation, office and other supplies etc. in connection with the services to be provided; and
- The Individual consultant must ensure that NEMA Certification and registration are valid as per the National Environment (Conduct and Certification of Environmental Practitioners) Regulations of 2003.

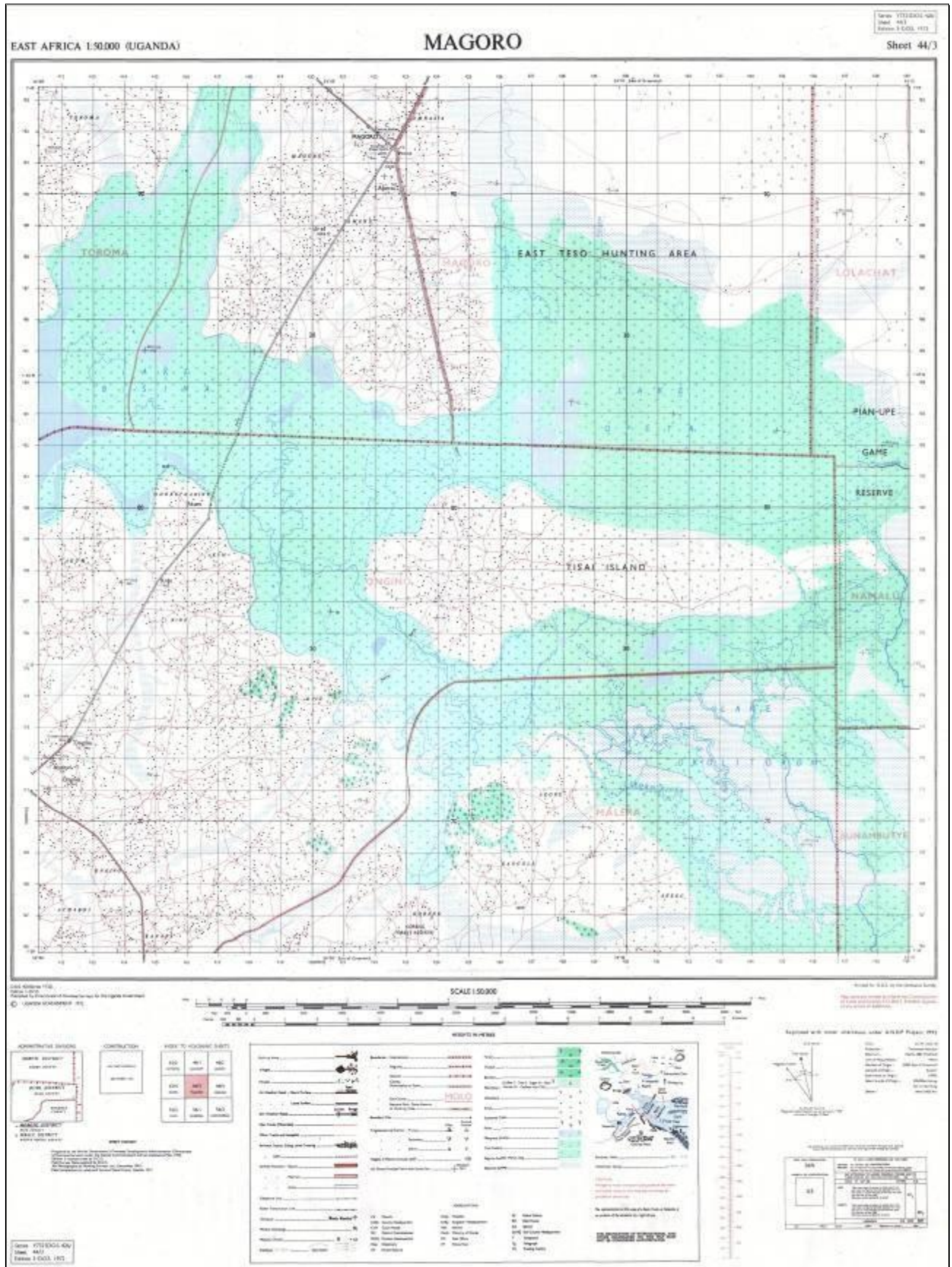
5.2 Reporting Requirements

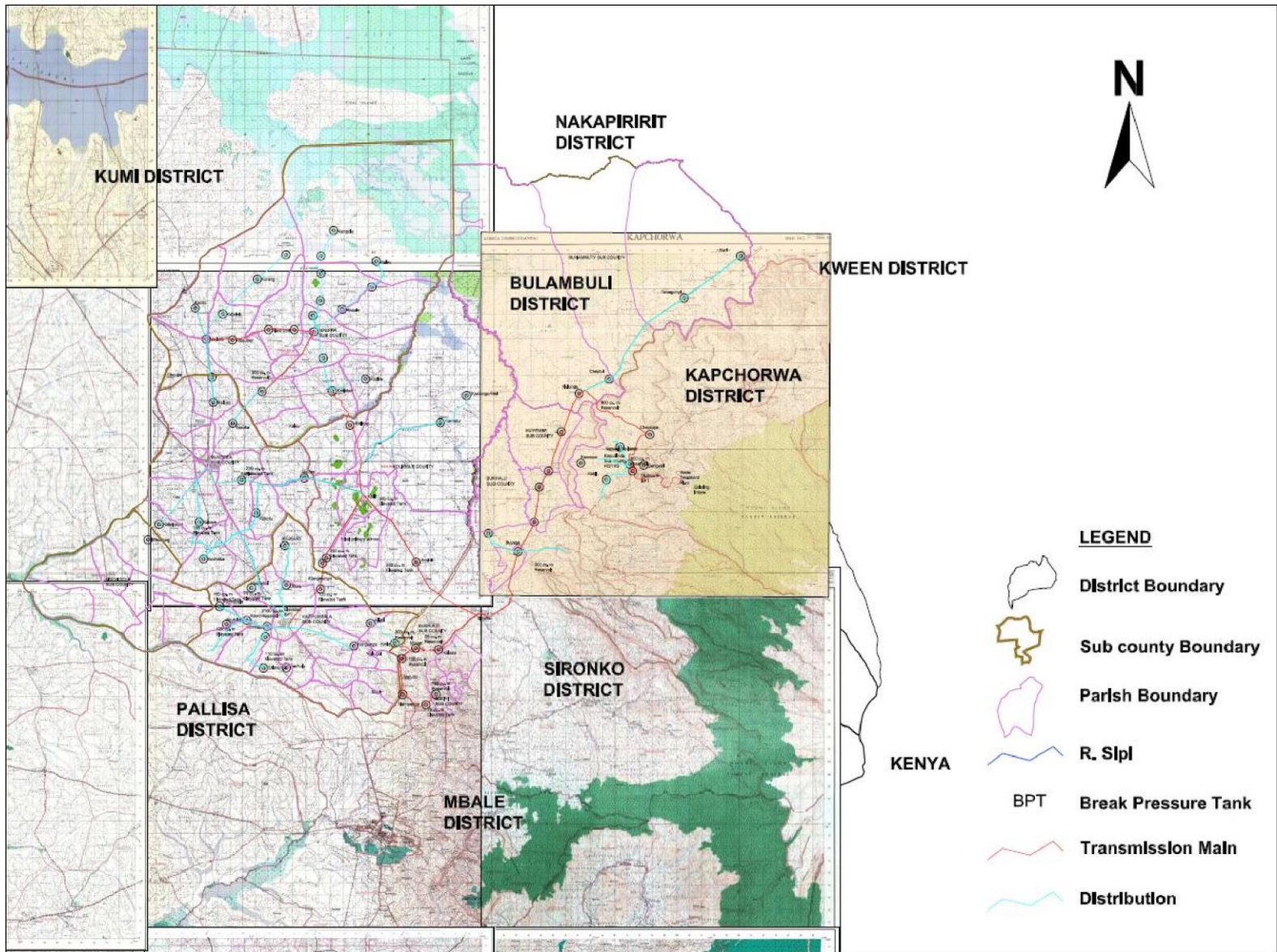
The consultant shall prepare and submit the following reports (all in English) to the Client. The reports shall be both in hardcopy and softcopy format.

- Expected Reports
- Environmental Scoping Report and TOR's for ESIA approved by NEMA
- Inception Report for ESIA
- Final Draft ESIA
- Draft ESIS addressing lead agencies and stakeholders concerns for Client's comments
- Revised ESIS
- Final ESIA and submitted to The Ministry of Water and Environment (MWE) and NEMA.

Annex 2: Project Location Maps







Annex 3: Notice of Presentations

TEL. GENERAL: +256 41 4505942
TELEPHONE: +256 41 4505945
 +256 41 4505950
 +256 41 4220203
 +256 41 4321316
 +256 41 4221198
 +256 414505941
FAX: +256 414505941
Email: mwe@mwe.go.ug
 ps@mwe.go.ug
website: www.mwe.go.ug



MINISTRY OF WATER AND
ENVIRONMENT
P. O. Box 20026
KAMPALA - UGANDA

In any correspondence on
this subject please quote Ref. No. **ADM/107/01**

July 10, 2015

The Managing Director
ACES Consulting Group in association with
SAMEZ Consultants Ltd,
Silivano Close, Mbuya
P.O Box 28018
KAMPALA

PRESENTATION OF 'FEASIBILITY REPORT FOR CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED DESIGN OF BUKEDEA WATER SUPPLY AND SANITATION SYSTEM IN BUKEDEA DISTRICT - CONTRACT No: MWE/SRVCS/13-14/00295

Following your submission of the draft feasibility report for the above study that was received on July 9, 2015; you are hereby invited to make a presentation to the Ministry team on Monday July 13, 2015. The presentation shall start at 11:30am at the Ministry Old Boardroom.

In this meeting, you will be expected to make a presentation on key aspects of the feasibility study to enable the team make meaningful decision for the next stage of the study.

Eng. Joseph Oriono Eyatu
FOR: PERMENNT SECRETARY

Draft Programme for Presentation of the Inception Report

DATE: July 13, 2015

Time	Activity	Action by
9:30 - 9:40 hrs	Welcome remarks by Chairperson and Self introductions	Chairperson
9:40 – 10:10 hrs	Presentation of the feasibility for Nyabuhikye/Kikyenkya	Consultant Nyabuhikye/Kikyenkya
10:10 – 11:25 hrs	Comments and Question from participants	All
11:30 – 12:15 hrs	Presentation of the feasibility for Bukedea	Consultant Bukedea
12:15 – 12:45 hrs	Comments and Question from participants	All
12:45 – 13:00 hrs	Closing Remarks	Chairperson



Uganda
Vision 2040

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 Email: microenergyug@yahoo.com



Our Ref: UWA/ESIA/28.07.2015

28th July, 2015

**The Executive Director,
 Uganda Wildlife Authority,
 Plot 7 Kira Road, Kamwokya,
 P.O. BOX 3530,
 Kampala, Uganda**



DIRECTORS
 MAUREEN TUSIME
 MSc. GEINFORMATICS
 BSc. SURVEYING
 MISU

SIMON PETER NGABO
 BSc. ENG (CIVIL)
 RENG (U), MUIFE

Dear Sirs,

ESIA FOR SIPI RIVER GRAVITY FLOW SCHEME

Request for Meeting

We are doing a plan for water supply scheme to supply 11 sub counties in the districts of Bukedea, Kapchorwa, Bulambuli and Sironko for Ministry of Water and Environment.

The water source is R. Sipi, which is currently supplying Sipi town with abstraction being done at the periphery of the park.

This is to request for a meeting on Friday morning or Thursday anytime this week to introduce the project and discuss environmental concerns from your side.

Your cooperation shall be highly appreciated.

Yours faithfully,

ACES CONSULTING GROUP LTD
 P. O. BOX 28018, KAMPALA
 DATE: 28/07/2015

ENG. NGABO SIMON PETER – DIRECTOR

Annex 4: List of Stakeholders Participation

Annex 5: Submissions from Stakeholders
