Kalangala Infrastructure Project (KIP), Uganda

Environmental and Social Impact Assessment Report

Executive Summary

0.1 FOREWORD

The proposed *Kalangala Infrastructure Project (KIP or the "Project")* comprises four key components, namely: rehabilitation of the main island road and ferry landings, potable water supply, improvement of ferry services and construction of a hybrid (solar/diesel) electricity plant on Buggala Island, Kalangala District, Uganda. The project company is *Kalangala Infrastructure Services Limited (KIS)*, registered in Uganda, and a wholly-owned subsidiary of the project sponsor InfraCo Limited, registered in the United Kingdom.

The purpose of the Executive Summary is to provide an overview, in non-technical language, of the main findings of the ESIA. Detailed information, including references and sources, can be found in respective chapters of the ESIA.

0.2 PROJECT BACKGROUND

In September 2005, the Government of Uganda (GoU) and InfraCo Limited entered into a Memorandum of Understanding (MoU), pursuant to which InfraCo was designated as the developer of the Kalangala Infrastructure Project on behalf of the GoU. Following conclusion of the first phase of work under the MoU, in March 2006, InfraCo submitted to the Steering Committee a Project Development Plan. Following comments and approval by the Steering Committee, a Project Development Plan was submitted for consideration and approval by the Cabinet of the GoU, which formally approved the Project Development Plan on September 13, 2006.

InfraCo has duly registered a local company, *Kalangala Infrastructure Services Limited* ("KIS" or "Project Company"), to undertake implementation of the Project.

0.3 APPLICABLE POLICIES, REGULATIONS AND INSTITUTIONAL FRAMEWORK

KIS conducted the ESIA to conform to regulations and policies (Box ES 3) of Uganda, international best practice of the World Bank Group and those of InfraCo's shareholder, the Private Infrastructure Development Group (PIDG). PIDG is a multi-donor, member-managed organisation, which provides financial and strategic support to encourage private infrastructure investment that contributes to growth and poverty reduction in developing countries. Member institutions include: the *UK Department for International Development (DFID)*, the *Swiss State Secretariat for Economic Affairs (SECO)*, the *Netherlands Ministry of Foreign Affairs (DGIS)*, the *Swedish International Development Cooperation Agency (Sida)*, the *World Bank* and the *Austrian Development Agency (ADA)*.

In Uganda, the National Environmental Management Authority (NEMA), which was created by the National Environmental Act, is the agency responsible for impact assessment of projects. NEMA is mandated with the responsibility to oversee, coordinate and supervise environmental management in Uganda.

Box ES 3: Policies and regulations reviewed

Policy Framework:

- The National Environment Management Policy, 1994
- The Uganda Forestry Policy, 2001
- The National Water Policy, 1999
- Energy Policy, 2001

Legal Framework:

- The Constitution of the Republic of Uganda, 1995
- National Environment Act, Cap 153
- Water Act, Cap 152
- Land Act, Cap 227
- The Road Act, Cap 358
- Town and Country Planning Act, Cap 246
- Local Governments Act, Cap 243
- Public Health Act, Cap 281
- National Forestry and Tree Planting Act, 2003
- Electricity Act, Cap 145
- Investment Code Act, Cap 92
- The National Environment (Wetlands, River Banks, and Lakeshores management) Regulations, 2000
- Uganda Wildlife Act, Cap 200

International Conventions and Agreements:

- The Convention on Biological Diversity (CBD)
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- The Ramsar Convention on Wetlands, 1971
- Protocol Agreement on Conservation of Common Natural Resources (1982)
- Protocol Agreement on the Conservation of Common Natural Resources (1982)

Institutional Framework:

- National Environmental Management Authority (NEMA)
- Ministry of Energy and Mineral Development, (MEMD)
- Electricity Regulatory Authority (ERA)
- Ministry of Works and Transport (MoWT) and RAFU
- Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)
- Ministry of Water and Environment (MoWE)
- National Forestry Authority (NFA)
- District Land Board
- Town and Country Planning Board
- Local Administration Structures
- Community Based Organisations (CBO)
- Development Partners

0.4 PROJECT COMPONENTS AND THEIR DESIGN

a) Upgrade of main island road

This component will involve the rehabilitation of the 66 km main road from Luku landing site on the northwestern side of the island towards Kalangala town ending at Mulabana landing site on the southern end of the island. Currently, the road is not in a good condition and in the wet season certain stretches are not passable. Introduction of a new ferry service (the MV Kalangala) on *Nakiwogo–Lutoboka* route, in April 2006, noticeably increased vehicular traffic on the road. Developments such as the BIDCO plantation operations, construction of the oil mill and Bidco power station and components of the KIP, are expected to contribute to further increases in road traffic. These reasons justify upgrading the road to be able to cope with this expected increase in traffic.

The main road will be upgraded to a Class B gravel road 8.6 meters wide (with a 5.66 m carriageway and 1.5 m shoulder on each side) with a 200 mm wearing course/ road base of natural gravel and a 300 mm natural gravel sub base. The existing alignment will be retained where possible, to minimise social and environmental impacts. The expected construction period is 12 months.

b) Power generation plant

Although, Buggala Island was identified by the GoU as a priority area for rural electrification, currently there is no grid-based electricity supply. Power is generated mainly via independent diesel generators and some solar panels, primarily to serve the tourist establishments, some commercial enterprises and the mobile phone masts in Kalangala Town. A diesel generator has recently (2006) been installed near Kalangala Town, mainly to serve the local government offices in Kalangala for a few hours each day. The significant majority of households, commercial enterprises, schools and healthcare facilities on the island lack access to grid-based electricity.

To meet some of the energy needs of communities, businesses and institutions on Buggala Island, KIS is proposing to establish a complete integrated power supply system comprised of a power generation system, a transmission/distribution system and domestic connections. The solar power generation system will comprise of a photovoltaic (PV) power plant with a peak capacity of 600 kW, supplemented by two 250 kW diesel generators. The solar system will include a battery bank and inverter system which will act as the synchronising unit of the entire power generation system, securing the correct power quality on the network. The batteries to be housed in two or four 20 ft containers are expected to have a useful life of six years, after which they would be recycled at Uganda Batteries Limited (UBL) or other similar facility which currently recycles similar large backup batteries disposed of by local telecommunication companies.

The power plant, requiring a footprint of about four acres, will be located on public land which has been leased to KIS under a 49-year lease agreement. A 50,000 litre fuel storage tank will be installed at the power station site.

The principle structures of the transmission line/distribution system will consist of a two-circuit 33 kV power line, transformers, wooden poles and supports. The grid will mainly follow the alignment of *Luku–Kalangala–Mulabana* main island road so as to minimise effects on private property and environmental resources and ease access during construction operation and maintenance. It is expected that the grid will pass through several forests, some of which are gazetted reserves controlled by the National Forest Authority (NFA).

c) Improvement of ferry operations and repair and upgrade of the ferry landings

Currently, two ferry services operate between the mainland and Buggala Island: Bukakata-Luku and Nakiwogo Pier (in Entebbe) to Lutoboka on the island. A demand assessment carried out by NERA (2006), on behalf of the Project Developer, projected a 51% increase in ferry passenger and vehicle traffic from 2007 to 2012, on assumption that the road will be rehabilitated. It is unlikely that the capacity of both existing ferry services will be sufficient to service this increase in traffic. KIS proposes to develop a private, fee-paying commercial ferry service between Bukakata and Luku.

The Project Company is finalising the purchase of two new ferries, the first of which will be put in service within 12-14 months of contract signing and the second one within 10 months after delivery of the first ferry. The Project has also retained the alternative option of purchasing, refurbishing and operating two second-hand ferries, one of which is the existing ferry, on the *Bukakata-Luku* route. The first ferry, purchased in the Netherlands will take about 12 months to be refurbished while the existing ferry is estimated to take 8 months. The project developer will ensure that one ferry is available to serve the route, when the second is under rehabilitation. A fuel storage facility will also be constructed at Bukakata.

During operation by the (private) operator, ferry services would remain regulated by the Ministry of Works & Transport (Transport Licensing Board) and users (vehicles and passengers) will be charged a fee agreed between KIS and the Ministry.

Silting and the recent drop in level of Lake Victoria by as much as 2 metres has made landing at fixed-level piers a significant challenge for the existing government-owned ferry. In addition, the gabion boxes acting as a retaining wall on one side of the ferry landings have been severely undercut, with whole sections of gabion boxes having collapsed and washed away.

The Project Company proposes to repair and upgrade ferry landings at Bukakata and Luku as part of the rehabilitation of Kalangala main island road. The upgrade and repair will consist of a partial civil reconstruction of the ferry landings in such a way as to allow

the new ferries to land. The Project Company proposes to install in due course floating ferry landings (pontoons) to accommodate variation in lake level.

d) Rehabilitation of water supply infrastructure

Buggala Island has a prevalent potable water shortage. Apart from Kalangala Town, Lutoboka and Senero landing sites, the rest of the population generally uses lake water, which is not safe for bathing and consumption. Gravity flow water supply schemes at Mweena, Lutoboka and Senero have either stopped functioning (for example, Mweena) or their yields severely reduced (e.g. Senero), due to poor operation/maintenance, long dry spells and environmental degradation within the catchment. The existing pipe network in Kalangala town is in poor condition and in need of replacement. Therefore rehabilitation and expansion of water infrastructure on Buggala Island is necessary to cater for the present and future water demand.

The water supply component will be implemented in three phases as follows:

- Phase 1: Set up and operation of piloted-scale water schemes at Kasekulo and Mulabana landing sites. In these schemes, lake water would be treated, and supplied to community at standpipes.
- Phase 2: Replication across Buggala Island, of the small-scale water systems piloted at Kasekulo and Mulabana landing sites.
- Phase 3: Rehabilitation and extension of piped water system in Kalangala town.

A Project Brief for Phase 1 ("Piloting Small Scale Water Supply Systems for the Mulabana and Kasekulo Landing Sites in Kalangala District, Republic of Uganda") was submitted to NEMA in August 2006, by KIS and subsequently approved by NEMA (a Certificate of Authorisation was issued in October 2006). Phase 2 will involve replicating a small-scale water supply system of similar design in the following landing sites:

- Bewendero
- Bbeta
- Mulore
- Bugoma
- Kagulube
- Kibanga-mabuga

For more information on the design of the system, please refer to the Project Brief submitted to NEMA in August 2006.

Rehabilitation of the existing reticulated piped water system in Kalangala Town and expansion of the network will entail installing pipes and standpipes to areas currently not served by the piped water network. Water will be abstracted from the lake and treated before supplying it to users who would pay tariffs agreed between KIS and the Directorate of Water Development in Ministry of Water and Environment.

The proposed water treatment plant to be located in Mweena Village is designed to treat 418 m^3/day with a rated output of 376 m^3/day (the difference being for plant use). The water treatment plant will comprise low-lift and high-lift pumping stations, pressure filters, alum dosing channel, sedimentation tank, rapid sand filters, back wash tank, chlorine contact tank and chlorine house and clear water tank.

0.5 BASELINE SOCIAL AND ENVIRONMENTAL CONDITIONS

a) Geographic location

Located in Lake Victoria, Buggala Island is the largest of 84 islands (commonly known as Ssese Islands) that make up Kalangala District. The whole archipelago lies between longitudes 39°E and 33°E and latitudes 0° and 1°S. Buggala Island is the largest island in the District, covering an area of 296 km^2 (or 65% of the total district land area) and is home to about 50% of the District's population. Kalangala District covers a total area of 9,066.8 km^2 (3.75% of the total area of Uganda) of which only 454.8 km^2 (5%) is land. Kalangala District is bordered by the districts of Masaka and Rakai to the west, Mpigi and Wakiso to the north, Mukono to the east, and by the Republic of Tanzania to the south.

Table ES 5.1: Location of proposed sites and their characteristics

Location	Proposed development	Topography
Bukuzindu near Bbeta and, Sozi Point near Kalangala Town	Preferred sites for PV Plant/diesel generator	Generally flat
Kalangala Town	Rehabilitation of reticulated town water supply system	Generally flat, sloping to the lake in an easterly direction
Bukakata Landing Site on the mainland	Ferry landing site and fuel storage facility	Generally flat
Luku Landing Site on Buggala Island	Ferry landing site	The area has a general north-easterly slope towards the lakeshore
Luku-Kalangala-Mulabana	Upgrade of the main island road; transmission line with tee-offs	Existing road is characterized by varied topography, which comprises flat stretches, dips and steep gradients

b) Biophysical conditions

Kalangala District is entirely overlain with ferralitic (iron-rich) soils of sandy clay loam type, with a characteristic red colour. These soils are undifferentiated and are represented by the Ssese "red" and Ssese "brown" soils. Buggala Island is long and narrow with a gentle elevation from the waterside culminating into an undulating flat formation at the highest point on the island. It has a 'spine' of narrow flat topped ridges at 1,220 to 1,260 m above sea level. Generally, the land is flat with slightly undulating slopes, of less than 15% gradient.

The "Lake Victoria Zone" climate of Kalangala District is generally moist and humid throughout the year. Two dry seasons are experienced from December to March, and June to July. Annual rainfall ranges from 1125 - 2250mm, with mean monthly rainfall of 140mm (ranging from 125mm in the dry season to 300mm during the peak rainy season). Precipitation is highest between March and May, whereas lighter rains fall between October and November. Mean annual maximum temperature of Kalangala is 25^{o}C, while mean annual minimum temperature is 17.5^{o}C. The District has solar radiation of over 450 calories/cm^2/day and average of 6.1 hours of sunshine per day.

Apart from ferry landings at Luku, Bukakata and Bukuzindu near Bbeta, all proposed development sites are well drained with no surface water. The sandy grassland south of Bukuzindu solar power plant site is categorized as a seasonal wetland. Seasonal streams cross the main road at several places as indicated by the presence of culverts.

Buggala Island has a variety of aquatic and terrestrial animal species: including 17 known amphibian and 12 reptile species; and 75 known bird species (although none endemic). The diversity of mammals in Kalangala District is not particularly rich, perhaps as a result of its isolation from the mainland.

The island road traverses eight gazetted Central Forest Reserves, where the vegetation is predominantly characterized by moist, evergreen forests. Notably, it is commonly saplings (or seedlings) rather than mature trees that grow within the road reserve.

c) Socio-economic and cultural conditions

The average population density in the District increased from 35 persons per km^2 in 1991 to around 74 persons per km^2 in 2002. Buggala Island has an average density of around 56 persons per km^2 and Kalangala Town is the most densely populated area (around 166-220 persons per km^2). Average household size in Kalangala District is 2.6 persons per household compared to a national average of 4.7 persons per household.

The 2004 Human Development Index (HDI) for Kalangala District was 0.529, compared to the national HDI of 0.488. This placed the District second to Kampala in terms of human development. The Human Poverty Index (a measure of deprivation) of Kalangala District in 2003 stood at 33.9, compared to the national HPI of 36. This indicated that people living in Kalangala District are better off than their counterparts in most other parts of Uganda, except Kampala. However, it also reveals that one out of three residents or 33.3% of the population of the District is poor.

Vulnerable groups in Kalangala, i.e. people less able to cope with sudden changes or economic shocks, include the elderly (3% of the total population is over 60 years of age), children, the ill, disabled and female-headed households dependent on a single source of income. Another category of vulnerable groups is households dependent on natural resources that may be affected by the project activities. Migrant communities who have moved to the region in search of employment may also be considered vulnerable if they do not succeed in getting jobs and adequate shelter.

The main sources of livelihood on Buggala Island are fishing, subsistence farming, commercial farming, trade/commerce, harvesting forest products and charcoal production. People in the project area tend to practice more than one livelihood activity depending on the season. For example, a fisherman may fish during the two peak fishing seasons in the year, and in the so-called "lean" periods, he may also undertake subsistence farming or trading.

The traditional role of women as housekeepers still dominates, with women responsible for household activities, child-rearing, subsistence farming and livestock-rearing, collecting firewood and water, buying basics like food, and clothing and medication. Women sometimes sell their produce on the market and engage in petty trading. Decision-making, participation in the community discussions and politics are primarily in the male domain.

The land use on Buggala Island is mainly secondary forest alternating with subsistence farmland, grasslands, woodlands, bushland and wetlands. In more densely populated areas (which generally correlate with more fertile soils) the proportion of land cultivated is relatively higher. Over the past three years, oil palm plantations have been established across large areas of the island (by BIDCO and its outgrowers), most of them on previously forested land. Land use along the main island road consists of linear settlements and subsistence farming. Land tenure on Buggala comprises *Mailo* tenure, *Customary*, *Freehold*, *Lease* and *Public Land* tenure.

There are no known archaeological or cultural sites in the project area apart from a rock outcrop near the road at Malanga in Mulabana, which is used as a traditional site of worship.

Detailed baseline conditions are presented in Chapter 4.

0.6 PUBLIC CONSULTATION AND DISCLOSURE

The purpose of consultation was to maximise stakeholder awareness of the proposed project and ESIA study and to maximise opportunities for community involvement. While face-to-face meetings and focus group discussions were the principal modes of consultation, telephone calls, distribution of project flyers and soliciting feedback were also undertaken. As shown in table ES 6.1, a diversity of stakeholders involving communities, Kalangala local government, central government ministries and lead agencies were consulted.

Table ES 6.1: Stakeholders categories consulted

Category	Stakeholder
Government - National	National Environment Management Authority (NEMA)
	National Forestry Authority (NFA)
	Ministry of Works & Transport (MoWT)
	Ministry of Agriculture, Animal Industry & Fisheries (Vegetable Oil Development Project)
	Ministry of Energy & Mineral Development
	Electricity Regulatory Authority (ERA)
	Rural Electrification Agency (REA)
	Transport Licensing Board
	Directorate of Water Development- Water Resources Management Department (DWD-WRMD)
	The Ministry of Finance, Planning and Economic Development
Government - Local	District officials: Chief Administrative Officer (CAO), Community Development Officer, District Planner, District Environmental Officer/Wetland Inspection Officers, Production Officer/ District Agricultural Officer, District Director of Health Services, District Engineer), District Chairman and executive
	Local Council Leaders (LC I, II, III)
	National Forestry Authority, NFA - Kalangala Sector
	Kalangala District Land Board chairperson
Traditional Authorities	Clan leaders
Social Development NGOs	Kalangala District NGO Forum
	Development Research & Training
	Kalangala Forum for People Living with HIV
	Ssese Health Effort for Development
Women NGOs	Kalangala District Women Initiative for Development
Local Communities on Buggala Island	Communities especially in sub-counties* comprising project sites (* Bujumba, Mugoye and Kalangala Town Council)
Vulnerable Groups	These included the elderly, children, women, including women headed households and people affected by HIV/AIDS.
Community Based Organisations	Ssese Community Development Association (SSECODA)
	Kalangala Oil Palm Out growers' Trust
Private Sector Companies	BIDCO
Other Companies	Beach Resort owners/operators
	Timber /Lumbers dealers

From engagement and consultation activities, a number of issues were identified and taken into account during preparation of the ESIA report. Key findings are summarised below while a comprehensive listing of issues identified, responses and participants is provided in Appendix 2 of the ESIA.

Table ES 6.2: Summary of key issues and responses from public consultation

	Issue	Response
1	***Ferry service:*** Some people on the island were concerned about having to pay for ferry transport when the current service is free because of the full subsidies of the GoU. Others wondered if reliability and safety of ferry transport would improve. *(Note: Another section of stakeholders appreciated safer and more reliable schedules and fixed/ predictable fares that would come with private operation of the ferry service).*	• Ferry transport is currently characterized by erratic schedules, frequent breakdowns, lack of fuel, poor hygiene and safety. Having a private operator take over will change all this to efficient, safe, reliable service. An investment will be made in two ferries. Recouping the investment means users should pay for ferry transport on top of any subsidy made by Uganda Government. • Ferry fares would be set by agreement between KIS and the Uganda Government. • Ferries, operated responsibly as a profitable business would be safer and more reliable than the existing ferry service.
2	***Affordability, stability and regulation of tariffs:*** Common stakeholder questions were about affordability of paid services; who would set and regulate tariffs for water, ferry and electricity.	• On affordability: While KIP cannot naturally make charges affordable to every single person on the island, proposed figures indicate charges that would be lower than current costs. For example, a 20-litre can of raw (untreated) lake water currently cost UGS 300 (18 US cents) while KIP expects an equal volume of *treated* water to cost UGS 50 (3 US cents). • On stability of charges, the process of setting, approving and regulating tariffs will be a preserve of government and the developer would not have liberty to erratically alter charges. Any tariff changes will be dedicated by annual inflation rate; any other changes would have to be approved by government.
3	***Compensation before road rehabilitation:*** A common concern was whether compensation would be adequate, fair and timely.	• KIP is committed to ensuring timely, adequate and fair compensation to persons whose property would be affected by the project. Compensation would be done according to national laws (The Constitution and Land Act) through a private valuer, as is the law, and overseen by local leaders. KIP also plans to engage a local witness NGO to ensure total transparency in the compensation exercise. • A key element of successful compensation and implementation of KIP is the grievance mechanism. This is intended to actively manage and track stakeholder grievances to ensure that they are resolved in an appropriate and timely manner.
4	***Sustenance of the improved infrastructure:***	• While KIS would be responsible for maintenance of the water supply, ferry and electricity infrastructure, government through the Ministry of Works & Transport, would maintain the improved

	Stakeholders on the Island wondered who would be responsible for maintenance of the infrastructure after they are improved.	main island road. That notwithstanding, project development would have inbuilt conditionalities to ensure that contractors put up infrastructure that can be operated for given period of time without major defects.

Grievance Management

To ensure that stakeholder grievances are handled and resolved conclusively, the following mechanism is proposed.

All complaints received verbally or in writing shall be recorded by KIS in a grievance log. A KIS employee will be appointed as the Grievance Manager and will ensure that appropriate action is taken to respond to the complaint. If they are unable to deal with a complaint directly he/she will refer the complaint to an appropriate individual for resolution. The Grievance Manager remains responsible for tracking the complaint and ensuring that it is addressed. Response to complaints will be done in writing, although a verbal response will also be provided where appropriate. The Grievance Manager will be responsible for monitoring complaints including production of quarterly reports that provide an analysis of the type of complaints received, number and status of complaints, outstanding issues to be addressed and actions to reduce complaints. These reports will be held by KIS but made available to NEMA.

Compensation Issues

KIS will follow the Ministry of Works/RAFU Road Development Programme Resettlement/ Land Acquisition Policy Framework for acquisition of sites associated with upgrade of the road. For neutrality and transparency, KIS proposes to engage a suitably qualified Ugandan NGO to oversee the compensation process to ensure that those displaced receive fair compensation; also that they are 'assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher'. This principle is in line with the World Bank's Involuntary Resettlement Policy (OP 4.12).

KIS is currently working with RAFU to develop a Resettlement Action Plan to ensure that adequate, fair and prompt compensation is paid before commencing construction.

0.7 ESIA PROCESS

This ESIA sets out our analysis of the environmental and social impacts of the Kalanagala Infrastructure Project (KIP). It has been conducted to meet InfraCo's company standards, external ESIA requiements of NEMA and benchmarked against international best practice, such as that of the World Bank Group and those of the Private Infrastructure Group ("PIDG"). The objective of the ESIA, conducted according to Terms of Reference approved by NEMA, was to ensure that all components of the Kalangala

Infrastructure Project are designed to prevent or reduce any significant negative social and environmental impacts while maximizing project benefits. Upon receipt of the ESIA report, NEMA will make it available to all stakeholders and lead agencies such as the National Forestry Authority and relevant government ministries (such as those responsible for energy, agriculture, works and transport) for review.

The ESIA study commenced in September 2006 with a scoping exercise in which potential stakeholders were identified and their input sought on relevant issues to be studied in the detailed ESIA. Baseline data was collected and a preliminary analysis of impacts and their mitigation measures undertaken. Scoping culminated in the formulation of terms of reference that were subsequently approved by NEMA.

The detailed ESIA study entailed dissemination of scoping findings, ecological fieldwork, social surveys and consultation with relevant lead agencies, local communities on Buggala Island and NGOs, on likely impacts and mitigation measures. These consultations were carried out from December 2006 through to February 2007.

Main sections of the ESIA Report, which are summarized in the rest of this executive summary, are:

a) Applicable policies, regulations and institutional framework,
b) Baseline social-environmental conditions in the project area,
c) Project alternatives,
d) Consultation including stakeholder responses,
e) Potential social and environment effects of the project, along with proposed mitigation and monitoring measures.

0.8 ALTERNATIVES

A number of alternatives (including a "Without Project" scenario) have been considered as part of this project. These were assessed, taking into consideration opportunities to maximise development benefits, environmental and social impacts, cost effectiveness and ease of maintenance.

Without the Project ("Without Project" scenario), BIDCO project and other developments will increase pressure on existing infrastructure and services. In addition, the island residents and businesses will be deprived of the opportunity to access electricity services and improved access to safe drinking water, among others.

For the power plant, two alternatives sites are being considered by KIS: Sozi Point near Kalangala Town and Bukuzindu near Bbeta. KIS has been granted a 49-year leasehold interest on both sites that are on public land. Bukuzindu is more favorable because the Local Town Council plans a housing development at Sozi point. No feasible alternatives can be considered for the upgrade of the road and town water supply.

0.9 IMPACT PREDICTION AND ANALYSIS

Impact prediction and analysis utilized a project lifecycle approach: identifying and analysing impacts from *planning*, *construction*, through *operation* to *decommissioning* phases. The impact analysis aimed to develop recommendations for all phases of the Project to maximize benefits and avoid/reduce/minimize adverse environmental and social impacts.

KIS will generate significant socio-economic developmental benefits at both national and local levels. Key sectors where benefits are expected include health, employment, water supply, electricity, fisheries and tourism.

Key potential economic benefits include:

- Improved connectivity and accessibility between the mainland and the island and between the towns and communities along the road.
- Economic benefits for the local business community through a reduction in transaction costs (easier access to markets, reduced travel times, cutting out middlemen, etc.).
- Access to electricity power supply will:
    - Replace more costly energy sources such as kerosene for lighting, diesel for motors, pumps and generators.
    - Allow traders to store perishable goods. Refrigeration of fish is a key benefit for fishermen.
    - Improve quality of life for residents and businesses with electric lighting and power for domestic appliances. This may result in time-savings especially for women and improvements in productivity.
    - Allow activities such as studying, socialising and working at night, using electricity-powered lighting.
    - Enable health facilities to store vaccines and install more equipment.
- Increased access to safe and reliable water may contribute to:
    - Improvement in the health of local communities through a reduction in the incidence of water borne and water related diseases.
    - Increase in time-savings for women and children (often whose responsibility it is to collect water).
- Employment opportunities during project construction and operation.
- Increased economic activities as a result of induced development.

Table ES-9 shows a summary of the key positive and negative impacts of the project and their characterization (color codes are explained in Chapter 6). The detailed impact assessment is presented in Chapter 7.

Table ES-9: Summary characterization of key potential impacts

Component Activity	Text Ref.	Issues/Impacts/Risks	Preliminary Assessment of Significance			
			ENERGY	ROAD	WATER	FERRY
Phase: Construction						
Sourcing of construction material.	7.1.1.1	Increased income earning opportunities	POSITIVE	POSITIVE	POSITIVE	POSITIVE
	7.1.1.2	Risks related to un-restored quarries and borrow pits.	MINOR-MODERATE	MINOR-MODERATE	MINOR-MODERATE	NEGLIGIBLE
Transportation of materials and equipment.	7.1.2.1	Increased congestion on the road and ferry.	MODERATE	MODERATE	MINOR-MODERATE	MINOR-MODERATE
	7.1.2.2	Air pollution, dust, noise and vibration impacts associated with the increase in construction related traffic.	MINOR	MINOR	NEGLIGIBLE-MINOR	NEGLIGIBLE
Storage of construction materials	7.1.3.1	Pollution of land and watercourses and material losses.	MINOR-MODERATE	MINOR-MODERATE	MINOR-MODERATE	NEGLIGIBLE
Site preparation	7.1.4.1	Loss of land and vegetation	MAJOR	MAJOR	MINOR-MODERATE	N/A
	7.1.4.2	Restricted Access	MINOR-MODERATE	MODERATE	MODERATE	N/A
	7.1.4.3	Damage to cultural sites.	N/A	MINOR-MODERATE	N/A	N/A
Establishment of construction yard and campsites	7.1.5.1	Generation of waste.	MAJOR	MAJOR	MODERATE	N/A
Employment	7.1.6.1	Employment opportunities.	POSITIVE	POSITIVE	POSITIVE	POSITIVE
Influx of construction workers.	7.1.7.1	Disruption of social networks and social tension between the locals and outsiders.	MINOR-MODERATE	MINOR-MODERATE	MODERATE-MODERATE	N/A
	7.7.7.2	Increase in crime, prostitution and communicable diseases.	MAJOR	MAJOR	MAJOR	N/A
	7.7.7.3	Increased pressure on social services	MINOR-MODERATE	MINOR-MODERATE	MINOR-MODERATE	N/A
Phase: Operation						
Noise pollution	7.2.1.1	Increased noise Pollution	MODERATE	MODERATE	N/A	N/A
Air pollution	7.2.2.1	Increased air pollution from vehicle emissions	N/A	MODERATE	N/A	N/A

Component Activity	Text Ref.	Issues/Impacts/Risks	Preliminary Assessment of Significance			
			ENERGY	ROAD	WATER	FERRY
	7.2.2.2	Increased air pollution from diesel generator	MINOR	N/A	N/A	N/A
Oil spills and waste	7.2.3.1	Fuel spills	MODERATE	N/A	N/A	MODERATE
	7.2.3.2	Waste generation	MINOR	N/A	N/A	MINOR
New road effect	7.2.4.1	Health and safety risks	N/A	MINOR-MODERATE	N/A	N/A
Ferry health and safety	7.2.5.1	Health and safety risks	N/A	N/A	N/A	MAJOR
Loss of livelihoods	7.2.6.1	Loss of livelihoods	N/A	N/A	MINOR-MODERATE	N/A
Ponding at standpipes	7.2.7.1	Ponding at standpipes	N/A	N/A	MINOR-MODERATE	N/A
Affordability of tariffs	7.2.8.1	Unaffordable tariffs	MINOR-MODERATE	N/A	MINOR-MODERATE	N/A
Fair and equitable access to water and power supply	7.2.9.1	Inequitable access to water and power supply	MINOR-MODERATE	N/A	MINOR-MODERATE	N/A
Improved road infrastructure	7.2.10.1	Improved road infrastructure	N/A	POSITIVE	N/A	N/A
Improved access between the island and mainland	7.2.11.1	Improved access between the island and mainland	N/A	N/A	N/A	POSITIVE
Improved health and safety and reduced breakdowns	7.2.12.1	Improved health and safety and reduced breakdowns	N/A	N/A	N/A	POSITIVE
Increased availability of power on Buggala Island	7.2.13.1	Increased availability of power	POSITIVE	N/A	N/A	N/A
Provision of water to Kalangala town	7.2.14.1	Provision of water to Kalangala town	N/A	N/A	POSITIVE	N/A
Employment during operations	7.2.15.1	Generation of employment	POSITIVE	N/A	POSITIVE	POSITIVE
Negative cumulative impact	7.2.16.1	Induced development: In-migration	MAJOR	MAJOR	MAJOR	MAJOR

Component Activity	Text Ref.	Issues/Impacts/Risks	Preliminary Assessment of Significance			
			ENERGY	ROAD	WATER	FERRY
	7.2.16.2	Induced development: Potential exploitation of resources	MAJOR	MAJOR	MAJOR	MAJOR
Positive cumulative impacts	7.2.17.1	Induced development: Increased economic activity	POSITIVE	POSITIVE	POSITIVE	POSITIVE