

# MAKUUTU RARE EARTHS PROJECT IN BUGIRI, MAYUGE AND BUGWERI DISTRICTS



## ESIA REPORT

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## ACRONYMS

(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	Ammonium sulphate (AMSUL)
ACDP	Agriculture Cluster Development Project
ART	Antiretroviral therapy
CAIIP	Community Agriculture Infrastructure Improvement Programme
CAO	Chief Administrative Officer
CO	Carbon Monoxide
CREE	Critical Rare Earths Elements
CSR	Corporate Social Responsibility
DDP	District Development Plan
DGSM	Directorate of Geological Survey and Mines
DHO	District Health Officer
DLG	District Local Government
DWRM	Directorate of Water Resources Management
EBITA	Earnings before interest, taxes, and amortization. A measure of company profitability
EL	Exploration License

EPFIs	Equator Principles Financial Institutions
ESIA	Environment and Social Impact Assessment
ESMP	Environment and Social Management Plan
FIFO	Fly In Fly Out workforce resident at a different location as opposed to residential.
GBV	Gender Based Violence
GDP	Gross Domestic Product
GIS	Global Information System
H <sub>2</sub> SO <sub>4</sub>	Sulphuric Acid
HC	Health Center
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
HMIS	Health Management Information System
HREE	Heavy Rare Earths Elements
ICT	Information and Communication Technology
IEC	Information Education Communication
ISR	In Situ Recovery
JORC	Joint Ore Reserves Committee
Koc	Soil Organic Carbon (Koc) / Water (Kow) Partition Coefficient
Kow	Octanol/water partition coefficient
LAeq	Equivalent Continuous Sound Pressure Level with A-weighting
LC	Local Council
LL	Location License
LREE	Light Rare Earth Elements
LRP	Livelihood Restoration Plan
MDA	Ministries Departments Agencies
MGLSD	Ministry of Gender Labour and Social Development
ML	Mining License
MLHUD	Ministry of Lands Housing and Urban Development
MREC	Mixed Rare Earth Carbonate
MSDS	Material Safety Data Sheet
NDP	National Development Plan
NEMA	National Environment Management Authority
NGO	Non-Government Organization
NH <sub>4</sub> HCO <sub>3</sub>	Ammonium Bicarbonate
NO <sub>2</sub>	Nitrogen Dioxide
OPd	Open Defecation
OWC	Operation Wealth Creation
PAP	Project Affected Person
PLHIV	People Living with HIV
PM	Particulate Matter
PSP	Public Standpipe
PWD	Person With Disability
RAP	Resettlement Action Plan
REE	Rare Earth Element
RGC	Rural Growth Center
RL	Retention Licence
ROM	Run-Of-Mine
RPEEE	Reasonable Prospects of Eventual Economic Extraction
S.I.	Statutory Instrument

SC or S/C	Sub County
SEA/SH	Sexual Exploitation and Abuse and Sexual Harassment
SGBV	Sexual Gender Based Violence
SO <sub>2</sub>	Sulphur Dioxide
STD	Sexually Transmitted Disease
STI	Sexually Transmitted Infection
TBA	Traditional Birth Attendant
TC	Trading Center
TCFD	Task Force on Climate-related Financial Disclosures
ToR	Terms of Reference
TREO	Total Rare Earth Oxide
UBOS	Uganda Bureau of Statistics
UGX	Uganda Shillings
UHC	Universal Health Coverage
USD	United States Dollars
USEPA	United States Environment Protection Agency
VCT	Voluntary Counselling and Testing
VHT	Village Health Team
VSLA	Village Saving and Loan Association
WASH	Water Sanitation and Health

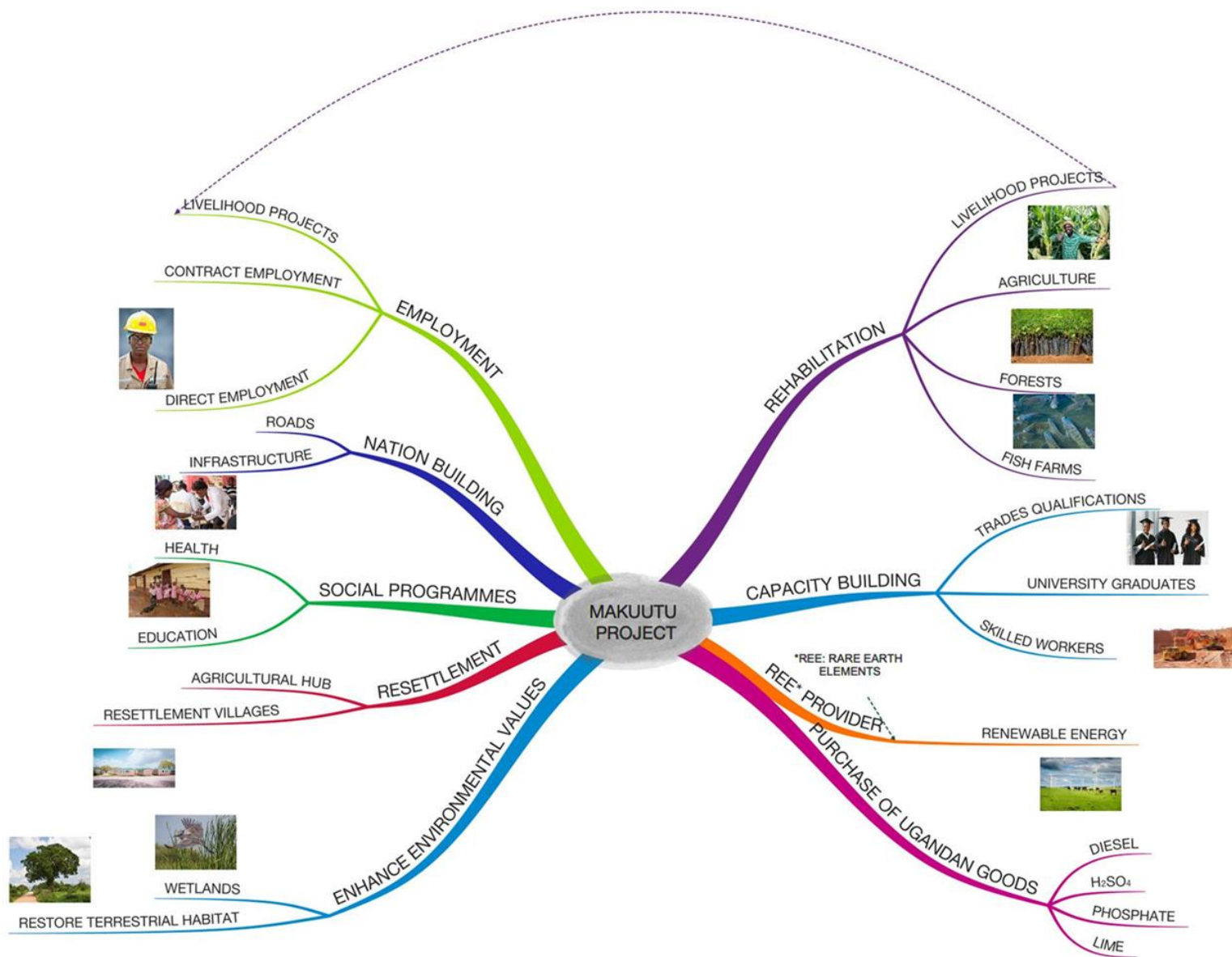


Figure 1: Mind-Map of Benefits of the Makuutu Rare Earths Project

# 1 High Level Summary

## 1.1 Project Overview

Modern technology is underpinned by Rare Earth Elements (REE). Almost every modern device contains some rare earth elements with electric motors and permanent magnets containing particularly high amounts. Catalytic convertors, phosphors in optical displays, mirror and glass polishing, diesel and petrol fuel refining processes, media and communications devices including mobile phones, televisions and computers all contain REE. Heavy Rare Earth Elements (HREE) used in the creation of neo-magnets necessary for the production of wind turbines and the world transition from fossil fuels to renewable energy are particularly important. These HREE are principally sourced from ionic adsorption clay deposits. Makuutu as one of the few known large ionic adsorption clay deposits outside of southern China is highly significant as an alternate source of these strategically important metals.

Makuutu is a large-scale, long-life, REE Project in Eastern Uganda. REE will be extracted from a 40 km long near surface ionic adsorption clay ore-body spanning the districts of Mayuge, Bugweri and Bugiri (refer Figures 19 and 20). By Year 10, the Project will be processing 12.5 million tonnes of ionic adsorption clay ore through 5 Process Plant modules and mining 25 million tonnes of material. A fleet of 130 large mining machines including 90 haul trucks will be consuming 24 million Litres of fuel a year and a full-time workforce of 1,200 trained and competent Ugandan workers will be in place. An estimated 79,213 tonnes of Rare Earth Oxide (REO) with a value of US\$7.6 billion will be extracted from 281.5 million dry tonnes of ionic clay ore over the 27-year Project life. The Project has earnings before interest, taxes, and amortization (EBITA) of US\$3.9 billion, and after-tax free cash flow of US\$2.4 billion. The project will deliver estimated gross royalty payments to Uganda of US\$380 million plus corporate tax contributions of US\$965 million over its life based upon the existing Mineral Resource Estimate (MRE) as of April 2021. With further drilling planned for the latter part of 2021 resource estimates are likely to increase substantially.

The ionic adsorption REE clay ore is hosted in a 10-metre-thick layer of oxidised regolith overlying bedrock. The proposed mining and processing sequence involves:

- Removal and temporary storage of a 1m thick surface layer of topsoil that will be replaced following complete backfill of the mining pit.
- Removal and stockpiling of an average 3 metres of uneconomic hard-cap and overburden.
- Removal of an average 5-6 metre layer of ionic-adsorption REE clay ore using truck and shovel and hauling this material to a Process Plant (refer Figure 2)
- Agglomerating the ionic-adsorption REE clay to increase its permeability before placing it in a 3m deep pile on top of an impermeable HDPE liner.
- Desorbing the ionically adsorbed REE into an ammonium sulphate lixiviant at pH 4 that is percolated through the clay-ore heap onto the HDPE liner which directs it to a process liquor pond.
- Concentrating the REE within the ammonium sulphate lixiviant via an ion exchange process in a membrane circuit. This step will consequently produce large volumes of Reverse Osmosis (RO) water that will be available for use as process water, dust control and irrigation of crops.
- Precipitating the REE as a REE carbonate from the concentrated REE lixiviant via the application of ammonium carbonate.
- Filtering, drying and bagging the REE carbonate product for export in shipping containers.



- Returning the “spent-ore” to the mining pit once the REE has been desorbed from the clay and residual ammonium sulphate has been washed out.
- Returning the overburden to the mining pit which in combination with the returned “spent-ore” will completely fill the mining void.
- Replacing the stored topsoil and returning the mined land to productive agricultural land via a process of liming (i.e., to increase pH and buffering capacity) and full fertilisation (i.e., triple superphosphate and Potassium Nitrate).

The full mining, processing and rehabilitation cycle is expected to be about 6 months and the moving mining footprint will be similar to the area disturbed by 6 months of mining which will be about 20 hectares.

The Project will preferentially employ local people with the appropriate skills and qualifications over the life of the Project and expects that almost all the 1,200-person workforce will be Ugandan by Year 7. This decision, in combination with a decision not to construct an onsite camp or to operate a Fly in Fly Out (FIFO) workforce, means that the workforce will be resident in the community. It also means that expatriate visitors and technical specialists will be residing in hotels and guest houses and using local restaurants when they visit. This will provide economic stimulus to local small businesses. Adult skills training and a focus on education support will develop local capacity and facilitate employment of local people including women into technical and managerial roles with the Project (refer Figures 3 and 4).



Figure 2: The Project will need people to operate and maintain a large fleet of mining equipment



Figure 3: Workers will be protected through the use personal Protective equipment





Figure 4: The Project will need many University graduates

## 1.2 Alignment with National Development Three Plan (NDP III)

In addition to the previously discussed economic benefits of the Makuutu Project for local communities, Regions and to Uganda more widely, the Project will be a catalyst for the development of other major mining projects in Uganda. This is highly consistent with the Third Uganda's National Development Plan (NDP III) of unlocking the mineral wealth of Uganda to secure the Vision 2040 of Uganda to become a prosperous middle-income country by 2040.

## 1.3 The Environmental and Social Impact Assessment Process

A comprehensive Environmental and Social Impact Assessment (ESIA) of the Project was undertaken in accordance with the National Environment Act, 2019, the National Environment (Environment Impact Assessment) Regulations 2020 and following other relevant international best practices. The approval of the ESIA is a requirement for the issuing of a Mining Permit from the Department of Geological Survey and Mines (DGSM) under the Ministry of Energy and Mineral Development (MEMD). DGSM is primarily responsible for ensuring that legal provisions under the mining and environmental legislation are followed in collaboration and communication with NEMA.

The ESIA process was undertaken by NEMA certified Environmental Impact Assessors. This commenced with a high-level scoping study involving stakeholder engagement and an overview of the legal, social and environmental context of the Project. The scale and design of the Project, considered within the context of options to minimise environmental and social impacts, was central to this study. This enabled the development of the Terms of Reference for the ESIA study which was approved by NEMA in February 2021. The Terms of Reference defined a comprehensive biophysical and socio-economic baseline study programme

in combination with extensive stakeholder engagement. This information enabled a detailed assessment of Project design alternatives to be completed together with a detailed risk assessment which in turn enabled the Project to be optimised for minimum social and environmental impact and maximum social and environmental benefit.

## 1.4 Project Alternatives

A Project Alternatives Assessment (refer Section 4) concluded that the Project will deliver significant social, environmental and economic benefit to local communities, to Uganda and to the world and that failure to proceed could therefore be viewed as a lost opportunity and particularly within the context of NDP III with its key theme of unlocking the mineral wealth of Uganda.

The Makuutu Project is the largest known ionic adsorption REE clay deposit outside of southern China. It is unique both in Uganda and globally. Within this context, it is particularly fortunate that it is an intrinsically safe project with no significant or unprecedented environmental and social risks that cannot be effectively managed. The design of the project has, however, been optimised to minimise social and environmental risks and to maximise benefits. Key design decisions include the following.

### 1.4.1 Process Plant location

The base-case processing option is an integrated Processing Plant comprising heap-leach pads, a membrane circuit to concentrate the REE and, ancillary facilities to precipitate, dry and bag the REE carbonate for export. Most of the 200-hectare required area is for the heap leach pads. There are limited options for an area of this size within close proximity to the ore deposits. Five options were considered (refer Section 4) with Option 5 selected largely on social grounds. This is a 200 hectare largely uninhabited sugarcane farm north of the Nakivumbi Trading Centre in Bugweri District. This decision will eliminate the need for resettlement in this area, but it will require the construction of a 4 km long dedicated haul road that will significantly increase capital costs as well as operational costs due to the long haulage distance.

### 1.4.2 Mining Sequence

Mining is planned to commence in the Central Makuutu Deposit in Bugweri District. This 350-hectare deposit will have a 10-year mine life and with staged mining and progressive rehabilitation, there should be no need for immediate resettlement. This will allow time for an appropriate nearby resettlement village to be planned and developed in consultation with Project Affected People (PAPs) and District Planners. The PAPs displaced by the expanding mine pit will then be sequentially resettled to the new village. The livelihoods of these people will be sustained including replacement of agricultural land, employment with Project and, with employment on livelihood projects established on rehabilitated land (refer section 1.3.3). Similar approaches will be adopted for future mining pits to the east and west in Bugiri and Mayuge Districts respectively when the mining footprint eventually expands into these areas.

### 1.4.3 Progressive Rehabilitation

Progressive rehabilitation will limit the active mining footprint, eliminate long-term legacies and, provide opportunity to establish livelihood projects on rehabilitated land as previously discussed (refer Figure 5). The opportunity to transform currently degraded land used for shifting agriculture to highly productive land through the strategic application of lime and fertiliser in combination with targeted research is particularly significant. It keeps the mine footprint small, enables resettlement to be staged and creates good land that can be used for resettlement, land swapping and livelihood projects.



Figure 5: Mined land will be progressively restored to highly productive agricultural land.

#### 1.4.4 Mining and Transport of Ore

The base case mining technique is truck and shovel excavation (refer Figure 30) because it is low risk, well understood and highly flexible. In the longer-term, other options might be considered in order to reduce costs. These include:

- The use of scraper trucks to strip and deposit topsoil. These are more efficient than truck and shovel for short haul distances of less than 1 km.
- Overland conveyors (refer Figure 51) could be used for ore transport, and they have a smaller footprint than haul roads. They are more efficient than haul trucks, but they have high capital cost and are less flexible and particularly in a situation with constantly moving mining pits. With hydropower, they also have a much smaller carbon footprint when compared to trucking.
- The clay-ore could be mixed with water and efficiently pumped as a slurry, but test-work has shown that Slurried Makuutu clay will not readily settle, and it cannot be filtered which rules this out as an option.
- In situ mining where ammonium sulphate lixiviant is pumped directly into the orebody where it will ionically desorb the REE from the clay. The “pregnant” lixiviant can then be recovered from deep bore-wells from where it would be treated in exactly the same way as with the heap leach process (refer Section 3.6.4). This option will continue to be assessed because it is extremely efficient and has a very low environmental and social impact. A comprehensive study will, however, need to be completed to demonstrate that the risks of lixiviant contaminating groundwater and surface water can be safely managed before this is trialled. Challenges with percolating lixiviant through un-agglomerated clay will also need to be addressed.

#### 1.4.5 Processing Options

The REE resource at Makuutu is ionically adsorbed onto the clay. The preferred lixiviant for desorbing REE from ionic adsorption clay is ammonium sulphate (AMSUL) at pH 4. AMSUL is widely used as an agricultural



fertiliser, including in Uganda, and is readily available. The REE could be desorbed from the clay by four standard processes.

#### *1.4.5.1 Heap Leaching*

Heap leaching is widely used in the mining industry and has been assessed as the best process for the project. In this process, the agglomerated clay ore is piled (heaped) 3 metres deep on top of an impermeable HDPE liner. The REE in the clay is desorbed into an ammonium sulphate (AMSUL) lixiviant at pH 4 that is percolated through the ore. The “pregnant” lixiviant drains out of the ore pile into a lined pond. It is then pumped through an ionic exchange system which concentrates the REE in the solution and consequently creates large volumes of Reverse Osmosis (RO) water which can be used for other purposes. The REE in the concentrated solution is then precipitated as a REE carbonate via the addition of ammonium bicarbonate (Bakers Ammonia). The barren lixiviant is then replenished and recycled back to the heap leach circuit and; the REE carbonate product is dried and bagged for export. The low permeability of the clay even with agglomeration limits the depth of the heaps to about 3 metres and the full desorption process is expected to take about 100 days per batch.

#### *1.4.5.2 Atmospheric Tank Leaching*

In tank leaching, the ionic adsorption REE clay would be continuously pumped as a slurry into a tank containing continuously added ammonium sulphate lixiviant. This system would be highly efficient with the REE rapidly desorbing from the clay. The “pregnant” slurry would then continuously flow from the tank into a separation system that separated the pregnant REE lixiviant from the spent clay. Test work, however, has shown that the slurried clay will not readily settle and neither can it be filtered. This method is therefore considered fatally flawed for the Makuutu ionic adsorption REE clay. It could, however, be revisited should a practical system for separating the suspended clay from the lixiviant slurry be developed.

#### *1.4.5.3 Vat Leaching*

The vat leaching process is similar to the tank leach process but operated as a batch process. In this process, the slowly agitated solids would remain in the vat while the ammonium sulphate lixiviant passed through. Once all of the REE has been desorbed from the clay, the vat can be emptied and replaced with fresh ore. This process would be used in preference to tank leaching for heavy particles with slower leaching. It would in general be an inferior choice than tank leaching for the fine Makuutu clays. It also has the same fatal flaw with a lack of an identified practical system for separating the pregnant lixiviant from the suspended clay.

#### *1.4.5.4 In Situ Recovery*

A system of injecting lixiviant directly into the orebody where it can desorb the REE in situ and then be recovered from deep pumping wells would allow the REE to be removed from the Makuutu deposit with no earthmoving, no need to resettle people and no impact on agriculture or native vegetation. It would be extremely cost effective and have minimal obvious impact. It would be necessary, however, to ensure that all lixiviant remained contained within the orebody and did not make its way via lateral groundwater flow into surface water streams. Challenges with percolating lixiviant through low permeability un-agglomerated clay would also need to be resolved. This system will continue to be investigated but is not considered immediately viable.

### **1.4.6 Electrical Power Supply**

At peak production from Year 10 to Year 27, the 5 module Process Plant will consume 9.5 MW of power a year. The decision to use renewable hydropower from Jinja for this power reduces peak project CO<sub>2</sub> emissions by 83,000 tonnes a year. This is more than the peak 62,000 tonne a year Project CO<sub>2</sub> emission from the combustion of diesel consumed by earth moving equipment and transport trucks. The life of project CO<sub>2</sub>

emissions of 1.5 million tonnes is therefore less than half of what it would have been had a fossil fuel electrical power option been chosen. This carbon footprint additionally has the potential to fall dramatically should the Project choose to install an electrical ore conveyor powered by hydropower rather than using diesel fuelled truck haulage from the mine to the Process Plant and back. This is still being assessed.

## 1.5 Maximising Environmental Benefit

The Makuutu Project ionic adsorption REE clay ore is contained within 10 discrete orebodies covering 950 hectares (refer Figure 20). These orebodies are located on elevated, cleared and largely degraded land used for shifting agriculture. This land drains into the headwaters of the Naigombwa and Lumbuye Rivers which flow northward to Lake Nakuwa (refer Figure 60). The upper reaches of these rivers, in the vicinity of the Project, contain degraded wetlands used for farming rice and sugarcane (refer Figure 64). The 300,000 kL/year positive water balance (refer Figure 39) in the Project area driven by 1,400 mm of annual rainfall and 125 mm of evaporation will result in significant discharge of harvested stormwater collected in mining pits and run-off stormwater from the Process Plant into the river system.

From an environmental perspective, the key priorities of the project include:

- Timely and progressive rehabilitation of the mining pits to minimise the land disturbance footprint which will have the following benefits:
  - It limits the short-term loss of agricultural land.
  - With appropriate liming and fertilising, the rehabilitated land will support intensive agriculture and be much more productive than the currently degraded land largely used for shifting agriculture.
  - Strategic establishment of woodlots and fish-farms to sustain livelihoods and enhance local food security both during the life of the Project and in the long-term.
  - Strategic planting of important rare species such as *Milicia excelsa* or *Mvule* (African Teak) and other rare trees that occur within the future mining footprint.
  - Minimises the disturbed land catchment of stormwater to facilitate high quality discharge water.
  - Minimises the aesthetic impact of large areas of open mining pits.
- Effective containment of process chemicals, sulfuric acid and diesel fuel in combination with effective spill prevention and response protocols to prevent contamination of land, surface water and groundwater.
- Treating all potentially contaminated stormwater, including with the use of a stormwater catchment pond to settle suspended sediment. This will ensure that all discharge water meets the discharge water quality requirements of the DWRM issued water discharge permit.
- Minimising noise and emissions to air from mining machinery to a level that does not impact the amenity of nearby communities.

The Makuutu Project is intrinsically benign and expected to deliver a net positive environmental benefit to the Project area and to Uganda more broadly. It in particular does not have the environmental challenges typical of its hard-rock REE mining competitors including radioactivity, permanent large-scale land disturbance and, high energy use.

- The ore-body is low in Uranium and Thorium radionuclides which are typically the greatest environmental challenge for hard rock REE mines globally. Baseline concentrations of Uranium are undetectable and Thorium either undetectable or very low in both surface water draining the orebody areas and in groundwater within the orebody. This should remain the case over the life of the Project.

- The mining pits will be progressively backfilled with a combination of overburden and “spent-ore” enabling the mining footprint to be limited to about 20 hectares and the life of the moving mining pit to about 6 months as previously discussed. At the end of mining, there will be no legacy waste dumps, mining voids or contaminated land.
- The Project will look for opportunities to collaborate with Ugandan institutions and specialist NGOs to restore degraded wetlands downstream of the Project area and enhance biodiversity outcomes (refer Figure 6). The creation of woodlots in combination with the donation of an expected 20,000 untreated wooden pine pallets a year to the community for use as firewood should help slow the current Ugandan forest clearing rate of 200,000 hectares a year (refer Figure 53) that is largely occurring as a consequence of firewood harvesting.



Figure 6: Ugandan Wetlands are immensely valuable for biodiversity and livelihoods.

- Millions of dollars of environmental controls embedded in the capital works programme and an ongoing focus on controls on Project activities (refer ESMP Volume 1 Environmental and Social Management and Monitoring Plan as summarised in Section 11.1) will ensure high standards of emission control during operations and limit adverse impacts on the quality of the downstream river systems.
- The ionic adsorption REE clay ore is hosted in “free-digging” surface regolith and there will be no need for energy intensive blasting or grinding as would be required at hard rock REE Projects which are the prevailing REE supply outside of the Ionic Absorption REE Clay Mines of southern China. The need for fine grinding would have increased the required Project energy use per module 5-fold from 1.9 MW to 9.5 MW. The Project will additionally be sourcing renewable hydro-electric power from an existing 132 kV transmission line from Jinja. The total calculated 27-year life of mine greenhouse gas emissions of 1.5 million tonnes from the combustion of diesel fuel in mining machinery and, the peak annual CO<sub>2</sub> emissions of 62,000 tonnes, is therefore a fraction of what would be expected from an equivalent sized hard rock REE project using fossil fuel energy. The project will additionally



produce sufficient HREE over its life to create 90 GW of renewable wind energy which would displace 300 million tonnes of coal-fired CO<sub>2</sub> per year (refer Figure 7). The Project is highly sustainable when compared with its competitors.



Figure 7: Makuutu will produce sufficient HREE to enable 90 GW of wind power displacing 300 million tonnes of coal fired CO<sub>2</sub> per year

## 1.6 Maximising Social Benefit

The Project is located in the Rural Eastern Region of Uganda which in 2016/17, with a mean per capita consumption expenditure of 44,000 shillings (i.e., US \$12.45), was the lowest in Uganda and one of the lowest on earth. One consequence of this extreme poverty is a lack of food security which has resulted in 14% of the children in nearby Iganga being stunted from malnutrition (<https://dataafrica.io/profile/iganga-uga>) and a high prevalence of endemic disease with malaria infection in particular at 23.7% amongst the highest in the world. In 2017, malaria accounted for 27-34 % of outpatient visits and 19-30 % of inpatient admissions. Under-five deaths due to malaria was at 7% while neonatal (under 12 months) mortality was at 11%. (<https://www.severemalaria.org/countries/uganda>). There is great opportunity for Makuutu to positively improve the lives of people in communities near the Project who are among the poorest in the world (refer Figure 8).



Figure 8: The Project will support community health initiatives

## 1.7 Stakeholder Concerns

There is a high degree of interest in the Project from local communities and other stakeholders. Some of the common themes and stakeholder concerns included:

- Inadequate disclosure of information.
  - This was a particular theme in the early stages of consultation prior to the large-scale engagement and socio-economic baseline studies that took place in August 2021 following a 42-day Uganda wide COVID lockdown that impacted the scheduled roll-out of this work programme.
- Potential adverse impact of the Project on social infrastructure.
  - The Project will be completely independent with respect to key services including water supply, electrical power, waste management and sewage treatment. With the exception of a shared access road for delivery trucks to the Process Plant, internal Project roads including haul roads will be private roads not shared with the general public.
  - The general community will additionally benefit from upgrades to social infrastructure including roads, bridges and emergency services capacity as presented in detail in the Environmental and Social Management Plan Volume 5, Emergency Response Plan prepared as a supplement to the ESIA and as summarised in Section 11.5.
- Land acquisition and compensation.
  - Makuutu is committed to ensuring that no Project Affected Persons requiring resettlement will be disadvantaged. The strategy for achieving this is presented in the Environmental and Social Management Plan Volume 4, Preliminary Compensation and Resettlement Action Plan and summarised in the ESIA (refer Section 11.4). Of particular note, however, is the selection of a single largely uninhabited sugar cane farm for the 200-ha base-case Process Plant which

eliminates the need for resettlement in that area. The staged mining and rehabilitation mining process, as previously discussed, is also significant because it eliminates the need for immediate resettlement in the mining area and enables future resettlement to be planned and staged at a manageable level. Makuutu seeks to avoid all involuntary resettlement.

- Establish the baseline conditions to monitor impacts in future.
  - A comprehensive environmental and socio-economic baseline assessment was completed as part of this ESIA which also includes an Environmental and Social Management and Monitoring Matrix (refer Table 142). A supporting Environmental Social Management and Monitoring Plan has also been compiled as summarised in Section 11.1.
- Capacity by DLGs to manage potential impacts
  - Makuutu will have strong internal capacity to manage onsite impacts and incidents, such as spills, by employing specialist experts, purchasing good equipment and providing good facilities including an on-site health centre so will not be relying on DLG resources. Makuutu will, however, collaborate with local authorities to improve external emergency response and medical support capacity (refer Section 6.6 and the Emergency Management Plan as summarised in Section 11.5). This will be particularly important in the management of offsite incidents.
- Potential impacts on human health
  - REE are essentially benign from a human health perspective in that they are not carcinogenic, and they do not bioaccumulate. The dust from the REE carbonate product is, however, generally irritating to the skin, eyes and respiratory tract and workers will need to be protected with personal protection equipment (PPE) including gloves, protective clothing safety glasses and dust masks dependent on their exposure. The REE mining, processing, and transport at Makuutu will, however, not impact community health.
    - The clay with 20% moisture will not be dusty and it only contains ppm REE concentrations in any case.
    - The heap leach process will not generate any dust.
    - The REE carbonate product will be bagged and sealed into shipping containers eliminating all risk of community exposure to REE dust during product transport.
  - Noise, dust and vehicle emissions will be controlled in line with regulatory requirements to a level that does not cause harm or nuisance to local communities.
  - The containment of process-chemicals in combination with effective monitoring will limit the risk of contamination of groundwater or surface water.
- Road safety during construction and operation
  - Internal Project roads including haul roads will be completely separated from public roads and will be security fenced. Any crossings of public roads and internal haul roads will be controlled.
  - For the base-case assumption delivery trucks for process chemicals, diesel, sulfuric acid and warehouse supplies will only travel 10 km on a shared public road from Busesa to the entry of the Process Plant 2 km north of the Nakivumbi Trading Centre (refer Figure 91). This road will be upgraded as appropriate to secure public safety, but it does not traverse existing settlements.
- Royalties to landowners
  - The Project expects to deliver gross royalty payments to Uganda of US\$380 million over its life and understands that Ugandan laws require 17% of this to be returned to the district and 3% to landowners. This is, however, a matter for Uganda and outside the control of the Project.

## 1.8 Compensation and Resettlement

While the resettlement of Project Affected Persons within the Project footprint is the greatest social challenge for the Project, the Project is committed to ensuring that Project Affected Persons are not disadvantaged socially or economically. The strategy to achieve this is presented in the Compensation and Resettlement action Plan as summarised in Section 11.4. This strategy centres on voluntary resettlement based around fair compensation for loss of assets, resettlement into a good replacement house with good social services and, sustaining livelihoods through provision of replacement farming land or employment on livelihood projects.

One option under consideration is the establishment of a demonstration farm, agricultural processing facility and, resettlement village prior to the commencement of mining. This would be used to validate the techniques intended for use on rehabilitated mining land. Liming, full fertilisation and potentially irrigation is expected to convert currently degraded low productivity land to high quality agricultural land with high productivity. Local farmers could then be supported in increasing the productivity of their land using similar techniques. Produce from the demonstration farm in combination with produce produced from local farmers would be processed in an adjoining processing facility prior to storage and despatch to market. Project Affected Households would be progressively resettled to a good house with good social services in the same complex in advance of the mining pit expansion with their livelihoods and food security secured with employment with the demonstration farm and agricultural processing facility.

Mining will commence in sparsely inhabited parts of the Central Makuutu deposit to limit the scale of initial resettlement. People would be progressively resettled in advance of the expanding mining pit which would be progressively backfilled and rehabilitated. The rehabilitated mining pit will support a range of livelihood projects including intensive agriculture, agroforestry and fish farms to sustain the livelihoods of people in the expanding resettlement village. Ownership of the resettlement village and the livelihood projects would ultimately transition to the community and additional resettlement hubs would be established as mining progressed to Mayuge and Bugiri Districts. The Mining Project would therefore create a positive post-mining legacy of a vibrant, prosperous and healthy community which would continue to receive the benefits of the Makuutu Project Social support programme (refer section 11.3). The integrated demonstration farm, agricultural processing facility and resettlement village concept is summarised below (refer Figure 9).



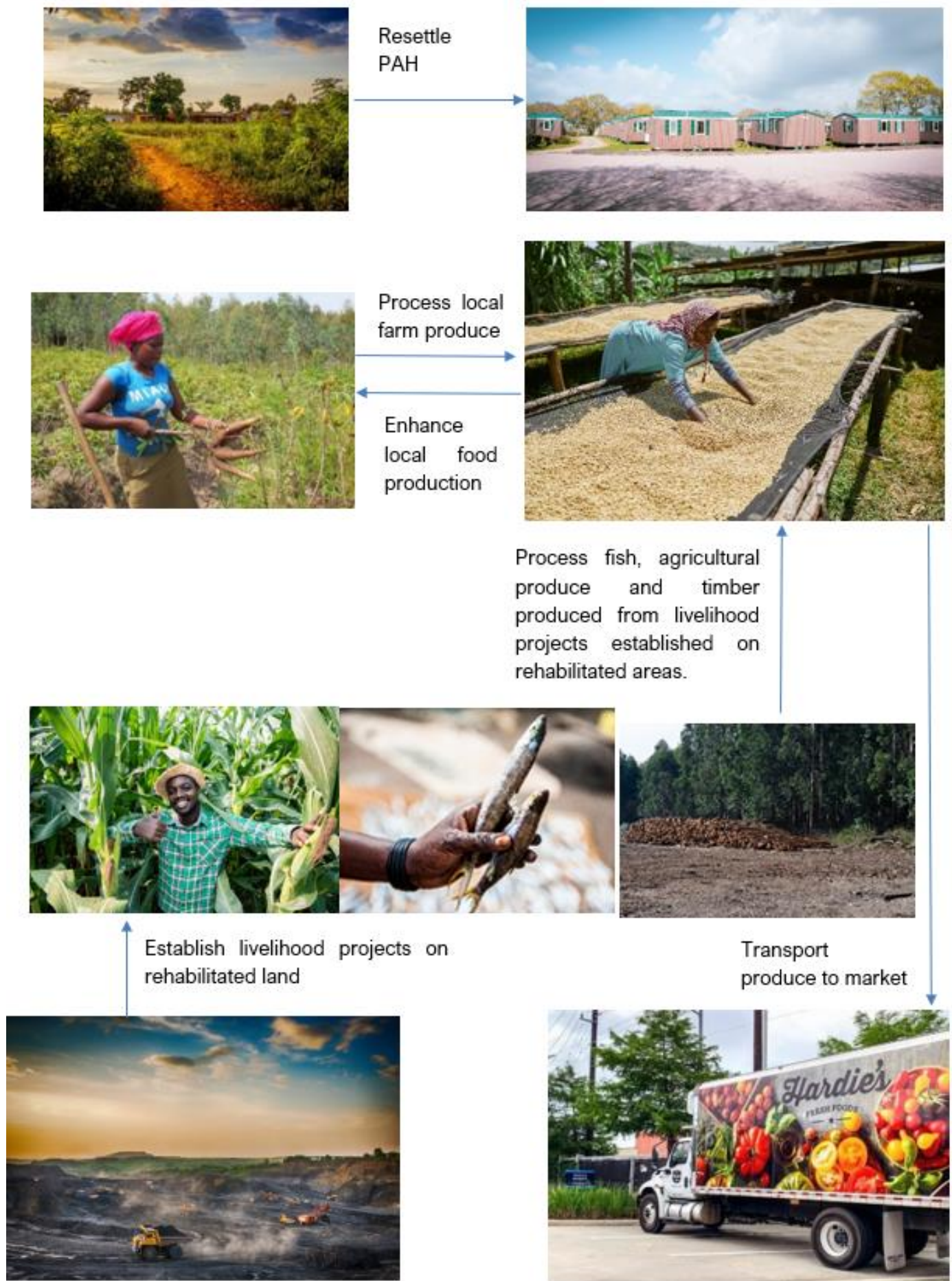


Figure 9: Integrated demonstration farm, agricultural processing facility and resettlement village

## 1.9 Community Development

The opportunity for Makuutu to transform the lives of some of the poorest people in Uganda is enormous. The direct benefit on local communities will include upgrades to road and infrastructure in combination with a focus on securing 100% of the 1,200 Makuutu employees as Ugandans by Year 7. Makuutu has also made a decision to not have on-site camps or a FIFO workforce during the establishment of the Project. The workforce will reside in the local Districts and visitors will utilise nearby hotels and restaurants for accommodation and food.

The Makuutu Rare Earths Project will be a significant financial contributor to Uganda, with the Preliminary Economic Study as of April 2021 estimating gross royalty payments of US\$380M plus corporate tax contributions of US\$965M over the life of the project. An estimated US\$76 million of Project Royalties is expected to be returned to the local area as previously discussed.

The Project is currently contributing US\$486,000 a year to community programmes. Makuutu will increase this financial contribution by allocating a portion of revenue to enable the community to directly benefit from Project success. It is proposed that this initially be set at 1% which by the 2-module phase of the Project in Year 3 would be about US \$1 million a year. This proportion would be slowly reduced as the Project expands and reach a maximum contribution of US \$2 million per year by Year 7. It would then be capped and remain at this level until Year-26 prior to dropping to US \$1 million in the final year of the Project. The total contribution to community programmes over the life of the Project would be US \$47 million.

A total of US \$123 million will therefore be allocated to community support and infrastructure over the life of the Project. With this level of support, the opportunity for local communities to benefit from the World Class Makuutu Project is enormous. Makuutu will establish a stakeholder advisory group to advise on how this funding can be best spent with a specific focus on the key areas of sustainable livelihoods and community health. These programmes will be undertaken in partnership with Ugandan Institutions and other stakeholders including NGOs. Makuutu is a long-term project, but it will put in place initiatives that deliver even longer-term health and prosperity to the local community and Uganda more broadly that will endure well past the end of the Project life.

The following proposed Projects on Rehabilitated land will be particularly significant.

- Establish an Agricultural Research Centre in collaboration with Ugandan Institutions to provide outreach services to local farmers and undertake intensive research trials on rehabilitated land.
- Establish fish ponds in collaboration with Ugandan institutions and specialist NGOs that could potentially deliver 1,000 tonne of fish a year from 100 hectares of ponds to employ and feed many people.
- Establish commercial timber plantations that would employ a lot of people as well as providing wood for downstream industries. These would also sequester carbon, create wildlife habitat and enable the planting of valuable timber species such as *Milicia excelsa* or Mvule (African Teak) that continue to be over-harvested from Uganda's natural environment (refer Figure 10).





Figure 10: African Teak or Mvule (*Milicia excelsa*) has food, medicinal and commercial timber value.

## 1.10 Environmental and Social Management Plans

Social and Environmental Objectives and performance targets were developed from a formal risk assessment process that considered the likelihood and consequence of project impacts on defined social and environmental values. The environmental footprint of Makuutu is small for its scale due to a number of intrinsic factors including: near-surface clay orebody not requiring energy intensive blasting or grinding to access; low levels of uranium and thorium radionuclides which are typically a challenge for REE projects; location on cleared farmland which reduces the environmental footprint despite creating social challenges; in-pit disposal of “spent-ore” and overburden leaving no legacy pits, waste dumps or tailings dams at the end of mining and; opportunity to restore degraded downstream wetlands and to restore forest to cleared landscapes including the use of species such as *Milicia excelsa* (Mvule or African Teak) which has an IUCN Near Threatened Status due to over exploitation. The social challenges are more significant. Most environmental and social risks can be mitigated to low or moderate through the application of effective operational controls with the exception being a number of social risks. These include in particular: challenges associated with the acquisition of project land and subsequent compensation and resettlement of Project Affected Persons and; uncontrolled in-migration of people seeking opportunity overloading existing community services and contributing to a deterioration in law and order, food security and community health outcomes. The strategies to be implemented by the Project to secure net positive social, environmental, and economic benefits for both local communities and for Uganda more broadly are detailed in an 8 volume Environmental and Social Management Plan which is summarised in the ESIA (refer Section 11.3). The approach proposed by Makuutu is to collaborate with Ugandan institutions, and particularly District Planners,

along with NGOs to build institutional capacity and to deliver projects that contribute to long term prosperity, food security and community health for local communities. A high-level summary of the content of the eight Environmental and Social Management Plan follows.

#### 1.10.1 Volume 1: The Environmental and Social Management and Monitoring Plan

This Plan is a specific requirement of the ESIA and includes an overview of resource allocation, performance objectives, monitoring programmes and reporting commitments. Of particular note is the estimated expenditure US\$123 million on community programmes and infrastructure over the life of the Project as previously discussed. The Environmental and Social Management and Monitoring Plan additionally includes an overview of the Environment and Social Management System and Environment and Social Performance Standards which are Equator Principle requirements. It, in particular, presents the Plan Do Check Act framework that will drive continual improvement in environmental and social performance within an ever-changing project, legislative, environmental and social context over the life of Project. An Environmental and Social Management and Monitoring Plan Matrix is included in the ESIA (refer Table 142).

#### 1.10.2 Volume 2: Stakeholder Engagement Plan

This Plan includes stakeholder mapping along with external communication processes and a Grievance Mechanism. Effective engagement and communication in combination with an effective Grievance Mechanism is fundamental to securing the Project's social licence to operate in addition to being an Equator Principle requirement. Makuutu is committed to open and transparent communication to ensure that all stakeholders are well informed about the project and that any issues and concerns are addressed quickly and effectively. Makuutu aspires to building stakeholder trust through the delivery of consistently high standards of environmental and social performance in combination with always delivering on promises and communicating openly and transparently.

#### 1.10.3 Volume 3: Community Development Plan

The Community Development Plan (CDP) presents the strategy that will be used by Makuutu to facilitate the development of independent communities with strong capacity in the areas of health, education, food security, infrastructure and sustainable livelihoods. The CDP has been developed in fulfilment of Makuutu Policy objectives, legal requirements, stakeholder expectations and the mitigation of risk. Of particular note are proposals and strategies to:

- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Support the principle of land tenure for local people to prevent loss of land and resources to outsiders in-migrating into Project areas.
- Improve food security in expanding local communities.
- Combat the spread of HIV and other diseases such as malaria in expanding local communities.
- Ensure high standards of road safety on shared access roads near Project areas.
- Facilitate community training and education to enable local communities to take advantage of Project opportunities and facilitate employment and business development opportunities in local communities.
- Invest in education, including girl's education, so that local children, including girls and women can secure skilled work with the Project (refer Figure 11). This includes employment in skilled trades and, in highly technical roles requiring University degrees. These include accountancy, engineering, geology, environment, HR, metallurgy, chemistry, IT, work-health and safety, communications, community relations and, medicine. Makuutu will create a pool of experienced and talented people who can contribute to the success of other mining Projects in Uganda.





Figure 11: School children are the future of the Project

- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities directly impacted by the Project.
- Establish woodlots, aquaculture and intensive agriculture Projects on revegetated project Land. These are significant large-scale projects proposed for rehabilitated project land and relevant to both sustainable livelihoods and to food security. After 10 years the rehabilitated Year 1-Year 10 Central Makuutu mining area could contain:
  - 100 hectares of intensive fish farms producing 1,000 tonnes of fish a year.
  - 400 hectares of agroforestry sequestering 16,000 tonnes of CO<sub>2</sub> a year by the end of the Project.
  - Agricultural Research Centre producing food from intensive agriculture and providing outreach support to local farmers to assist with climate change adaptation and to improve farm productivity.

#### 1.10.4 Volume 4: Preliminary Compensation and Resettlement Action Plan

The Preliminary Compensation and Resettlement Action Plan presents the strategy for compensation and resettlement and will be superseded by a Detailed Compensation and Resettlement Plan following detailed Project design and the completion of formal land access agreements. This Plan has been developed to limit disadvantage to directly impacted communities during the development of the Makuutu Project from the acquisition of Project land. The Preliminary RAP encompasses

- The Ugandan Resettlement Legal Framework and the International Best Practice Standards and approaches that will be applied to resettlement at the Makuutu REE Project site.
- The risk context of the Project with respect to physical and livelihood impacts and measures to mitigate these risks including, Project efforts to avoid resettlement through an Options Assessment for the location of the 200 ha Process Plant which resulted in the selection of Option 5.

- The expected scale, severity and cost of resettlement impacts.
- The Compensation and Resettlement Action Plan strategy.

#### 1.10.5 Volume 5: Emergency Management Plan

The Emergency Management Plan (EMP) is designed to assist with the prevention and timely and effective response to any social and environmental emergency situations experienced by the Makuutu Project. The EMP encompasses the Mining, Process Plant and connecting haul roads. The content details in the embedded flowcharts of the EMP reflect the situation at August 2021 but the EMP is a living document. The EMP will be reviewed and updated annually and following any emergency situation over the life of the operation. It additionally draws on the Community Health and Safety baseline completed for the ESIA (refer Section 6.6).

#### 1.10.6 Volume 6: Waste Management Plan

The Waste Management Plan presents the strategy for managing solid and liquid waste generated by the Project over its life and is consistent with the requirements of the National Environment (Waste Management Regulations of 2020. These will be managed within a Reduce Reuse Recycle framework with appropriate disposal a last resort. The waste management plan encompasses descriptions of waste streams, logistics of waste management and strategies to achieve key Waste Management Objectives including:

- Implement an Integrated Recycling System.
- No unauthorised disposal of hydrocarbon and chemical waste to landfill.
- Management of the site landfill to ensure legal compliance and environmental protection.
- Appropriate disposal of medical waste to eliminate risk of infection to workforce or the community.
- Ensure workforce compliance with waste procedures.

Of particular note is the proposal to donate 20,000 untreated pine pallets a year to the community for use as firewood. These will be generated from the delivery bagged process chemicals to site on pine pallets if that option is selected.

#### 1.10.7 Volume 7: Greenhouse Gas Mitigation and Climate Change Adaptation Plan

This Greenhouse Gas Abatement and Climate Change Adaptation Plan presents Makuutu's strategy for minimising emissions of greenhouse gasses during the construction and operation of the Makuutu Project. On current estimates the Project will emit 1.5 million tonnes of CO<sub>2</sub> from the combustion of diesel fuel over its 27-year life while producing sufficient Heavy Rare Earth Elements (HREE) to produce 90 GW of offshore wind turbines which would displace over 300 million tonnes per year of coal fired CO<sub>2</sub> emissions. The design and operation of Makuutu is described in detail in the ESIA. The Greenhouse Gas Abatement and Climate Change Adaptation Plan also encompasses adaptation to climate change as required by the Ugandan National Environment (Environmental and Social Assessment) Regulations of 2020. The pattern of declining rainfall exhibited in Western and Central Uganda has not been evident in the Project area and the magnitude of rainfall in the Project area is unlikely to change significantly over the life of the Project. It is likely, however, that rainfall intensity will increase and that there will be longer dry spells. This, in combination with increased temperature, will impact agricultural production. Makuutu will therefore:

- Design drainage and pumping systems to accommodate rainfall at higher levels than that currently being experienced.
- Have sufficient water trucks and dust suppression systems to manage dust in dry periods.
- Have sufficient water storage in mine and process plant storm-water dams to encompass dry periods.
- Support agricultural outreach programmes to local farmers as previously discussed (refer ESMP Volume 3, Community Development Plan as summarised in Section 11.3).

- Significantly contribute to reduction in global green-house gas emissions by supplying the HREE necessary for the production of 90 GW of offshore renewable wind power that will prevent 300 million tonnes a year of coal-fired power CO<sub>2</sub> emissions.

#### 1.10.8 Volume 8: Life of Mine Rehabilitation and Closure Plan

The Life of Mine Rehabilitation and Closure Plan is designed to eliminate economic, social and environmental legacies throughout the lifecycle of the Makuutu Project. It also includes a Conceptual Closure Plan which will evolve into an annually reviewed Working Closure Plan during the operational phase of the Project. A Final Closure Plan will be developed within 5 years of decommissioning and ultimate closure. The Final Closure Plan will be developed with the assistance internal and external stakeholders and in particular an appointed Mine Closure Committee.

The Closure Plan presents the strategies for avoiding legacies over the life of the mine and to ultimately relinquish the leases. It also presents the financial mechanisms that will be put in place by Makuutu to ensure that the mine is properly decommissioned without incurring liability for the State of Uganda in the event of an unplanned closure. Key Objectives include:

- Develop Physical completion criteria and rehabilitation techniques to the satisfaction of key stakeholders.
- Formally determine the project Asset Retirement Obligation (ARO) annually and ensure sufficient funds are in place.
- Develop a conceptual life of mine and closure plan.

#### 1.10.9 Volume 9: Occupational Health and Safety Plan

The Occupational Health and Safety Plan presents the strategy that the Project will adopt to secure zero harm to people as consistent with the Makuutu Project Safety Health and Hygiene Policy (refer Section 2). Makuutu is committed to the concept of zero harm to people and the environment and believes that all accidents are preventable. Accidents will be prevented through a combination of a robust OHS management system and a culture where everyone takes personal responsibility for their own safety and the safety of others.

### 1.11 Conclusion

The Makuutu Project is intrinsically safe from an environmental perspective, and it can be managed so that it does not create any legacies for Uganda. Its potential to enable the global reduction of 300 million tonnes of CO<sub>2</sub>/year by supplying the heavy REE necessary for 90 GW a year of renewable wind power is globally significant. The progressive rehabilitation of mined land to create a mosaic of productive agricultural land, forest blocks and fish ponds that will sustain livelihoods post mining is particularly noteworthy.

The most significant risk for the Project is the challenge associated with compensating and resettling Project Affected People. This can, however, be achieved with no Project Affected persons becoming socially or economically disadvantaged and with food security and livelihoods secured. The Project will more broadly deliver health, wealth and prosperity and significantly improve the lives of people in both the project area and in the rest of Uganda.

The Project is highly consistent with Uganda's National Development Plan three (NDPIII) of unlocking Uganda's mineral potential and enabling Uganda to become a wealthy middle-income country by 2040 as per the Vision 40. Makuutu will generate significant wealth for Uganda and serve as a catalyst for other major mining projects as well as contributing to positive social and environmental outcomes.

## 2 Introduction

The Makuutu Project ESIA has been compiled under the guidance of NEMA certified EIA practitioners working for the Ugandan based JBN and Atacama Consulting teams. These teams closely collaborated with Australian based Ionic Rare Earths who are the majority shareholder in Rwenzori Rare Metals and the planners and designers of the Makuutu Ionic Adsorption REE Clay Project. The close collaboration between: JBN Consults and Planners with extensive experience in the completion of high quality ESIA's in Uganda; Atacama Consulting with extensive social and resettlement consultancy experience in Uganda and; highly experienced international experts in mining within the Ionic Rare Earths Team, enabled the project to be designed in a way that minimises social and environmental risks and maximises the economic, environmental and social benefits of the Project. JBN Consults and Planners were the lead ESIA consultants. They completed the Scoping ESIA and Terms of Reference that was approved by NEMA in February 2021; completed the environmental baseline study programme and; coordinated the compilation of the ESIA documentation. Atacama consulting completed the social engagement programme and the socio-economic baseline assessment. Ionic Rare Earths in close consultation with JBN and Atacama designed the Project and embedded operational controls to address the concerns of stakeholders and protect baseline socio-economic and biophysical values.

The Makuutu Project is focussed on securing a Mining Permit in late 2022 followed by construction in 2023 and the commencement of operations in 2024. The Project is highly consistent with the Third National Development Plan (NDPIII) (refer Section 3.1.2). With an expected life of mine revenue of US\$7.6 billion in combination with significant community development programmes it will increase household incomes and improve the quality of life of people in the Project area and in Uganda more broadly. Resettlement will be staged and managed so that no Project Affected Person is socially or economically disadvantaged. The Project will contribute to economic growth, lower rates of poverty and improved health and education outcomes. In addition to this, the progressive rehabilitation strategies will convert currently degraded farmland used for shifting agriculture into a mosaic of productive agricultural land, forest plantations and fish farms providing food security and supporting livelihoods. The Project will additionally work with stakeholders to enhance the biodiversity values of degraded wetlands in downstream river systems to positively benefit biodiversity conservation.

An overview of the properties, uses, and commercial potential of Rare Earth Elements (REE) is included in the Project Description Section of the ESIA (refer Section 3.2). Modern technology is underpinned by REE which are used in diesel and petrol refining, in the polishing of glass and mirrors, in catalytic converters, in optical display phosphors and in media and communication devices including televisions, mobile phones and computers. It is the HREE used in neo-magnets necessary for electric vehicles and wind turbines that are, however, in global short supply and these are largely sourced from ionic adsorption REE clay deposits. Makuutu is one of a very few known major REE ionic adsorption clay deposits outside of southern China and potentially the first one to be developed. This underscores its significance as an enabler of the necessary global transition from fossil fuel to renewable energy.

The Makuutu Project (Makuutu) is a large-scale, long-life, ionic adsorption clay Rare Earth Element (REE) Project located 120 kms east of Kampala in Eastern Uganda (refer Figure 21). The ore-body is 40 km long and spans the Districts of Mayuge, Bugweri and Bugiri (refer Figure 19). In March 2021 it was assessed as containing 315 million tonnes of indicated and inferred resources at a 200ppm Total Rare Earth Oxide (TREO)-CeO<sub>2</sub> Cut-off Grade and resources are expected to increase with further drilling, including in EL00147 which was added to the east of the Project in 2021 (refer Figure 20). The Project has a 27-year life that will commence with a mining rate of 12.5 million tonnes per year which will increase to 25 million tonnes of overburden and ore a year at peak production rates by Year 10. By this time the Project will be mining 12.5 million

tonnes of ore to recover an average 820 tonnes of year of mixed Rare Earth Oxide (REO). The ore will be transported on a dedicated haul road completely separated from public roads and all operational facilities, including the mine, haul road and processing plant will be securely fenced to protect the community. For a Project of this magnitude, it has a small environmental footprint. It is low in Uranium and Thorium radionuclides that are typically a challenge for REE mines; the shallow ore-body can be exploited without blasting or crushing and; the mining pits will be progressively backfilled and returned to productive agricultural land leaving no legacy mining pits, waste dumps or tailings impoundments. Progressive rehabilitation over a 27-year mine life limits the magnitude of the mining footprint and facilitates staged resettlement, which is the most significant social challenge for the project. Makuutu seeks to maximise the economic, social and environmental benefits of the Project and to mitigate adverse impacts wherever possible. It is a large Project but with no social or environmental risks that would be considered diverse, irreversible or unprecedented it is considered a Category B Project under Equator Principles guidance. This exciting Project is being developed by Ugandan Registered Rwenzori Rare Metals Limited and their Australian-based Ionic Rare Earths major shareholder. Rwenzori have been exploring the Project area since 2012.

The Makuutu Rare Earths Project will be a significant financial contributor to Uganda, with estimated gross royalty payments of US\$380M plus corporate tax contributions of US\$965M over the life of the project. Under Ugandan Tax Law 17% of Project Royalty payments are required to return to the area through mandated local government (17%) and land owner (3%) share of Project Royalties. This amounts to US\$76 million over the life of the Project which would be dedicated the areas adjacent to the Project. The Project will additionally be making significant direct contribution to community development programmes (refer ESMP Volume 3, Community Development Plan as summarised in Section 11.3) and other programmes that will deliver economic and social benefit to local communities and Uganda more broadly.

The Scoping Study and Terms of Reference for the Makuutu Project Environmental and Social Impact Assessment (ESIA) (refer Annex I) were approved by NEMA in February 2021. This document provided an overview of the Makuutu Project and its legal, social and environmental context. Its approval enabled the work programme for the socio-economic and environmental baseline study programme to commence along with the associated stakeholder engagement and, risk assessment and mitigation required for the ESIA study period.

## 2.1 Uganda's Mineral Potential

The Third National Development Plan (NDP III) reveals that Uganda has a vast potential of metallic mineral deposits, which is under-exploited. These include; Gold, Iron Ore, Zinc, Niobium-Tantalum (or columbite-tantalite), Tin (cassiterite), Copper, Cobalt, Lead, Beryllium, Wolfram, Bismuth, Bismutite, Chromium, Lithium, Titanium. Non-metallic minerals include; Bentonite, Diatomite, Kaolin, Limestone, Marble, Vermiculite, Gypsum, Phosphates, Feldspar, Aggregate, Crushed and Dimension Stone, Glass sands, Sand, Clays and Salt. Mineral exploration has indicated the potential for Uranium, Platinum Group Minerals, Nickel, Diamonds and Rare Earth Elements (REE) (refer Figure 12 and Figure 13). The NDP III lists the Rare Earth Elements as Phase II Minerals prioritized for the NDP III period i.e., 2020/21 – 2024/25. The rough estimates of the quantities in Uganda indicated in the NDP III document include 73.6 million tonnes of REE estimated at Sukulu with grade of 0.32%  $\text{La}_2\text{O}_3$  and Aluminous clays that are enriched in Scandium, Gallium and Yttrium. This is in addition to **REE in Makuutu area** that was estimated at 300 million tonnes of proven reserves (NDP III, 2020). Makuutu will serve as a catalyst to unlock Uganda's large untapped resource potential. This is consistent with the specific focus of Uganda's third National Development Plan (NDP III) to address constraints in the minerals and mining sector as a key strategy in achieving Uganda's Vision of becoming a competitive, upper middle-income country by 2040.



Uganda is Mineral Rich, but the mining sector is undeveloped. Unlocking the mineral potential of Uganda is therefore seen as priority in NDP III which considers Mineral exploitation to be critical to industrialization. The development of the Makuutu Project will be an example of the possible and serve as a catalyst for the development of other mineral deposits in Uganda into World Class Mines. After 10 years of exploration and study the Makuutu Project can be considered well advanced, and the Developer is not aware of any other potential major mining projects in Uganda at a similar level of development. Other potential Mineral Commodities in Uganda include:

- **Metallic mineral resources:** Beryllium, Bismuth, Copper, Cobalt, Columbite-Tantalite (Coltan), Gold, Iron, Lead, Lithium, Manganese, Platinum Group of Metals (PGM), Rare Earth Elements (REE), Tin, Uranium and Zinc
- **Industrial minerals:** Bentonite, Clay, Diatomite, Dimension Stones, Feldspar, Glass sands, Graphite, Gypsum, Kaolin, Kyanite, Marble /limestone, Mica, Phosphate (Apatite), Pozzolana, Salt (rock salt, halite), Talc and Vermiculite
- **Gemstones:** Apatite, Beryl – emerald, aquamarine, heliodor, morganite, Corundum (Ruby, blue sapphire), Fluorite and Garnet.

The Phase I minerals listed in the NDPIII are: oil and gas, Marble/ limestone, Gold, sand/ aggregates, Iron ore, phosphates, and Copper. The Phase II minerals are: Rare Earth Elements, Cobalt, Tin, Tungsten, and Granite. The quantities listed in the NDPIII are summarized below (refer Table 1):

**Table 1: Mineral Resources of Uganda (Source: NDP III)**

Mineral	Location and Estimated Quantities
Oil and gas	The Albertine Graben with 1.4b barrels of recoverable oil.
Marble/ Limestone	<ul style="list-style-type: none"> <li>• 14.5mil tonnes at Hima, Kasese and 11.6 Mt at Dura, Kamwenge and over 300 milMt of</li> <li>• Marble in Karamoja region.</li> </ul>
Gold	<ul style="list-style-type: none"> <li>• 5mil ounces of gold in Mubende District mined by Anglo Uganda corporation.</li> <li>• 1 mil ounces of Gold estimated at Mashongain Bushenyi district.</li> <li>• 500,000 ounces of gold estimated at Tiira, Busia, and Over 800,000 ounces estimated at Alupe in Busia.</li> <li>• 500,000 ounces of gold at Kampono (Ibanda)</li> <li>• 139,000 ounces and possible reserves of 160,000 ounces of gold at Nakabat, Moroto.</li> </ul>
Sand/ Aggregates	Diimu and Bukakata, Lwera-Masaka; Nalumuli Bay and Nyimu Bay and Kome Island-Mukono (The highest quality- 99.95 percent SiO <sub>2</sub> ).
Iron Ore	<ul style="list-style-type: none"> <li>• 50milMt at Muko- Kabale; 2milMt in Mugabuzi-Mbarara; 23milMt at Bukusu and 45mil Mt at Sukulu-Tororo, 48mil Mt at Buhara-Kabale (new discovery), 55mil Mt at Butogota-</li> <li>• Kanungu (new discovery), and 8mil Mt in Bufumbira-Kisoro (new discovery).</li> </ul>
Phosphates	230mil tonnes at Sukulu with grade of 13.1percent P <sub>2</sub> O <sub>5</sub> , 50mil tonnes at Bukusu with grade of 12.8percent P <sub>2</sub> O <sub>5</sub> .
Copper	Kilembe in Kasese District (1.77 percent Cu, 4.5miltonnes), Boboong in Kotido District, Kitaka in Bushenyi District and Kampono in Mbarara District.
Cobalt	Kilembe (0.17percent Co, 5.5miltonnes)
Tin	1mil Mt at 2.5percent tin estimated in Ntungamo and 2.5m Mt in Isingiro
Tungsten	<ul style="list-style-type: none"> <li>• Kirwa wolfram resources are at 801,300Mt with average grade of 68.67 percent WO<sub>3</sub></li> <li>• 2.1mil Mt and possible reserves of 355mil Mt at Nyamuliro with ore grade at 0.1percent</li> </ul>
Granite	Bulema-Kanungu; Bugangari-Rukungiri; Mutaka-Bushenyi; Lwemivumbo-Mubende; Nyabakweri-Ntungamo; Lunya-Mukono.

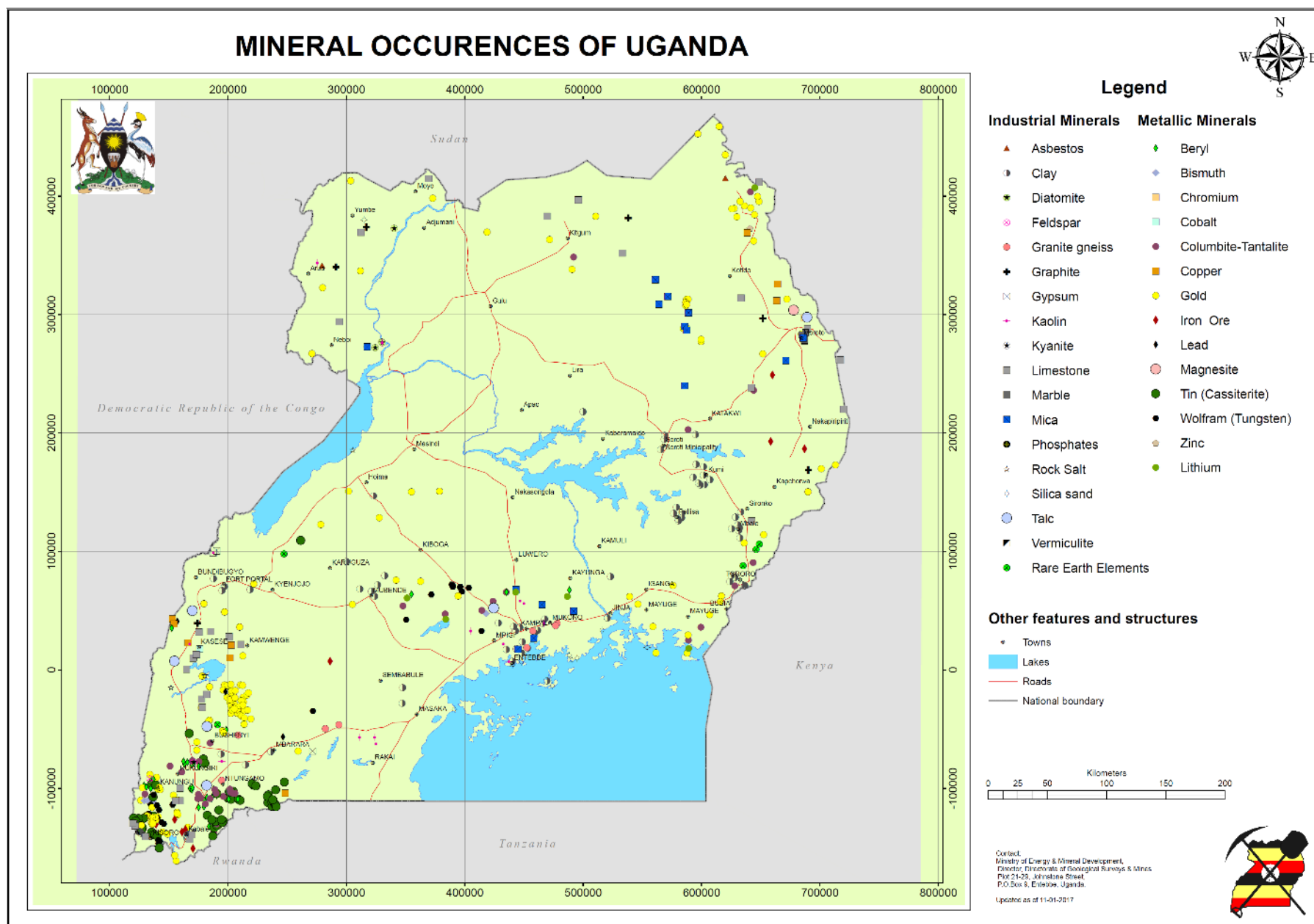


Figure 12: Mineral Occurrence map of Uganda

# MAP SHOWING CONCESSIONS AND MINERAL OCCURENCIES IN UGANDA

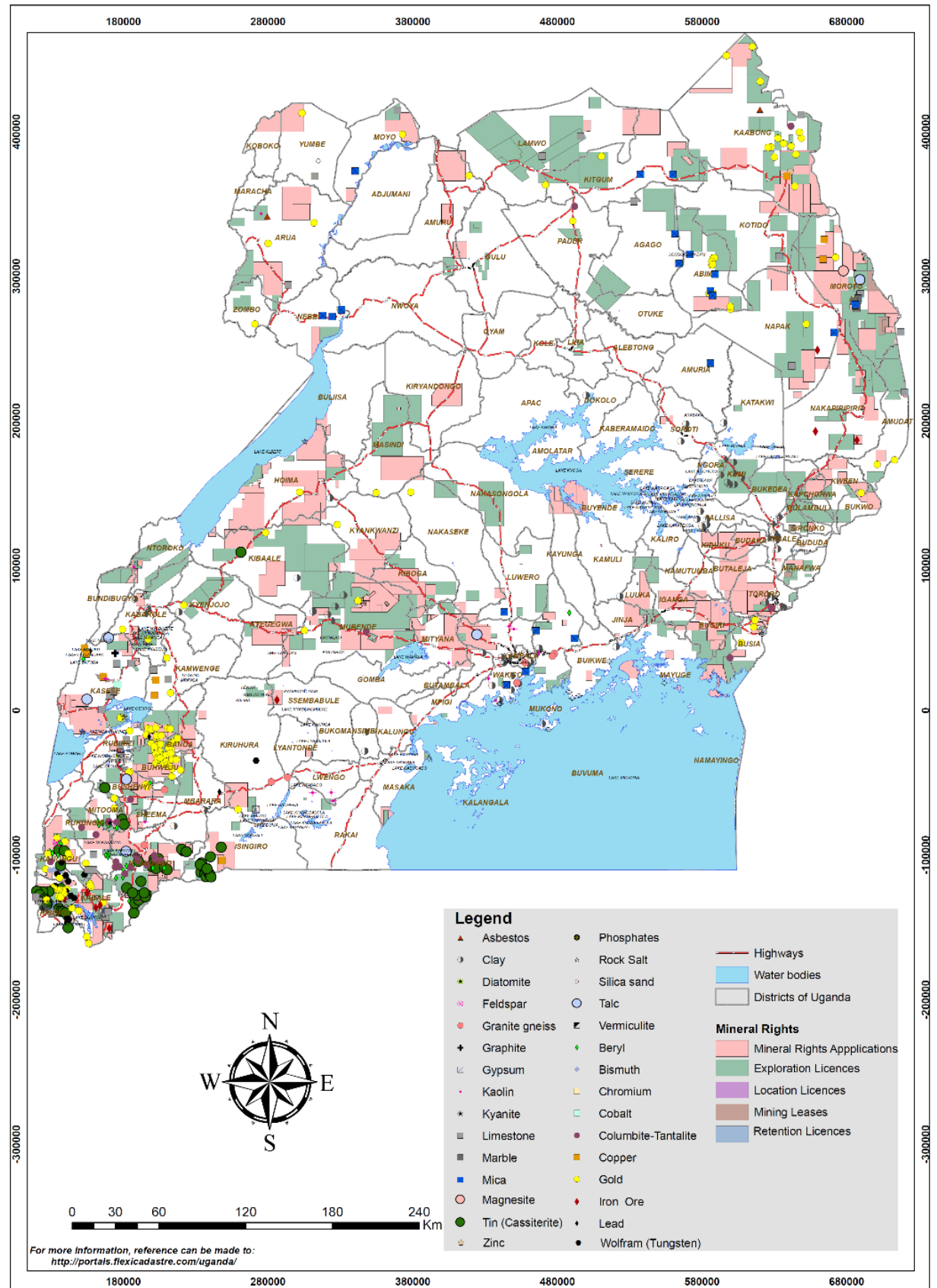


Figure 13: Map Showing Concessions and Mineral Occurrences in Uganda



## 2.2 The Makuutu Rare Earths Project

The Makuutu project area encompasses a series of REE ionic adsorption clay deposits in Bugweri, Mayuge and Bugiri Districts. The grades of the project's REE are comparable to the grades in the southern China REE ionic clay mines that produce much of the world's HREE (refer Figure 16). The currently scoped resource size supports a 27-year life of mine. The Makuutu REE project covers 5 exploration/ retention areas (refer Figure 20) with project details are summarized in the Table below (refer Table 2).

Table 2: Summary of Makuutu Project

<b>Project Name</b>	Makuutu Rare Earths Project
<b>Developer</b>	Rwenzori Rare Metals Limited
<b>Location</b>	Bugweri, Mayuge and Bugiri  Retention License RL1693 Retention License RL00007 Exploration License EL1766 Exploration License EL00148 Exploration Licence EL00147
<b>Estimated Cost</b>	US\$89 million construction cost
<b>Contact Person</b>	WARREN TREGURTHA Chief Executive Officer Rwenzori Rare Metals <a href="mailto:warren@rwenzorimetals.com">warren@rwenzorimetals.com</a>

## 2.3 ESIA Justification

### 2.3.1 Requirement under the National Environment Act 2019

An ESIA is a requirement by laws of Uganda for any development project deemed to have significant environmental and social impacts. Schedule 4 of the National Environment Act 2019 lists projects for which Project Briefs are required that include the following:

11. Mining industry and mineral processing.
  - (a) Reconnaissance and geophysical surveys.
  - (b) Geochemical sampling, pitting and trenching.
  - (c) Support facilities to (a) to (b).

Schedule 5 also lists Projects for which Environmental and Social Impact Assessments (ESIAs) are mandatory which include the following:

17. Mining industry and mineral processing.
  - (a) Mineral exploration.
  - (b) Mining of metal and non-metal minerals.**
  - (c) Processing of minerals, including smelting and refining of ores.**

Given the scope of the Makuutu project, an ESIA is mandatory.

### 2.3.2 Requirement under the Mining Regulations 2019

The Mining Regulations 2019 provide justification for an ESIA including the scope as detailed below.

**Regulation 53. Submission of project brief and environmental and social impact assessment.**

(1) A holder of a prospecting licence, exploration licence, location licence, retention licence or mining lease shall, as applicable, prepare and submit a project brief or an environmental and social impact assessment before commencement of work, in accordance with the National Environment Act, 2019 and the National Environment (Environment Impact Assessment) Regulations of 2020.

(2) The environmental and social impact assessment prepared under subregulation (1) shall, in addition to the requirements of the National Environment Act, 2019 and regulations indicate the following—

- (a) the activities involved in the programme of exploration or mining activity in a sequential order;
- (b) the projected area to be affected by each activity;
- (c) the materials that are to be used in construction and the necessary inputs;
- (d) the number of people projected to be employed;
- (e) the likely environmental effects of the materials to be used, products and by-products to be generated, the duration of the environmental effects and their prevention and mitigation; and
- (f) any other activities that may arise during the implementation of the project.

### 2.3.3 ESIA Approach

The ToR were developed through a process known as scoping. The scoping report was submitted to the National Environment Management Authority (NEMA), which forward the ToR to the lead agencies, and other project stakeholders for comments. Following a review of the scoping report and ToR by NEMA, lead agencies, and stakeholders, NEMA approved the ToR (refer to Annex I). The detailed methods for baseline investigations, impact assessment, risk assessment and stakeholder engagement are presented in the respective chapters.

## 2.4 Makuutu Rare Earth Project Policies

### 2.4.1 Social and Environmental Policy

#### MAKUUTU RARE EARTHS PROJECT SOCIAL & ENVIRONMENT POLICY



Policy number	RRM004	Version	V1
Responsible person	Stephen McEwen	Approved by	Tim Harrison
Issue Date	October 2021	Review Date	TBC

#### Introduction

Ionic Rare Earths Ltd and Rwenzori Rare Metals Ltd are committed to ensuring that the Makuutu Rare Earths Project is economically viable, socially equitable and environmentally sustainable

#### Purpose

This policy is designed to ensure that Ionic Rare Earths Ltd and Rwenzori Rare Metals Ltd comply with all its obligations under the relevant legislation

#### Policy

Ionic Rare Earths Ltd and Rwenzori Rare Metals Ltd will be responsible stewards and add value to the environments and communities in which we operate by:

- Complying with all legal and other requirements as a minimum.
- Implementing an effective environmental and social management system that secures a level of performance that meets the expectations of all stakeholders.
- Communicating openly with employees, the community and regulatory authorities to capitalise on opportunities that secure environmental and social benefit.
- Ensuring that the workforce is aware of their environmental risks and follows established procedures to minimise them.
- Preventing the pollution of air, land and water by providing facilities that contain emissions and by managing activities to prevent the spillage of fuels and hazardous chemicals.
- Prohibiting the trapping of animals and the consumption of bush-meat by Makuutu Rare Earths Project employees and Contractors on Makuutu property.
- Implementing a progressive life of mine and closure plan that minimises the disturbance footprint during operations and that returns all disturbed land to aesthetically pleasing productive farmland and functional ecosystems following ultimate closure.
- Conserving resources and minimising emissions of green-house gasses through efficient operations.
- Supporting research programmes relevant to agricultural productivity, biodiversity conservation and community health in Uganda.
- Effectively engaging stakeholders in order to quickly address issues of concern and, by negotiating in good faith to resolve disputes.

A handwritten signature in blue ink, appearing to read 'Tim Harrison'.

Signed by Tim Harrison  
Ionic Rare Earths Ltd

19<sup>th</sup> October 2021

## 2.4.2 Safety, Health and Hygiene Policy

### MAKUUTU RARE EARTHS PROJECT SAFETY, HEALTH & HYGIENE POLICY



Policy number	RRM003	Version	V1
Responsible person	Stephen McEwen	Approved by	Tim Harrison
Issue Date	October 2021	Review Date	TBC

#### Introduction

Ionic Rare Earths Ltd and Rwenzori Rare Metals Ltd are committed to ensuring that all workers at the Makuutu Project return home safely to their families each day. We will achieve this through an approach of mutual responsibility for keeping people safe.

#### Purpose

This policy is designed to ensure that Ionic Rare Earths Ltd and Rwenzori Rare Metals Ltd comply with all its obligations under the relevant legislation

#### Policy

The Project will provide safe equipment and facilities; ensure that workers are fit for work, well-trained and follow procedures. Each worker will additionally take ownership of their personal safety by ensuring that they are fit for work and by being alert to hazards that may impact on them or their workmates. All work will be risk assessed prior to commencement and each worker has the right to refuse to undertake unsafe work.

To support this philosophy we will:

- Ensure that people are fit for work through a combination of pre-employment medical assessment, routine drug and alcohol testing and fatigue management strategies
- Establish standards for the management of critical safety risks including chemical management; electrical safety; confined spaces; working at height; operation of mobile equipment and machine guarding
- Enforce the use of appropriate Personal Protection Equipment (PPE) including work boots, helmets, safety glasses/goggles and high visibility work clothing
- Require formal risk assessment prior to the commencement of any task
- Provide high standard facilities including crib-rooms, treated drinking water and, toilets and showers.
- Be well prepared for Emergencies including maintaining a site presence of a well-equipped and trained emergency response team and a nursing post with trained paramedics.
- Enforce hygiene standards that minimise the health risks to employees, contractors, and visitors. These standards encompass anticipation, recognition, evaluation, and control strategies to manage a variety of occupational health hazards including exposure to dust and fumes; chemicals; noise; vibration; ergonomics and communicable and non-communicable diseases
- Reward and encourage safety leadership through aspects such as personal safety plans, safety shares, safety interactions, vital behaviours and, leadership coaching

A handwritten signature in blue ink, appearing to read 'Tim Harrison'.

Signed by Tim Harrison  
Ionic Rare Earths Ltd

19<sup>th</sup> October 2021

## 2.4.3 Employment Policy

### MAKUUTU RARE EARTHS PROJECT EMPLOYMENT POLICY



Policy number	RRM002	Version	V1
Responsible person	Stephen McEwen	Approved by	Tim Harrison
Issue Date	October 2021	Review Date	TBC

#### Introduction

Ionic Rare Earths Ltd and Rwenzori Rare Metals Ltd are committed to securing safe and effective working relationships at the Makuutu site. We will respect local cultures, traditions and employment practices within an over-arching commitment to eliminate workplace injuries and to foster ethical behaviour.

#### Purpose

This policy is designed to ensure that Ionic Rare Earths Ltd and Rwenzori Rare Metals Ltd comply with all its obligations under the relevant legislation

#### Policy

Ionic Rare Earths Ltd and Rwenzori Rare Metals Ltd are equal opportunity employers and will provide equality in employment for all people employed or seeking employment.

We will specifically:

- Select employees on basis of job requirements without discriminating on grounds of age, ethnic or social origin, gender, sexual orientation, politics or religion. The potential exception to this is prioritising local employment.
- Not employ forced, bonded or child labour.
- Require everyone to be properly trained and to work in safe, healthy and environmentally responsible ways.
- Promote personal development and skill improvement through regular performance reviews, recognising potential and providing personal development, education, training and coaching as appropriate.
- Expect managers and supervisors to be models of the highest standards of behaviour.
- Treat each other and those we deal with externally with dignity, fairness and respect.
- Guard against harassment in the workplace and neither abuse nor misuse our positions or facilities for personal purposes.
- Respect our obligations to our colleagues and employer.
- Work together to improve performance.

The Makuutu Project offers sound conditions of work and transparent remuneration and incentive systems in combination with fair disciplinary procedures. We recognise everyone's right to choose whether or not they wish to be represented collectively and we embrace the spirit of our code of conduct.

A handwritten signature in blue ink, appearing to read 'Tim Harrison'.

Signed by Tim Harrison  
Ionic Rare Earths Ltd

19<sup>th</sup> October 2021



## 2.4.4 Anti-corruption Policy

### MAKUUTU RARE EARTHS PROJECT ANTI-CORRUPTION POLICY



Policy number	RRM001	Version	V1
Responsible person	Stephen McEwen	Approved by	Tim Harrison
Issue Date	October 2021	Review Date	TBC

#### Introduction

Ionic Rare Earths Ltd and Rwenzori Rare Metals Ltd are committed to complying with Australia and Uganda's anti-corruption laws and never using entrusted authority for illicit gain. It is specifically illegal for any Makuutu staff or their engaged consultants to make a gift, payment, or anything of value to a public official.

Lawful payments include:

- Receipted payments approved under written law to government officials, international organisations or members of the legislature.
- Receipted payments of a minor nature to facilitate routine government action of a minor nature including:
  - granting a permit, licence, or other official document necessary to do business
  - processing government papers such as a visa or work permit
  - providing police protection or mail collection or delivery
  - scheduling inspections associated with contract performance or related to the transit of goods
  - providing telecommunications services, power or water
  - loading and unloading cargo
  - protecting perishable products, or commodities, from deterioration

Facilitation payments for awarding new business or negotiating business terms are excluded.

Records of all payments must be kept detailing:

- the value of the benefit concerned
- the date on which the conduct occurred; and
- the identity of the official with some verification of identity

A request for approval of payment of facilitation or entertainment expenses for the purpose of the company's Anti-corruption Policy must be approved by the CFO.

#### Purpose

This policy is designed to ensure that Ionic Rare Earths Ltd and Rwenzori Rare Metals comply with all its obligations under the relevant legislation.

#### Policy

##### Note on Uganda corruption context and anti-corruption strategy

The Justice and Law Sector for the republic of Uganda has developed an anticorruption strategy.

<https://www.jlos.go.ug/index.php/about-jlos/projects/anti-corruption-strategy>

It is estimated that Uganda losses over 250 million US dollars of public resources per annum to corruption with the Uganda Police Force and the Judiciary ranked among the top three corrupt institutions in Uganda. Uganda is placed among countries in which people reportedly most often (in comparison to other countries) have to pay bribes when entering into contact with institutions like the Police, Judiciary or customs.

## MAKUUTU RARE EARTHS PROJECT ANTI-CORRUPTION POLICY



This reflects public mistrust, which heightens the crime rates and complicates the work of JLOS institutions in administration of justice in Uganda. The reasons for corruption were identified as:

- Public beliefs and attitudes;
- Ineffective accountability systems;
- Lack of political leadership and accountability;
- Moral decay in public service
- Limited capacity of anti-corruption agencies and the judicial system
- Delays in the legislative framework:

Other driving factors include but are not limited to;

- Poor staff motivation and/or remuneration;
- Poor organisational/institutional structures that do not clearly outline roles and responsibilities to specific officials;
- Poor internal controls and segregation of duties;
- Poor record keeping, archiving and tracking systems;
- Inadequate transparency, for example in prioritizing and sequencing the hearing of court cases or payment of court awards;
- Public ignorance about various procedures and rights;
- Lengthy court resolution timelines that lead to frustration of stakeholders who may resort to easier/faster options to achieve end results; and
- Political interference among others.

The main strategy is to strengthen the capacity of the Justice and Law Sector in Uganda to deal with corruption by strengthening integrity, transparency and service delivery within institutions, and thereby building public trust.

A handwritten signature in blue ink, appearing to read 'Tim Harrison'.

Signed by Tim Harrison  
Ionic Rare Earths Ltd

19<sup>th</sup> October 2021

## 3 Project Description and Justification

### 3.1 Project Justification

#### 3.1.1 Relevance to Uganda Vision 2040

The Uganda Vision 2040 acknowledges that the main drivers of economic growth from 1988 to 2010 have been posts and telecommunications, construction, and mining sectors. The Vision 2040 further observes that the continued growth of sectors such as the telecommunication, construction and mining will be crucial in driving the growth of the country and will influence GDP Growth over the Vision period. In the same document, Government committed that it will continuously carry out geological explorations in the various parts of the country to assess the viability of the various mineral potentials. The proposed Makuutu project falls under the mining sector and is expected to contribute to realization of the Vision 2040 aspirations (refer Figure 14).

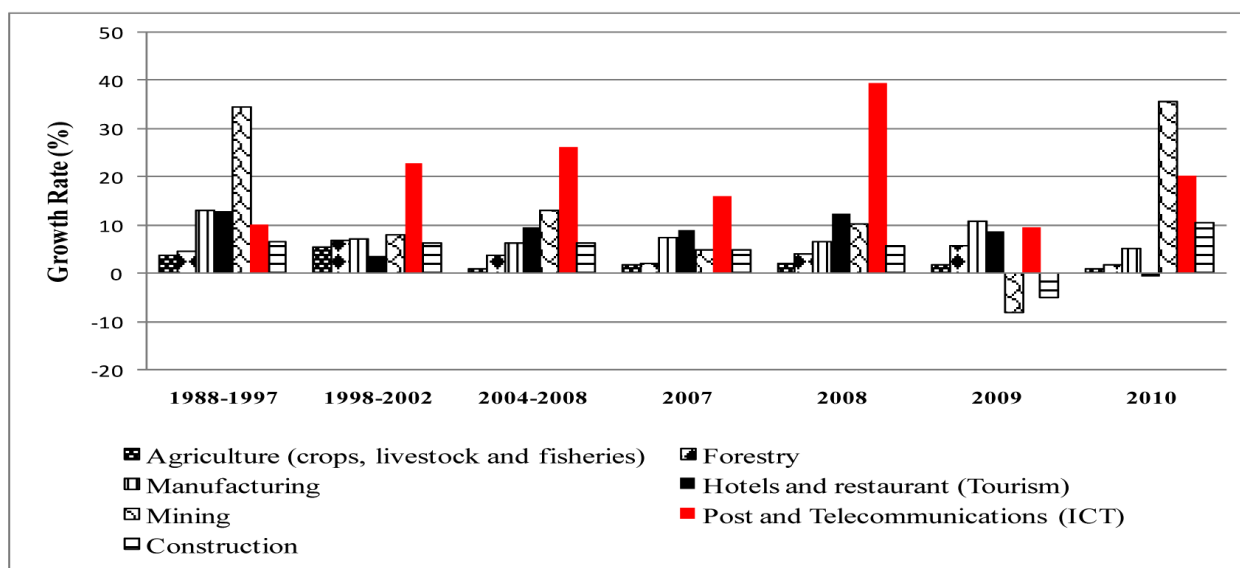


Figure 14: Vision 2040 Aspiration (Source: Uganda Vision 2040)

#### 3.1.2 Relevance to the NDP III

The Makuutu Project is highly consistent with the Third National Development Plan (NDPIII), whose goal is “Increased household incomes and improved quality of life”. The development of the World Class Makuutu Rare Earth Element (REE) Project with an expected revenue of US\$7.6 billion will be a significant step in unlocking the resource potential of Uganda and will contribute to Uganda achieving its 2025 targets of an average economic growth rate of 7 percent, increased per capita income to USD 1,300, lower poverty rate to 15.4 percent, reduce income inequality (Gini-coefficient) to 0.39 and, improve health and education outcomes for the population. In addition to Makuutu’s contribution to positive community development outcomes the progressive rehabilitation strategies are expected to convert currently degraded farmland used for shifting agriculture into a mosaic of productive agricultural land, forest plantations and fish farms. The Project will additionally work with stakeholders to enhance the biodiversity values of degraded wetlands in downstream river systems.



The theme of the Third National Development Plan (NDP III) 2020/21 – 2024/25 in support of the Goal is “Sustainable Industrialization for inclusive growth, employment and wealth creation”. Under the NDP III, the **Mineral Development Programme** aims to increase mineral exploitation and value addition in selected resources for quality and gainful jobs in industrialisation. Key expected results include: reducing the volume and value of imported iron and steel and inorganic fertilisers; increasing the volume and value of refined gold exports and copper; **increasing investment in the exploration and processing of selected minerals**; and **creating more jobs** in the mining subsector.

The NDP III highlights that mineral exploitation is critical for the industrialization process. In addition to their intrinsic, practical value as part of a manufactured product, minerals also have a significant general value to the economy from both a financial, economic and an employment standpoint (NDPIII). However, there is limited minerals exploitation and value addition due to: (i) rudimentary mining methods and informality in the mining sector; (ii) inadequate human and institutional capacity to carry out exploration, quantification and characterization activities; (iii) inadequate supporting physical and R&D infrastructure; and (iv) Limited investment in industries that utilize available minerals. The current investment in mineral exploration is now over USD 1.6 billion (NDPIII). Some of the key results expected to be achieved by the NDPIII over the next five years include:

- Increase the value of investment into the exploration and processing of the selected minerals from USD 0.8 billion to USD 2 billion.
- Increase contribution of processed minerals to total manufactured exports from 5 % to 7.1 %.
- Increase the number of jobs created by the programme by 10 percent annually.

The NDPIII observes that despite the successes registered in this industry, there are still some challenges that have to be addressed to realize the aspirations of Vision 2040. This includes unexplored and unquantified mineral resources. According to the NDPIII, the discoveries which require promotion and development include: Iron ore reserves, which stand at about 350 million tonnes of confirmed reserve with a resource base of over 1 billion tonnes inferred; Over 1 billion tonnes of marble in Karamoja; 12 million ounces of gold at Wagagai in Busia; 1.7 billion tonnes of graphite of graphite in Orom in Kitgum; a current estimate of 281.5 million dry tonnes of Rare Earth Elements (REE) in Makuutu (refer Table 5); estimated 3 billion tons of kaolin and bentonite in Kaiso Tonya; among others. Some of the minerals available in Uganda are yet to be quantified (NDPIII, 2020).

**The Makuutu project is expected to address the challenge of rudimentary mining methods and informality in the mining sector by adopting best practices. The Developer has also significantly invested in exploration, quantification, and characterization of the rare-earth mineral potential in the 3 districts. Lastly, the 281.5 million dry tonnes of REE at Makuutu (refer Table 5) is expected to expand greatly with further drilling.**

The NDPIII uses a two-pronged approach to develop Uganda’s mineral potential. First, **minerals whose quantities and values are known and where studies and work towards their development has already commenced will be fully developed** (the case of Makuutu Rare Earths project). Towards this, 5 minerals are prioritised for development across the value chain. These are: Iron ore, Gold, Copper, Phosphates, and Development Minerals (marble, silica sand, aggregate, and limestone). Second, more studies will be undertaken to ascertain the quantity and quality of the other minerals for development in subsequent plans

(studies for Makuutu Rare Earths project are already on-going). The rare earth elements are listed under Phase II of the list of Prioritized Minerals for NDP III.

**Therefore, the proposed Makuutu Rare Earths project is consistent with the Third National Development Plan (NDP III) 2020/21 – 2024/25.**

## 3.2 Overview of Rare Earth Elements

### 3.2.1 REE Uses

An overview of Rare Earth Elements (REE) and their uses has been compiled by Britannica Science (<https://www.britannica.com/science/rare-earth-element>). There are 16 naturally occurring rare earth elements in addition to Promethium which does not occur naturally (refer Table 3). While they have broadly similar properties it is the unique properties of each that accounts for 75% of their uses. Almost every modern device contains some rare earth elements with electric motors and permanent magnets containing particularly high amounts. Catalytic convertors, phosphors in optical displays, mirror and glass polishing, diesel and petrol fuel refining, media and communications devices including mobile phones, televisions and computers all contain REE.

Table 3: Period Table showing the REE in purple

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg	Sc Scandium	Y Yttrium									Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba		Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra		Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og
		<div> <div>La</div> <div>Ce</div> <div>Pr</div> <div>Nd</div> <div>Pm</div> <div>Sm</div> <div>Eu</div> <div>Gd</div> <div>Tb</div> <div>Dy</div> <div>Ho</div> <div>Er</div> <div>Tm</div> <div>Yb</div> <div>Lu</div> </div>															
		<div> <div>Ac</div> <div>Th</div> <div>Pa</div> <div>U</div> <div>Np</div> <div>Pu</div> <div>Am</div> <div>Cm</div> <div>Bk</div> <div>Cf</div> <div>Es</div> <div>Fm</div> <div>Md</div> <div>No</div> <div>Lr</div> </div>															
		<div> <div>La</div> Lanthanum <div>Ce</div> Cerium <div>Pr</div> Praseodymium <div>Nd</div> Neodymium <div>Pm</div> Promethium <div>Sm</div> Samarium <div>Eu</div> Europium <div>Gd</div> Gadolinium <div>Tb</div> Terbium <div>Dy</div> Dysprosium <div>Ho</div> Holmium <div>Er</div> Erbium <div>Tm</div> Thulium <div>Yb</div> Ytterbium <div>Lu</div> Lutetium </div>															

### 3.2.2 REE Health and Safety

Makuutu will produce a mixed REE carbonate product comprised of all 16 naturally occurring REE including Scandium (refer Table 3). While there are some differences in the toxicology and occupational hygiene impact of each Rare Earth Element, a review of the Material Safety Data Sheets of each REE carbonate reveals broad similarities (refer Table 4). This in turn enables appropriate hygiene and handling standards for the mixed REE carbonate product to be developed.

The mixed REE carbonate product can be considered essentially benign from a human health perspective in that it will not be carcinogenic or bioaccumulate. It will, however, be generally irritating to the skin, eyes and respiratory tract and good dust control in the bagging plant in particular will be necessary. Workers in the bagging plant area will additionally require protection through the mandatory use of gloves, safety glasses, dust masks and protective clothing. The general community will not, however, be exposed to this product which, once bagged, will be sealed into shipping containers and not be a dust hazard. Peak production will be about 4,000 tonnes a year.

The REE carbonate product will not be explosive or flammable but if it is combusted in a fire, it will give off both carbon dioxide and carbon monoxide and it should be extinguished with either a CO<sub>2</sub> or dry chemical extinguisher. The individual or combined REE carbonates are not considered Dangerous Goods from a transport perspective.

Table 4: Summary of Material Safety Data Sheets for REE

Rare Earth Element	Toxicology	Comment
Scandium carbonate	Not known to have harmful effect on human health when handled to specification (i.e., gloves, protective clothing and safety glasses)	<ul style="list-style-type: none"> <li>Not flammable</li> <li>Not explosive</li> <li>Not soluble in water</li> </ul>
Yttrium carbonate	Skin and eye irritation from dust (gloves, protective clothing and safety glasses required when handling). If combusted it will emit toxic fumes of carbon dioxide / carbon monoxide. Can be extinguished with dry chemical or CO <sub>2</sub> extinguisher.	Hazardous reactions will not occur under normal transport or storage conditions.
Lanthanum carbonate	Skin and eye irritation from dust (gloves, protective clothing and safety glasses required when handling). This substance/mixture contains no components considered to be either persistent, bio-accumulative and toxic (PBT), or very persistent and very bio-accumulative (vPvB) at levels of 0.1% or higher.	Not a Dangerous Good for transport.
Cerium carbonate	Skin and eye irritation from dust (gloves, protective clothing and safety glasses required when handling).	<ul style="list-style-type: none"> <li>This product does not contain any hazardous materials with occupational exposure Limits established by region-specific regulatory bodies.</li> <li>Insoluble in water.</li> </ul>
Praseodymium oxide	<ul style="list-style-type: none"> <li>Not a hazardous substance or mixture</li> <li>Do not let enter drains</li> <li>Do not inhale dust (irritant)</li> </ul>	Not a dangerous good
Neodymium carbonate	<ul style="list-style-type: none"> <li>Skin and eye irritation from dust (gloves, protective clothing and safety glasses required when handling).</li> <li>Hazardous to water.</li> </ul>	Insoluble in water

Samarium carbonate	<ul style="list-style-type: none"> <li>• Skin, eye and respiratory hazard (gloves, protective clothing and safety glasses required when handling).</li> <li>• Do not release into waterways</li> </ul>	Samarium has been used in trials studying the treatment and prevention of Pain, Cancer, Metastasis, Prostate Cancer, and Metastatic Osteosarcoma, among others.
Europium carbonate	Skin, eye and respiratory hazard (gloves, protective clothing and safety glasses required when handling).	Not reactively hazardous and does not require monitoring in the workplace.
Gadolinium carbonate	Skin, eye and respiratory hazard (gloves, protective clothing and safety glasses required when handling).	<ul style="list-style-type: none"> <li>• The substance or mixture is not classified as a specific target organ toxicant from repeated exposure.</li> <li>• Hazardous in water but not a marine pollutant.</li> </ul>
Terbium carbonate	Irritating to eyes, respiratory system and skin. (Gloves, protective clothing and safety glasses required when handling)	No toxicological information available but avoid disposal in drains.
Dysprosium carbonate	Very irritating to eyes. Gloves, protective clothing and safety glasses required when handling)	No occupational health or environmental exposure limits
Holmium carbonate	Skin and eye irritation from dust (gloves, protective clothing and safety glasses required when handling).	Not flammable and no dangerous reactions.
Erbium carbonate	Skin and eye irritation from dust (gloves, protective clothing and safety glasses required when handling).	Non-hazardous for transport
Thulium carbonate	Skin and eye irritation from dust (gloves, protective clothing and safety glasses required when handling).	Non-hazardous for transport
Ytterbium carbonate	Wear eye and skin protection but respiratory protection not necessary.	This product does not contain any hazardous materials with occupational exposure Limits established by the region-specific regulatory bodies.
Lutetium carbonate	Mild irritant to eyes and nose (gloves, protective clothing and safety glasses required when handling).	Not a Dangerous Good for transport.

### 3.2.2.1 SDS References

- Scandium carbonate: [https://www.chemblink.com/MSDS/MSDSFiles/5809-49-4\\_Strem.pdf](https://www.chemblink.com/MSDS/MSDSFiles/5809-49-4_Strem.pdf)
- Yttrium carbonate: [https://www.chemblink.com/MSDS/MSDSFiles/5970-44-5\\_Apollo.pdf](https://www.chemblink.com/MSDS/MSDSFiles/5970-44-5_Apollo.pdf)
- Lanthanum carbonate: [https://www.chemblink.com/MSDS/54451-24-0\\_MSDS.htm](https://www.chemblink.com/MSDS/54451-24-0_MSDS.htm)
- Cerium carbonate: [https://www.chemblink.com/MSDS/MSDSFiles/54451-25-1\\_Across-Organics.pdf](https://www.chemblink.com/MSDS/MSDSFiles/54451-25-1_Across-Organics.pdf)
- Praesodymium oxide: <https://www.sigmaaldrich.com/AU/en/sds/aldrich/558249>
- Neodymium carbonate: <https://www.americanelements.com/neodymium-carbonate-5895-46-5#section-safety>
- Samarium carbonate: <https://www.sigmaaldrich.com/AU/en/product/aldrich/463906>
- Europium carbonate: [https://www.chemblink.com/MSDS/MSDSFiles/5895-48-7\\_Strem.pdf](https://www.chemblink.com/MSDS/MSDSFiles/5895-48-7_Strem.pdf)

- Gadolinium carbonate: [https://www.chemblink.com/MSDS/MSDSFiles/38245-36-2\\_Carl-Roth.pdf](https://www.chemblink.com/MSDS/MSDSFiles/38245-36-2_Carl-Roth.pdf)
- Terbium carbonate: [https://www.chemblink.com/MSDS/MSDSFiles/6067-34-1\\_Alfa-Aesar.pdf](https://www.chemblink.com/MSDS/MSDSFiles/6067-34-1_Alfa-Aesar.pdf)
- Dysprosium carbonate: [https://www.chemblink.com/MSDS/MSDSFiles/5066-34-2\\_GFS.pdf](https://www.chemblink.com/MSDS/MSDSFiles/5066-34-2_GFS.pdf)
- Holmium carbonate: [https://www.chemblink.com/MSDS/MSDSFiles/38245-34-0\\_Alfa-Aesar.pdf](https://www.chemblink.com/MSDS/MSDSFiles/38245-34-0_Alfa-Aesar.pdf)
- Erbium carbonate: <https://www.sigmaaldrich.com/AU/en/product/ALDRICH/325589>
- Thulium carbonate: <https://www.sigmaaldrich.com/AU/en/product/aldrich/325988>
- Ytterbium carbonate: <https://www.fishersci.com/store/msds?partNumber=AA1457418&productDescription=YTTRB%28II%29+CARB+HYD+99.9%25+50G&vendorId=VN00024248&countryCode=US&language=en>
- Lutetium carbonate: <https://prochemonline.com/product/lutetiumcarbonate-2396>

### 3.2.2.2 REE Environmental Risk

The individual REE carbonate elements are generally insoluble in water and are not considered marine hazards but the MSDS advice is to avoid disposing of these products into drains. The mixed REE carbonate is a very high value product creating high incentive to ensure that none is lost as emissions.

An overview of the Environmental Risks and impacts of REE mining was reviewed by the US Geological Society in 2017 (<https://pubs.usgs.gov/pp/1802/o/pp1802o.pdf>) under the following headings.

#### 3.2.2.2.1 Fate in the Environment

REE are generally found in very low concentrations in surface and groundwater due to their low solubility. In seawater, the average dissolved concentration of combined REEs is 0.15 part per billion (ppb) and in major rivers, the REE concentrations average 1.6 ppb. REE concentrations in surface and groundwater near REE projects with data was also very low with most REE below the 0.2 ppb limit of detection as is consistent with Makuutu (refer Annex IV).

#### 3.2.2.2.2 Mine Waste Characteristics

The paucity of sulfide minerals, including pyrite, minimizes or eliminates concerns about acid-mine drainage for carbonatite-hosted REE deposits and alkaline-intrusion-related REE deposits and this also applies to the Makuutu ion-adsorption clay deposit which is hosted in oxidised regolith.

Unlike REE ionic absorption clays like Makuutu, the main ore minerals currently processed for REEs—bastnaesite ( $\text{LnCO}_3\text{F}$ ), monazite ((Th, Ln)  $\text{PO}_4$ ), and xenotime ((Y, Ln)  $\text{PO}_4$ ) (where “Ln” [for lanthanide] indicates the place of REEs in the mineral formulas)—contain appreciable amounts of uranium and thorium. Bastnaesite reportedly contains between 0 and 0.3 weight percent thorium dioxide ( $\text{ThO}_2$ ) and 0.09 weight percent uranium dioxide ( $\text{UO}_2$ ); monazite, between zero and 20 weight percent  $\text{ThO}_2$  and zero and 16 weight percent  $\text{UO}_2$ ; and xenotime, between zero and 5 weight percent  $\text{UO}_2$ . The thorium and uranium contents of the ore minerals and mine waste represent one of the biggest environmental challenges that must be managed during mining, ore processing, and mine closure at many REE mines.

The low concentrations of uranium and thorium in the Makuutu REE ion adsorption clay ore and in the surface and groundwater remove one of the greatest environmental challenges of global REE mining from the Makuutu Project and places it in a particularly advantageous position from a sustainability perspective.

#### 3.2.2.2.3 Ecological Health Concerns

Little is known about the aquatic toxicity of REEs although their low solubility likely limits their toxicity. A few studies suggest that their aquatic toxicity varies as a function of water chemistry. More study is needed to evaluate the potential environmental risks associated with REEs in hydrologic systems. Environmental guidelines for REEs in surface water and sediment are lacking in the United States. The low solubility of the REE in combination with controls on spillage and treating discharge water (ie. in settlement dams) prior to discharge will mitigate the risk of REE contribution to downstream river systems at Makuutu.

#### 3.2.2.2.4 Mine Closure

The main closure challenges associated with REE mining relate to hard rock mining with legacy mining pits and waste dumps. The progressive back-fill of mining pits with the spent ore and overburden followed by the return of the previously mined area to productive agricultural land removes this as a risk for Makuutu.

### 3.3 Project Description

#### 3.3.1 Uniqueness of Makuutu

REE deposits have been found in (a) carbonatites, (b) peralkaline igneous systems, (c) magmatic magnetite-hematite bodies, (d) iron oxide-copper-gold (IOCG) deposits, (e) xenotime-monazite accumulations in mafic gneiss, (f) ion-adsorption clay deposits, and (g) monazite-xenotime bearing placer deposits. Carbonatites have been the world's main source for the light REEs since the 1960s. Ion-adsorption clay deposits in southern China are the world's primary source of the heavy REEs (<https://pubs.usgs.gov/pp/1802/o/pp1802o.pdf>). The US Geological Survey completed a review of REE in 2017 due to their status as raw materials critical to evolving technologies, such as clean-energy applications, electronics, and high-tech military components. Their map of major mines and advanced projects (refer Figure 15) does not identify any operating ion-adsorption REE clay mine outside of China and no advanced ion-adsorption REE clay projects. This makes Makuutu unique.



Figure 15: World Map of active REE mines and advanced REE Projects (<https://pubs.usgs.gov/pp/1802/o/pp1802o.pdf>)

The strategic importance of Makuutu as a major REE ionic adsorption clay deposit outside of southern China is accentuated by China's increasingly tightening strategic control of rare earths. In late 2020 China passed a law to impose restrictions or bans on exports of military and nuclear products, as well as other goods, to



protect their national interest and security (<https://asiatimes.com/2021/01/china-tightens-strategic-control-of-rare-earths/>). This particularly includes the heavy REE that are critically important in the manufacture of defence equipment, and which are primarily sourced from ion-adsorption REE clay mines not currently found outside of China. These heavy REE are additionally critical for the production of wind turbines and the world transition from fossil fuel to renewable energy. The rapidly increasing demand and relative rarity of heavy REE such as Dysprosium in non-ion-adsorption clay REE deposits is resulting in a global oversupply of the lighter REE which are relatively more abundant in non-ionic adsorption clay REE mines. These mines in seeking to maximise the mined volumes of heavy REE coincidentally mine more of the lighter REE than is needed resulting in oversupply and a fall in the price of the lighter REE. This in turn threatening the viability of many REE mines. REE ionic adsorption clay deposits such as Makuutu with large proportions of heavy REE are the beneficiaries of this trend. Heavy REE comprise about 13% of the Makuutu deposit in addition to 23% Neodymium which is also used in magnets (refer Figure 17). The bulk of projected Project revenue (in excess of 85%) is forecast to come from the heavy or magnet REOs, Nd (45.5%), Pr (7.7%), Dy (13.4%) and Tb (18.8%) (refer Figure 18). Terbium which comprises only 0.64% of the Project REE is projected to deliver 18.8% of the economic value is a good example of the financial benefit of a Project containing a relatively high proportion of heavy REE. The key strategic questions posed by the US Geological Survey at the end of their extensive review include the following key questions which are highly relevant for Makuutu.

- Do substantial sources of HREEs occur outside of China? Are the ion-adsorption clay deposits of southern China unique? These deposits serve as the world's principal source of the HREEs and, as of 2015, other HREE deposits had not been brought into production. Can other clay deposits similarly enriched in the HREEs be brought into production outside of southern China? Will other types of HREE deposits eventually be brought into production?
- Can REEs be replaced in some current applications by other metals that are less costly and more readily available? If so, will these products perform as well as those that use REEs?

The clays in Makuutu have similar REE baskets to the well-known clay mines currently in operation in China (arrows denote clay mines with similar REE baskets) (refer Figure 16).

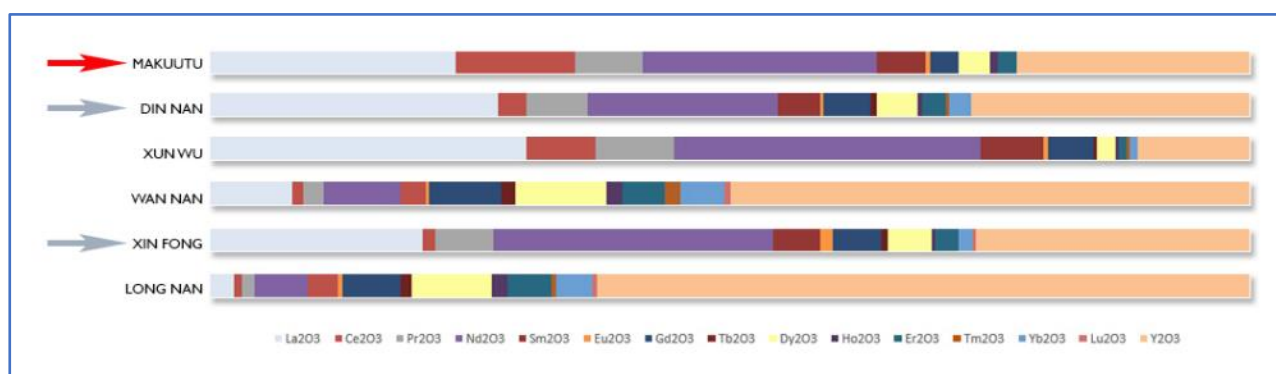


Figure 16: Comparison of Makuutu clays with other well-known clays mines in operation in China



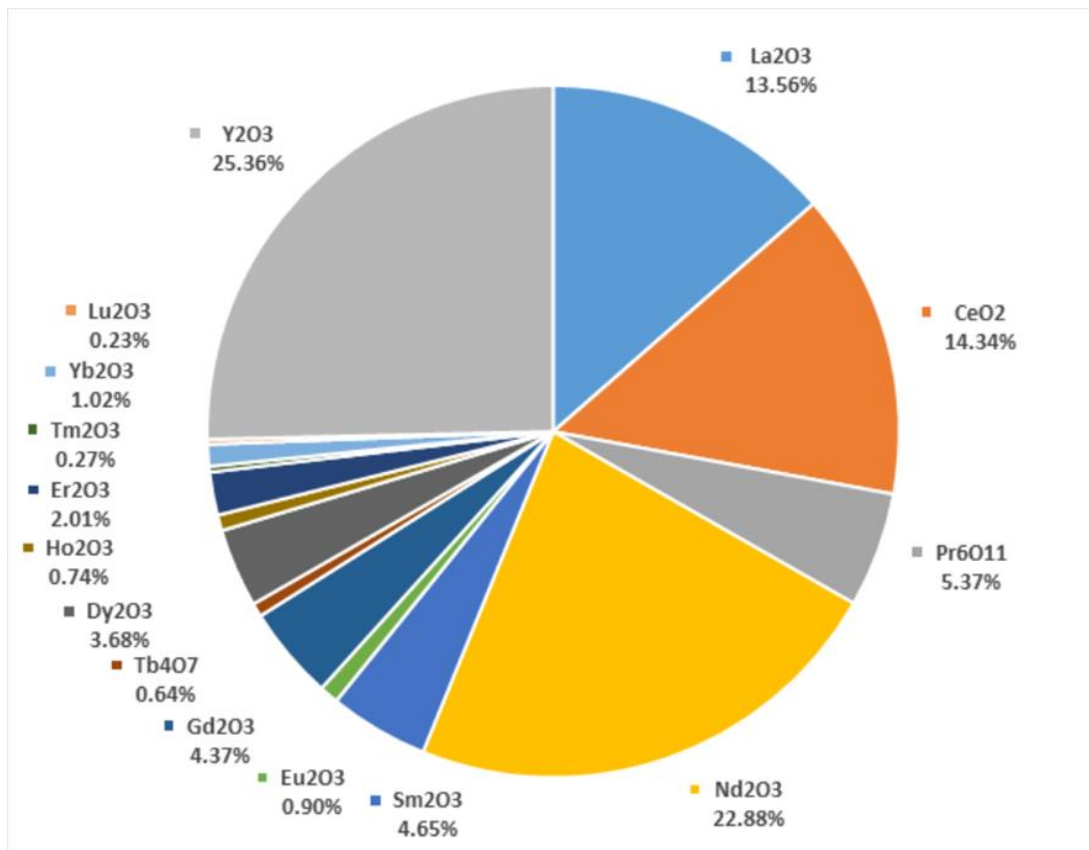


Figure 17: Makuutu Rare Earths Project distribution of REO equivalent LOM production

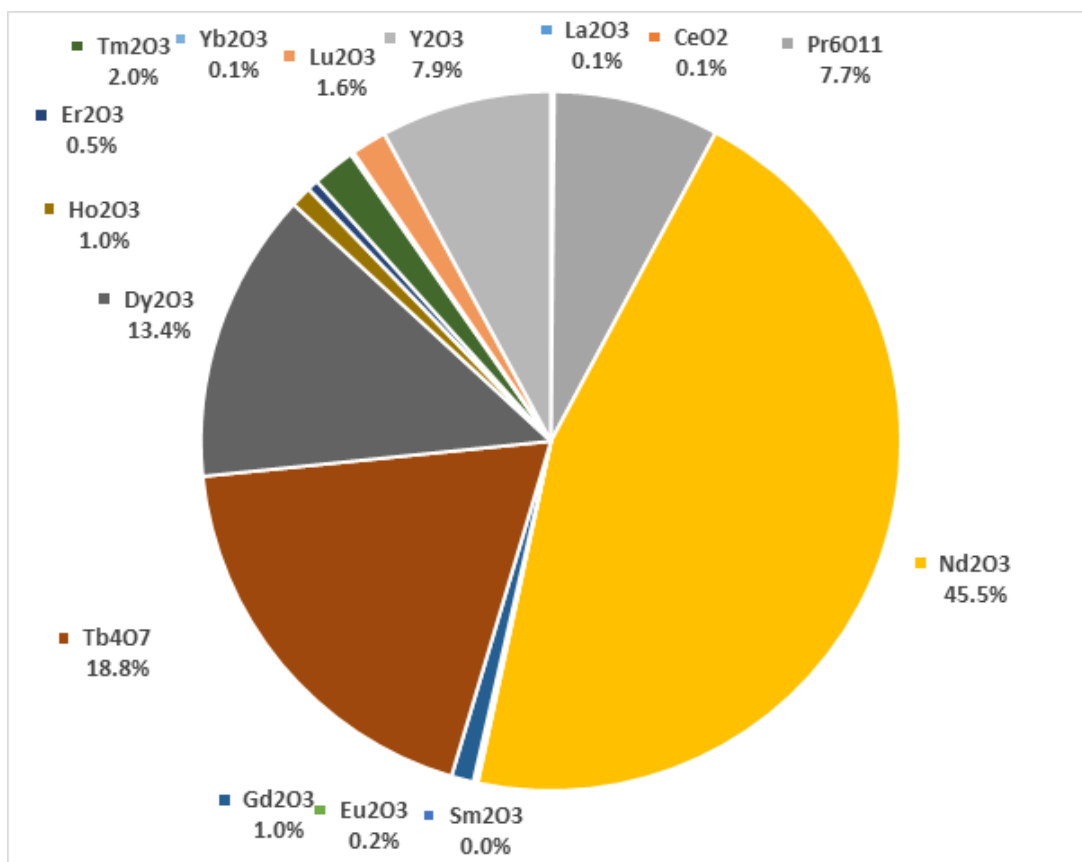


Figure 18: Proportion of economic value of the Makuutu Rare Earth Oxide extracted over the life of the Project

The relatively high concentrations of 13.4% Dysprosium and 45.5% Neodymium at Makuutu is particularly significant with respect to meeting the ever-increasing global demand for electric motors and turbines. Dysprosium is an essential element in the creation of permanent neodymium magnets. Dysprosium allows such permanent magnets to maintain their properties at the high temperatures which typically exist inside electric motors and turbines. In one study (<https://web.mit.edu/12.000/www/m2016/finalwebsite/problems/ree.html>) it has been projected that by 2025 Dysprosium supply will be only 15-18% of demand and Neodymium 40-60% of demand. This will result in extremely high prices for neodymium magnets, especially those with dysprosium and make green technology very expensive. Makuutu will therefore become increasingly profitable and increasingly important in the global transition from fossil fuels to renewable energy.

### 3.3.2 Value Addition

The project will process the minerals prior to export. This is consistent with the Uganda Vision 2040 which states: *“To promote local beneficiation, the country will ensure value addition on the minerals and provide manufacturing feedstock”*.

The average concentration of REE in the Makuutu ionic adsorption clay is a very low 663 ppm and requires complex processing to produce a REE carbonate product. The REE are ionically bonded to the ionic adsorption clay and must first be desorbed from the clay. This will be achieved by percolating an ammonium sulphate lixiviant at pH 4 through agglomerated (i.e., to increase permeability) ionic adsorption REE clay. This is challenging because even agglomerated clay has low permeability and very close attention will need to be paid to both the chemistry and the physical properties of the clay. Aspects such as the particle size of the clay, heap thickness, percolation rates and strategy, concentration of the lixiviant, pH, temperature and dilution from rainfall will all need to be monitored and managed.

The REE desorbed into the lixiviant then needs to be concentrated. This will be achieved with a proprietary high technology membrane filtration process that will concentrate the REE salts in addition to producing high volumes of deionised water as a useful by-product of the concentration process.

The concentrated REE salts then need to be precipitated out of the “pregnant” ammonium sulphate lixiviant. This will be achieved with the addition of ammonium bicarbonate. The precipitated REE carbonate product then needs to be filtered from lixiviant salt solution which is recycled back to the process. The filtered REE carbonate product, concentrated sufficiently to enable separation into the individual REE at a REE separation plant, will then be dried, bagged and placed in shipping containers for export.

The REE carbonate product is a valuable value-added product but further separation into individual rare earth elements requires a capital-intensive and technically complex separation plant which is not feasible for the current Project for a number of reasons:

1. Economy of scale – The project will likely only produce at peak less than 4,000 tonnes per annum of Rare Earth Oxide. To justify the capital investment, the project would need to be producing ~ 20,000 tonnes per annum.
2. It is far too costly and technologically complex to implement e.g., the USA does not yet have this capability yet.
3. Because of the cost and complexity, rare earths separation is undertaken by government organisations and not private organisations e.g.:

- a. China rare earth separation capabilities are funded by state-owned enterprises.
  - b. Lynas (of Australia) separation capabilities are funded by the Japanese government and based in Malaysia.
  - c. Recent US attempts at constructing separation facilities have been funded by the US Department of Defence.
4. There is simply no downstream industry (in all of Africa) to justify or support such a significant investment.

### 3.3.3 Project Economics

#### 3.3.3.1 Significance to Uganda

The US\$7.6 billion revenues that Makuutu will generate over its life (refer Table 5) will add significantly to Uganda's income from the mining sector. According to the Directorate of Geological Survey and Mines 2017 ANNUAL PERFORMANCE REPORT 2017/ 2018, in 2017/2018, the value of mineral export from export of Gold, Wolfram, Iron Ore, Tantalite and Beryl was worth Fourteen billion two hundred thirty million eight hundred sixty thousand and five hundred and sixty-one (UGX 14,230,860,561 or US\$4 billion).

Revenues from an estimated US\$380 million royalty payments from the Project will be shared by: Government (80%); Local Governments (17%); and Land Owner (3%). The typical royalties paid by holders of mineral rights or mineral dealers for different minerals are summarized below as contained in Schedule 3 of The Mining (Licensing) Regulations, 2019:

- Precious metals – five (5%) per centum of the gross value;
- Precious stones – ten (10%) per centum of the gross value;
- Base metals and ores – five (5%) per centum of the gross value
- Graphite – five (5%) per centum of the gross value;
- Vermiculite – Shs.10,000/ = per tonne;
- Coal; including peat – Shs.5,000/ = per tonne;
- Kaolin, limestone, chalk or gypsum – Shs.5,000/ = per tonne;
- Marble, granite, sandstone and other dimension stones – Shs.5,000/= per tonne;
- Pozzolanic materials – Shs.1,000/ = per tonne.
- Phosphates – Shs.10,000/ = per tonne.

According to the Uganda Vision 2040, Uganda has the opportunity to build a strong mining industry that will be a source of revenue, employment, and economic lifeline industries. The same document highlights some of the key minerals with high economic potential. The document states, "On the other hand, rare earth minerals are a strong input to the manufacturing of IT and electronic products". The Makuutu Rare Earths project is expected to achieve some of these aspirations. The economic potential and benefits of REEs are highlighted below:

#### 3.3.3.2 Economic Highlights

Once all drilling has been completed, the Developer estimates to have a JORC (Joint Ore Reserves Committee) compliant resource of around 315mt (JORC refers to the mining industry's official code for reporting exploration results, mineral resources and ore reserves, managed by the Australasian Joint Ore Reserves Committee). Whilst the total amount of REE mineralised material will be greater than this, included in the JORC compliant resource is only the material (clay and upper saprolite only) that can be economically processed. A theoretical resource model for Makuutu would provide a life of mine in excess of 30 years.

There is potential for this resource to grow with additional drilling and the Developer is focused on this in parallel to the development of the Makuutu Rare Earths Project which in the first instance will develop a mine and process plant to treat the clay material.

The economic highlights of the Makuutu Project were presented in the Preliminary Economic Assessment that was publicly announced in April 2021 (refer Table 5). Makuutu will mine 500 million tonnes of ore and waste material over its 27-year life to produce 79,213 tonnes of mixed Rare Earth Oxide (REO) with a value of US \$7.6 billion and an Internal Rate of Return of 40%.

Table 5: Makuutu Rare Earths Project Economic highlights (from Project Scoping Study publicly released April 2021)

Parameter	Unit	Incl Scandium
LOM	Years	27
LOM Feed	tonnes, dry	281,540,341
LOM Waste	tonnes, dry	219,345,163
LOM Strip Ratio		0.78
LOM TREO Head Grade	ppm	663
Total REO Feed	tonnes	186,689
Total REO Production	tonnes	79,213
Average REO Production	tonnes / annum	2,934
LOM Sc2O3 Head Grade	ppm	29
Total Sc2O3 Feed	tonnes	8,238
Total Sc2O3 Production	tonnes	2,471
Average Sc2O3 Production	tonnes / annum	92
Total LOM Revenue	US\$M	\$7,607
REO Revenue, LOM	US\$M	\$6,390
Sc2O3 Revenue, LOM	US\$M	\$1,217
REO Revenue (excl Sc2O3)	US\$ / tonne Ore	\$22.70
REO Revenue (excl Sc2O3)	US\$ / kg REO	\$80.67
Total LOM OPEX	US\$M	\$3,483
OPEX, average	US\$M / annum	\$129
OPEX, average	US\$ / tonne Ore	\$12.37
OPEX, average	US\$ / kg REO	\$43.97
OPEX, average less Sc2O3 credit	US\$ / kg REO	\$28.60
CAPEX, upfront	US\$M	\$89.0
CAPEX, expansion	US\$M	\$212.0
CAPEX, sustaining	US\$M	\$58.0
EBITDA	US\$M	\$3,893
Free Cash Flow (Post Tax)	US\$M	\$2,432
Net Present Value (Post Tax)		
NPV <sub>10</sub>	US\$M	\$492.6
NPV <sub>8</sub>	US\$M	\$658.1
NPV <sub>6</sub>	US\$M	\$889.3
IRR	%	40.3%
Payback	Years	5

By early 2021 Makuutu had identified a total of 315 million tonnes of indicated and inferred Rare Earth Element (REE) Resources which is expected to increase with further drilling.

The global demand for Rare Earth Elements (REE) is increasing based upon a shift in macro events relating to the deployment of renewable energy, electric vehicles and communications. The existing REE supply chain is dominated by China, with world governments now become increasingly concerned with future supply and access to their own REE supply security. The growing economy of China is creating a worldwide risk to supply, as China's growing consumption limits its exports of rare earths. In the next decade, rapid demand growth will challenge the ability of the supply-side to keep up, particularly for the magnet metal, Nd, Pr, Dy and Tb, with global annual demand for these elements expected to increasingly exceed global annual production in the years after 2020. This will result in the depletion of historically accumulated inventories and, ultimately, shortages if the market continues on a path of business as usual.

The REE product proposed to be generated by the Makuutu Rare Earth Project is a strategically important one; balanced in REE constituents, with a net content of up to 73% critical plus heavy content (CREE + HREE). As ionic clays are the source of >95% of the world's HREE, Makuutu strategically can help world governments insulate their supply requirements of the magnet metals plus other critical REE used in technology applications, such as Er, Eu, Gd and Y. The resultant product basket (refer Figure 17) over the Life of Mine (LOM) shows REO components are yttrium (Y, 25.4%) and neodymium (Nd, 22.9%), with other major revenue contributors being praseodymium (Pr, 5.4%), dysprosium (Dy, 3.7%) and terbium (Tb, 0.6%). The magnet metal content of the product basket (Nd, Pr, Dy, Tb) represents 32.6% of product basket.

### 3.3.4 Project Sites Location

The project area comprises four (4) licences covering approximately 182.94 km<sup>2</sup> in 3 districts of Bugweri, Mayuge and Bugiri (refer Figure 19) with a fifth additional exploration lease (EL00147) added to the east in Bugiri District in 2021 (refer Figure 20).

1. The **Makuutu Eastern Zone** – Buwunga under Exploration License No. EL1766 covers an area of 47.025 km<sup>2</sup> in Buwunga (Bugiri), Nankoma (Bugiri) and Ibulanku (Bugweri) Subcounties. It stretches towards the west of Bugiri District near the border of Bugweri district. It further covers approximately nine (9) parishes and 34 villages on topographic map sheet 63/3. The addition of EL00147 extends the Project footprint further east into Bugiri District (refer Figure 20).
2. The **Makuutu Central Zone** – Makuutu continues towards the west under a Retention Licence No. RL1693 with an area of 44.2624 km<sup>2</sup> in Buwaaya (Mayuge), Makuutu (Bugweri) and Buwunga (Bugiri) Sub-counties. This spreads over about six (6) parishes and 42 villages on topographic map sheet 63/3 and 73/1.
3. Further, in the west, is **Makuutu Western Zone** – Buwaaya under a Retention Licence No. RL00007 that covers an area of 43.3875 km<sup>2</sup> of Manyiro and Buwaaya Subcounties. It spreads over six (6) parishes and 24 villages in Mayuge District partially touches a very small area of Iganga district on topographic map sheet 62/4 and 72/2.
4. In the north, is **Makuutu Northern Zone** – Buwunga (Processing Plant Area & its Environs) under Exploration License No. EL00148 that covers an area of 48.15046 km<sup>2</sup> in Buwunga (Bugiri), Igombe, Ibulanku and Makuutu (Bugweri) Subcounties. It further covers about nine (9) parishes and 49 villages on topographic map sheet 63/3.

Mining is planned to commence in the indicated resource in the Makuutu Central Zone (i.e., green area in Figure 20) which will sustain the first 10 years of mining and it will then move to Central Zone East. The Process Plant and centralised facilities will be located in the northern Makuutu Zone outside of the footprint of the ore-body. Active mining and processing will therefore be confined to the Bugweri District for the first 15 years or so of mining (refer Figure 21).



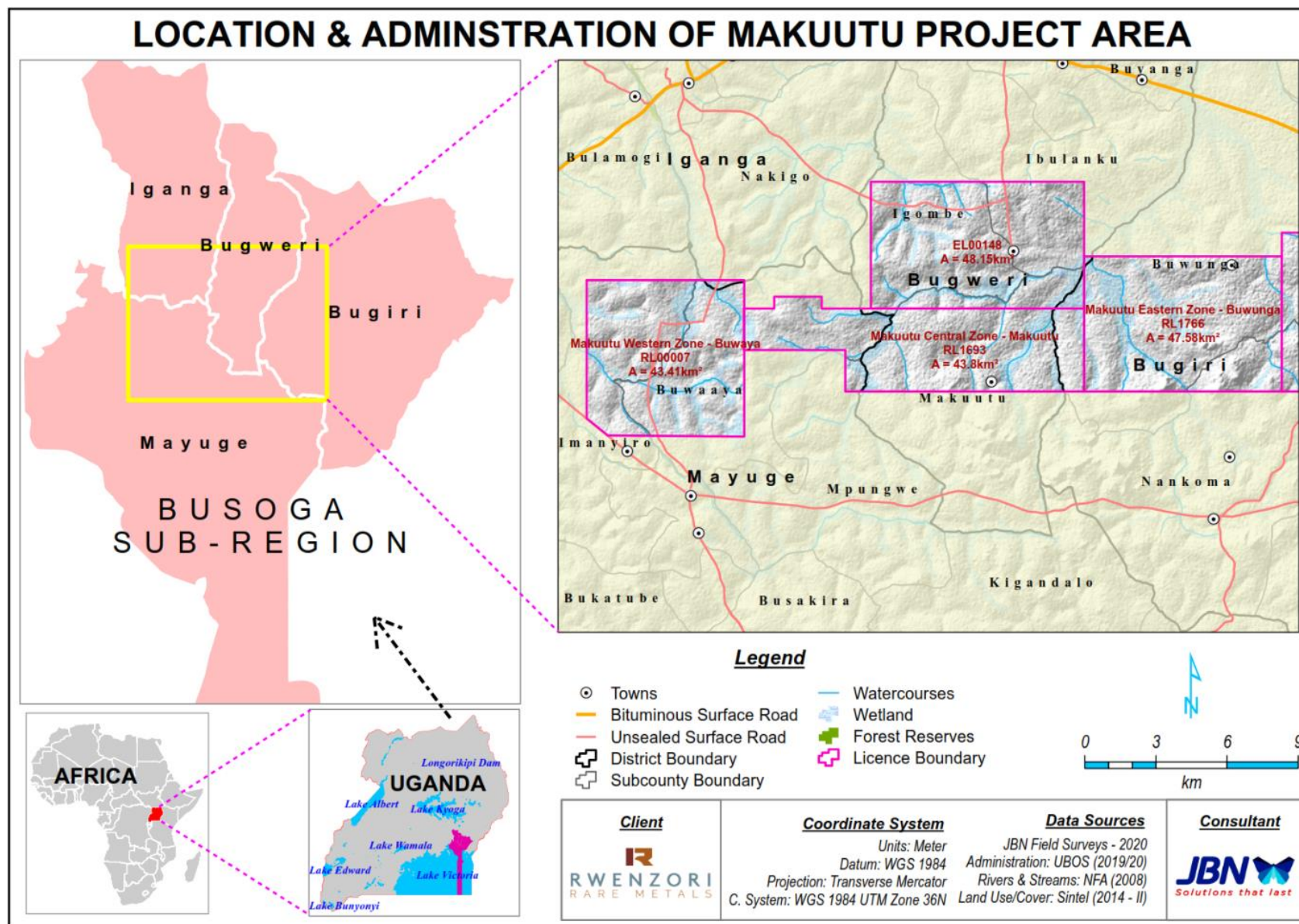


Figure 19: Location of Project Areas



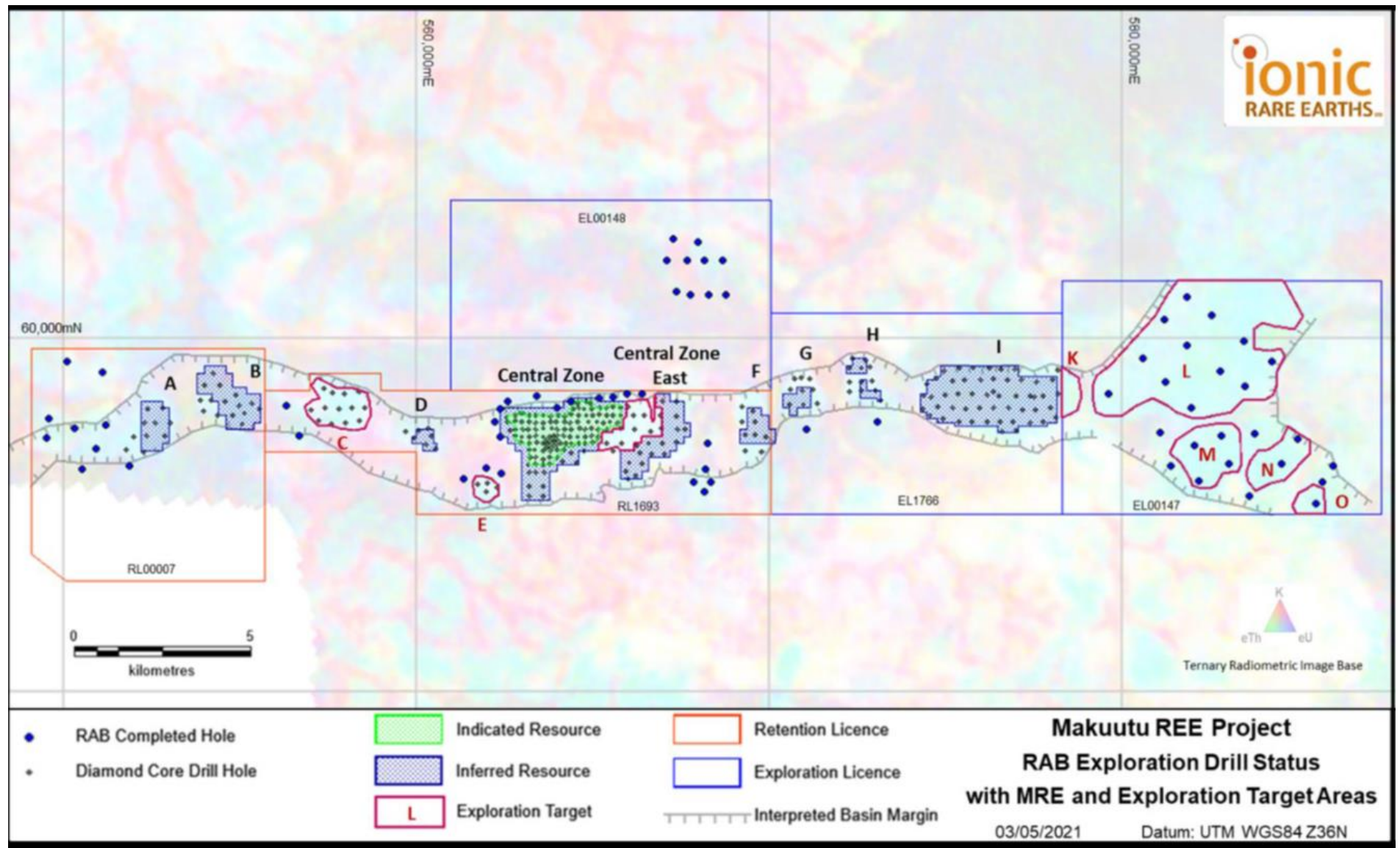


Figure 20: Makuutu Project Retention and Exploration Leases at May 2021 showing drill hole locations and including a new lease EL00147.

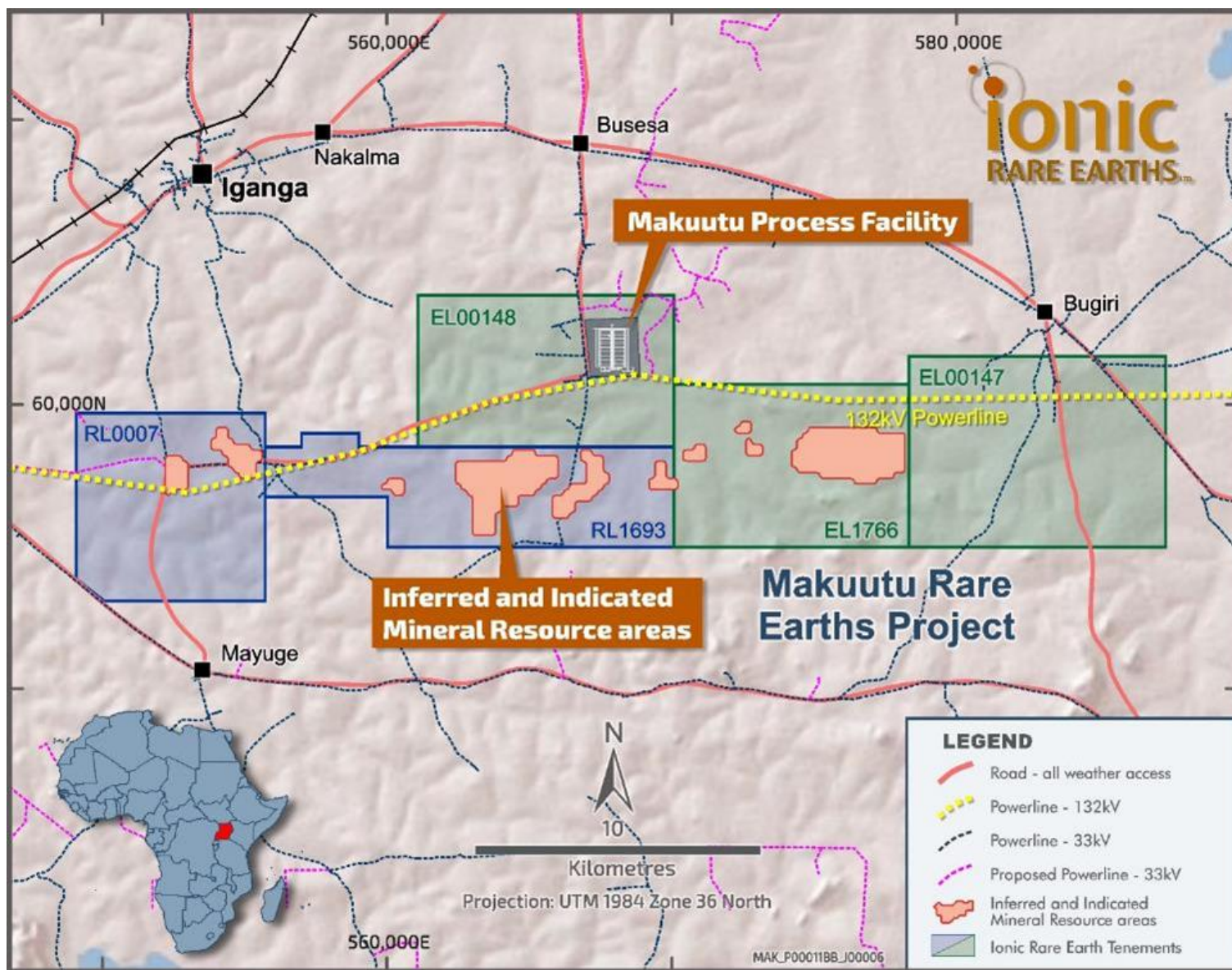


Figure 21: Overview of Makuutu Rare Earths Project

The GPS coordinates presented below (refer Table 6) delineate the exploration areas.

Table 6: GPS corner coordinates of the Makuutu Licences including new Exploration Leases recently acquired

<b>Retention/Exploration Licence</b>	<b>Beacon</b>	<b>Easting(x)/mE</b>	<b>Northing (y)/mN</b>
RL00007	1	549000	54160
	2	549000	60000
	3	555630	60000
	4	555630	53400
	5	549975	53400
RL00234	LB	570000	55300
	CB1	570000	61000
	CB2	578250	61000
	CB3	578250	55300
RL1693	LB	555630	57050
	CB1	555630	58800
	CB2	556920	58800
	CB3	556920	59300
	CB4	558920	59300
	CB5	558920	58800
	CB6	570000	58800
	CB7	570000	55300
	CB8	559920	55300
	CB9	559920	57050
EL00147	1	578250	55300
	2	578250	62000
	3	587250	62000
	4	587250	55300
EL00148	[1]	561000	58800
	[2]	561000	64150
	[3]	570000	64150
	[4]	570000	58800
EL00257	[1]	549000	64195
	[2]	549000	60000
	[3]	555630	60000
	[4]	555630	58800
	[5]	556920	58800
	[6]	556920	59300
	[7]	558920	59300
	[8]	558920	58800
	[9]	561000	58800
	[10]	561000	64150



**Legend**

- Watercourses
- National Road
- Haul Road 3.5 Km
- Plant Option 5 Design
- Licence Boundary
- 100m Buffer LOM Pit Design
- 500m Buffer LOM Pit Design
- Life of Mine Pit Design 2021-30
- Plant Option 5 2.5 Km<sup>2</sup>
- District Boundary
- Project Subcounty
- Project Parish
- Contours
- Wetland

**Coordinate System**  
WGS 1984 UTM Zone 36N  
Datum: WGS 1984  
Units: Meter

**Data Sources**  
Features: Surveys by JBN (2020/21)  
Proposed Components: Rwenzori Rare Earths  
Admin. Boundaries, Infrastructure: UBOS (2020)  
DEM, Contours, Hillshade: STRM (30m Resolution)  
Open water, Rivers & Streams: DRWM & NFA (2008)

**Map Labels:** Walanga, Igombe, Kikunyu, Kabaingire, Makandwa, Makuutu, Naigombwa, Kigulama, Kioto, Isegere, Nambigiri, Walutente, Kitumbezi, Naigombwa, Kigulama, Kioto, Ibulanku, Buniantole, Namiganda, Nawansaga, Haul Road 3.5 Km.

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### 3.4 Project Geology

The geophysical and geotechnical baseline for the Project is presented in the Makuutu Preliminary Economic Assessment that was publicly reported to the Australian Stock Exchange on the 18/04/2021. The location of the project and the layout of planned project infrastructure including the Process Plant (refer Figure 21) has already been presented. The Project is located in undulating cleared agricultural land bisected by minor watercourses with seasonal drainage (refer Figure 23).



Figure 23: Typical landscape within the Makuutu Project area

The Makuutu Rare Earths Project is in the Neoarchean granite-greenstone Lake Victoria Terrane (LVT) (refer Figure 24). The host of the REE mineralisation at Makuutu is a potentially Karoo age sedimentary basin overlying the Neoarchean basement rocks (refer grey area in Figure 25).



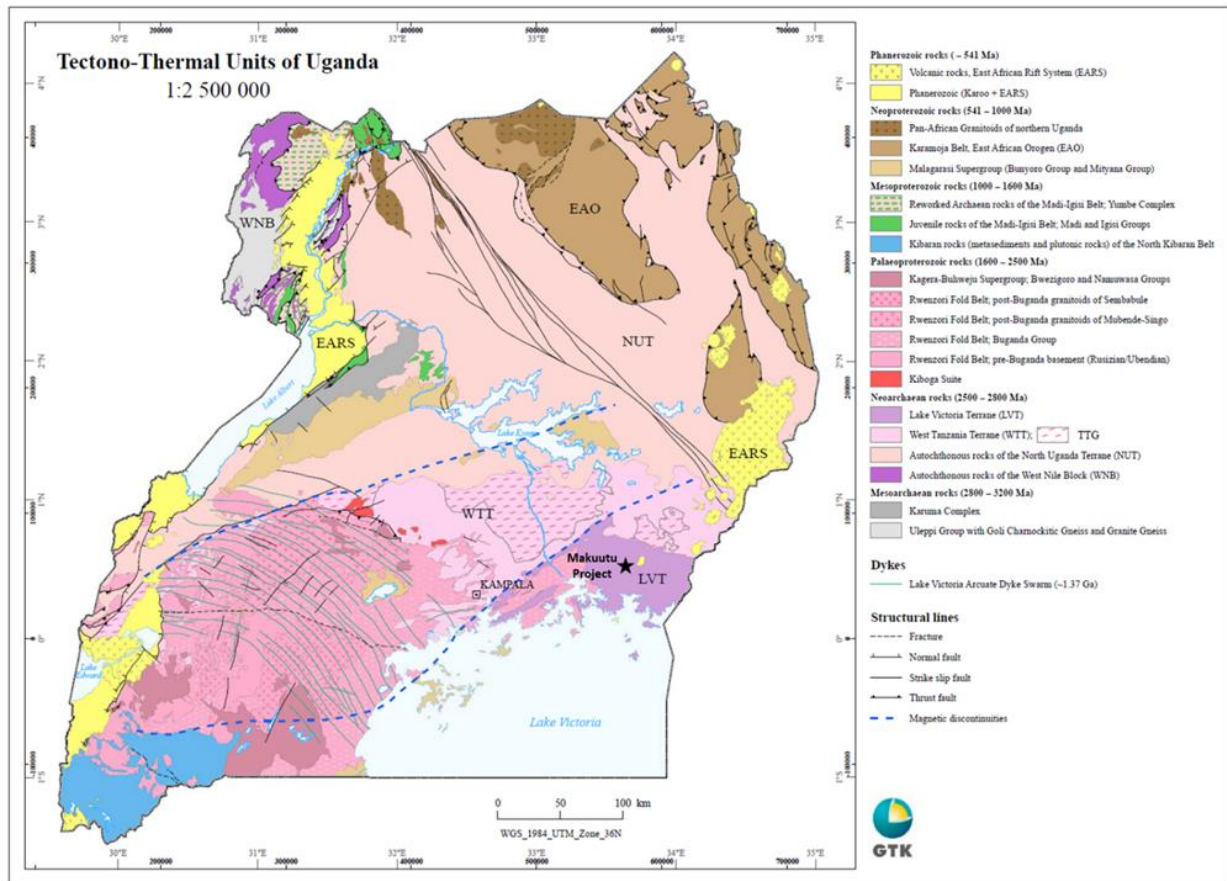


Figure 24: Tectono-thermal units of Uganda

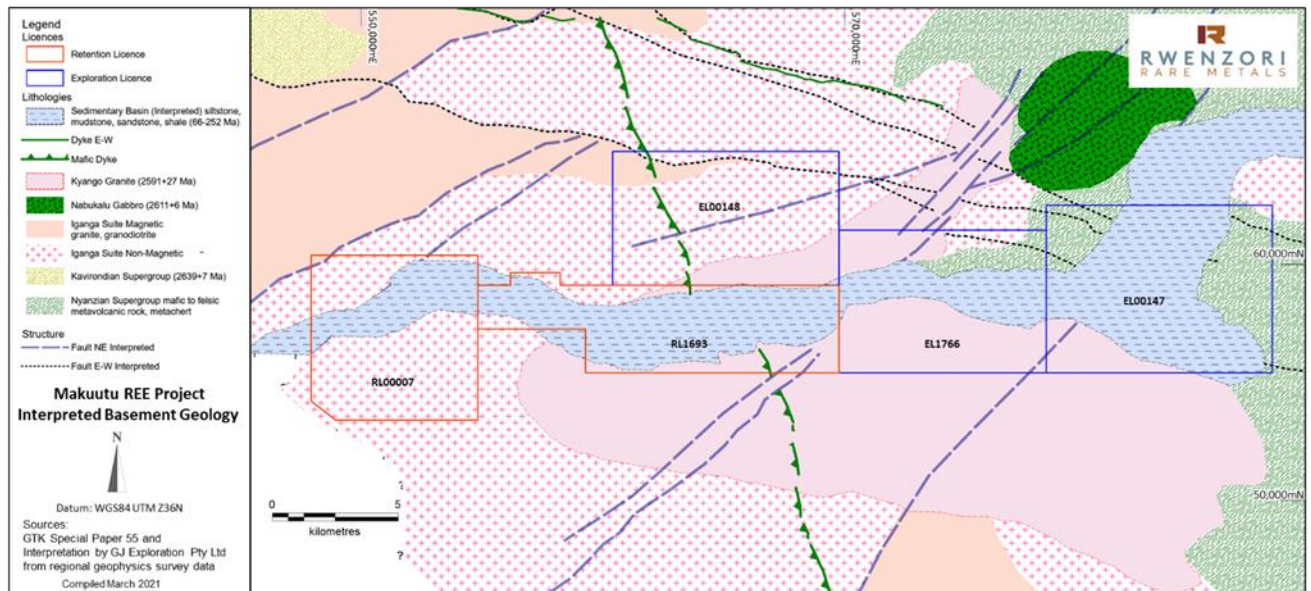


Figure 25: Interpreted Project Geology – Sedimentary Basin on Basement Rocks



### 3.4.1 Lithology

The REE are hosted in ionic-adsorption clay within an average 20m layer of regolith overlying the basement rocks (refer Figure 26 and 27). The layers vary in thickness but on average are as follows:

#### 3.4.1.1 Topsoil

A 1 metre layer of deeply weathered lxic ferrasol topsoil. These soils tend to be stable, acidic and with low fertility with most of the nutrients recycled through the vegetation cover. They do, however, have excellent porosity, good permeability, and favourable water-infiltration rates and, with liming and full fertilisation can support sustainable sedentary agriculture. <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/ferralsol>. The implication for the Project is that these soils should be resistant to erosion. It additionally reinforces the view that the currently degraded agricultural land on the Project site that is largely used for shifting agriculture could be transformed into highly productive agricultural land post-mining.

#### 3.4.1.2 Hard-cap

An average 2.4m thick reddish hard-cap layer composed of ferruginous fragments and pisolites underlies the topsoil and transitions into an underlying mottled white and reddish clay layer. This material should prove useful as rip-rap and road sheeting to minimise erosion risk.

#### 3.4.1.3 Mottled clay

The average 2.14m layer of mottled clay is derived from a fluctuating water table and along with the underlying clay is the main host for the REE and as such is sometimes part of the orebody dependent on grade. This material is primarily kaolinite clay which is a non-swelling clay with higher porosity than the deeper montmorillonite clay which is a swelling smectite clay.

#### 3.4.1.4 Clay

The mottled clay is underlain by a layer of pale soft montmorillonite clay that averages 4.8m thickness but which can vary between 0.65m and 19.5m. This zone, which is also called the pallid zone, is the main REE ore-body which also extends into the underlying saprolite layer. This “clay-ore” contains about 20% moisture and is fine grained and homogenous. The pale clay in the upper part of this profile becomes yellow-brown clay at depth as it transitions into the underlying saprolite.

#### 3.4.1.5 Upper-saprolite

The upper saprolite zone is on-average 3m thick and mainly clay (95%) with primary rock fabrics preserved. It slowly transitions into the underlying lower-saprolite and can also host REE resources.

#### 3.4.1.6 Lower-saprolite

The lower saprolite layer is on average 2.2m thick and more competent than the upper-saprolite

#### 3.4.1.7 Saprock-bedrock

Saprock is the weakly weathered rock close to the base of weathering with the boundary to the underlying bedrock distinguished by the lack of iron-oxides and clay in the fresh rock. The protolith sedimentary rocks observed in diamond core include: Dark grey siltstones; Dark grey to black shale; Chlorite-altered grey siltstone; Hematite banded mudstones/shale and buff coloured siltstone, and; Sandstone.



Figure 26: Laterite Regolith Summary

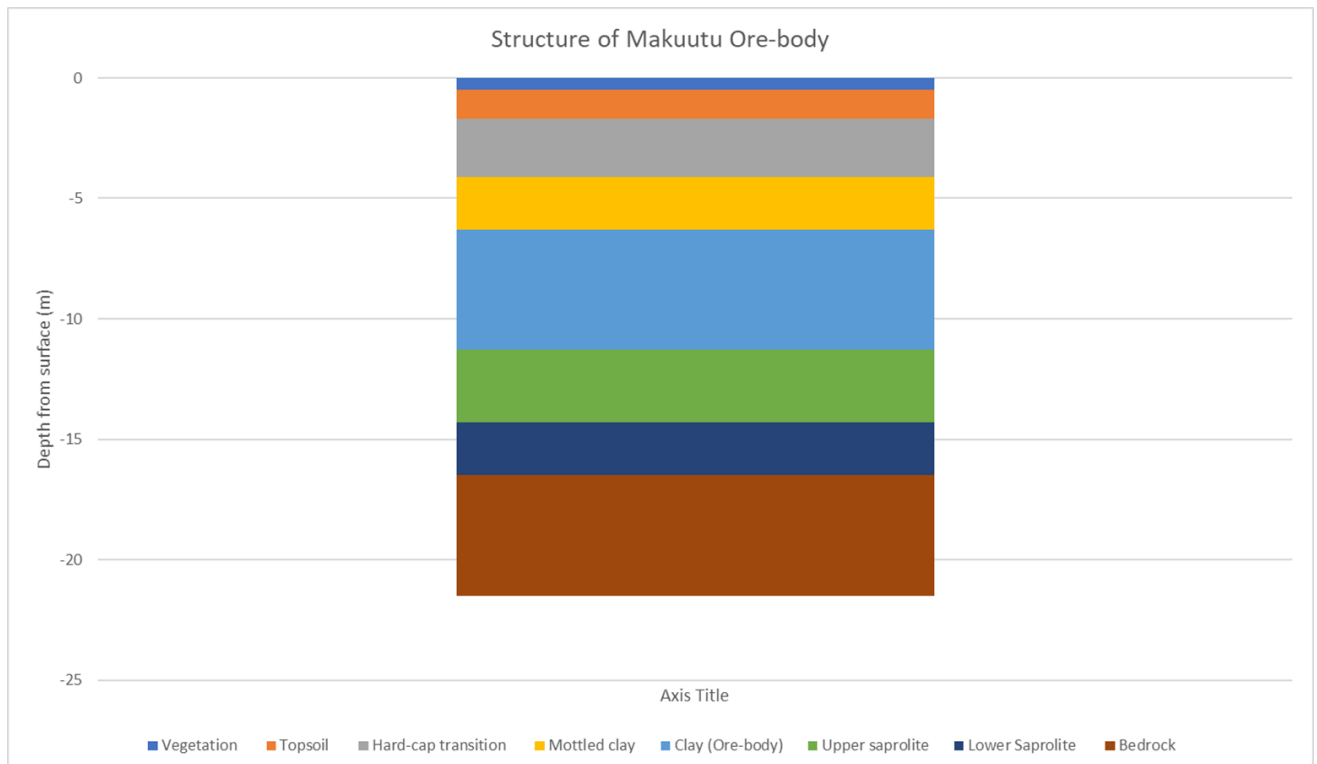


Figure 27: Lithology of the regolith showing average thicknesses of the layers. The ore-body is contained within the zone of mottled clay to Upper saprolite

### 3.5 Mining

A Mining Study was completed for the Project by an independent Resource and Mine Planning consultant, Libertas Infinity Pty Ltd. and presented in the Project Preliminary Economic Assessment that was publicly released in April 2021. This study encompassed mine planning, pit design, mining equipment selection and cost estimation. The mining study comprises a proposed open pit mining operation, and evaluation of varied annualised mining rates from 2.5 to 12.5 million tonnes per annum (Mtpa) of mineralisation from the Makuutu Rare Earths Project. It makes conservative assumptions pending detailed hydrogeological and geotechnical engineering and processing studies which will include:

- Run of Mine (ROM) grades need to be calculated with conceptual metallurgical recoveries applied in order to determine product grades.
- Input assumptions from other groups, including metallurgical and processing assumptions need to be added.
- Processing costs need to be used as initial input parameters for the Mine Optimisation in order to determine a mining sequence. Preliminary operating costs for the Project were calculated based on the 2.5 Mtpa nominated initial throughput capacity, and entered within the Preliminary Economic Assessment financial model to determine the economics of the Project.
- No revenue was included for Scandium in the mine plan optimisation.
- The Mining reflects an expectation of selective mining with rehabilitation and backfilling of the pit once areas have been completed.
- Mining will be undertaken on a continuous day and night shift basis over the Life of Mine (LOM).
- Operational personnel numbers, from which mining costs to achieve scoping level (+/-50%) costing is based, need to be confirmed. The Preliminary Economic Assessment (PEA) has involved collaboration between selected consultants, Ugandan based mining service provider ADT Africa Ltd., and Ionic Rare Earth.

### 3.5.1 Geotechnical Considerations

A conservative geotechnical pit angle of 45 degrees was adopted due to the nature of the weathered rock and the lack of detailed geotechnical assessment being undertaken as part of the study (refer Figure 28).

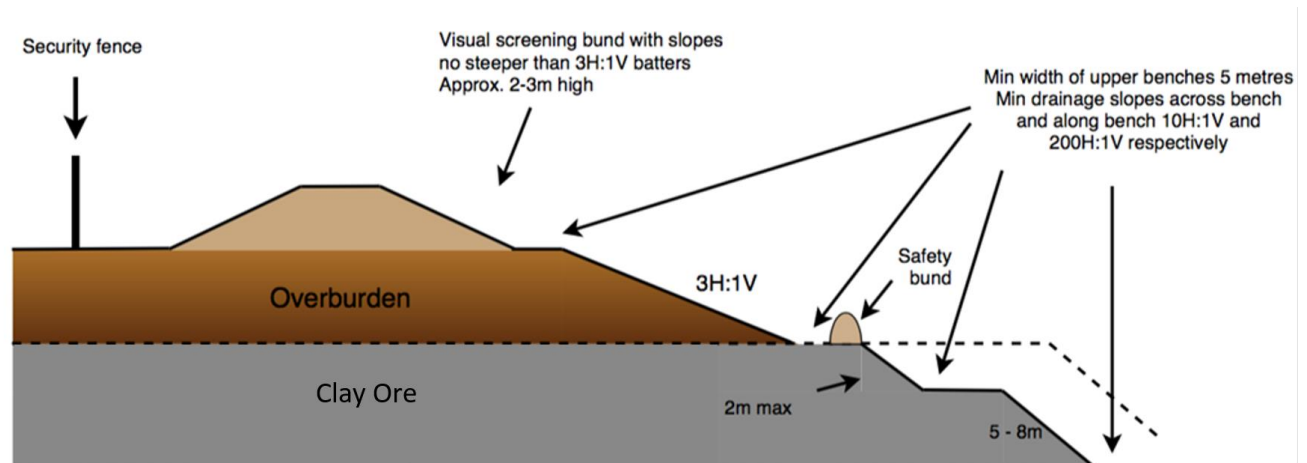


Figure 28: Typical mine profile to secure pit stability and high safety standards

### 3.5.2 Payable Oxides and Impurity Considerations

Rare earth elements and impurities were modelled as part of resource modelling process and incorporated into the mine planning. Element grades in the resource model were converted into oxide forms and reported as Run of Mine (ROM) and recovered product grades.

### 3.5.3 Mine Operations

The mine will operate 24 hours a day and 365 days per year. Mining will involve a pre-strip of 1m of topsoil which will be stockpiled adjacent to the pit. ROM mining will be selective with lower recovered rare earth grade ore stockpiled adjacent to the pit and waste (overburden) paddock-dumped adjacent to the pit. Ore will be hauled to the Run-of-Mine (ROM) pad and either stockpiled or direct dumped onto the heap leach pads. Once areas are completely mined out, the mined waste and heap leach residue will be reclaimed and the pit will be backfilled, prior to topsoiling. It is assumed that mining will commence prior to processing with stockpiling of ore into various recovered rare earth grade stockpiles directed by the Metallurgist, Geologist and Mining Engineer.

### 3.5.4 Grade Control and Mine Planning

Mine planning will be based on a grade control infill drilling program which will be undertaken with a grade control rig on a 20m x 20m scale. Samples will be dried and assayed at either an onsite Sample Preparation Laboratory using XRF / ICP-OES or, at an offsite commercial laboratory. Assays for all deleterious elements shall also be undertaken. A revised production model shall be developed and used for selective mining and discrimination of the ore/overburden for the planned production.

### 3.5.5 Life of Mine (LOM) Inventory

The Life of Mine (LOM) pit inventory includes 281.5 Mt of ROM @ 663 ppm TREO over a 27-year mine-life. This includes 72 Mt of ROM for the first 10 years at 825 ppm (500 ppm TREO-Ce<sub>2</sub>O<sub>3</sub> cut-off grade). The total pit tonnage mined over the LOM is 513.1Mt including 219.3 Mt of waste and mineralised rock material with a very low strip ratio (Waste:ROM ore) of 0.78.

### 3.5.6 Mine Modifying Factors

- A specific processing cut-off grade of 500 ppm TREO-Ce<sub>2</sub>O<sub>3</sub> cut-off was utilised for the Base case pit scenario for the first 10 years, with the optimisations all run on a cash flow basis for Rare Earth Oxide equivalent revenue only. Beyond the initial 10 years a processing cut-off grade of 200ppm TREO-Ce<sub>2</sub>O<sub>3</sub> was applied on the assumption that the value of REE will significantly increase during the first 10 years.
- No dilution and or ROM loss has been applied as part of the study given the utilisation of 'inferred' resources to generate the preliminary mine-plans.
- Metallurgical factors were applied to the block model based on metallurgical test-work.
- Revenue factors were applied to the block model at a 70% payability factor.

### 3.5.7 Operating Costs

The total operating cost for mining was calculated at US\$7.50/dry tonne (refer Table 7).

Table 7: Operating Cost factors used in optimisation (NPV Scheduler)

Item	Units US\$/dt
Mining Cost – ROM	2.40
Mining Cost – Waste	1.33
Non-Mining Cost	3.77

#### ▪ Pit Optimisation and Strategic Scheduling

During the study, numerous mine optimisation runs were undertaken utilising PVS/Multimine software with processing (metallurgical) recoveries applied for the optimisations.

Modifying factors and inputs to the mine optimisation were based on preliminary information, with modifying factors including processing & mining costs, infrastructure costs, financial parameters, and geotechnical design parameters. Cut-off grade is based on a Net Block Value (NBV) per tonne basis, taking into account the net revenue from the Rare Earth products and the cost of mining, processing plus general and administration (G&A) for each block. Blocks with a NBV greater than zero are considered for processing as ROM. Key assumptions used to determine the pit extents included:

- Initial 2.5 Mtpa of ROM Ore mined for first two years, expanding by 2.5 Mtpa every 2 years to a maximum throughput of 12.5 Mtpa in Year 10 for a nominal 27-year mine life. This assumes 500 ppm TREO-Ce<sub>2</sub>O<sub>3</sub> cut-off grade in the first 10 years of mining followed by a reduction to a 200 ppm TREO-Ce<sub>2</sub>O<sub>3</sub> cut-off grade after that (Base Case) (refer Figure 29).
- Revenue was determined from mixed rare earth carbonate product grade using a 70% payable factor for mine-optimisation.
- Mining costs were estimated on physical mining movements costing US\$1.80/tonne (wet) with mining equipment and personnel provided by a local Ugandan operator with allowance made for operational/technical personnel and grade control drilling costs.
- An alternative mine scenario of 5 Mtpa of ROM Ore Mined at start-up expanding by 2.5 Mtpa every 2 years from Year 4 to a maximum throughput of 12.5 Mtpa in Year 10 (alternate case) was also assessed.
- Given the preliminary nature of the Makuutu Rare Earths Project evaluation phase, the base case assumes a relatively small initial plant establishment scale and consequent lower capital

cost. This will be revisited and will likely expand in line with a Mineral Resource Estimate that is likely to grow with additional exploration.

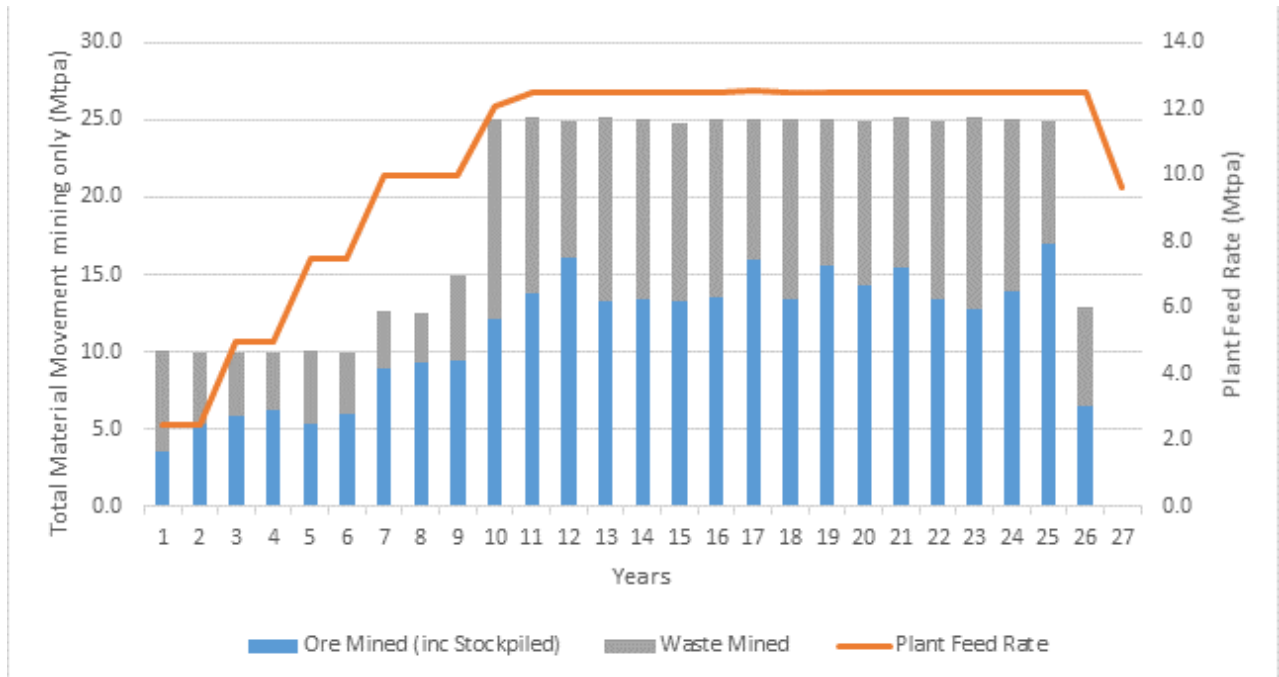


Figure 29: Annualised Total Mining Movement v Plant Feed Rate (base scenario)

### 3.5.8 Mining Equipment and Personnel

The nominated mining fleet (refer Table 8) is based on conservative assumptions of 80% utilisation, 80% efficiency and 90% availability. The Year 1 Mining Fleet of 57 large machines will peak at 142 machines in Year 14. Mining will be based around a truck and shovel operation (refer Figure 30).

Table 8: Proposed Mining Fleet for Year 1

Major Equipment	Model	Availability	Utilisation	Efficiency	Annual Operating Hours	Year 1 Fleet
Excavator	Liugong CLG970E	90%	80%	80%	5,600	5
Wheel Loader	Liugong CLG890H	90%	80%	80%	5,600	2
Truck	Sino Truk (40T)	90%	80%	80%	4,500	38
Water Truck	Sino Water Cart 30t Truck	90%	80%	80%	5,600	2
Fuel Truck	Sino Truk fuel truck 25k L	90%	80%	80%	5,600	4
Bulldozer	Liugong CLGB320	90%	80%	80%	5,600	4
Grader	Liugong CLG4180	90%	80%	80%	5,600	2

### 3.5.9 Mining Infrastructure

There is provision in the initial capital for a mining workshop, mining offices, crib rooms and ablution blocks and associated facilities. A mine dewatering plant has also been factored into the estimate to enable stormwater harvested into the open pit to be pumped back to the process plant where it will be treated to meet water quality discharge limits set by DWRM prior to any offsite disposal into natural water-courses.



### 3.5.10 Mining Schedule

The mining schedule, mining fleet and staffing requirements for the base-case (refer Table 9) shows that in Year 12 the mine will be moving 25 million tonnes of material a year with a fleet of 142 large machines and a mining workforce of 740 Ugandan people.

### 3.5.11 Mine Rehabilitation

The mine will be progressively rehabilitated to high quality agricultural land. This will first involve completely filling the mining void with a combination of overburden rich in kaolinite clay and “spent ore” from the leach pads that will be rich in montmorillonite swelling smectite clay. With appropriate compaction this will create a stable and largely impermeable landform that will be contoured to avoid ponding and to strategically direct stormwater to appropriate exit points. The contoured landform will then be capped with a metre of stored “lixic ferralsol” topsoil. These soils are stable and have good structure and high permeability. They also, however, have poor “plant available” moisture and poor nutrient holding capacity. The topsoil will be limed with dolomite to increase pH and buffering before being fully fertilised with triple superphosphate and potassium nitrate as recommended by the FAO (<http://www.fao.org/3/y1899e/y1899e08a.htm> ). Dry season irrigation may also be appropriate dependent on the crop. Infiltrating stormwater will be directed by the impermeable clay sub-drainage to strategic exit points in ways that avoid erosion. The cycle of mining through to progressive rehabilitation is expected to take about 6 months and create and moving mining void of about 20 hectares. At the end of the 27-year project life all 10 pits encompassing a total mining footprint of about 950 hectares will have been mined and returned to agricultural use or other beneficial uses such as agroforestry or fish-farms. There will be no mining voids, tailings dams or waste dumps.



Figure 30: *Truck and shovel mining*

Table 9: Mine schedule for the Makuutu Rare Earths Project base case with mining fleet requirements

Tonnage	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	Total
	Unit																												
Ore ROM	Mt	2.5	2.5	5.0	5.0	7.5	7.5	10.0	10.0	10.0	12.1	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	281.5
Indicated ORE	Mt	2.5	2.5	5.0	5.0	7.3	7.5	8.4	9.5	9.3	0.4	0.7	2.7	1.2	0.8	-	-	-	-	0.1	0.0	-	-	-	-	-	-	-	62.9
Inferred ORE	Mt	-	-	-	-	0.2	-	1.6	0.5	0.7	11.7	11.8	9.8	11.3	11.7	12.5	12.5	12.5	12.5	12.4	12.5	12.5	12.5	12.5	12.5	12.5	12.5	9.6	218.7
Cumulative %Indicated	%	100%	100%	100%	100%	99%	99%	96%	96%	95%	80%	69%	63%	57%	51%	47%	43%	39%	37%	34%	32%	30%	28%	27%	25%	24%	23%	22%	22%
Ore to Plant	Mt	2.5	2.5	5.0	3.5	5.2	5.6	8.9	9.4	9.4	12.1	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	9.6	273.6
Ore to Stockpiles	Mt	1.1	2.9	0.9	2.7	0.1	0.3	0.0	-	-	-	1.2	3.5	0.8	0.9	0.9	1.1	2.7	0.5	0.6	-	0.0	0.5	-	-	1.0	1.5	-	23.3
Ore Reclaimed	Mt	-	-	-	1.5	2.3	1.9	1.1	0.6	0.6	-	-	-	2.4	2.4	-	-	6.3	-	-	0.3	0.0	-	-	0.2	-	6.0	9.6	35.3
		2.5	2.5	5.0	2.0	3.0	3.7	7.7	8.7	8.8	12.1	12.5	12.5	10.1	10.1	12.5	12.5	6.2	12.5	12.5	12.2	12.5	12.5	12.5	12.3	12.5	6.5	-	
Ore Total Mined	Mt	3.6	5.3	5.9	6.2	5.3	6.0	8.9	9.4	9.4	12.1	13.7	16.1	13.3	13.4	13.3	13.6	16.0	13.4	15.6	14.3	15.4	13.4	12.7	13.9	17.0	6.5	-	293.7
Waste Mined	Mt	6.5	4.7	4.0	3.8	4.8	4.0	3.7	3.2	5.5	13.0	11.4	8.8	11.8	11.6	11.5	11.5	9.0	11.6	9.4	10.6	9.7	11.5	12.4	11.1	8.0	6.3	-	219.3
Total Mined	Mt	10.1	10.0	10.0	10.0	10.1	9.9	12.6	12.6	14.9	25.1	25.1	24.9	25.1	25.0	24.8	25.1	25.1	25.0	25.0	24.9	25.1	24.9	25.1	25.0	25.0	12.9	-	513.1
Strip ratio		2.6	1.9	0.8	0.8	0.6	0.5	0.4	0.3	0.6	1.1	0.9	0.7	0.9	0.9	0.9	0.9	0.7	0.9	0.7	0.8	0.8	0.9	1.0	0.9	0.6	0.5	-	0.7
Waste movements																													
Waste	Mt	6.5	4.7	4.0	3.8	4.8	4.0	3.7	3.2	5.5	13.0	11.4	8.8	11.8	11.6	11.5	11.5	9.0	11.6	9.4	10.6	9.7	11.5	12.4	11.1	8.0	6.3	-	219.3
Run of Mine Grade																													
TREO	ppm	726	935	970	903	753	816	892	799	816	756	714	709	631	610	853	848	470	585	544	551	525	565	549	615	586	557	358	663
HREO	ppm	195	267	288	241	213	228	259	221	227	190	175	175	176	142	211	231	135	158	149	148	149	166	144	160	158	139	96	178
CREO	ppm	255	348	370	322	272	292	328	291	298	260	245	239	223	197	292	309	170	201	187	190	183	207	184	213	204	191	124	233
LREO	ppm	532	668	682	663	540	589	633	578	588	570	543	537	458	472	646	621	338	429	397	406	378	402	408	459	432	420	264	488
TREO-CeO2	ppm	492	649	689	616	522	564	623	557	576	517	494	480	415	401	591	627	316	378	349	357	339	384	347	413	389	383	241	
REO ROM Grade																													
La2O3	ppm	136	166	177	167	143	159	170	153	163	158	158	150	113	129	186	200	84	102	92	97	89	101	95	120	111	119	70	130
CeO2	ppm	234	286	281	287	231	253	269	242	240	239	219	229	215	209	262	221	154	207	195	194	185	181	202	202	197	174	117	213
Pr6O11	ppm	35	46	47	45	36	38	41	39	40	38	36	35	28	29	44	44	21	26	23	24	22	26	24	30	26	28	16	31
Nd2O3	ppm	127	169	177	163	131	139	153	144	146	136	130	124	102	104	155	156	79	94	87	90	82	95	87	107	98	99	60	114
Sm2O3	ppm	24	32	33	30	24	25	28	26	26	24	22	21	19	17	28	28	14	18	17	17	16	18	16	19	18	17	10	21
Eu2O3	ppm	4	6	6	5	5	5	5	5	5	4	4	4	3	3	5	5	3	3	3	3	3	3	3	4	3	3	2	3.8
Gd2O3	ppm	19	26	28	24	21	22	25	22	22	19	18	18	16	14	23	24	13	15	14	14	14	16	14	16	16	14	9	17
Tb4O7	ppm	3	4	4	4	3	3	4	3	3	3	3	3	2	2	3	4	2	2	2	2	2	2	2	2	2	2	1	2.6
Dy2O3	ppm	16	22	24	20	18	19	22	18	19	16	15	15	14	12	18	19	11	13	12	12	12	14	12	14	13	12	8	15
Ho2O3	ppm	3	4	5	4	4	4	4	4	4	3	3	3	3	2	3	4	2	3	2	2	2	3	2	3	3	2	2	2.9
Er2O3	ppm	9	12	13	11	10	11	12	10	11	9	8	8	8	7	9	10	6	8	7	7	7	8	7	8	8	6	5	8
Tm2O3	ppm	1	2	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2
Yb2O3	ppm	8	11	12	10	9	10	11	9	9	4	2	3	4	3	4	4	2	5	4	3	4	4	4	2	2	4	3	5
Lu2O3	ppm	1	2	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1
Y2O3	ppm	105	147	159	130	116	127	144	121	125	102	94	94	101	76	111	125	76	88	83	83	84	93	80	86	87	76	53	98
Co-product Grade																													
Sc2O3	ppm	30	30	30	31	32	30	31	30	28	29	25	24	33	28	27	24	25	35	34	31	37	31	35	30	26	24	22	29
Impurity Grade																													
U3O8	ppm	17	21	20	17	16	18	21	16	14	15	10	9	7	15	11	6	18	6	5	5	6	20	8	19	16	13	13	12
ThO2	ppm	29	29	29	30	28	30	32	28	27	29	28	26	23	29	30	25	22	21	20	21	19	25	21	27	27	22	19	25
Mining Fleet																													
Excavator	Units	5	5	5	5	5	5	6	6	7	11	11	11	11	12	11	11	14	11	10	10	10	11	11	11	11	9	5	
Wheel Loader	Units	2	2	2	3	3	3	3	3	3	2	2	2	3	3	2	2	4	2	2	3	3	2	2	3	2	4	5	
Truck	Units	38	37	37	38	38	38	48	47	55	92	92	92	94	101	92	93	116	90	81	85	88	93	92	92	70	36		
Water Truck	Units	2	2	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	
Fuel Truck	Units	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	6	5	5	5	5	5	5	5	5	5	5	
Bulldozer	Units	4	4	6	5	6	6	10	10	10	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	8	
Grader	Units	2	2	2	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Mining Supervision	Persons	70	70	88	88	105	105	123	123	123	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	70	
Operators	Persons	234	234	253	273	267	272	347	342	374	543	543	549	553	600	538	543	679	538	490	516	484	506	522	526	522	440	273	





Figure 31: Large Scale Open Pit Mining similar to what is expected at Makuutu

## 3.6 Process Plant

### 3.6.1 Recovery Methods

The mineralogy of REE deposits can be varied and complex. The successful development of a REE mining operation is reliant upon understanding the unique REE mineralisation properties of the orebody and the metallurgical processes critical to extracting the REE from the deposit.

Ionic adsorption REE clay deposits are known for their simple low capital processing arrangements. REE adsorbed onto clays are simply desorbed using an ion-exchange-based elution process with eluants such as sodium chloride or ammonium sulphate. Current practice in China is to use in-situ or heap leaching methods, which produce much of the global HREE. As such, the concept identified for the Makuutu Rare Earths Project is a low capital simple process arrangement when compared to capital intensive hard rock mineral REE process flowsheets (refer Figure 32 and Table 10). The Lynas Corporation's US\$1 Billion plus Mount Weld concentrator in Western Australia with a downstream cracking and separation plant in Malaysia is an example of this.

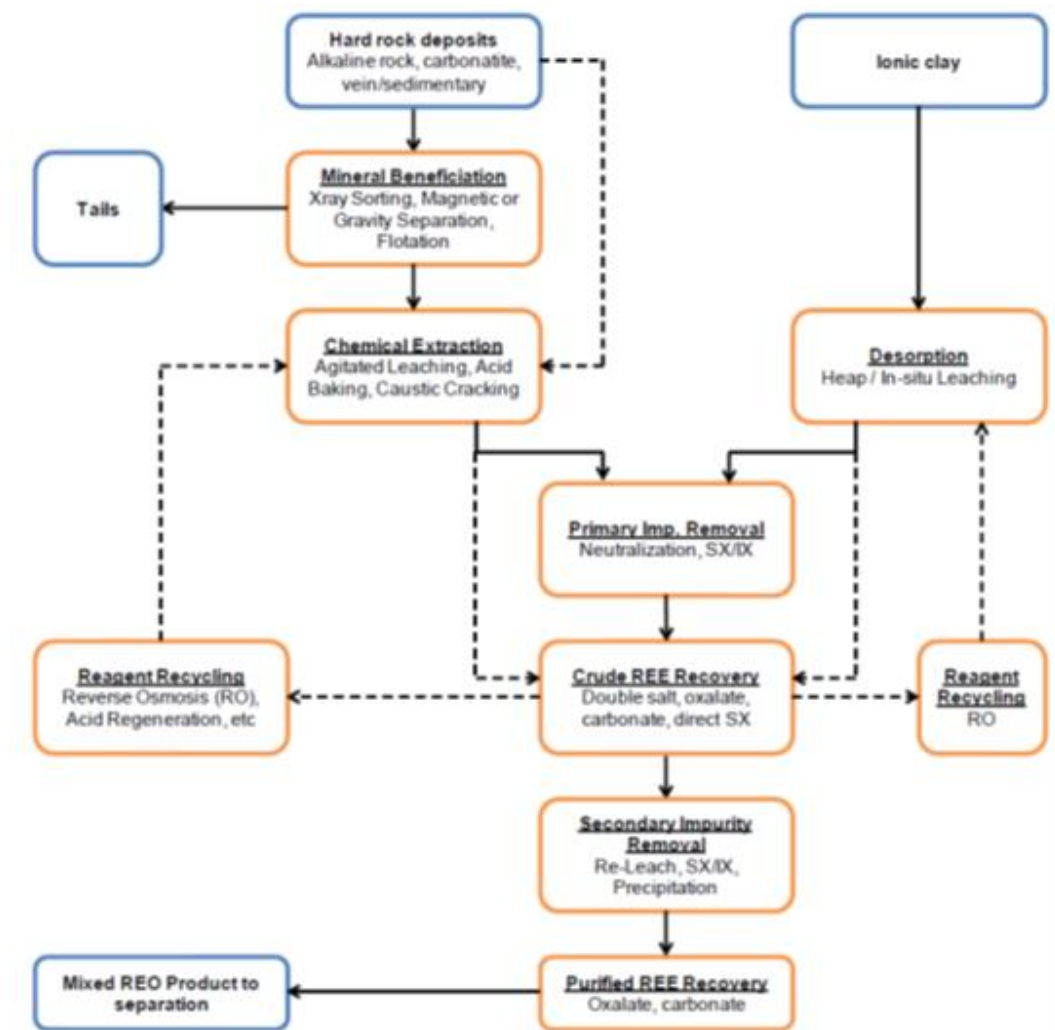


Figure 32: Generic conceptual REE process flowsheet options for major sources of REE mineralisation

Table 10: Comparison of different REE mineralisation's and how the processing flowsheets differ

MINING/PROCESSING STAGES	CLAY-HOSTED REE	HARD ROCK-HOSTED REE
Mineralisation	<input checked="" type="checkbox"/> Soft material, negligible (if any) blasting	<input type="checkbox"/> Hard rock
Mining	Low operating costs: <input checked="" type="checkbox"/> Surface mining (0-15m) <input checked="" type="checkbox"/> Minimal stripping of waste material <input checked="" type="checkbox"/> Progressive rehabilitation of mined areas	High operating costs: <input type="checkbox"/> Blasting required <input type="checkbox"/> Could have high strip ratios
Processing – Mining site	<input checked="" type="checkbox"/> No crushing or milling <input checked="" type="checkbox"/> Potential for static or in-situ leaching <input checked="" type="checkbox"/> Ambient temperature <input checked="" type="checkbox"/> Simple process plant	<input type="checkbox"/> Comminution, followed by beneficiation that often requires expensive (flotation) reagents
Mine product	<input checked="" type="checkbox"/> Mixed high-grade rare earth precipitate (~50-95% depending on precipitant) for feedstock into rare earth separation plant	<input type="checkbox"/> Mixed REE mineral concentrate (typically 20 – 40% TREO)
Processing – Refinery (typically not on mining site)	<input checked="" type="checkbox"/> Simple acid solubilisation followed by conventional REE separation <input type="checkbox"/> Complex recycling of reagents and water	<input type="checkbox"/> High temperature mineral “cracking” using strong reagents <input type="checkbox"/> Complex plant (to withstand strong reagents and high temperatures) <input type="checkbox"/> High reagent consumption per tonne of REO)
Processing Environmental	<input checked="" type="checkbox"/> Non-radioactive tailings <input type="checkbox"/> Solution treatment and reagent recovery requirements (somewhat off-set by advantageous supporting infrastructure)	<input type="checkbox"/> Tailings often radioactive (complex and costly disposal)

### 3.6.2 Heap Leaching

As well as being one of the most cost-effective methods for leaching low grade ore deposits, heap leaching provides the benefit of reduced acid consumption as well as reduced iron levels in the pregnant leach solution, compared with a conventional atmospheric tank leach. Heap leaching has been widely applied to the recovery of copper, gold and uranium from lower grade oxide ore, driven by the lower capital requirements and operating costs for the process.

In heap leaching, the mined ionic adsorption REE clay ore will be agglomerated (i.e., to increase permeability) before being directly heaped onto an impermeable plastic lined leach pad where it will be irrigated with a desorption / leach solution to desorb / dissolve the rare earths. The clay nature of the ore avoids the need for energy intensive blasting, crushing and grinding which would be required for hard rock mining. The leach solution (lixiviant) will then be percolated through the heap and desorb / leach both the target and other minerals. This process, called the "leach cycle," is expected to take 100 days for the Makuutu ore. The leach solution containing the dissolved rare earths will then be collected, concentrated via an ion-exchange process and then treated with ammonium bicarbonate to precipitate a mixed rare earth element carbonate product. The mother liquor, now rich in ammonium sulfate will be recycled back to the heap after reagent levels are adjusted. Ultimate recovery of the target mineral can range from 35 to 75% TREE-Ce. The leach solution is upgraded in concentration through the use of reverse osmosis and nano-filtration processes, also known as membrane technology. The use of the technology enables the separation of rare earths in salt form



along with residual reagents, from pure clean water (permeate), enabling the clean water to be removed from the process stream. The inclusion of membrane technology is seen as innovative application of technology in the processing of these type of ore deposits and is expected to have a very beneficial impact on the overall site water balance and the environmental standards of the project. The design of the process has been to meet or exceed international standards. Heap leaching does not require large tailings dams and the amount of overall environmental impact caused by heap leaching is often lower than more traditional techniques and is therefore more environmentally friendly. It also requires less energy consumption to use this method, which many consider to be an environmentally superior alternative.

Heap leaching has been successfully applied to nickel laterite ores at sites such as European Nickel's Caldag operation in Turkey and Murrin Murrin in Western Australia. The process is also widely used in China for REE Ionic Clay deposits. An on/off reusable pad design was nominated in the expectation of a relatively short leach cycle and consistent leaching characteristics. This reusable pad method minimises the plant footprint but adds costs due to double handling of the ore and the pad/liner system needs to be more durable due to the added machinery movements. The smaller footprint, however, results in a smaller storm water pond which is favourable for Makuutu given the high rainfall and positive water balance. However, the method adds ponds, drains, and header piping in order to accomplish the ore washing and rinsing requirements. This option allows the barren washed/rinsed heap leach tailings to be reclaimed and returned to the mined-out pits prior to rehabilitation.

Liner design is critical for a re-usable on-off pad leach otherwise known as a dynamic heap (refer Figure 33). The interaction between the foundation materials and under-liner soils, the geomembrane liner itself, and the over-liner materials that protect both the drainage/solution collection piping network and the geomembrane need to be designed in detail and optimised.

### 3.6.3 Process Description

The existing project concept is based upon bulk mining processed via excavator and / or scraper and trucking to the process plant, which is envisaged to use the environmentally friendly heap leach technology. The site will be contained such that all surface water is recovered to drainage ponds on site and recirculated on site. Ore will be delivered to the ROM via mine truck or belly dump scraper and either dumped on the ROM pad in stockpiles or direct feed to the drive over hopper. Ore will be reclaimed from the ROM pad via Front End Loader and fed into the drive over hopper. The ore is characteristically fine grained with dense clay like properties and contains no competent lump material and consisting of friable conglomerate with no floating competent rock. The ore has a 20% plus moisture content as hydrated water within the clay structure. Given the dense clay like properties of the ore, the ore is expected to friable and break up relatively easily. Given potential for friable material, whilst provision in the plant layout exists for a sizer, it has been omitted from the nominal operation to be replaced with a contract sizer if required.

ROM Feed, or sizer discharge, will be sent via conveyor to a small stockpile. The stockpile feed conveyor will be fitted with a weightometer for process accounting, which will then feed an agglomerator which will bind the feed to approximately 12 to 25mm using ammonium sulfate solution. The agglomerate product will then be fed to the materials handling system where the feed rate is controlled by variable speed belt feeders discharging onto overland transfer conveyors. The

overland transfer conveyors feed tripper conveyors (yard conveyors). The yard conveyors feed advancing/retreating conveyors that feed the stacker conveyors. In the 2.5Mtpa feed case, only one train of 17 heap leach cells is installed. The agglomerated ore will be stacked to a height of 3 metres (refer Figure 33) and will have time to cure prior to commencing salt desorption (refer Figure 34). Each 2.5mtpa will require the installation of a standalone new on-off heap leach pad consisting of 17 heap leach cells and materials handling system (refer Figure 35).



Figure 33: Stacking ore on liner for heap leaching <http://miningmirror.co.za/2018/07/11/heap-leaching-a-stack-of-gold/>



Figure 34: Application of leach liquor to heap leach pads

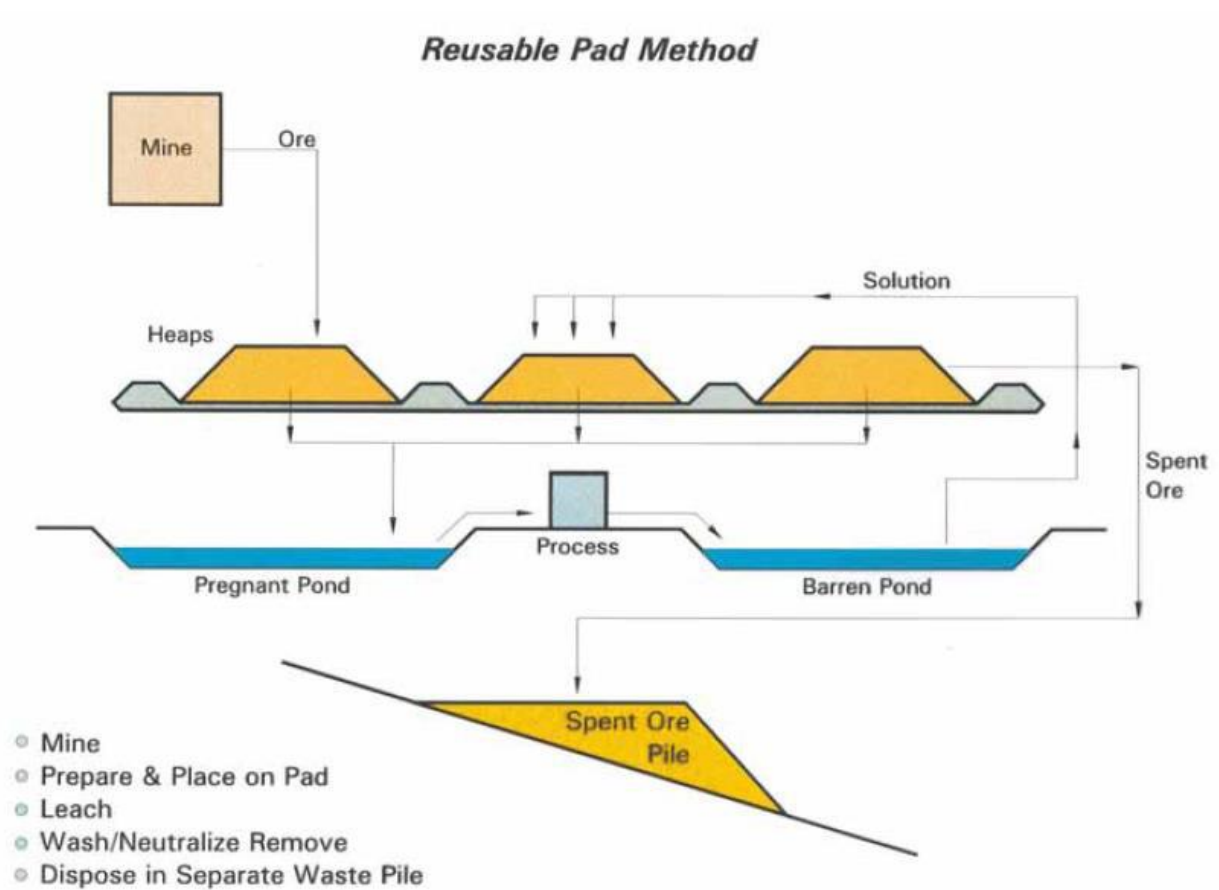


Figure 35: Dynamic heap leach pads, otherwise known as On-Off pads

### 3.6.4 Heap Leaching Process

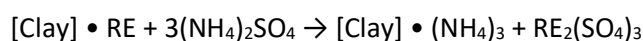
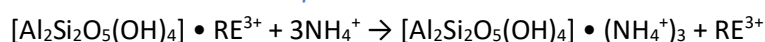
After stacking is completed, each cell is irrigated with process solutions in the following sequence;

1. Primary Leach Cycle: Salt/Acid Recycle Solution → Heap Leach → PLS Pond
2. Secondary Leach Cycle: Wash Pond#2 Solution → Heap Leach → ILS Pond
3. Wash Cycle: Wash Pond#1 Solution → Heap Leach → Wash Pond#2
4. Rinse Cycle: Process Water → Heap Leach → Wash Pond#1

#### 3.6.4.1 Primary Leach Cycle

Pregnant Leach Solution (PLS) produced during the primary leach cycle of the fresh ore and is collected in the PLS collection pond. PLS is pumped from the collection pond to reverse osmosis (RO) and nano filtration (NF) plant #1 where impurity metals and REE's are concentrated prior to the precipitation stage. Permeate is returned to the Salt/Acid solution collection pond for recycle as primary leachate (Primary Leach Cycle) in order to recover REE's in this stream by recycle back to the heap.

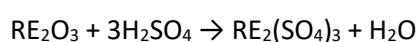
#### 3.6.4.2 REE Desorption



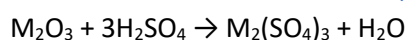
#### 3.6.4.3 Secondary Leach Cycle

Wash Pond #2 water is acidified with sulfuric acid and used for the secondary leach of the heap to recover remaining REE into an Intermediate leach solution (ILS). ILS produced during the secondary leach reports to RO Plant #2. Brine containing recovered and concentrated metals and REE are recycled back to the heap leach (primary leach) via the Salt/Acid Recycle solution pond (see Primary Leach Cycle). Permeate from RO Plant #1 reports to the process water pond for re-use as heap rinse water (see rinse cycle).

#### 3.6.4.4 REE Dissolution



#### 3.6.4.5 Metal Dissolution (Where "M" denotes the impurity metal element such as Al, Fe)



#### 3.6.4.6 Wash Cycle

Heap Rinse water from Wash Pond#1 is used for primary washing of the heap and the wash water drains to Wash Pond#2 for recovery of residual REE's (see Secondary Leach Cycle).

#### 3.6.4.7 Rinse Cycle

Finally, the heap is rinsed with clean process water to remove all residual reagents and salts prior to the heap reclaim and tailings disposal stage. Rinse water reports to Wash Pond#1 and is re-used for the Wash Cycle.

#### 3.6.4.8 RO/NF & Solution Ponds

PLS will be purified and preconcentrated by reverse osmosis and nano filtration technology.

RO/NF Plant #2 will receive intermediate leach solution (ILS) and recirculate a brine back to the HLP that contains Salts/Acid/Ammonium Sulfate, as well as dissolved REE. The intent is to increase the



solution REE tenor of the ILS primarily upgrading and re-contacting the solution with the ionic clay component in the primary leach of the fresh ore.

Permeate (that which flows through the membrane) from RO/NF Plant #2 will report to the process water pond and will be used for the final heap rinse. Heap rinse water will report to Wash Pond #1 and is to be used for the heap wash. Heap wash water will report to wash pond #2. Wash Pond #2 water will be dosed with sulphuric acid (98% H<sub>2</sub>SO<sub>4</sub>) and is to be used for the secondary leach cycle. The secondary leach will be the source of Intermediate leach solution (ILS) which is to be collected in the ILS pond and feed RO/NF Plant #2 (completing the cycle).

RO/NF Plant #1 will receive pregnant leach solution (PLS). Conversely to RO/NF Plant #2, Plant #1 will recirculate permeate solution back to the heap leach combined with the Plant #1 brine. The brine from RO/NF Plant #1 that will contain REE, and impurity element metals will be pumped to the precipitation plant where the impurities will be removed and the REE recovered.

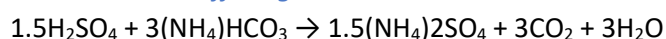
RO/NF Plant #3 will receive the solution tailings from the final REE precipitation step and recirculate brine back to the heap leach (combining with discharges from Plants 1&2). The permeate will report to a holding pond and will be used for dust control and the excess will be discharged to the environment under controlled conditions and in accordance with regulatory guidelines, as described in the Uganda Gazette No. 52 Volume XCI - The Water (Waste Discharge) Regulations, 1998.

#### *3.6.4.9 Precipitation*

##### **Impurity Elements & REEC Precipitation**

Ammonium bicarbonate (NH<sub>4</sub>)H<sub>2</sub>CO<sub>3</sub> will be used for precipitation of impurities and the final product, which will be a rare earth element carbonate suitable for further processing by consumers. Precipitation occurs when the pH is raised (buffering) and precipitation reactions are as follows:

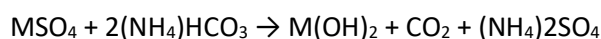
#### *3.6.4.10 Buffering Reaction*



#### *3.6.4.11 Impurity Precipitation*

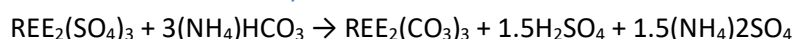


Where “M” designates trivalent impurity metal ions (such as Al<sup>3+</sup>, Fe<sup>3+</sup>)



Where “M” designates divalent impurity metal ions (such as Fe<sup>2+</sup>)

#### *3.6.4.12 REE Precipitation*



The reactions generate ammonium sulfate (Amsul) that will be recovered in RO/NF Plant #3 and recycled to the Salt/Acid recycle pond for use in the primary heap leach cycle.

Impurity precipitate will be thickened, filtered, and the filter cake disposed of in a dedicated waste containment. Mixed rare earth element carbonate (REEC) product will also be thickened and filtered before being fed to the drying and bagging plant.



### 3.6.5 Product Drying and Bagging

It is envisaged that the final REEC product will contain a considerable amount of residual moisture (50-60%) following thickening and filtration. A flash dryer will be required to dry the product prior to packing for shipment to consumers.

The plant has been designed so that all parts can be containerised (some parts in open top containers), in order to facilitate transport to site. The system will consist of a feed hopper with variable speed screw feeder that feeds the flash dryer. The flash dryer will come with a diesel fired hot gas generator, de-agglomerator, drying column, dust collection system and support structure.

The plant has been designed with ease of assembly in mind. Assembly requires use of a crane and a team of fitters/riggers. No specialist skills are required. A conceptual process flowsheet (refer Figure 36) is provided.

### 3.6.6 Process Design Criteria

The process plant is planned to be centrally located adjacent to the Makuutu ROM deposits. It is planned that mining will be conducted continuously on an owner operated basis. The process plant is planned to be operated 24 hours per day, 365 days per year. The key process design criteria for the Heap Leach Operation are presented (refer Table 11)

Table 11: Key Process Design Criteria Summary for Heap Leach Operation

Parameter Description	Units	
Life of Mine	Years	27
ROM Processing Throughput – Year 1	Mtpa (dry)	2.5
ROM Processing Throughput – Year 3	Mtpa (dry)	5.0
ROM Processing Throughput – Year 5	Mtpa (dry)	7.5
ROM Processing Throughput – Year 7	Mtpa (dry)	10.0
ROM Processing Throughput – Year 10	Mtpa (dry)	12.5
ROM Moisture	%w/w	25
ROM Processing Throughput – Year 1	Mtpa (wet)	3.33
ROM Processing Throughput – Year 3	Mtpa (wet)	6.67
ROM Processing Throughput – Year 5	Mtpa (wet)	10.0
ROM Processing Throughput – Year 7	Mtpa (wet)	13.33
ROM Processing Throughput – Year 10	Mtpa (wet)	16.67
Agglomeration Capacity – Year 1	Mtpa (dry)	6.25
Agglomeration Capacity – Year 5	Mtpa (dry)	6.25
Number of Stacker & HLP Trains	per module	1
Stacker treatment rate (per module)	tph (wet)	600
Stacking Height	m	3
Cell Width (Base)	m	80
Cell Length (Base)	m	240
Number Of Cells per Heap Leach module		17
Heap Leach and Material Handling availability	%	70%
Precipitation Capacity – Year 1	tpa REO	2,500
Precipitation Capacity – Year 5	tpa REO	5,000
Precipitation Availability	%	85%

### 3.6.7 Process Flowsheet

The process flowsheet presents the material movement from mine to market (refer Figure 36).

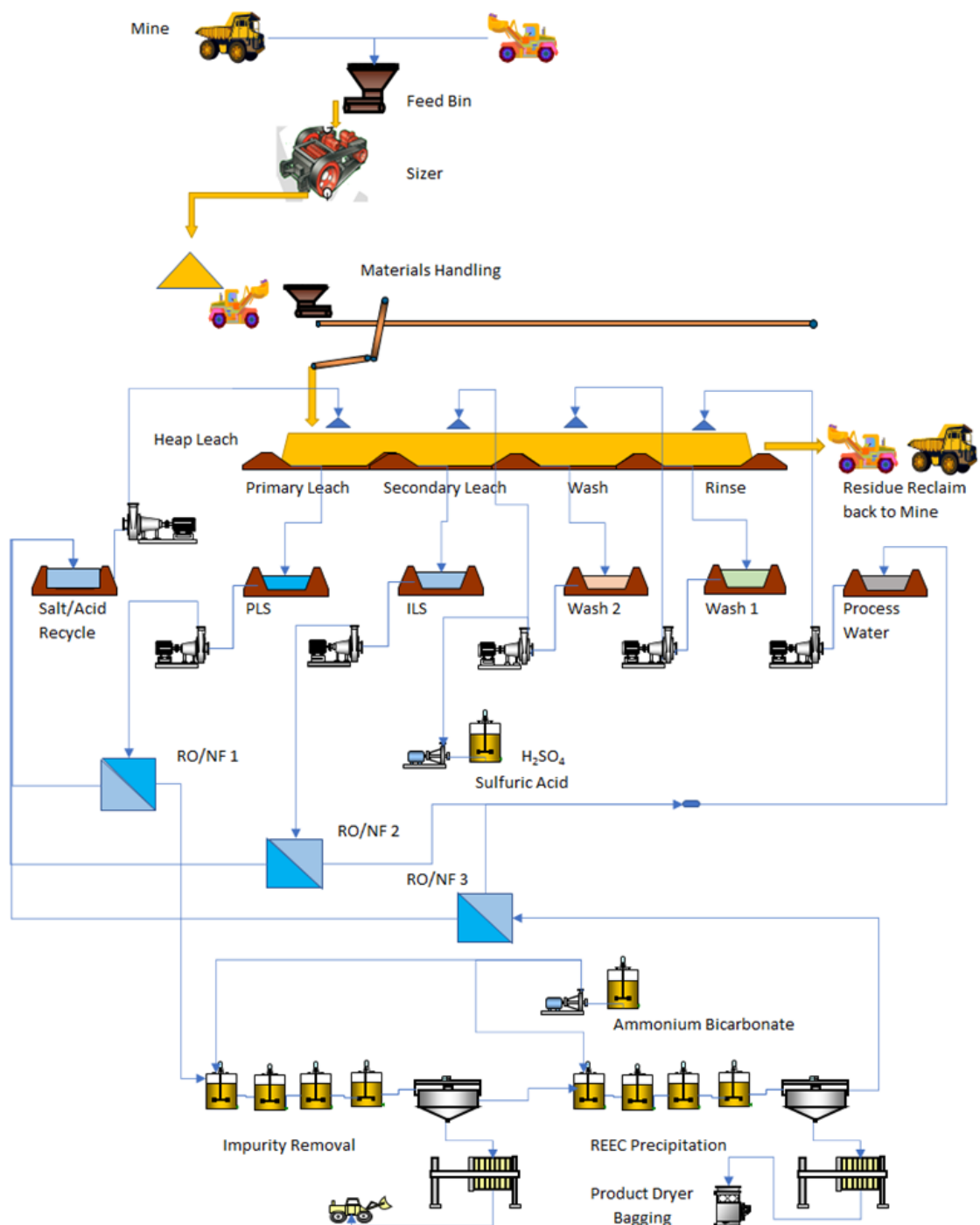


Figure 36: Makuutu Rare Earth Project conceptual process flowsheet

### 3.6.8 Rare Earth Element Carbonate Product

The process plant has been designed to produce a rare earth element carbonate (REEC) product, which will be dispatched to customers in plastic lined FIBC bulk bags. It is proposed that product will be loaded into 20-foot shipping containers and transported to a REE separation plant for downstream processing into individual REE.

The forecast REO production over the LOM based on the current mineral resource estimate is 79,213 tonnes of Rare Earth Oxide (REO) equivalent product. The REO production profile, split based upon the various individual REO follows (refer Figure 37).

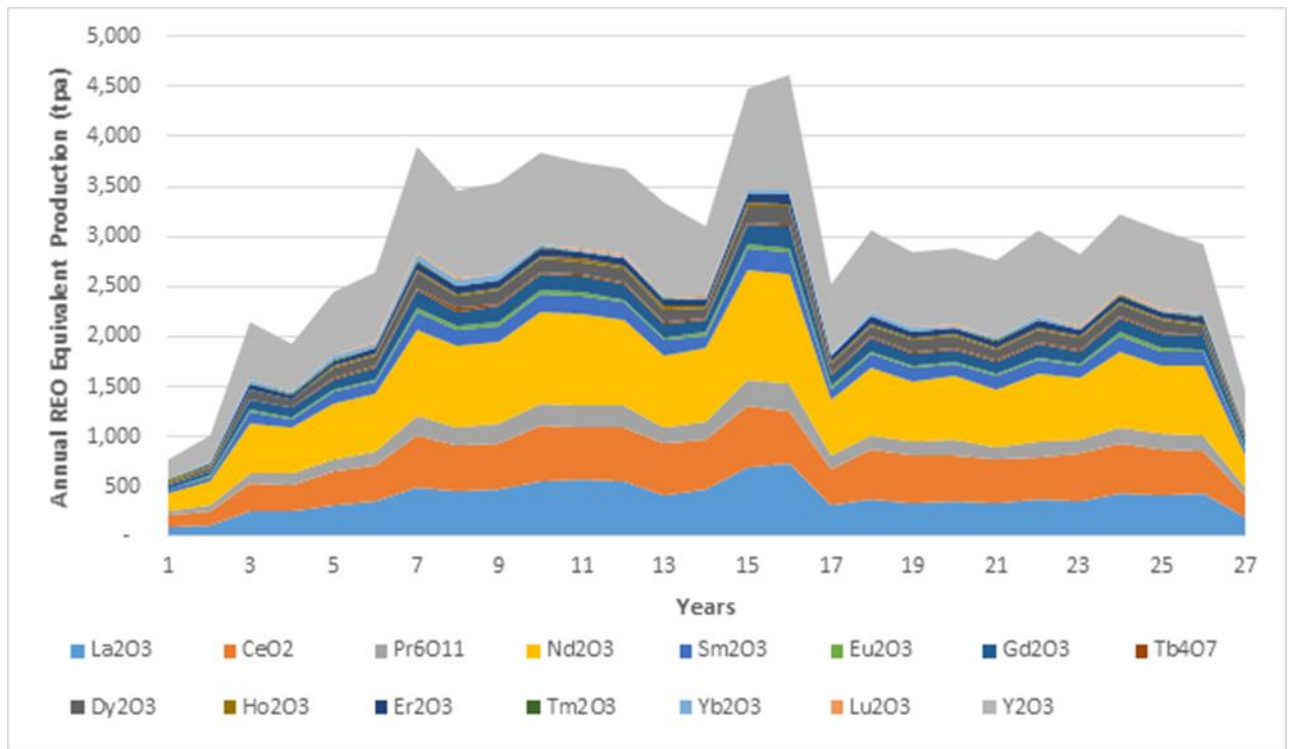


Figure 37: REO production profile for 27-year LOM scenario with throughput ramping up from 2.5 Mtpa in Year 1 to 12.5 Mtpa in Year 10

The distribution of REO equivalent production basket over the LOM, using the March 2021 Mineral Resource Estimate (refer Figure 37) was yttrium (Y, 25.64%) and neodymium (Nd, 22.9 %), with other major revenue contributors being praseodymium (Pr, 5.4%), dysprosium (Dy, 3.7%) and terbium (Tb, 0.6%).

### 3.6.9 Process Plant Equipment Sizing and Selection

Process equipment selected in the study for the Heap Leach option is considered standard for use in a lateritic ionic clay Heap Leach process application and represents the base case.

Chinese made mobile equipment has been selected as follows;

- Liugong 8 tonne rated 886H Front End Loader;
- Sany STC 500 Mobile Crane (50T);
- Quindao Chary Machinery – 8 tonne Hiab Truck & Crane mounted.

A mineral sizer was selected for crushing duty given the soft competency of the ROM and is an ideal machine for conditioning the material for heap leaching.

An advancing /retreating materials handling and stacking system based on expert design advice is planned for the Heap Leaching operations.

### 3.6.10 Plant Operation and Control Philosophy

The proposed control system will be a PLC based system with an operator interface unit such as an Allen Bradley Panel View. A single PLC should have sufficient capacity for the control of the circuit and associated infrastructure requirements however this will be reviewed in subsequent study phases of the project. The operation of the integrated process plant will require multiple process interlocks and safety controls. It is envisaged that all process plant operations will be controlled from one central control room.

### 3.6.11 Reagents

#### 3.6.11.1 Sulfuric Acid

Sulfuric acid will be dosed to the Wash Pond #2 solution via an inline mixer. 98.4% grade Sulfuric acid will be trucked in 25t bulk quantities in single unit tanker trucks. Sulfuric acid will be unloaded into a bulk storage tank, with site storage volume sufficient for 7 days. The storage tank will be carbon steel (refer Figure 38).



Figure 38: Fully bunded Sulfuric Acid Storage Tanks will be in place at Makuutu

#### 3.6.11.2 Ammonium Sulfate (Amsul)

Ammonium sulfate (Amsul) is supplied at fertiliser grade (21%) in 50kg bags on pallets or 1 tonne bulk bags. The Amsul will be mixed dosed as a solid onto belt while building the heap leach pads.



#### *3.6.11.3 Ammonium Bicarbonate*

Industrial grade ammonium bicarbonate will be supplied in 50kg woven polypropylene bags on pallets. The reagent will be mixed into a slurry and dosed via a ring-main to the precipitation circuits.

#### *3.6.11.4 Other Reagents*

Liquid reagents will be sourced in IBCs where possible. Flocculant will be used in thickener operations for the impurity removal and REEC precipitation. Provision for one powder flocculant make up system has been allowed for. Other reagents are required for RO membrane descale and NF cleaning.

### **3.6.12 Infrastructure and Utilities**

#### *3.6.12.1 Mobile Equipment*

The mobile equipment fleet has been specified based on the expected requirements of the plant. This includes various maintenance and operating personnel vehicles. Two Front End Loaders (FELs) (886H or equivalent) will be required on the ROM pad and to feed the materials handling system feed hoppers and a further two FEL's will be required for heap leach tailings reclaim activities. The plant will require a 50t yard crane, hiab-flatbed truck (crane mounted), container forklift, store AT forklift (Manitou style), small skid steer loader, backhoe and mobile welding machine. As the plant is quite compact only four light vehicles will be required and a bus to move personnel to and from townships / residential centres. A larger 200T crane will be required for periodic sizer maintenance and is assumed to be hired in by the crusher contractor on an as-required basis.

### **3.6.13 Water**

A preliminary water balance (refer Figure 39) indicates that the Project will be completely self-sufficient with respect to water supply and will be discharging about 380,000 kL a year of high-quality treated water to the river system or for beneficial uses including irrigation of crops.

#### *3.6.13.1 Process Water*

A process water pond will be installed on site to collect discharge from neutral plant operations, RO Plant 2 permeate and mine-dewatering. This pond provides ongoing rinse water to the heap leach process. The maximum storage of the process water pond is 30 days operation. Process water will be supplied to the process water ring main with electric pumps. Filtered process water will be utilised for gland water services.

#### *3.6.13.2 Gland Water*

Gland water will be used for a limited number of pumps within the process plant. The majority of pumps will be specified with mechanical seals or as hose pumps to avoid having to use water for sealing duties. A gland water tank and pumps will supply duty points within the process plant.

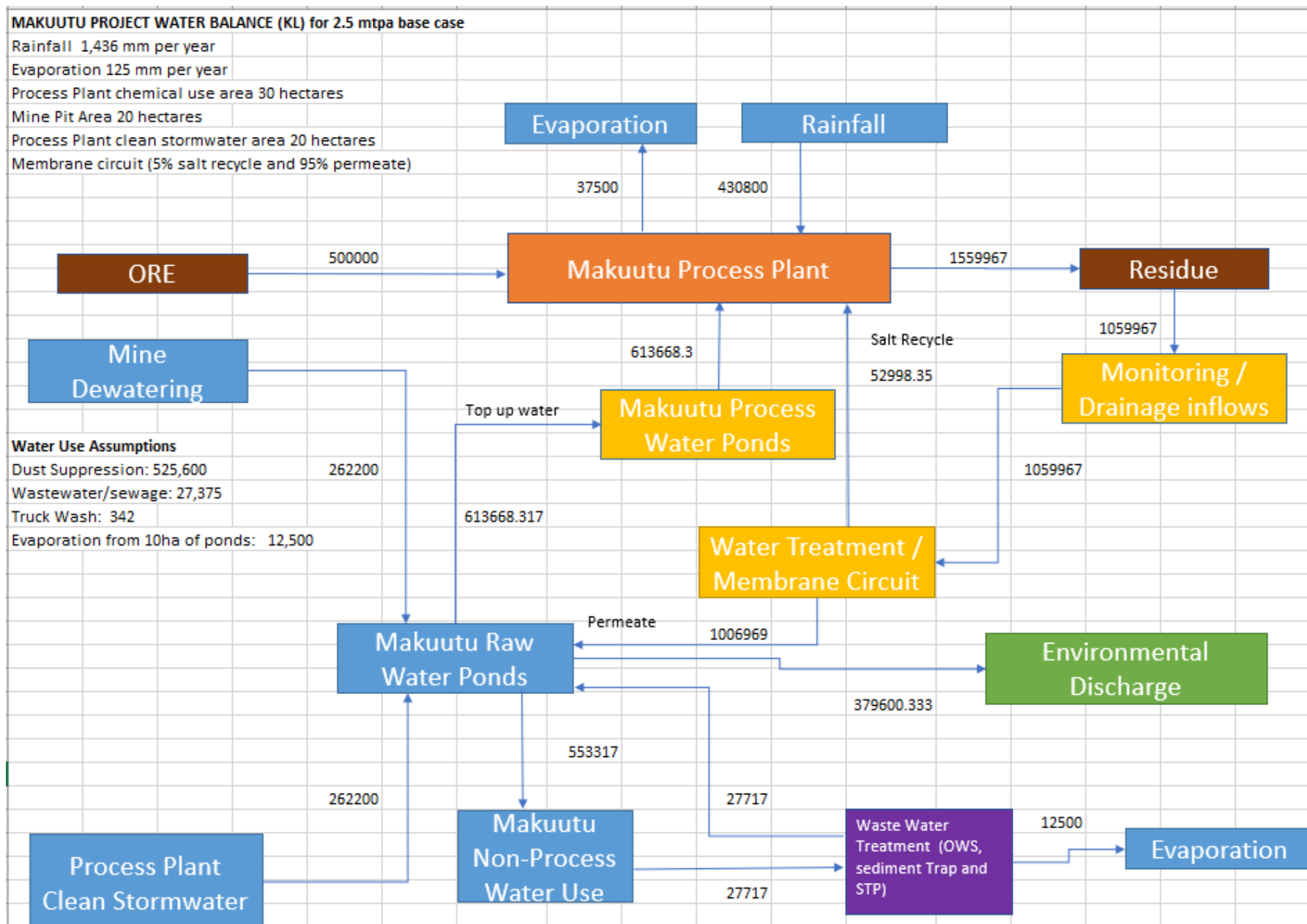


Figure 39: Preliminary Water Balance (KL)

#### 3.6.13.3 Raw Water

The plant will obtain process water from stormwater harvesting and RO Plant permeate. A modest raw water storage tank will be installed on site, which will also provide for fire water storage capacity. Nominal capacity of the raw water tank is 130m<sup>3</sup>. The raw water tank will overflow to the process water pond.

#### 3.6.13.4 Fire Water

A firewater storage and reticulation system will be provided for firefighting duties. Fire water will be supplied to the fire water ring main with a diesel operated fire water jockey pump. All substations will be equipped with dedicated fire suppression equipment to protect the motor control panels and plant control systems.

#### 3.6.13.5 Potable Water

Raw water will be processed through a reverse osmosis plant to provide potable water for the operation. Potable water will be chlorinated and stored on site in a potable water tank. Potable water will be distributed via a ring main with electric pumps supplying potable water to the safety shower ring main and the offices block, crib room / ablutions and workshop.

### 3.6.14 Sewage

The site will be equipped with both male and female toilets and showers. The Sewage Treatment Plant will be used to treat domestic effluent from toilets, showers, sinks and from office facilities. Sewage will be collected by gravity at a local pumping station and will be pumped to the Sewage Treatment Plant. The treated effluent will be discharged by pumping to the process water tank. Sludge will be removed from the treatment plant periodically, dried, and disposed of to landfill.

### 3.6.15 Air Services

Plant air will be supplied by a duty standby arrangement of rotary screw type compressors. The compressors will provide air at a pressure of 700 kPa<sub>g</sub> to plant services. It is unclear whether special compressors will be required for some plate and frame filters. Instrument air will be withdrawn from the plant air receiver to an instrument air accumulator and then dried in a duty standby arrangement of driers and air filters.

### 3.6.16 Power

132kV, 33kV and 11kV voltage power is readily available in the project area from the national grid. Based on the mechanical equipment list and assumed energy factors, the power requirement for the Project (refer Table 12) is provided as a breakdown of the power consumption by area. 11 kV power is connected to the plant MCC transformer and stepped down to the 415-volt distribution. The 415-volt bus for the MCC is split in order to reduce the available fault level.

Table 12: Processing Plant Electrical Load Summary per 2.5 Mtpa module

Plant Area	Description	2.5Mtpa Heap Leach		
		Installed (kW)	Load Factor	Operating (kW)
200	Mobile Equipment	0	55%	0.0
210	Mineral Sizer	404	55%	222.2
220	Materials Handling	240	66%	158.4
230	Heap Leach Pads	0	66%	0.0
240	Heap Leach Ponds	292	44%	128.48
250	RO/NF	1323	66%	873.18
260	Impurity Precipitation	42	66%	27.72
270	REE Precipitation	39	66%	25.74
280	REEC Drying Bagging	6	66%	3.96
290	Reagents	62	44%	27.28
300	Water Services	198	50%	99
310	Air Services	60	50%	30
320	Fuel Services	2	50%	1
330	Buildings	267	100%	267
	<b>TOTAL</b>	<b>2,935</b>		<b>1,864</b>

### 3.6.17 Tailings and Water Management

Tailings (heap leach residue) disposal is via progressively rehabilitated mining areas. Following the rinse cycle, the leached ROM will be reclaimed and trucked to the mined-out pits for rehabilitation. An intermediate lined tailings dump, preferably located adjacent to the ROM pad, may be required while mining is in progress (dependent on mine planning). FELs are provided in the process plant for heap leach railings reclaim and loading. Excess permeate water will be stored in a holding pond, filtered and treated prior to environmental discharge.

### 3.6.18 Control Room and Switch Room

A control room and switch room have been estimated in the capital cost estimate.

### 3.6.19 Roads

No allowance for roads external to the Process Plant area have been made in this estimate. However, it is estimated only moderate internal roads such as haul roads will be required. The existing paved roads surrounding the project will be used for access to site and deliveries, and an additional haul road will be used for ROM transportation to the processing plant. The estimate for haul roads at the plant site is assumed to be included in the earthworks factored estimate.

### 3.6.20 Accommodation and Construction Camp

As the workforce is small initially, it is assumed that all site-based staff will reside in one of the regional centres in the area. At time of construction, it is assumed any specialist labour or expatriate construction supervision would be accommodated in the nearby guesthouses in Iganga or Jinja.

### 3.6.21 Security

A guard house with security has been assumed in the estimate and included in the site labour.

### 3.6.22 Fuel Services

Fuel will be stored on site in fuel storage facilities for distribution to vehicles and for use in the flash dryer for product drying. As diesel will be supplied in bulk, it will be pumped to a 35m<sup>3</sup> tank located adjacent to a designated re-fuelling area connected to the ROM pad via a road such that heavy vehicles can refuel on their rotations. Machines based at the mine pits will be refuelled by an intermediary fuel truck. At the refuelling area, there will also be a separated light vehicle refuelling bowser. The flash dryer will have a dedicated 1000L diesel storage tank that is periodically filled by an intermediary fuel truck.

### 3.6.23 Site Buildings

Anticipated site buildings are as follows (refer Table 13). An allowance cost has also been made for a typical ICP laboratory. The purpose is to provide a grade control and metallurgical assay laboratory. The laboratory is to be equipped with sample preparation, screening, ore digestion and analysis facilities. The primary means of analysis will be by inductively couple plasma optical emission spectroscopy (ICP-OES) and mass spectrometry (ICP-MS). Provision for additional building is included in the Module 3 expansion.

Table 13: Anticipated Site Buildings

BUILDINGS	m <sup>2</sup>
MAIN ADMINISTRATION OFFICE	297
MINE OFFICE	89
PLANT WORKSHOP	800
WAREHOUSE & STORE	800
PLANT WORKSHOP OFFICE	30
MINE WORKSHOP	200
MINE WORKSHOP OFFICE	30
CHANGEROOMS/ ABLUTIONS / LAUNDRY / LUNCHROOM	297
EMERGENCY RESPONSE	72
CONTROL ROOM	30
SUBSTATION	72
LABORATORY	72

### 3.6.24 Offsite Infrastructure

A freight consolidation yard will be required to support the rail freight operation and a Jinja office for in country logistics and project support activities.

### 3.6.25 Proposed Site Layout

The proposed layout of the heap-leach and processing facilities (refer Figure 40) and the general layout of centralised facilities (refer Figure 41) follows. Key features of the proposed layout include:



- A peripheral vegetated mound will be constructed from topsoil pushed up from the 200ha property. It is proposed that the foundation tree to be planted on the mound be *Milicia excelsa* (Mvule or African Teak) which is a fast-growing pioneer tree species with timber and traditional medicine value. These can be grown in an onsite nursery and planted out with local labour. The vegetated mound will be a visual screen and noise barrier and at the end of mining, the timber can be harvested, and the topsoil spread over the decommissioned site. The site with established infrastructure could alternatively be maintained as an industrial facility.
- The nursery and a waste management facility will be located in the SW corner of the property adjacent to Nakivumbi and potential labour. The waste management activities will include incineration of oily and polypropylene bag waste, compacting cardboard, making paper pots and, processing wooden pallets that would then be made available to the community.
- The public road to the east of Nakivumbi will be equipped with a controlled crossing or an overpass to avoid disruption to public traffic. The fully fenced haul road will therefore have no public road connection at this location.
- The entry to the site for the workforce and for delivery trucks would be in the NW corner of the property to ensure that Nakivumbi is not impacted by project traffic.
- A constructed wetland for the sewage treatment plant and other sources of contaminated water will be located in the SE corner of the property and supply irrigation water to the vegetated mound. This will be adjacent to a stormwater pond which would be the project process water supply as well as being designed to secure good quality discharge water should this be necessitated by heavy rain. Potable water will be mixture of RO water from the Process Plant and rainwater harvested off site buildings
- Buildings and facilities along the western and southern boundary adjacent to the vegetated mound will contribute to the buffer between Nakivumbi and operational areas.
- The landfill will be an inert industrial landfill but located in the NE corner of the facility.
- The heavy vehicle workshop, truck-wash and banded bulk diesel facilities will all be located adjacent to the haul road entry point. A fuel truck will convey diesel fuel from the bulk diesel tank to the mine.
- The banded bulk Sulfuric Tank will be located on the SE corner of the main Process Plant where it can be easily filled by delivery tanks and where it is remote from busy work areas and the Nakivumbi community. Clean stormwater in the bunds of both the diesel and sulfuric acid tanks can be drained under observation into the adjacent constructed wetland.

NORTH

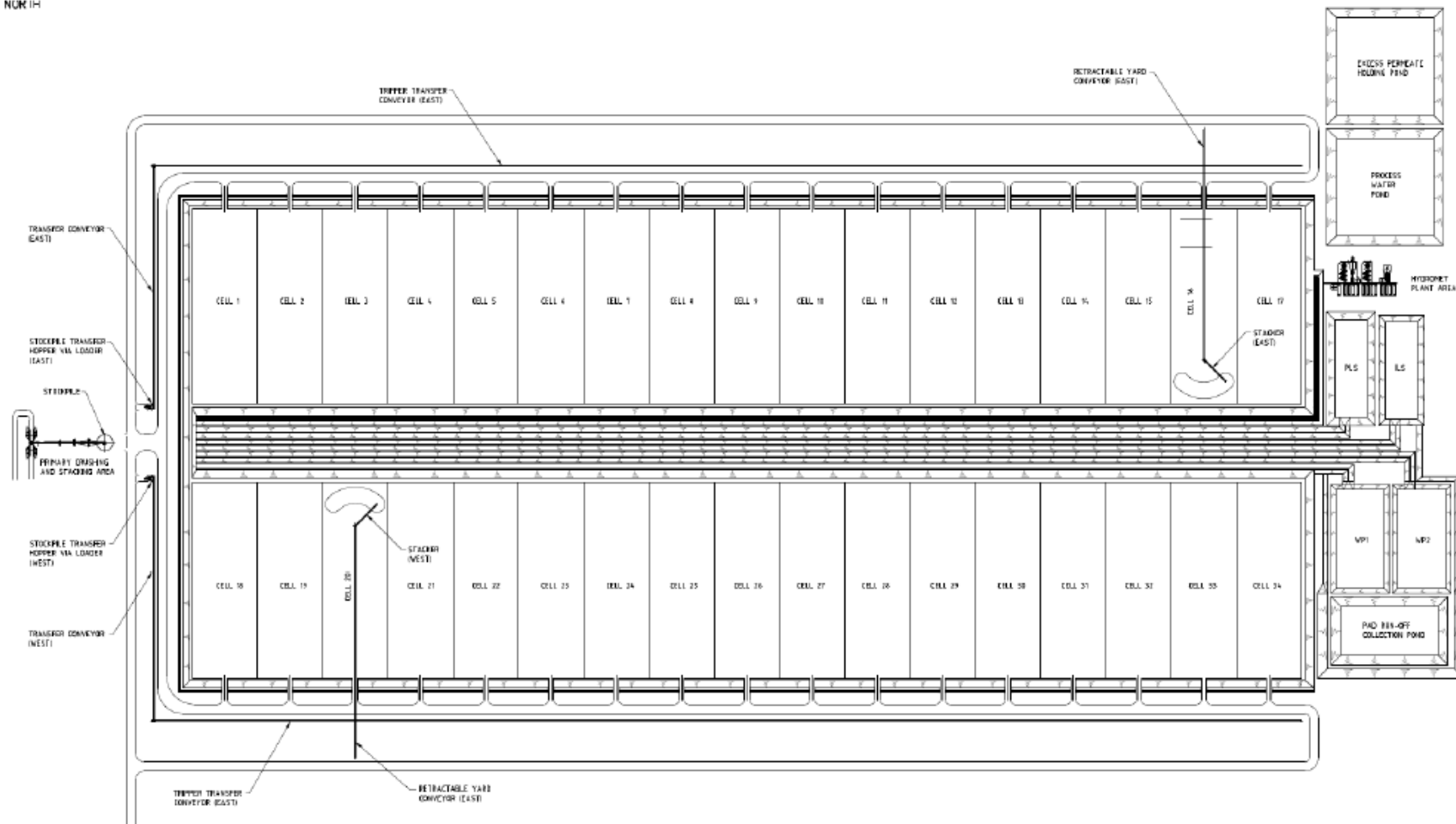


Figure 40: Proposed layout of the Process Plant Heap Leach circuit

To Busesa

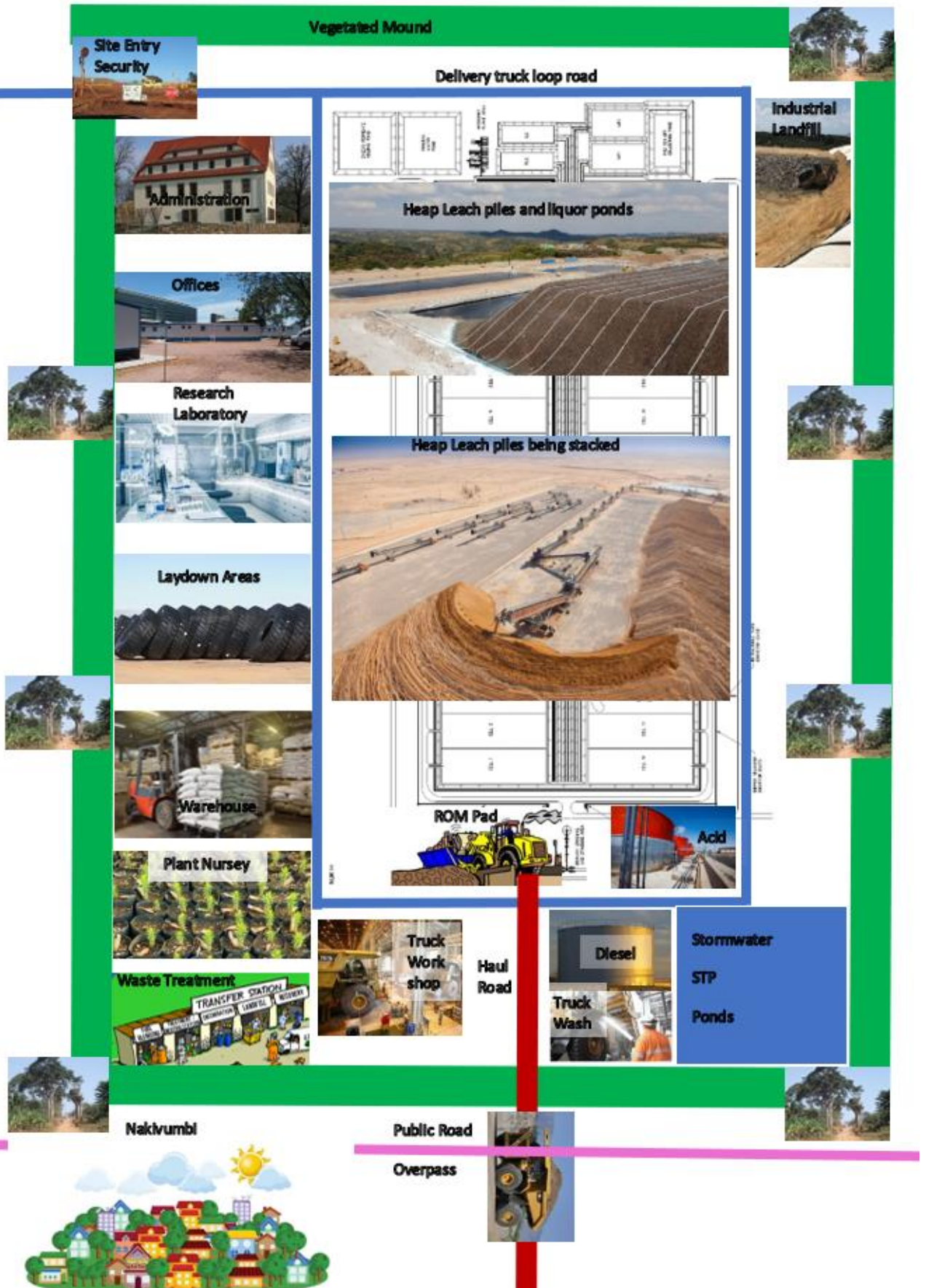


Figure 41: Conceptual layout of the Process Plant and ancillary facilities

## 3.7 Project Infrastructure

The Makuutu Project is commercially advantaged by its close proximity to major existing infrastructure including installed roads, rail, power and regional centres (refer Figure 21).

### 3.7.1 Site Access Roads

The project is approximately 10 km from Highway 109 which is a sealed bitumen road connecting to Kampala and to Kenya (Port of Mombasa) which is the main access road for goods into Uganda. All weather access roads connecting the site to the adjacent sealed bitumen highway are already existing.

### 3.7.2 Rail

A rail line lies within 10 kilometres north of the Makuutu site near the township of Iganga. Uganda, Kenya, Rwanda and South Sudan agreed in 2014 to build standard gauge railways in their territories as part of a regional plan to cut transportation costs. Uganda has already acquired 126 km of the corridor for the Malaba-Kampala SGR with land acquisition for the route expected to be concluded by June 2022. It is expected to be constructed by 2025. The Uganda Standard Gauge Railway (SGR) project will link neighbouring countries of Kenya, Rwanda, Democratic Republic of the Congo and South Sudan.

### 3.7.3 Power

There are four hydroelectric power plants located within 65 km of the project area, with total installed generating capacity of ~810 MW, including the US\$567m, 183 MW Isimba Hydropower Dam that was commissioned in March 2019 (refer Figure 42). There is significant expansion of the grid network capacity under construction (refer Figure 43), further supporting long term attractive power costs which will support the development of the Makuutu Rare Earths.



Figure 42: Isimba hydroelectric dam with 183 MW installed capacity



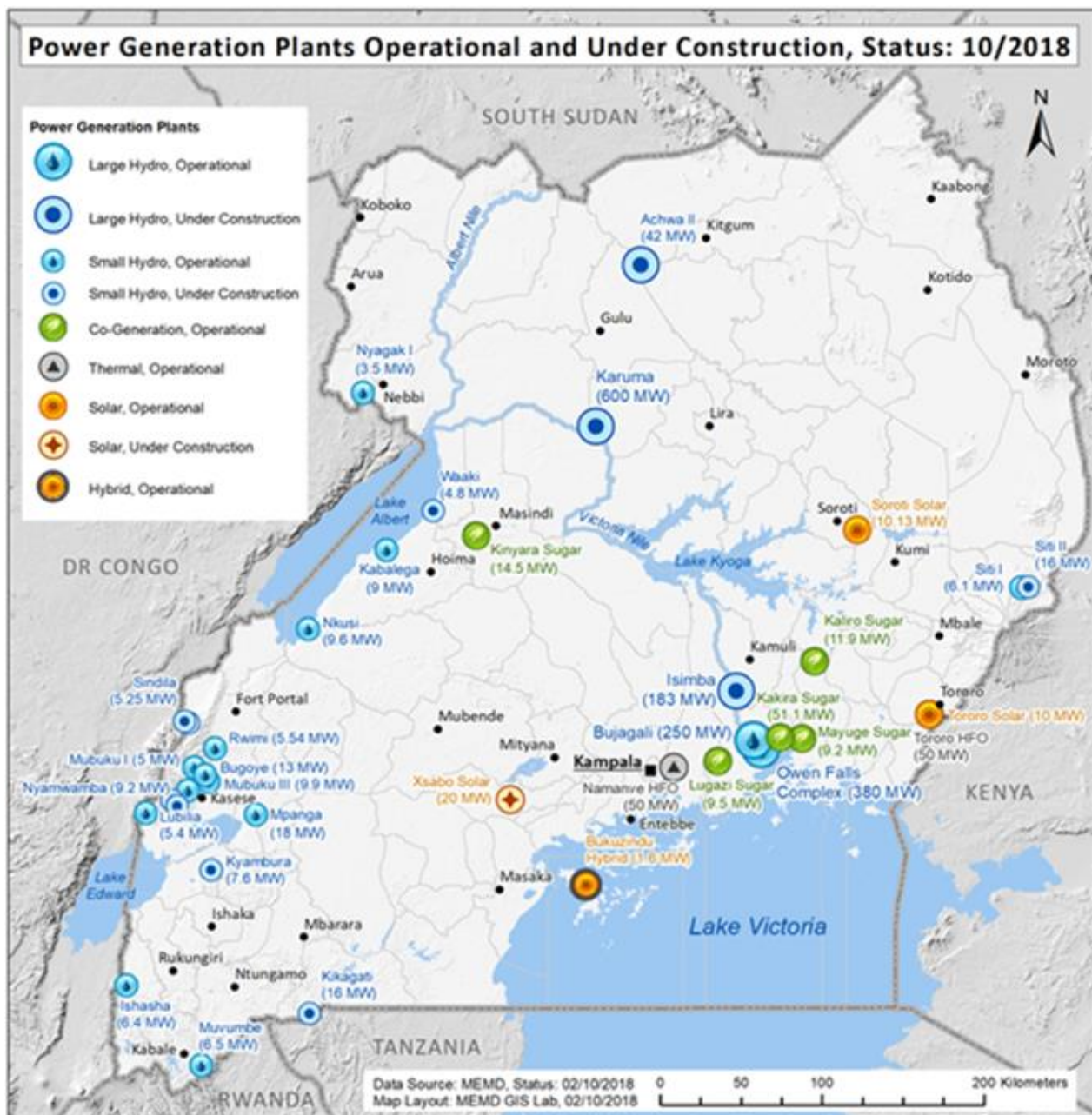


Figure 43: Power Generation Infrastructure.

### 3.8 Workforce

The Project will commence at a processing rate of 2.5 million tonnes of ore per annum and a workforce of 546 people (refer Figure 44). By Year 10, the Project will be processing 25 million tonnes and employing 1,200 people with the intention that these all be Ugandan by Year 7.

A workforce of semi-skilled and artisanal workers is available in nearby townships and population centres. The closest major population centre is Iganga, which has a population of 50,000. The township of Mayuge is approximately 10 km from the project site and the intent is to source local operations staff from the immediate districts and train staff accordingly. The operation is to be staffed by a residential workforce. No fly in – fly out is envisaged, and the number of expatriate staff is intended to be low, and to be phased out over the first 3 years of operations.



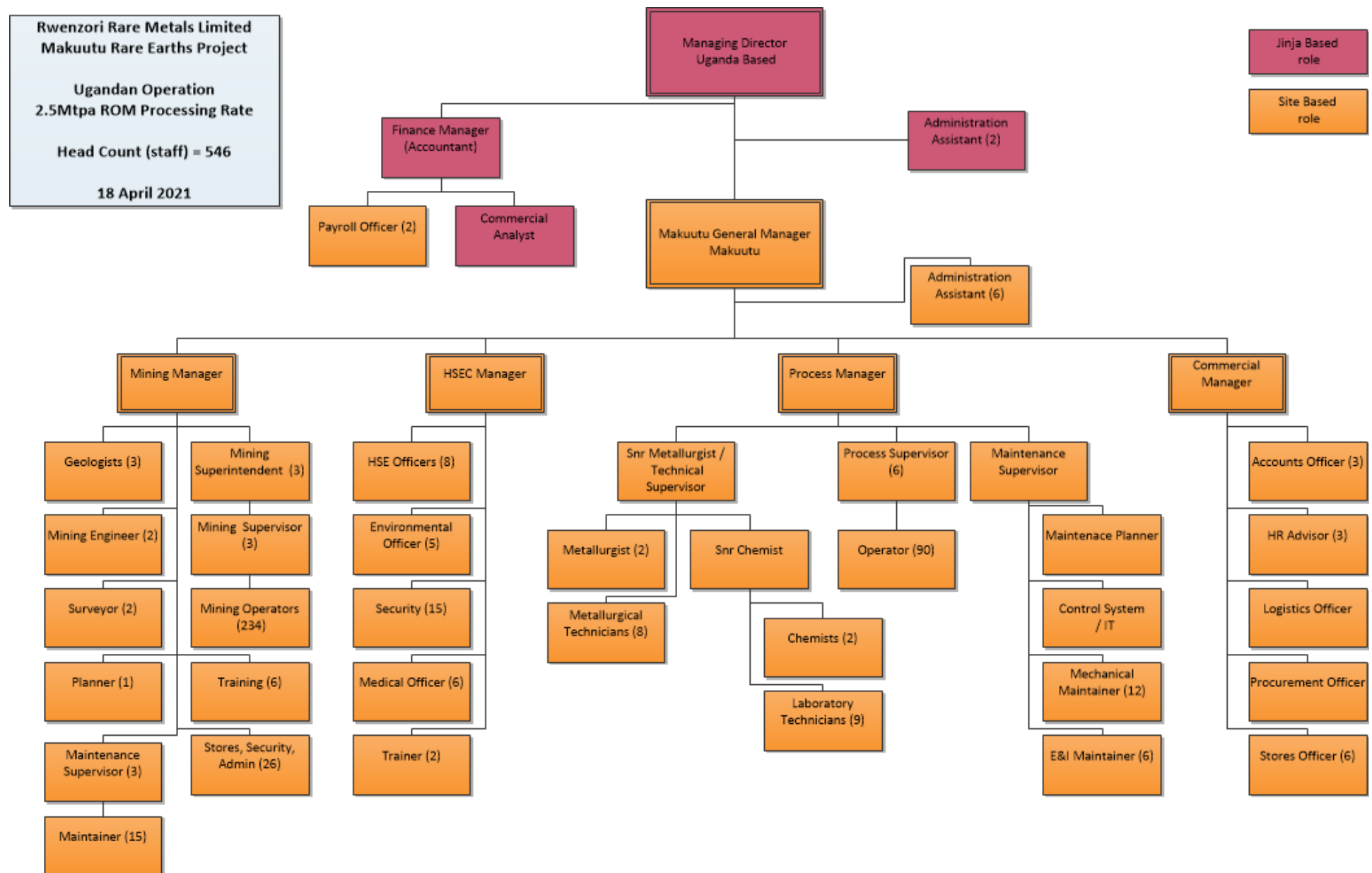


Figure 44: Makuutu Project Initial Organisation Chart for Processing Rate of 2.5 million tonnes per annum

### 3.9 Support Industry

Industrial facilities are available in the city of Jinja, approximately 40 km from the project area. Additional industrial facilities are available on the outskirts of Kampala. The Osukuru Industrial Complex is 81 km to the NW.

### 3.10 Preliminary Approvals

To date, the project has only secured approvals for exploration drilling programs and field exploration activities in addition to NEMA approval for the ESIA Scoping Study and Terms of Reference.

### 3.11 Project Implementation Schedule

The provisional schedule is as follows:

- i. Commence Environmental and Social Impact Assessment – September 2020
- ii. Complete Mineral Resource Drilling – October 2020
- iii. Submission of Retention Licence renewal application, and Preliminary Economic Assessment on the Makuutu Rare Earths Project – October 2020
- iv. Commence Feasibility Study – December 2020
- v. Commence Field Trial / Demonstration Test-work Activities on site at Makuutu – March 2021
- vi. Complete and submit ESIA to NEMA – December 2021
- vii. Complete land access agreements for the development of the Makuutu Rare Earths Project – June 2022
- viii. Complete Feasibility Study and Submit Mining Lease Application – October 2022
- ix. Receive Mining Lease approval – January 2023
- x. Place long lead items orders – January 2023
- xi. Commence mining activities, earthworks, and plant construction – February 2023
- xii. Complete construction – August 2023
- xiii. Commence commercial operations – October 2023

The mining will be done in a phased manner commencing in the centre of the Year 1 to Year 10 Makuutu Central Pit (refer Figure 21).

### 3.12 Government participation

The NDPIII observes that in regard to mining/extraction, about 80 percent of the subsector is dominated by small miners, using rudimentary methods of mining due to lack of capital to invest in the requisite equipment to carry out activities on a large scale. Such mining methods are hazardous and with poor recovery, waste Uganda's mineral wealth. The informality of the sector further limits government support and participation in the sector. The proposed project intends to establish formal mines and a processing plant. This kind of formality will attract Government participation. Already, Government has been closely participating in the exploration activities to quantify the economic potential of the rare earth elements.

## 4 Alternatives Analysis

The proposed project, as described in Chapter 6, has been optimized to minimize risk and to maximise benefit. The following overview presents the alternatives that were considered in this optimization process.

### 4.1 No Project Alternative

The Project will deliver significant social, environmental and economic benefit to local communities, to Uganda and to the world with respect to the supply of heavy REE necessary for the global transition from fossil fuel to renewable energy (refer Table 14). Failure to proceed with the Project could therefore be viewed as a lost opportunity.

Local communities would continue to maintain their lands and existing land-uses but the status quo is far from optimal. The 2016/17 Ugandan National Household Survey Report showed that the 2016/17 per capita consumption in rural areas of Uganda's Eastern Region was 44,000 Ugandan Shillings (i.e., US\$12.40) which was the lowest in the country and it had decreased since 2012/2013 (refer [https://www.ubos.org/wp-content/uploads/publications/03\\_20182016\\_UNHS\\_FINAL\\_REPORT.pdf](https://www.ubos.org/wp-content/uploads/publications/03_20182016_UNHS_FINAL_REPORT.pdf)). There is additionally a high incidence of diseases such as malaria and schistosomiasis and public infrastructure is undeveloped. Failure to proceed with the Project would deny local communities, who are among the poorest in Uganda, the opportunity to improve their health, wealth, and standard of living.

The Ugandan government would forego gross royalty payments of US\$380M plus corporate tax contributions of US\$965M that this project will deliver over its life. Failure to proceed with such a financially outstanding Project that has been in development for over 10 years would additionally be a significant blow to the reputation of Uganda as a good place to invest. The NDPIII observes that mineral development is hampered by high costs for exploration and quantification given the unavailability of advanced testing, equipment, and state-of-the-art laboratory services. The Developer has invested heavily in the exploration phase and is ready to proceed to the development phase. Therefore, a no project alternative would be inconsistent with the Uganda Vision 2040 and the NDPIII.

Uganda is mineral rich but it has no World Class mining operations and the mining sector's contribution to gross domestic product (GDP) fell from 6 percent during the 1970s to below 0.5 percent in 2010 ([https://en.wikipedia.org/wiki/Mining\\_industry\\_of\\_Uganda](https://en.wikipedia.org/wiki/Mining_industry_of_Uganda)). The Makuutu Project will deliver billions of dollars to Uganda's economy over its life and will serve as a catalyst for further international investment and development. This can additionally be achieved with a project with a positive social and environmental impact (refer Table 14). While the location of the orebody cannot be changed a lot of assessment was completed to ensure the Project design was optimised from a social, environmental and economic viewpoint.

Table 14: Environmental and Social Impact of the Makuutu REE Project over its life

Aspect	Scale of Impact	Offset	Overall Outcome
<b>Total GHG (LOM)</b>	1.5 million tonnes CO <sub>2</sub> emissions from diesel combustion over the 27-year life of the Project	<ul style="list-style-type: none"> <li>Provides enough REO to produce approximately 90 GW of gearless direct drive offshore wind turbines by 2050 displacing 300 million tonnes of coal fired GHG a year.</li> <li>200,000 tonnes of CO<sub>2</sub>/year sequestered by 400 ha of replanted forest would partially offset GHG footprint and continue to sequester carbon following project completion.</li> </ul>	<b>Strongly Positive</b>
<b>Community Health</b>	Potential increase in communicable diseases such as HIV/AIDs due to people influx	<ul style="list-style-type: none"> <li>Influx management programme</li> <li>Workforce control/education</li> <li>Community Health Programme support focused on malaria, schistosomiasis and HIV/AIDs</li> </ul>	<b>Likely Positive</b>
<b>Livelihoods/Food Security</b>	Displacement of people and influx of outsiders.	<ul style="list-style-type: none"> <li>Siting of Process Plant to minimise resettlement.</li> <li>Preliminary Compensation and Resettlement Action Plan.</li> <li>Project and government investment in mitigation and development projects including large agroforestry /fish farming projects.</li> </ul>	<b>Positive</b>
<b>Education (including for girls)</b>	Displacement of people and influx of outsiders.	<ul style="list-style-type: none"> <li>Community Development Plan, Preliminary Compensation and Resettlement Action Plan.</li> <li>Project and government investment in education.</li> </ul>	<b>Positive</b>
<b>Community Infrastructure</b>	Closure of public roads through mining areas	<ul style="list-style-type: none"> <li>New roads and community infrastructure.</li> <li>Investment by Project and Government during long (27 year) mine-life.</li> </ul>	<b>Positive</b>
<b>Land Clearing Footprint (LOM)</b>	945 ha	Restoration of all 945-ha cleared over the life of the Project to arguably improved quality.	<b>Neutral</b>
<b>Timber resources</b>	Almost nil in cleared agricultural land	400 ha of strategic woodlots and timber by end of mining.	<b>Positive</b>
<b>Impact on surface water quality</b>	Potential impacts on rivers and streams.	<ul style="list-style-type: none"> <li>Water quality monitoring</li> <li>Good bridges and culverts</li> <li>Stable soils</li> <li>Rapid revegetation of cleared land</li> <li>Sewage treatment</li> </ul>	<b>Neutral</b>
<b>Wildlife Conservation</b>	Minimal direct impact	Protection/restoration of downstream wetlands.	<b>Neutral</b>

## 4.2 Alternative Minerals

There are other potential minerals that could be mined in the 3 districts of the Makuutu Project and in other areas of Uganda, but they haven't been sufficiently explored to confirm that they are commercially viable (refer Section 2.1). The Developer is, however, seeking to maximise the value of the Makuutu ore-body and recent metallurgical test work has indicated that an additional rare earth called Scandium that is present in the Makuutu ore-body could also be exploited and potentially add US\$1.2 billion to the value to the Project (refer Table 5) with no additional environmental or social impact.

## 4.3 Alternate Rare Earth Element Projects in Uganda

The global demand for Heavy Rare Earth Elements (REE) is skyrocketing because they are critical components of electronic devices and vital for many green technologies. They are in magnets for wind power turbines and in batteries for hybrid-electric vehicles. Up to 600 kilograms of rare-earth metals are required to operate just one wind turbine (<https://theconversation.com/demand-for-rare-earth-metals-is-skyrocketing-so-were-creating-a-safer-cleaner-way-to-recover-them-from-old-phones-and-laptops-141360>). The annual demand for rare-earth metals doubled to 125,000 tonnes in 15 years, and the demand is projected to reach 315,000 tonnes by 2030, driven by increasing uptake in green technologies and advancing electronics. This is creating enormous pressure on global heavy REE supply. With accelerating demand and more than 70% of global REE controlled by China there is intense global interest in expanding REE mining. Unfortunately, most known REE deposits are from hard rock deposits which typically have significant environmental challenges due to high levels of radioactive Uranium and Thorium. Environmentally friendly REE Ionic adsorption clay deposits with low levels of Uranium and Thorium and no requirement for energy intensive and expensive blasting and grinding are, however, very rare outside of southern China. The Makuutu deposit is one of these very rare deposits. It is also unique in Uganda. The Makuutu Deposit is hosted by the Lake Victoria Terrane Tectono-Thermal Unit which only occurs in the vicinity of Makuutu (refer Figure 24). The REE mineralisation at Makuutu is additionally hosted by a unique sedimentary basin, potentially of Karoo age, overlying the Neo-archaeon basement rocks (refer Figure 25).

Makuutu is therefore unique in Uganda and there are no known alternative Ionic Adsorption Clay REE deposits in the country.

## 4.4 Alternative Processing Plant Location Option Study

The proposed base-case processing plant will cover about 200 hectares with much of this area encompassed by heap-leach pads (refer Figure 40). While the project mineral deposits are fixed in position, the location of the processing plant can be selected for minimal impact. The Developer identified 5 potential locations for establishment of the 200-ha processing plant (refer Figure 50). These sites were evaluated during the scoping phase based on environmental and socio-economic criteria.

### 4.4.1 Location Option 1

Location Option 1 is located in Makuutu Subcounty, Kigulamo Parish, 1 km east of Makuutu trading centre. The proposed site area is 2.08 km<sup>2</sup> covering 5 villages under Naitandu "A" & "B". In the east, the site borders Bugiri district, River Kituto in the south, River Nahidadala in the west (before crossing to Makuutu) and North (before Buswiriri village). All the wetlands and small swamps along these small rivers have been degraded and are heavily cultivated with sugarcane, cabbage, yams, maize, pineapples, rice and potato gardens. The main land use/cover of site include subsistence croplands, permanent settlements and scattered trees.



The site is an isolated hill that forms a pediment with a broad and gently sloping expanse surrounded by undulating lowlands. It has an altitude of about 1125 - 1149 m above sea level (m.a.s.l). The site has a level ground slope of 2.3% and – 2.9%. The site environment is well drained due to gentle slopes and nearby streams and swamps.

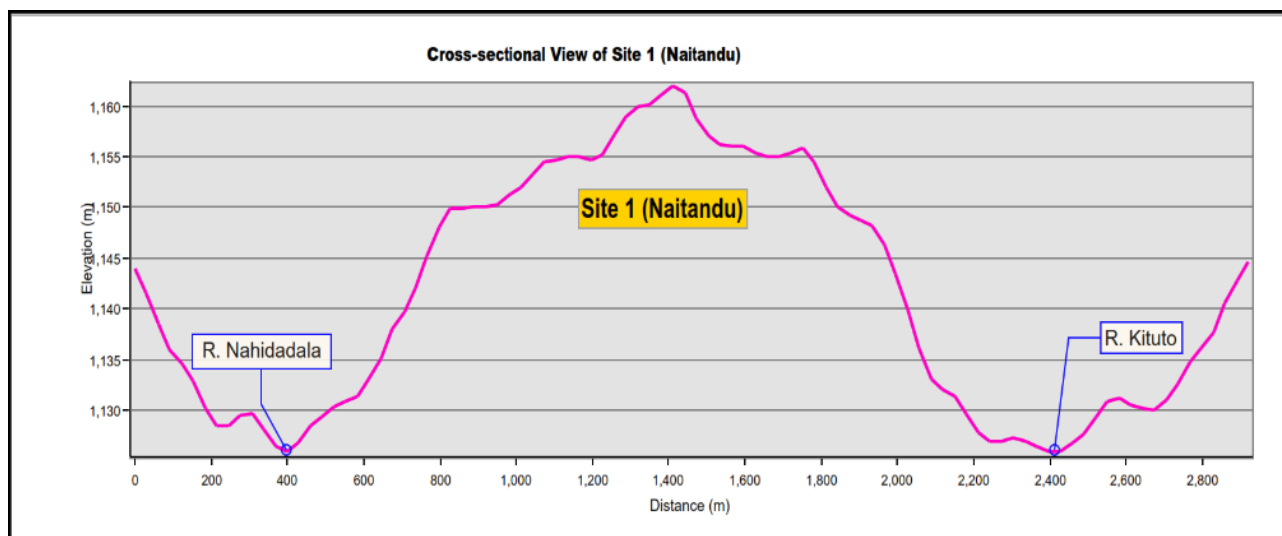


Figure 45: Cross-sectional view of Site 1 showing variation in topography

The site is somewhat densely populated with some significant socio-economic infrastructure that would be lost including Naitandu P/S, churches, a water supply scheme, a mosque, coffee/banana gardens, value addition/ agro-processing facilities etc. The displacement of communities would be a challenge, and the compensation packages would likely be huge given the number of permanent and semi-permanent structures. There are also several graveyards which would pose a risk of strong social attachments and reluctance to relocate.

**Conclusion:** Although it is within the licensed area, Location Option 1 was not recommended for establishment of the processing plant due the significant land acquisition and relocation risks.

#### 4.4.2 Location Option 2

Location Option 2 is also located in Makuutu Subcounty, Kikandwa Parish, near the border of Igombe Subcounty along River Kitumbezi. The proposed site area is 2.9 km<sup>2</sup> covering 5 villages under Nakavule, Makandwa and Mawololo. In the east, the site borders Kigulamo Parish and Naigombwa stream. In the west, it borders Mayuge District with River Kitoto as a boundary. In the North, there is R. Kitumbezi with various tributaries, while in the south its immediate neighbour is Makandwa trading centre just 200m southwards. The main landuse/cover of site include subsistence croplands, permanent settlements and scattered trees. Main crop grown is sugarcane plantation and settlements are scattered. The small wetlands and swamps along these various rivers draining site 2 have been degraded and heavily cultivated with sugarcane, cabbage, maize and rice gardens.

The site is an isolated raised land several pediments of broad and flat surfaces surrounded by undulating lowlands. It has an altitude of about 1110 - 1170m above sea level (m.a.s.l). The site has a level ground slope of 2.6% and – 3.1%. The site environment is well drained due to gentle slopes and nearby rivers, streams and swamps.

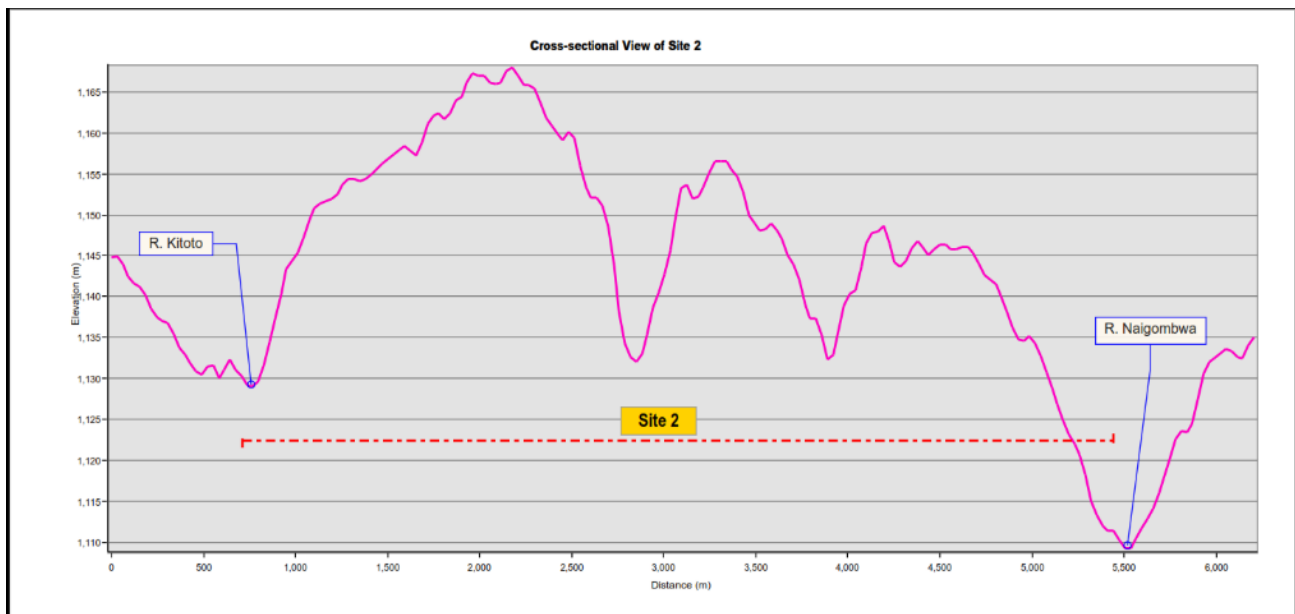


Figure 46: Cross-sectional view of Site 2 showing variation in topography

The northern part (Nakavule village) is sparsely populated with limited socioeconomic infrastructure to be lost. Areas mainly cultivated with semi-permanent structures. Compensation likely to be minimal compared with sites 1, 3 and 4.

**Conclusion:** The site is within the licensed area and was ranked as the 2<sup>nd</sup> best for establishment of the processing plant on the basis that it is within existing exploration or retention licence areas.

#### 4.4.3 Location Option 3

Location Option 3 is located in Igombe Subcounty, Kikunyu Parish, near the border of Makuutu Subcounty along River Kitumbezi. The proposed site area is 3.39 km<sup>2</sup> covering 6 villages under Bubinga, Businda and Kikunyu. In the east, the site borders Nakivumbi town. In the west, it borders Igombe parish. In the North, there is Igombe trading centre and site 4, while in the south its immediate neighbour is River Kitumbezi and the degraded wetland. The main landuse/cover of site include subsistence croplands, permanent settlements and scattered trees. Main crops grown are banana, sugarcane plantation, beans and maize. The settlements pattern is concentrated along the feeder roads and scattered inside the villages. The nearby small wetlands and swamps along these various rivers draining site 3 have been degraded and heavily cultivated with sugarcane, maize and rice gardens.

The site is long stretch of a raised land, with broad and flat surfaces surrounded by undulating lowlands. It has an altitude of about 1124 - 1167m above sea level (m.a.s.l). The site has a level ground slope of 1.5% and – 2.4%. The site environment is well drained due to gentle slopes and nearby rivers, streams, and swamps.

**Conclusion:** The site is outside the licensed area. It is somewhat densely populated with some economic infrastructure to be lost (boreholes, places of worship, etc.). The displacement of communities would be a challenge, and the compensation packages would likely be significant which would increase project expenditure. The site was not recommended given the associated socio-economic losses.

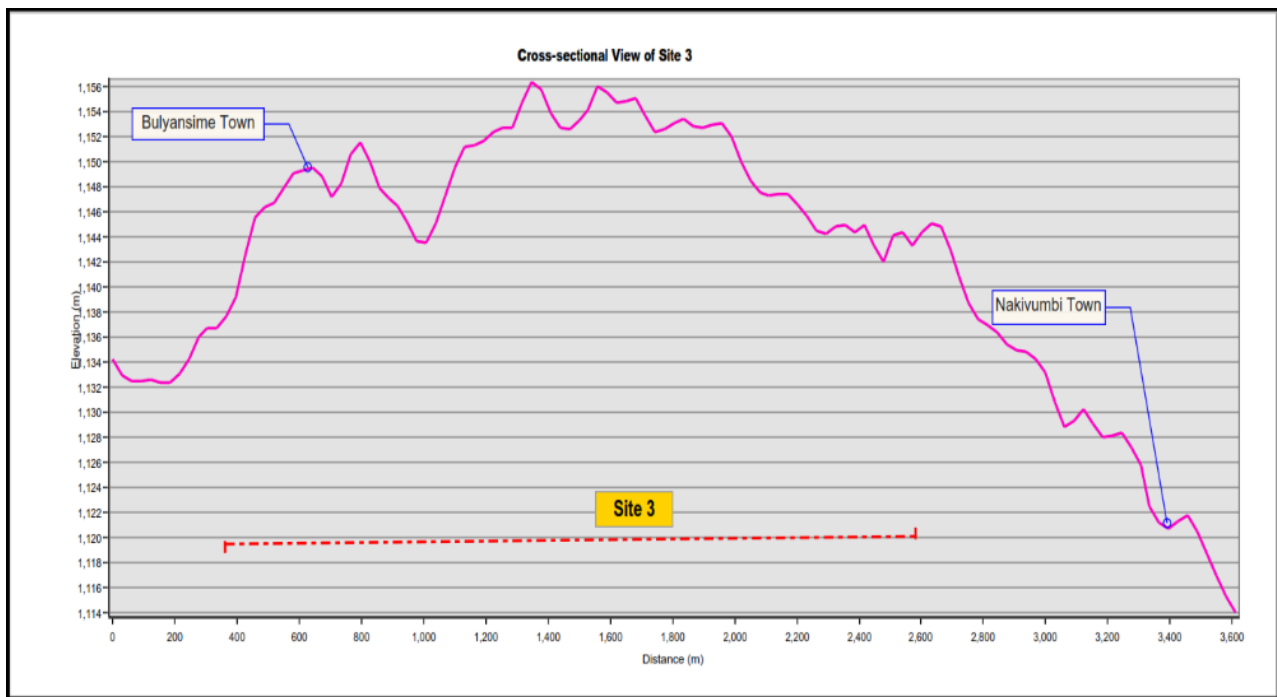


Figure 47: Cross-sectional view of Site 3 showing variation in topography

#### 4.4.4 Location Option 4

Location Option 4 is also located in Igombe Subcounty, Igombe Parish, near site 3. The proposed site area is 2.97 km<sup>2</sup> covering 3 villages under Igombe. In the east, the site borders Nakivumbi town. In the west, it borders Igombe parish. In the North, there is R. Nambulamunya next to Bubenge parish while in the south; its immediate neighbour Site 3 and the degraded wetland. The main landuse/cover of the site include subsistence croplands, permanent settlements, eucalyptus woodlots and other scattered trees. Main crops grown are banana, beans, maize, and some patches of sugarcane plantations. The settlements pattern is concentrated along the feeder roads and scattered inside the villages. The nearby small wetlands and swamps along various rivers and streams draining site 4 have been degraded and heavily cultivated with food crops like rice among others. The site is long stretch of a raised land, with broad and flat surfaces surrounded by undulating lowlands on all sides. It has an altitude of about 1101 - 1154m above sea level (m.a.s.l). The site has a level ground slope of 2.7% and – 1.5%. The site environment is well drained due to flat and gentle slopes and nearby rivers, streams and swamps.

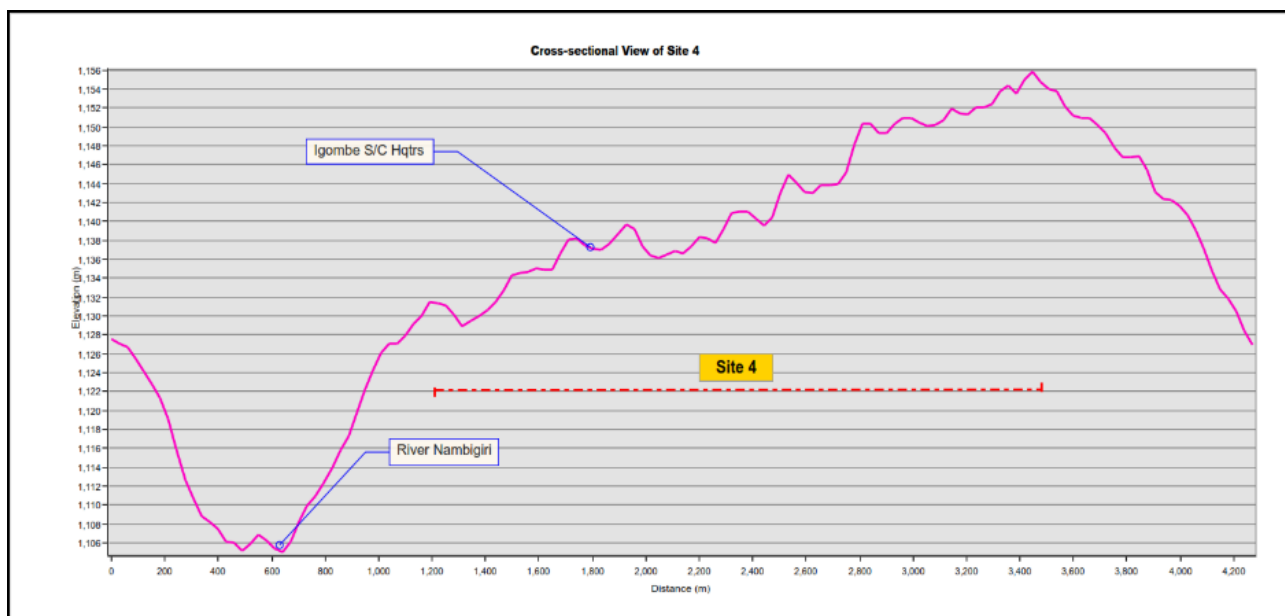


Figure 48: Cross-sectional view of site 4 showing variation in topography

The site is outside the licensed area. It is also densely populated (for a rural setting) with some economic infrastructure that would be lost including Igombe S/C offices, Igombe HC III, graves, boreholes, schools, places of worship, etc. The displacement of communities is a challenge, and the compensation packages will likely be huge to relocate the existing socio-economic infrastructure.

**Conclusion:** Site 4 was not recommended for the processing plant because of the associated social risks.

#### 4.4.5 Location Option 5

Location Option 5 is also located in Ibulanku Subcounty, seating on 2 Parishes of Buniantole and Naminganda, near Nakivumbi trading centre. The proposed site area is 3.88 km<sup>2</sup> covering 5 villages under Kabugweri and Namiganda. In the east, the site borders Bukenke village while in the west, it borders the Busesa – Nakivumbi unpaved road. In the North, there is Nawansega parish while in the south; its immediate neighbour is Nakivumbi trading centre and the degraded wetland. The main landuse/cover of the site include large-scale sugarcane plantation and other few food crops like cassava, matooke. The rest of the land the land is currently free and open hence used as grazing land. There are no major settlements on-site except approximately 3 permanent structures and a high voltage power line traversing it. The land is also drained by a small stream, which is heavily cultivated around. Also, the nearby small wetlands and swamps along various rivers and streams draining site 4 have been degraded and heavily cultivated with food crops like rice among others. The site has broad and flat surfaces slightly raised on the sides with a small lowland in the middle. It has an altitude of about 1115 - 1139m above sea level (m.a.s.l) and a level ground slope of 2.1% and – 2.6%. The site environment is well drained due to flat and gentle slopes and nearby rivers, streams and swamps.

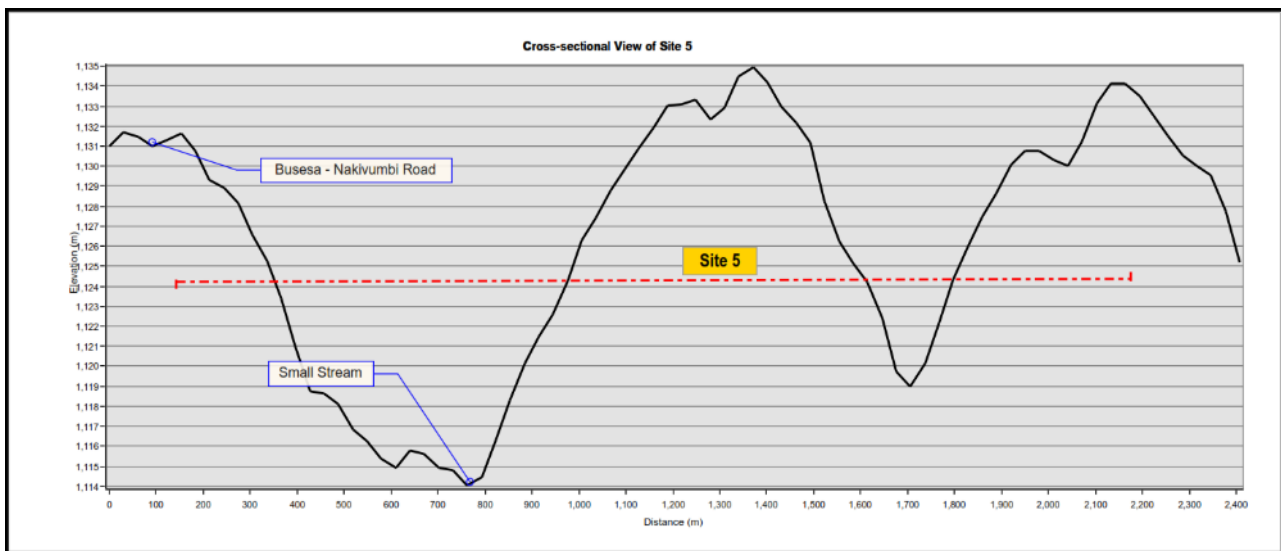


Figure 49: Cross-sectional view of Site 5 showing variation in topography

**Conclusion:** The site was initially outside the licensed area, but the rights have now been secured by the Developer. The key loss would be displacement of the sugarcane plantation and some gardens. There are hardly any settlements. This was selected as the best site from an environmental and social perspective and the subject of this ESIA. The land is titled and owned by a single family.



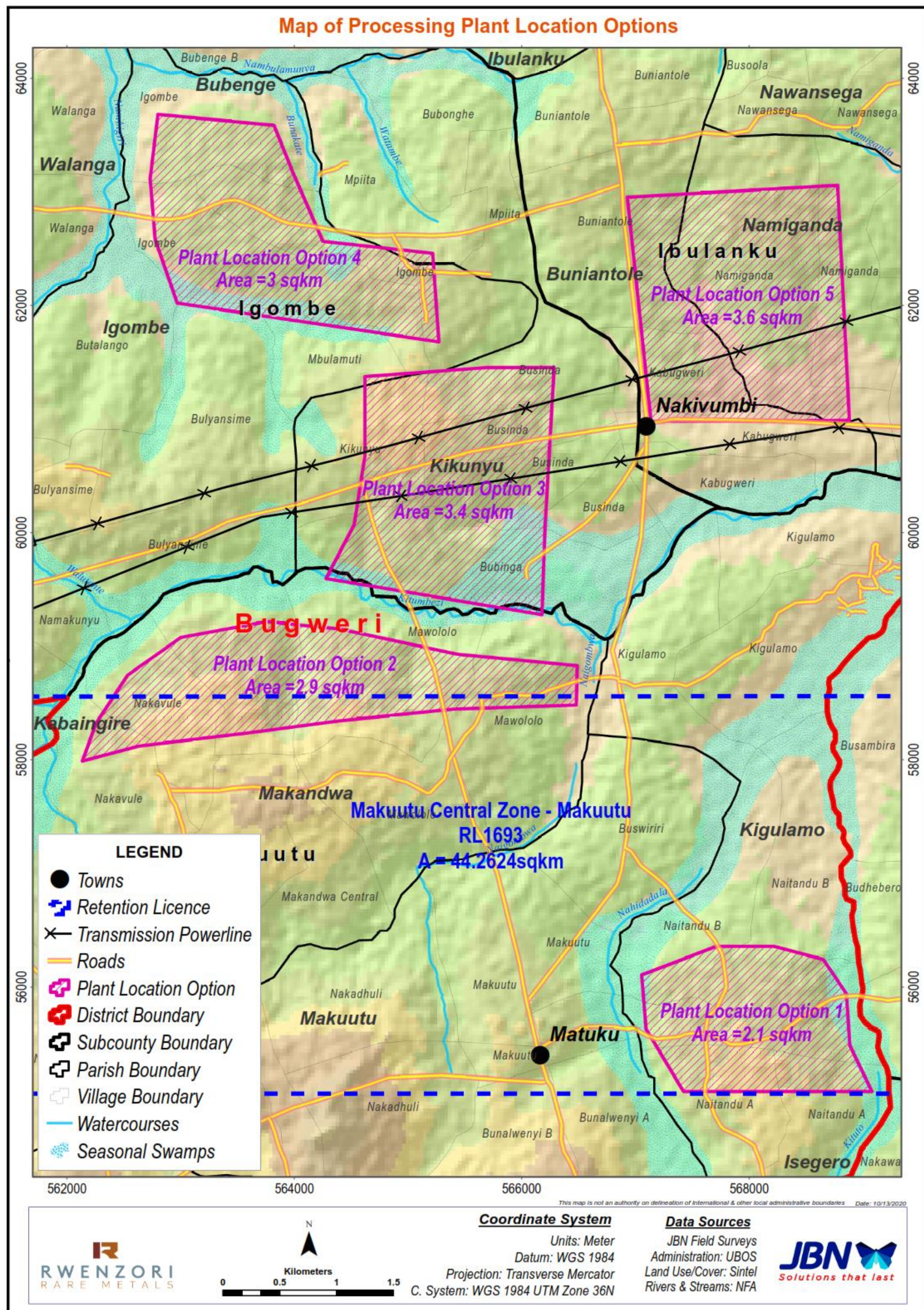
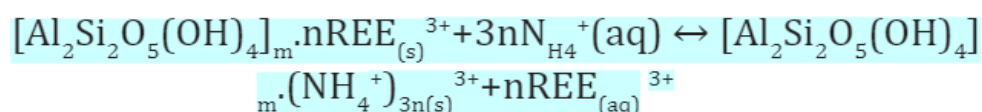


Figure 50: Location of the potential sites considered for the Processing Plant during the scoping study



## 4.5 Processing Technology Alternatives

REE<sup>3+</sup> can be desorbed from ion-adsorption clay using monovalent salt leaching extraction. ([https://www.researchgate.net/publication/334008432 A Short Review on REE Recovery from Ion-Adsorption Clays](https://www.researchgate.net/publication/334008432_A_Short_Review_on_REE_Recovery_from_Ion-Adsorption_Clays)) as follows:



Metallurgical test-work completed by Makuutu has concluded that an Ammonium Sulphate (AMSUL) lixiviant at pH 4 will effectively desorb REE from the Makuutu ion-adsorption clay. This could be done in four ways:

- In Situ or solution mining
- Tank Leach
- Vat Leaching
- Heap Leach

### 4.5.1 In Situ or Solution Mining Option

Solution mining involves pumping a lixiviant directly into the ore-body via injection wells and then recovering the “pregnant solution” from extraction wells. The REE can then be concentrated with membrane filtration prior to precipitation as a REE carbonate product in a Process Plant.

If conditions were suitable, this mining method would be extremely efficient and would enable mining to take place without the need to excavate the ore or disturb the landscape. No earthmoving equipment would be needed and no diesel fuel would be required. No people would need to be resettled. Makuutu will continue to investigate this option because of the potential economic, social and environmental benefits but it is not currently a viable option because of two key challenges:

- The lixiviant does not pass readily through the clay ore making it very inefficient at extracting the REE.
- While the montmorillonite clay ore is very impermeable there remains potential for acidic lixiviant to pipe through aquifers in or near the orebody and leave the site. This could in turn cause contaminate off-lease areas with ammonium sulphate. The hydrogeology and in particular the location and nature of any aquifers would need to be very well understood to eliminate this risk.

#### 4.5.1.1 Chinese Solution Mining Example

REE will desorb rapidly from ion-adsorption clays if the clay is agitated in the lixiviant but in the absence of this the desorption process can be slow. A large number of REE ion-adsorption clay mines in China therefore chose to adopt a hydraulic mining approach which could very quickly and effectively desorb large amounts of REE from the clay. The environmental and social consequences of this have been profound with destruction of the landscape and widespread ammonium salt pollution of water-ways. China’s Ministry of Industry and Information Technology estimated that the clean-up bill for southern Jiangxi Province could amount to 38 billion yuan, or around \$5.5 billion. (<https://e360.yale.edu/features/china-wrestles-with-the-toxic-aftermath-of-rare-earth-mining>). China is now focussed on implementing much stronger environmental controls and focussing on environmentally friendly static in situ leach techniques. Makuutu has taken note of this example and will put in place strong controls to prevent this happening in Uganda.

### 4.5.2 Tank Leach Option

Tank leaching is a continuous process where a slurry of REE ionic adsorption clay is pumped through a tank containing continually added ammonium sulphate lixiviant. This will result in rapid desorption of the REE from the clay into the lixiviant solution. This process would remove the need for large piles of clay required for the heap leach alternative. It also potentially provides an opportunity to quickly scale up production rates because it is a very rapid process compared to the 3 months that it will take to fully desorb REE from a heap-leach pile.

Metallurgical test-work completed by Makuutu has, however, shown that clay in Makuutu clay slurries will not filter easily and it will also not settle spontaneously. This is a fatal flaw for the tank-leach option. It also rules out the option of slurry transport of clays using pumps and pipelines from the mine to the process plant which would be much more energy efficient and cost effective than trucking.

This does not rule out the possibility of benefits from a hybrid plant scenario as a fines treatment option (subject to confirmatory test-work). Tank leaching for treatment of slimes/fines in a hybrid style circuit is ranked as possible, however there is not yet sufficient fundamental test-work that can be used as a basis for design. Hence study of this scenario is deferred until test-work exists that confirms or repudiates the benefit.

### 4.5.3 Vat Leach Option

Vat leaching is similar to tank leaching but as a batch process where the lixiviant is added to a vat containing the ionic adsorption clay and slowly agitated. This system works best for heavy particles that settle readily and this is ranked as less likely to succeed as a whole ore treatment method for the lateritic ionic clay ore type. This is due to its fine-grained nature, with up to 40% passing 75-micron, and propensity to further degrade (producing more fines) with time when fully saturated. Even if fines are first removed by scrubbing and wet screening; in a fully saturated vat situation, the ore will likely continue to degrade, producing even more fines that would eventually compromise the efficacy of the vat leaching system. This conclusion is however somewhat speculative without supporting test-work to confirm the underlying assumptions.

### 4.5.4 Heap-Leach Option

The heap-leach option is reliable and safe and is the current technology proposed for Makuutu. It is in particular:

- Proven in the mining industry;
- Applicable to whole ore treatment; and
- Has had sufficient test-work completed on it by Makuutu to support its selection at the scoping study level.

Even though Heap Leaching is the favoured option, careful consideration is required to ensure the heap leach facility is properly designed allowing for the known difficult ore characteristics. Similarly, a program of variability test-work, demonstration plant, and supporting engineering study will be undertaken to validate the flowsheet selection as well as to confirm all underlying assumptions.

## 4.6 Mining Technique Alternatives

Heap leaching requires the ore to be excavated from the ore-body and placed on the heap-leach pad for irrigation with lixiviant to desorb the REE. Once this process is complete, after about 3 months, the spent-ore will be returned to the mining pit.

Mining will commence with the removal of surface vegetation followed by the removal of an average 1 m thickness of topsoil which will be temporarily stockpiled prior to replacement over the reinstated landform to return the land to productive agricultural land (refer Section 3.5.11). This could be done with scraper trucks which are more efficient than truck and shovel operations on hauls of less than 1km but the currently preferred method is by truck and shovel (refer Figure 30) due to its greater flexibility in a whole of mining process and the 4 km distance of the process plant from the initial mining pit. Both methods would have an equivalent environmental and social impact from both the perspective of diesel fuel combustion and land disturbance.

Once the topsoil has been removed, the several metres of hard-cap and overburden overlying the ore body needs to be removed to expose the ore-body. This will also be initially removed with truck and shovel to a temporary stockpile but once the mining sequence is underway the overburden could be efficiently pushed with a bulldozer into the adjacent mining void.

The ore will be mined with truck and shovel and hauled by truck to the Process Plant. This method of transport is less efficient than a slurry transport system involving pumps and pipelines but the difficulty of filtering the slurry make this alternate method unviable, as previously discussed (refer Section 4.5.2). The relatively short haulage distance of about 4 kilometres in combination with relatively low initial ore volumes of 2.5 million tonnes per year additionally makes other ore transport methods such as overland conveyors less attractive (refer Figure 51). These have not, however, been ruled out and with further assessment might prove viable and particularly at full production levels of 12.5 million tonnes a year and longer haulage distances when more distant ore-bodies are exploited. The project will, therefore, initially commence with a highly flexible truck and shovel operation that facilitates rapid access to multiple locations while continuing to assess other options. Controlled crossings or public road overpasses may be needed with both these options to secure public safety (refer Figure 52).

With respect to rehabilitation the decision to backfill the mining void, topsoil the land-formed area and, to return the land to productive agricultural use is clearly a preferred option from an environmental and social impact perspective. For a long-term Project like Makuutu this approach is necessary to secure both a social and legal licence to operate over the life of the Project. The potential adverse environmental and social impact of uncontrolled mining have previously been presented in Section 4.5.1.1.

The selection process for the location of the Process Plant has previously been presented (refer Section 4.4). All key project facilities with the exception of a moveable double skinned diesel tank at the mine would be centralised at this location. The arrangement of facilities and activities within this Process Plant site have, however, been optimised to minimise impacts on local communities and particularly at the roadside Nakivumbi Trading Centre which is adjacent to the SW corner of the facility. A stylised conceptual layout has been developed which minimises impacts on local communities and particularly on the Nakivumbi Trading Centre (refer Figure 41).



Figure 51: Worsley Alumina (Western Australia) overland ore conveyor



Figure 52: Public Road overpass over Worsley Alumina (Australia) haul road and overland conveyor system



## 4.7 Decisions to Maximise Social Benefit

In addition to the social benefits of optimally siting the Process Plant (refer Section 4.4) the social benefits of the Project will be maximised by the following decisions:

- Progressive rehabilitation with no legacy mine pits, waste dumps or tailings dams at the end of mining.
- Community Development Plan (refer ESMP Volume 3 as summarised in Section 11.3).

### 4.7.1 Progressive Rehabilitation

Progressive rehabilitation (refer Section 3.5.11) involves the ongoing backfilling, topsoiling and revegetation of mining voids allowing mined areas to be returned to productive agricultural land. This has a number of significant social benefits:

- It limits the total mining footprint to about 20 hectares.
- It enables resettlement to be staged over the 27-year life of the project allowing proper planning to ensure that the social connections, livelihoods and food security of Project Affected Persons can be assured. It also allows resettlement to occur in the rehabilitated mining areas.
- Rehabilitated areas can also be used for Community Development Projects such as intensive agriculture, agroforestry and fish farms which would secure the livelihoods and food security of many people and particularly Project Affected Persons (refer ESMP Volume 3 Community Development Plan as summarised in Section 11.3).
- There will be no legacy mining pits, waste dumps, tailings dams or contaminated land at the end of mining that could create a community hazard and a financial liability for the Government of Uganda.

### 4.7.2 Community Development Plan

The Community Development Plan (refer ESMP Volume 3 as summarised in Section 11.3) presents the strategy to collaborate with NGOs and the Ugandan Government to strengthen capacity and deliver benefits to health, education and infrastructure. In addition to this the potential establishment of large timber plantations fish farms and intensive agriculture on rehabilitated land will provide long term profitable businesses and employ large numbers of people.

## 4.8 Decisions to Maximise Environmental Benefit

The Project is located on largely cleared farmland that drains into degraded swamps and wetlands that are also utilised for agriculture. The biodiversity impact of the Project footprint is therefore low. The Project additionally has low concentrations of radionuclides such as Uranium and Thorium which are a challenge for many REE projects. The Project will implement strong controls (Refer ESMP Volume 1, Environmental Management and Monitoring Plan as summarised in Section 10) to prevent pollution and to maintain the volume of quality of water in downstream river systems in particular. The Project, however, has the capacity deliver significant environmental benefit and particularly in the areas of:

- Greenhouse Gas Abatement and Climate Change Adaptation
- Agroforestry
- Restoration of degraded ecosystems

#### 4.8.1 Greenhouse Gas Abatement and Climate Change Adaptation

One of the most significant environmental benefits of the Makuutu Project is as an enabler of the global transition from fossil fuel to renewable energy. Over 95% of the heavy REE needed for wind turbines in particular are sourced from China which has recently imposed export restrictions on this strategically important material. Heavy REE elements will therefore increasingly become a bottleneck in the transition to a low carbon global economy. In the next decade, rapid demand growth will challenge the ability of the supply-side to keep up, particularly for the magnet metal, Nd, Pr, Dy and Tb, with global annual demand for these elements expected to increasingly exceed global annual production in the years after 2020. Without new HREO production to come online in the near term, there will be insufficient Dy and Tb available for individual countries to meet renewable objectives by 2030, with supply beyond 2030 a fraction of demand.

With offshore wind power generation expected to grow at 20% compounded per annum to 2030, offshore wind installations are predicted to increase by a further 200 GW of installed capacity by 2030. Adding to this is a recently announced plan from the US Department of Energy (DOE) to develop 30 GW of offshore energy by 2030, and potentially as much as 110 GW by 2050.

Makuutu, which is expected to commence operations in 2024, will produce approximately 4,800 tonnes of  $\text{Nd}_2\text{O}_3$ ,  $\text{Pr}_6\text{O}_{11}$ ,  $\text{Dy}_2\text{O}_3$  and  $\text{Tb}_4\text{O}_7$ , which should enable the production of 17 GW of gearless direct drive offshore wind turbines by 2030. This equates to 10% of the increased to forecast demand. Further exploring the longer-term Upside Case potential of Makuutu, the Project has the potential to produce enough REO to produce approximately 90 GW of gearless direct drive offshore wind turbines by 2050, 27 years from first production in 2024.

Makuutu will enable development and deployment of renewable offshore wind energy that will displace current coal fired power, which emits approximately 1 tonne  $\text{CO}_2$  per MWh, which equates to approximately 300 million tonnes of  $\text{CO}_2$  per year. This annual  $\text{CO}_2$ , now displaced each year by wind turbines, is two orders of magnitude more than the 1.5 million tonnes of  $\text{CO}_2$  estimated to be generated over the life of the Makuutu Rare Earths Project.

A number of opportunities have been identified with potential to reduce the carbon footprint at Makuutu. These will be explored in the next phase of studies on the Makuutu, and include but are not limited to the following;

- Installation of conveying systems to transport ROM Feed from the mining pits to the process plant, utilising hydroelectric power to offset diesel consumed by trucking; and
- Options to produce reagents on site or in close proximity of the project area thereby reducing carbon footprint due to transport, thereby developing more extensive industry for Uganda.

With the use of renewable hydro-electric power most Project  $\text{CO}_2$  emissions will be from the combustion of diesel fuel in mining machinery and transport trucks bringing process chemicals to the Process Plant. The average annual  $\text{CO}_2$  production from the combustion of diesel will be about 66,900 tonnes of  $\text{CO}_2$  a year from Year 10-25 which is under the Equator Principle guidance of 100,000 tonnes of  $\text{CO}_2$  a year for mandatory reporting. The project will nevertheless annually report  $\text{CO}_2$  emissions and improvement strategies in an Annual Environmental Report.

## 4.8.2 Agroforestry

Uganda is losing about 200,000 hectares of forest per year <https://www.alliedacademies.org/articles/deforestation-in-uganda-population-increase-forests-loss-and-climate-change-10008.html>. Much of this is due to an annual population increase of 3.6% and consequent increased demand for agricultural land and firewood energy. The problem has been exacerbated by rural poverty which restricts the ability to invest in sustainable land use practices. The socio-economic baseline identified 95.2% of families in the Central Makuutu Pit area as reliant on firewood (refer Table 76). The interactive tool on the Global Forest Watch website shows this visually with areas of forest reduction between 2000 and 2020 shown in pink (refer Figure 53).

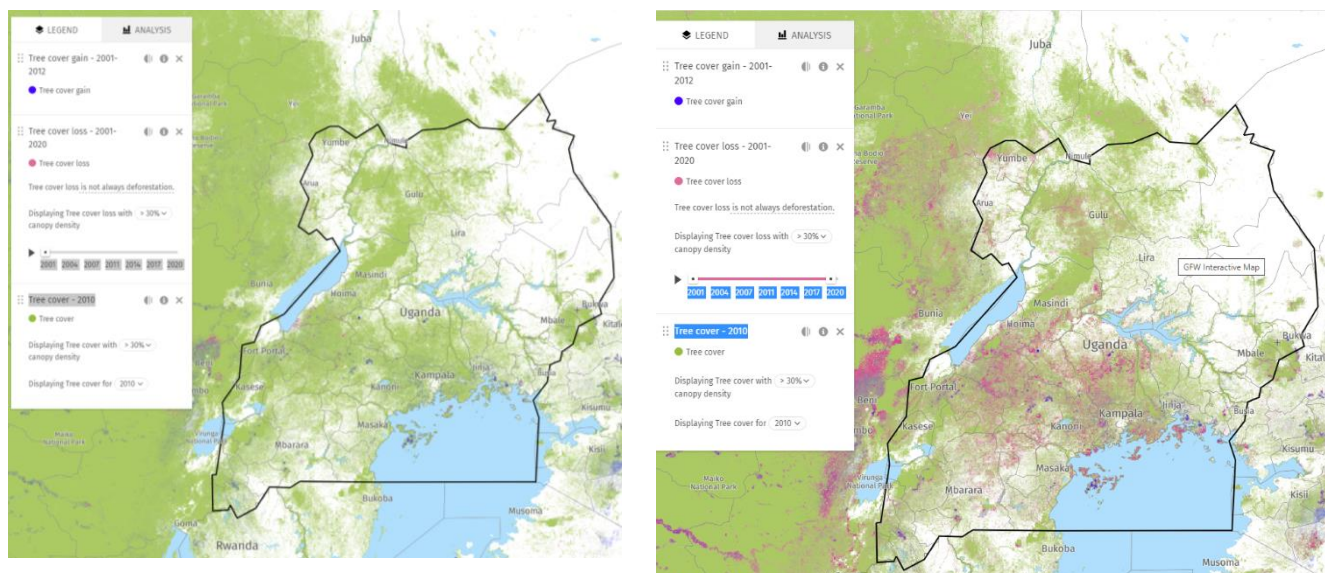


Figure 53: Ugandan loss of forest cover between 2000 and 2020 shown in pink <https://www.globalforestwatch.org/map/country/UGA/>

If about one third of the rehabilitated land was planted with trees at a density of about 1,000 trees/hectare after mining an area of about 150 hectares of planted forest could be established by Year 10 of the Project and 400 hectares by the end of mine-life. In addition to providing valuable timber and employing large numbers of people the production of timber on rehabilitated land reduces pressure on the Uganda's dwindling natural forests and sequesters significant volumes of carbon dioxide.

At the end of mine life, the accumulated agroforestry could be sequestering about 16,000 tonnes of CO<sub>2</sub> a year and a total of 226,800 tonnes of CO<sub>2</sub> may have been sequestered over the 27-year life of the Project.

## 4.8.3 Restoration of degraded ecosystems

There is a proposal in the Community Development Plan (refer ESMP volume 3 as summarised in Section 11.3) to collaboratively establish an agricultural research centre in a community near the project area with a specific focus on utilising rehabilitated land within the Project area for intensive agriculture, agroforestry and fish-farms. This facility would also provide agricultural outreach programmes for areas outside of the mining footprint and promote sustainable agricultural techniques and adaptation to climate change. This would deliver both increased food yield and better environmental outcomes and particularly for currently degraded swamplands and wetlands downstream of the Project. In addition to this Makuutu will collaborate with specialist NGOs and the Ugandan Government to restore degraded wetlands and swamplands in both Project areas and on water-courses downstream of the Project.

## 4.9 Decisions to Enhance Economic Benefit to Uganda

Makuutu will generate significant wealth for Uganda and serve as a catalyst for further development. The development of a national skills and infrastructure base will in particular stimulate international interest in business opportunities in Uganda.

A number of decisions were made, however, to both maximise the efficiency of the Project and its benefit to Ugandan businesses. These include:

- Purchase of 110,000 tonnes of Sulfuric Acid a Year from the Sukulu Phosphate Plant in the Osukuru or Sukulu Industrial Complex 81 km NE of the Project. This purchase will provide significant support for this newly constructed industrial and mining complex over the 27-year life of the Project. The delivery of the Sulfuric Acid to Makuutu will additionally be undertaken by a contracted transport company as another business opportunity for Uganda.
- The Project will purchase 440,873 MW of renewable hydropower over its life from the existing 131 kV line from Jinja.
- The Project will purchase a large portion of the 218 million L of diesel fuel consumed over the life of the Project in Uganda (refer ESMP Volume 7, Greenhouse Gas Abatement and Climate Change Adaptation Plan). This includes the portion used to transport Sulfuric Acid to the Project site from Osukuru and much of the 171 million tonnes of diesel projected to be used in earthmoving.
- The preferential employment of local Ugandan people on the project (refer Labour Plan in ESMP Volume 1 Environmental and Social Management and Monitoring Plan as summarised in Section 11.1) in combination with use of local contractors will both upskill the local population and provide tax revenue to Uganda. The project is intended to be staffed with 100% Ugandans by Year 7 with peak staffing of 1,200 people by Year 10.
- The decision to utilise local off-site facilities as opposed to establishing a large onsite mining camp will provide increased custom to local facilities including hotels and restaurants and provide economic stimulus. The Project will not have a FIFO workforce.

Financial benefits will include direct and indirect taxation, royalty payments, employee and contractor taxes, wages and salaries, the purchase of goods and services, and the multiplier effects of all of the above. Makuutu also has the potential to deliver significant social and environmental benefits, particularly through capacity building resulting from employment and training, infrastructure development and assistance with the development of robust systems and policies. The Project will deliver billions of dollars to Uganda over its life and will be a catalyst for the development of other large-scale mining Projects in Uganda.

## 5 Policy, Legal and Regulatory Framework

### 5.1 Policy Framework

The relevant policies are summarized below (refer Table 15):

Table 15: Key Development Policy of Uganda

Name of Policy/Leislature	Brief description and implications
The National Environment Management Policy, 1994	The overall goal of the National Environment Management Policy is the promotion of sustainable economic and social development mindful of the needs of future generations. 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 project. Preparation of this ESIA is consistent with the provisions of the policy.
The Uganda Vision 2040	<p>Uganda Vision 2040 builds on the progress that has been made in addressing the strategic bottlenecks that have constrained Uganda's socio-economic development since her independence, including; ideological disorientation, weak private sector, underdeveloped human resources, inadequate infrastructure, small market, lack of industrialization, underdeveloped services sector, underdevelopment of agriculture, and poor democracy, among others.</p> <p>The Vision 2040 is conceptualized around strengthening the fundamentals of the economy to harness the abundant opportunities around the country. The opportunities include; oil and gas, tourism, <b>minerals</b>, ICT business, abundant labour force, geographical location and trade, water resources, industrialisation, and agriculture.</p>
The Third National Development Plan (NDPIII)	<p>In order to address the constraints in the minerals and mining subsector, the objectives of the Mineral Development programme are to:</p> <ol style="list-style-type: none"> <li>1) Increase exploration and quantification of priority minerals and geothermal resources across the country.</li> <li>2) Increase adoption and use of appropriate and affordable technology along the value chain.</li> <li>3) Strengthen the legal and regulatory framework as well as the human and institutional capacity.</li> <li>4) Increase investment in mining and value addition.</li> <li>5) Expand mineral based processing and marketing.</li> </ol> <p>Some of the planned Mineral Development Interventions in the NDPIII that are relevant to the proposed project are summarized below:</p> <ul style="list-style-type: none"> <li>• Undertake feasibility studies in priority mineral value chains to guide investment.</li> <li>• Review (Mining Act 2003, Industrial Licensing Act 1969, Competition Bill, Legal and Industrial Metrology Bills) and develop relevant laws and regulations</li> <li>• Incentivize private sector to offer industrial training and apprenticeship opportunities.</li> <li>• Strengthen the capacity to undertake mineral certification, trading, testing, inspection, regulation and enforcement.</li> <li>• Strengthen monitoring and inspection of mining operations to minimize negative social and environmental impacts.</li> </ul>



Name of Policy/Leigslature	Brief description and implications
	<ul style="list-style-type: none"> <li>• Require mining companies to enter into Community Development Agreements (CDAs) with mining host communities.</li> <li>• Provide a framework for gender mainstreaming, equity and human rights and eradication of child labour in the mining industry.</li> <li>• Strengthen capacity to monitor, inspect and enforce health, safety and environmental provisions.</li> <li>• Extend transport, energy, water and ICT infrastructure to mining areas and mineral processing facilities/industries.</li> </ul>
The Mining and Mineral Policy 2018	<p><b>Policy Goal:</b> To develop the mining industry through increased investment, value addition, national participation and revenue generation to contribute significantly to socio-economic transformation and poverty eradication.</p> <p><b>Policy objectives:</b></p> <ol style="list-style-type: none"> <li>To strengthen the legal and regulatory framework for the development of the mineral sector.</li> <li>To ensure efficient, equitable, accountable and transparent management of mineral revenues.</li> <li>To establish, manage and promote the country's mineral potential.</li> </ol>
The National Land Use Policy, 2006	The overall policy goal is to achieve sustainable and equitable socio-economic development through optimal land management and utilization in Uganda. The policy recognizes amongst others, the need for the protection of vulnerable groups on matters of land ownership and its utilization. In the planned project, land use needs to be taken into consideration. Major land use changes are therefore expected for project implementation.
National Employment Policy for Uganda 2011	The Employment Policy addresses one of the critical challenges facing the country namely; the attainment of full employment coupled with decent work and equitable economic growth. A fast rate of growth of permanent (non-casualised) employment in the private sector remains the most effective route to sustainable poverty eradication. The main thrust of the policy therefore, is generating sufficient productive and decent jobs for Ugandans.
The National Water Policy, 1999	The Policy emphasizes amonsgt others, the need for participatory planning to ensure sustainable use of the country's water resources. The project will secure any required surface water abstraction permits from Directorate of Water Resources Management (DWRM).
National Child Labour Policy 2006	The Policy defines a child as a person below 18 years of age. Child labour includes work that is mentally, physically, socially, and / or morally dangerous and harmful to children. Child labour has been cited as a key challenge in Busoga subregion.
The National Gender Policy, 2007	The Policy provides a framework and mandate for every stakeholder to address gender imbalances within their respective sectors. The policy outlines the legitimacy of gender equality as a fundamental value that should be reflected in Uganda's development choices, poverty reduction strategies and institutional practices which no doubt is consistent with the Banks safeguards policy on gender. This policy would especially apply in the recruitment process of labour, both during construction and operation phase. Men and women should have equal opportunities for available jobs. This policy also requires provision of a work environment that is safe and conducive to women, as it is for men, considering gender-disaggregated differences and vulnerabilities.
The Policy on the Conservation and	The National Policy for the Conservation and Management of Wetlands is of relevance to this Project. There are several degraded swamps within the project

Name of Policy/Leigslature	Brief description and implications
Management of Wetlands, 1995	area. These must be protected from any potential pollution. The ESMP details the planned mitigations to safeguard wetlands from pollution.
The Uganda National Culture Policy 2006	The Uganda National Culture Policy aims to promote aspects of Uganda's cultural heritage that are cherished by its people. The ESIA has documented the existing cultural resources and how these shall be preserved to ensure harmony.
The National HIV/AIDS Policy, 2004	This Policy provides overall policy framework for national HIV/AIDS response, and emphasizes the need for development projects to mainstream HIV/AIDS interventions into their plans and activities. The requirements of this policy are expected to be fulfilled by the Developer, especially regarding having an in-house HIV Policy, worker sensitisation and provision of free condoms. The provision of HIV/AIDS services such as voluntary counselling and testing as well as free condom distribution can reduce risk.
National Policy on Elimination of Gender Based Violence, 2016	The policy emphasizes early intervention to prevent re-victimisation of and long-term effects for girls, including interpersonal violence, sexual coercion, alcohol and drug abuse and mental health problems, Reporting cases of violence against children immediately. The common forms of Sexual Gender Based Violence (SGBV) include sexual advances, assault, rape, fraud and verbal abuses. The project should have a sexual harassment policy that is communicated to all workers as well as continuous sensitization on GBV, risk and prevention mechanism.

## 5.2 Legal

The relevant Uganda laws are summarized below (refer Table 16).

Table 16: Ugandan Law relevant to major mining projects

Law/ Regulations	Relevance
The Constitution of the Republic of Uganda, 1995	The Constitution is the cardinal law in Uganda upon which all environmental laws and regulations are founded. All environmental impact actions of the project are therefore meant to conform to the broader objectives of the Constitution which requires a healthy environment for all citizenries. In this context, this ESIA was conducted to identify, assess, and recommend practical measures to ensure that, during implementation of the project the environment does not compromise the environmental and social settings for the project area.
The National Environment Act, 2019	In February 2019, the new Uganda National Environment Act was passed to repeal, replace and reform the law relating to environmental management in Uganda. It is mandatory for every developer to undertake an environmental assessment for projects listed in Schedule 5 of the Act. The activities of the planned project require an ESIA to be conducted before implementation which therefore justifies the need for this ESIA.
The Mining Act, 2003	This law, consisting of 12 Parts, describes the mineral and mining development including set-up of new quarries and/or sandpits. It provides that:: <ul style="list-style-type: none"> <li>• Ownership of minerals is vested in the Government.</li> <li>• Mineral Licenses/Rights include: Prospecting License, Exploration License, Retention License, Mining Lease, Location License, Mineral Dealers Licence and Goldsmith License.</li> <li>• Mineral Agreements can be made with investors for large scale projects.</li> </ul>

Law/ Regulations	Relevance
	Article 110 (1) provides for inclusion in exploration license or a mining lease granted, a condition that the holder shall submit an environmental restoration plan of the exploration or mining area that may be damaged or adversely affected by his or her exploration or mining operations. The Developer shall prepare a formal mine decommissioning plan to restore all mined sites.
The Physical Planning Act, 2020	This act provides for the National Physical Planning Board; to provide for the composition, functions and procedure of the Board; to establish district and urban physical planning committees; to provide for the making and approval of physical development plans and for the applications for development permission; and related matters. Under section 25, the District urban and subcounty physical committee shall cause to prepare a district urban physical development plan consisting of a topographical survey in respect of the area to which the plan relates, carried out in the prescribed manner, maps and descriptions as may be necessary to indicate the manner in which the land may be used, technical report on the conditions, resources and facilities. The Developer shall liaise with the Physical Planning Committees at various levels to agree on integration of the various infrastructure required to support the mining and processing activities.
The Water Act, Cap 152	The objective of the Act is to enable equitable and sustainable management, use, and protection of water resources through supervision and coordination of public and private activities that may impact water quantity and quality. The Developer shall secure groundwater abstraction permits to source water for the project.
The Public Health Act, Cap 281	The Act includes the following key provisions: Section 7 of the Act provides local authorities with administrative powers to take all lawful, necessary, and reasonable measures for preventing the occurrence of or for dealing with any outbreak or prevalence of any infectious communicable or preventable diseases. Section 105 of the Act imposes a duty on the Local Authority to take measures to prevent any pollution dangerous to the health of any water supply that the public has a right to use for drinking or domestic purposes. The developer is required to take all lawful, necessary, and reasonable measures to ensure the public safety in relation to any likely negative impacts that may arise as a result of the Project. Several rules have been issued in response to the COVID-19 pandemic. These must be adhered to during project implementation.
The Land Act, Cap 227	The Land Act provides for the tenure, ownership, and management of land in Uganda. The tenure systems are customary, freehold, mailo and leasehold. Section 43 of the Act empowers the GoU to acquire land compulsorily in accordance with Article 26 (92) and Article 237 of the Constitution. However, the Constitution and the Land Act have both guaranteed security of occupancy of land to lawful and bona fide occupants. Use of land must also comply with the provisions of the National Environment Act and other relevant laws. Key consideration on this law is that, the land owner has to use the land consistently with the existing laws and that, all forms of land tenure are recognized on matters of land acquisition for the project. Land acquisition is envisaged for the processing plant and securing of surface land rights for the mining pits; the process will be as enshrined in the Land Acquisition Act 1965 and the Mining Regulations.
Traffic and Road Safety Act, Cap.361	Section 119 of the Traffic and Road Safety Act stipulates that every person who uses, parks, or stands a motor vehicle, trailer, or engineering plant on any road carelessly or without reasonable consideration for other persons using the road commits an offence.

Law/ Regulations	Relevance
	A traffic count was commissioned, and the results are presented in this report. This will inform the project's Traffic Management Plan.
The Occupational Health and Safety Act, 2006	The Act includes the following key requirements: Section 40, Sub-section (2) stipulates that a person shall, not less than one month before he or she begins to occupy any premises as a workplace, serve on the commissioner, a notice with the particulars described in Schedule 3. Section 13(1) (a) states that "it is the responsibility of an employer to take as far as is reasonably practical, all measures for protection of his or her workers and the general public from the dangerous aspects of the employer are undertaking at his or her own cost." The Developer shall prepare a comprehensive Occupational Safety and Health Plan to guide his activities to safeguard workers.
National Forestry and Tree Planting Act, 2003	The National Forestry and Tree Planting Act 2003 is the main law that regulates and controls forest management in Uganda by ensuring forest conservation, sustainable use and enhancement of the productive capacity of forests, to provide for the promotion of tree planting and through the creation of forest reserves in which human activities are strictly controlled. Specifically, the Act provides for tree planting and ownership which is to be undertaken in this project as part of environmental mainstreaming. Some vegetation including a few trees will be cut to establish processing plant and the mining pits, a replanting program be considered to compensate for the lost vegetation. As part of corporate social responsibility, the project can plant woodlots and encourage tree nurseries in the project Area.
The Local Government Act, 1995	This Act provides the legal foundation of the Government Policy on decentralization and devolution of functions, powers, and services to Local Governments. Under this Act, district and lower local councils are given the responsibility of managing their natural resources including environment at the local government level. In reference to this project, the local governments will be involved in issues of land acquisition, compensation and environmental monitoring and compliance in this project. The project will be under jurisdiction of Bugweri, Bugiri and Mayuge District Local Governments, which are mandated under the Local Governments Act, Cap 243 to sanction and oversee development projects in their respective local governments. The District Environmental Officers and Community Development Officers are mandated to inspect and monitor management of environmental and social aspects in their areas of jurisdiction.
Land Acquisition Act, 1965	This Act makes provision for the procedures and methods of compulsory acquisition of land for public purposes whether for temporary or permanent use. The Act requires that adequate, fair and prompt compensation is paid before taking possession of land and property. Dispute arising from the compensation to be paid should be referred to the court for decision if the Land Tribunal cannot handle. These are all meant to ensure that the process of land acquisition is in compliance with existing laws and that the affected persons receive fair, timely, adequate compensation. This project will trigger the World Bank's ESS5. Land acquisition is envisaged for the processing plant and mining pits; the process will be as enshrined in the Land Acquisition Act 1965 and the World Bank's ESS5.
The Workman's Compensation Act, 2000	This law requires that, compensation be paid to a worker who has been injured or acquired an occupational disease or harmed in any way in the course of his work. The Developer may opt to secure insurance policies to cover his workers.

Law/ Regulations	Relevance
The Employment Act, 2006	This Act provides for matters governing individual employment relationships in terms of circumstances of provision of labour and that, no one should be forced to work, there should be no discrimination with regard to recruitment process, and it prohibits sexual harassment in employment. Of relevance to this project the Act provides for matters of grievance settlement and issues of payment of wages and salaries and most important it also obliges employers to repatriate employees especially those from other countries as well as those coming from more than 150.5 Km from their home areas.
The Labour Disputes (Arbitration and settlement) Act, 2006	The Labour Disputes (Arbitration and settlement) Act, 2006 amongst others, makes provision for referring dispute to the industrial court subject to discretion of the labour officer and circumstances of the agreement or disagreement. In addition to the project's Grievance Redress Mechanism (GRM), the disputes that may escalate can be referred for further arbitration as guided by the law.
Domestic Violence Act 2010	The Act provides for the protection and relief of victims of domestic violence; to provide for the punishment of perpetrators of domestic violence; to provide for the procedure and guidelines to be followed by the court in relation to the protection and compensation of victims of domestic violence; to provide for the jurisdiction of court; to provide for the enforcement of orders made by the court; to empower the family and children court to handle cases of domestic violence and for related matters. Domestic violence cases could arise for many reasons and these shall be managed in line with the project's Gender and SGBV Management Plans.
Children Act Cap 59	The act defines a child as a person below the age of 18. It lists the right for children to be with their parents, circumstances under which they should not, foster care and adoption procedures as well as mandates of local authorities and roles of community. Child labour which is common within the project area (children working in sugar plantations) shall not be entertained. The project shall develop a Child Protection Plan.
The Petroleum Supply Act, 2003	The Petroleum Supply Act of 2003 provides for the transportation, monitoring, importation, exportation, processing, supply storage and distribution among others of petroleum products. This implies the installations of project diesel pump and storage of related petroleum products will require permits from MEMD.
REGULATIONS	
Mining Regulations, 2019	<p>The Regulations are under section 121 of the Mining Act, 2003, Act. 9 of 2003.</p> <p><b>Regulation 28. Application for mining lease.</b></p> <p>(1) An application for a mining lease shall—(e) be accompanied by—</p> <ul style="list-style-type: none"> <li>(i) the dimensions of the area applied for;</li> <li>(ii) a statement of the number of land owners or lawful occupants of land in the area applied for, including a resettlement action plan (RAP), if applicable;</li> <li>(iii) written proof that the applicant has reached an agreement with the land owner or lawful occupier of the area he or she intends to mine as required by section 42 (3) of the Act;</li> <li>(iv) written proof that the applicant has secured the surface rights of the land subject of his or her application as required by section 43 (3) (h) of the Act;</li> <li>(v) a certificate of approval of environmental and social impact assessment from National Environment Management Authority.</li> </ul>



Law/ Regulations	Relevance
	<p><b>Regulation 53. Submission of project brief and environmental and social impact assessment.</b></p> <p>(1) A holder of a prospecting licence, exploration licence, location licence, retention licence or mining lease shall, as applicable, prepare and submit a project brief or an environmental and social impact assessment before commencement of work, in accordance with the National Environment Act, 2019 and the National Environment (Environment Impact Assessment) Regulations.</p> <p>The Developer is working towards securing all requirements listed above.</p>
The National Environment and Social Assessment Regulations, 2020	<p><b>Section 4. General prohibition</b></p> <p>(1) A developer shall not implement a project to which these Regulations apply without a certificate of approval of environmental and social impact assessment issued by the Authority in accordance with the Act and these Regulations.</p> <p><b>Section 12. Projects for which environmental and social impact assessment is mandatory</b></p> <p>(1) A developer of a project under section 113 of the Act and set out in Schedule 5 of the Act shall undertake scoping and an environmental and social impact study in accordance with these Regulations.</p>
The National Environment (Audit) Regulations, 2020	<p>The National Environment (Audit) Regulations operationalizes the National Environment Act 2019 which defines an “environmental audit” as the systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing in conserving the environment and its resources. Section 12 (1) of The National Environment (Audit) Regulations, 2020, states, “The developer of a project or activity listed in Schedule 3 to these Regulations shall carry out an environmental compliance audit”. Section 12(3) states, “The environmental compliance audit referred to in subregulation (1) shall be undertaken annually, unless otherwise required by the Authority”.</p>
The National Environment (Waste Management) Regulations, 2020	<p>The Regulations define “waste” as any substance or object which is dumped, abandoned, discarded or disposed of or intended or required by law to be disposed of while “waste management” means activities relating to the collection, transportation, storage, treatment and disposal of waste, including the management of waste at source and during decommissioning of waste management facilities. 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. The Developer will be required to prepare and implement a robust Waste Management Plan.</p>
The Water (waste discharge) Regulations 1998	<p>These provide for the establishment of standards for effluent or waste before discharge into water or on land, prohibition on the discharge of effluent or waste, and the requirement for waste discharge permits.</p>
The National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 2020	<p>These Regulations prescribe the environmental standards and measures for the treatment of effluent before discharge from various sources into water or land.</p> <p><b>Section 5. Discharge of effluent into water or land</b></p> <p>A person shall not discharge effluent into water or land except in accordance with the Act, the Water Act, the National Environment (Waste Management) Regulations, 2020, the Petroleum (Waste Management) Regulations, 2019, the Water (Waste Discharge) Regulations, these Regulations, and environmental standards.</p>

Law/ Regulations	Relevance
	<p><b>Section 6. Environmental standards for effluent</b></p> <p>(1) The standards for effluent before discharge into water or land shall be as prescribed in these Regulations.</p> <p>(2) A person who intends to discharge effluent into water or land shall ensure that the effluent meets the standards for general chemicals and micro-biological discharge set out in Schedule 2 to these Regulations.</p>
The National Environment Regulations (Noise Standards and Control), 2003	<p>The standards for noise control applicable to the proposed activities include:</p> <ul style="list-style-type: none"> <li>a) The maximum permissible noise levels from a facility in the general environment to which a person may be exposed: As prescribed under Regulation 6 (1) of the Noise Standards and Control Regulations, the limits apply to facilities and receptors which are not located within designated noise control zones but are nevertheless likely to receive noise emissions.</li> <li>b) The maximum noise levels of continuous or intermittent noise from a factory or a workshop to which a person may be exposed</li> <li>c) The limits may apply to workshops that could be used during execution of the proposed activities, for instance, at the asphalt plant.</li> </ul>
The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, S.I., No. 3 /2000	<p>Provides for protection of Wetlands, River Banks and Lakeshore zones. There are several degraded swamps within the project area. These must be protected from any potential pollution. The ESMP details the planned mitigations to safeguard wetlands from pollution. In case mining is to be done within wetlands and riverbanks, the Developer shall secure the relevant user permits from NEMA.</p>

### 5.3 International Conventions

The Project will abide by Ugandan laws and regulations as well as applicable international treaties and agreements including the 2015 Paris Climate Change Agreement to which Uganda is a signatory. Uganda is a signatory to 204 binding international conventions which have specific obligations. It is the responsibility of the Ugandan Government to ensure that development projects conform to these requirements and that this be evaluated in the ESIA process. Of particular relevance to the ESIA and supporting documents are:

#### 5.3.1.1 *The Agreement on the Conservation of African-Eurasian Migratory Waterbirds*

Similar to the requirements of other International Agreements with a focus on the protection of waterbirds including the RAMSAR Convention, CITES and, the Convention of Biological Diversity. The Project has a no bush-meat or hunting on Project land Policy and will educate the workforce about the importance of wildlife conservation. The prevalence of wetlands and swamplands near the Project area and along downstream water-courses make this Agreement relevant.

#### 5.3.1.2 *Paris Agreement on Climate Change (signed and ratified in 2016).*

Under the Paris Agreement each country must determine, plan, and regularly report on the contribution that it undertakes to mitigate global warming and achieve the country-specific emission target by a specific date. Equator Principles commit Projects emitting more than 100,000 tonnes of CO<sub>2</sub> e to Greenhouse Gas Emission Reporting and a description of improvement strategies in annual reports. Makuutu will emit about 62,000 tonnes of CO<sub>2</sub> a year at peak production which is under this threshold. The Project will nevertheless report greenhouse gas emissions and details of scoped improvement plans in an Annual Environmental Report. A

Greenhouse Gas Abatement and Climate Change Adaptation Plan (refer Volume 7 of the Environmental and Social Management Plan as summarised in Section 16.7) has been prepared as part of the submitted ESIA documentation. This document additionally includes a section on Climate Change Adaptation with respect to an expected increase in the intensity to wet season rainfall and periods of dry weather during the dry season.

With electrical energy sourced from existing renewable hydropower, most greenhouse gas emissions from the Project will be from the combustion of diesel used in mining machinery and in the delivery of Sulfuric Acid and Process Chemicals to site. Diesel consumption over the life of mine based on diesel use of specific mining equipment and operating hours is calculated at 524,940,900 Litres. Life of Mine carbon dioxide emissions have been calculated at 1,500,382 tonnes. This will be partially offset by the sequestration of 226,800 tonnes of carbon dioxide in agroforestry. The heavy REE produced by the project will additionally enable the creation of 90GW of renewable offshore wind energy displacing 300 million tonnes a year of carbon dioxide from coal fired power.

While the magnitude of rainfall in the Project area is not expected to change significantly over the life of the Project there will likely be increased climate instability with more intense wet seasons and longer periods of dry weather. The Project will adapt to this by ensuring sufficient pumping and dewatering to manage peak wet season rain and to have sufficient water-trucks, water storage and dust suppression for extended periods of dry weather. Local farming will likely be affected and the proposed Agricultural Research Centre undertaking intensive agriculture trials on rehabilitated mining areas and providing outreach support to local farmers will help with agricultural adaptation.

#### *5.3.1.3 Basel Convention prohibiting the import of hazardous wastes*

Uganda has been a signatory to the Basel Convention since 1999. The Basel Convention regulates the transboundary movements of hazardous wastes and other wastes and obliges its Parties to ensure that such wastes are managed and disposed of in an environmentally sound manner. The Convention covers toxic, poisonous, explosive, corrosive, flammable, ecotoxic and infectious wastes. Radioactive waste is covered by other treaties. The Project will not import any such wastes so this Convention shouldn't be an issue for the Project.

#### *5.3.1.4 The Bamako Convention*

The Bamako Convention on the Ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa is a treaty of African nations prohibiting the import of any hazardous (including radioactive) waste. This applies to wastes not products but the Project will not be producing hazardous wastes in any case.

#### *5.3.1.5 CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora)*

This is also known as the Washington Convention and is a multilateral treaty to protect endangered plants and animals. It was drafted as a result of a resolution adopted in 1963 at a meeting of members of the International Union for Conservation of Nature (IUCN). Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival and it accords varying degrees of protection to more than 33,000 [species](http://en.wikipedia.org/wiki/CITES) of animals and plants. (Reference: <http://en.wikipedia.org/wiki/CITES> ).

This will not be as significant for a Project in an agricultural area as opposed to a high biodiversity forest area but policies to prevent hunting in Project areas will be enforced. Rare trees in the Project area, including Mvule or African Teak (*Milicia excelsa*) will be avoided where possible and will also be used in rehabilitation.

#### *5.3.1.6 The Convention on the Conservation of Migratory Species of Wild Animals*

Also known as the Convention on Migratory Species (CMS) or the Bonn Convention, is an international agreement that aims to conserve migratory species throughout their ranges. This Agreement was signed under

the auspices of the United Nations Environment Programme and is concerned with conservation of wildlife and habitats on a global scale. The Project is sited on degraded farmland with degraded wetlands in downstream river systems but will work with key stakeholders over the life of the Project to enhance biodiversity values both within the Project area and in downstream river systems.

#### *5.3.1.7 The Montreal Protocol on Substances that Deplete the Ozone Layer*

Also known simply as the Montreal Protocol, this is an international treaty designed to protect the ozone layer by phasing out the production of numerous substances responsible for ozone depletion. This protocol prohibits the use of ozone depleting substances in refrigerants and halon fire-suppression systems. These substances are also banned in Australia and the Project engineering team understand the obligations of the Project under this convention to not use these substances. The National Environment (Management of Ozone depleting substances and products) Regulations, 2020 are relevant to this protocol.

#### *5.3.1.8 The Ramsar Convention on Wetlands of International Importance*

This particularly applies to waterfowl habitat and is an international treaty for the conservation and sustainable use of wetlands. It is also known as the Convention on Wetlands. It is named after the city of Ramsar in Iran, where the convention was signed in 1971.

Uganda has many Ramsar listed wetlands <https://www.ramsar.org/news/uganda-adds-nine-new-ramsar-sites> with Lake Nakuwa to the north being the closest to the Project area (refer Figure 54).





between European and African nations, and its current scope stretches from the Arctic to South Africa, encompassing the Canadian archipelago and the Middle East as well as Europe and Africa.

The agreement focuses on bird species that depend on wetlands for at least part of their lifecycle and cross international borders in their migration patterns. It currently covers 254 species and is relevant to the Makuutu Rare Earths Project due to presence of nearby wetlands.

#### *5.3.1.10 The Convention on Biological Diversity (CBD) (2002)*

In April 2002, the Parties to the Convention committed themselves to achieve by 2010 a significant reduction in the current rate of biodiversity loss at a global, regional and national level to alleviate poverty and benefit life on Earth. This target was subsequently endorsed by the World Summit on Sustainable Development and the United Nations General Assembly and incorporated as a new target under the Millennium Development Goals. Articles 8j and 10c additionally include commitments to protecting traditional culture and livelihoods.

The protection of flora and fauna is a high priority for the Project. While the project is largely located in an agricultural area, as opposed to a forest zone, it will still be necessary to enforce controls on hunting and the traffic of bushmeat, similar to obligations under CITES.

#### *5.3.1.11 United Nations Framework Convention on Climate Change (UNFCCC) also known as the Kyoto Protocol (1992)*

While largely superseded by the Paris Agreement, the Kyoto Protocol is a protocol to the United Nations Framework Convention on Climate Change (UNFCCC or FCCC). It is an international environmental treaty produced at the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit, held in Rio de Janeiro, Brazil, from 3–14 June 1992. The treaty is intended to achieve "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." The Kyoto Protocol establishes legally binding commitments for the reduction of four greenhouse gases (carbon dioxide, methane, nitrous oxide, sulfur hexafluoride), and two groups of gases (hydrofluorocarbons and perfluorocarbons) produced by "Annex I" (industrialized) nations, as well as general commitments for all member countries. (Reference: [http://en.wikipedia.org/wiki/Kyoto\\_Protocol](http://en.wikipedia.org/wiki/Kyoto_Protocol) )

Uganda is an Annex II developing country with an obligation to report emissions but with no reduction targets. The Makuutu Rare Earths Project has a responsibility to report emissions of green-house gasses to the Ugandan Government as well as presenting strategies to minimise these emissions similar to the requirements as a signatory to the Paris Agreement.

#### *5.3.1.12 United Nations Convention to Combat Desertification (UNCCD (1994))*

The United Nations Convention to Combat Desertification in those countries experiencing serious drought and/or desertification, particularly in Africa is a convention to combat desertification and mitigate the effects of drought through national action programs that incorporate long-term strategies supported by international cooperation and partnership arrangements. (Reference: [http://en.wikipedia.org/wiki/United\\_Nations\\_Convention\\_to\\_Combat\\_Desertification](http://en.wikipedia.org/wiki/United_Nations_Convention_to_Combat_Desertification)).

Uganda is a signatory to the UNCCD but the Project is in a high rainfall zone and this convention is more relevant to the arid northern regions of the country. As such it is expected that this convention does not immediately apply to Makuutu however it must be addressed with a clarifying statement as to why it does not apply at Makuutu.

The Project has a net positive water balance of about 300,000 kL a year (refer Figure 39) and will use some of this water to irrigate high productivity agricultural land and woodlots established on rehabilitated land. The

establishment of sedentary agriculture in place of shifting agriculture and, woodlots to reduce harvesting timber from native forests are both positive measures to reduce desertification.

#### *5.3.1.13 The UNESCO Convention for the Protection of the World Cultural and Natural Heritage (1972)*

A UNESCO World Heritage Site is a site (such as a forest, mountain, lake, desert, monument, building, complex, or city) that is on the list maintained by the international World Heritage Programme administered by the UNESCO World Heritage Committee. The programme catalogues, names, and conserves sites of outstanding cultural or natural importance to the common heritage of humanity. Under certain conditions, listed sites can obtain funds from the World Heritage Fund. The programme was founded with the Convention Concerning the Protection of World Cultural and Natural Heritage, which was adopted by the General Conference of UNESCO on November 16, 1972. Since then, 185 states have ratified the convention. (Reference: [http://en.wikipedia.org/wiki/World\\_Heritage\\_Site](http://en.wikipedia.org/wiki/World_Heritage_Site) )

The Bwindi Impenetrable National Park and Rwenzori Mountains National Park are the two World Heritage listed sites in Uganda and both are distant from the project area.

#### *5.3.1.14 The African Convention on the Conservation of Nature and Natural Resources (the Algiers Convention) (1968)*

Adopted on 15<sup>th</sup> September 1968 in Algiers, Algeria, the African Convention entered into force on the 9<sup>th</sup> October 1969. Its objectives are "to encourage individual and joint action for the conservation, utilization and development of soil, water, flora and fauna for the present and future welfare of mankind, from an economic, nutritional, scientific, educational, cultural and aesthetic point of view." It commits the Parties to adopting "measures necessary to ensure conservation, utilization and development of soil, water, floral and faunal resources in accordance with scientific principles and with due regard to the best interests of the people." The Parties agree to use resources wisely, to manage populations and habitats, to control hunting, capture and fishing, and to prohibit the use of poisons, explosives and automatic weapons in hunting. They also agreed to prevent and control water pollution, establish conservation areas and consider ecological factors in development plans. (Reference: <http://www.unep.ch/regionalseas/legal/afr.htm> ).

This convention is relevant to the biodiversity conservation and management which is a priority for the project.

#### *5.3.1.15 Asbestos Convention*

This is part of the 1986 International Labour Organization Convention defining protocols for the safe use of asbestos. Asbestos use is banned completely in Australia and it will not be used at the Makuutu Rare Earths Project. Quality checks will, however, need to be completed on imported construction materials to confirm that they are asbestos free.

#### *5.3.1.16 Rotterdam Convention on the Prior informed consent procedure for certain hazardous chemicals and pesticides in international trade.*

This is a multilateral treaty that promotes shared responsibility in relation to the importation of hazardous chemicals. It covers aspects such as proper labelling, directions on safe handling, and informing purchasers of any known restrictions or bans. The Project will additionally have a new chemical to site assessment process that requires health, safety and environmental sign off and approval for all new chemicals to site after assessing that the risk of using the new chemical, including disposal can be managed. An inventory of all chemicals on site including volumes and storage locations will be maintained and routinely audited with particular attention paid to storage requirements and shelf life.

#### *5.3.1.17 Stockholm Convention on Persistent Organic Pollutants*

This is an international environmental treaty, signed in 2001 and effective from May 2004, that aims to eliminate or restrict the production and use of persistent organic pollutants (POPs).

There is an international ban on organo-chlorine insecticides like DDT but it needs to be a consideration in the “new chemical to site process” for chemicals such as insecticides as previously discussed.

#### *5.3.1.18 Abolition of Forced Labour Convention, 1957*

The full title of which is Convention concerning the Abolition of Forced Labour, 1957 (No. 105), is one of the eight ILO fundamental conventions of the International Labour Organization, which cancels certain forms of forced labour still allowed under the Forced Labour Convention of 1930, such as punishment for strikes and as a punishment for holding certain political views. In order to implement the 1930 Forced Labour Convention and the 1957 Abolition of Forced Labour Convention, the Special Action Programme to Combat Forced Labour was set up.

#### *5.3.1.19 The African Charter on Human and Peoples' Rights*

Also known as the Banjul Charter, is an international human rights instrument that is intended to promote and protect human rights and basic freedoms in the African continent.

#### *5.3.1.20 The African Charter on the Rights and Welfare of the Child*

Children in Africa are affected by many different types of abuse, including economic and sexual exploitation, gender discrimination in education and access to health services, and their involvement in armed conflict. Other factors affecting African children include migration, early marriage, differences between urban and rural areas, child-headed households, street children and poverty. Furthermore, child workers in Sub-Saharan Africa account for about 80 million children or 4 out of every 10 children under 14 years old which is the highest child labour rate in the world.

The ACRWC defines a "child" as a human being below the age of 18 years. It recognises the child's unique and privileged place in African society and that African children need protection and special care. It also acknowledges that children are entitled to the enjoyment of freedom of expression, association, peaceful assembly, thought, religion, and conscience. It aims to protect the private life of the child and safeguard the child against all forms of economic exploitation and against work that is hazardous, interferes with the child's education, or compromises his or her health or physical, social, mental, spiritual, and moral development. It calls for protection against abuse and bad treatment, negative social and cultural practices, all forms of exploitation or sexual abuse, including commercial sexual exploitation, and illegal drug use. It aims to prevent the sale and trafficking of children, kidnapping, and begging of children.

#### *5.3.1.21 The United Nations Convention on the Rights of the Child*

This is commonly abbreviated as the CRC or UNCRC and offers similar protections to the African Charter on the rights and welfare of the child. It is an international human rights treaty which sets out the civil, political, economic, social, health and cultural rights of children. The Convention defines a child as any human being under the age of eighteen, unless the age of majority is attained earlier under national legislation.[https://en.wikipedia.org/wiki/Convention\\_on\\_the\\_Rights\\_of\\_the\\_Child](https://en.wikipedia.org/wiki/Convention_on_the_Rights_of_the_Child) - cite note-5 Nations that have ratified this convention or have acceded to it are bound by international law.

#### *5.3.1.22 The Arusha Agreement*

This treaty was signed on 24 September 1969 in Arusha, Tanzania, between the European Community and the three East African states of Kenya, Uganda and Tanzania. The agreement entered into force on 1 January 1971, concomitant with the second Yaoundé Convention, with the aim of establishing better economic relations between the EC and the African states. At the end of their validity time, the Lomé Convention was signed which substituted the previous agreements and enlarged them to 46 ACP countries.

This has some project relevance due to the planned transport route to the Project from Mombasa in Kenya.

#### *5.3.1.23 The United Nations Convention against Corruption (UNCAC)*

This is the only legally binding international anti-corruption multilateral treaty. Negotiated by member states of the United Nations (UN) it was adopted by the UN General Assembly in October 2003 and entered into force in December 2005. The treaty recognises the importance of both preventive and punitive measures, addresses the cross-border nature of corruption with provisions on international cooperation and on the return of the proceeds of corruption. The UN Office on Drugs and Crime (UNODC) in Vienna serves as Secretariat for the UNCAC. UNCAC's goal is to reduce various types of corruption that can occur across country borders, such as trading in influence and abuse of power, as well as corruption in the private sector, such as embezzlement and money laundering. Another goal of the UNCAC is to strengthen international law enforcement and judicial cooperation between countries by providing effective legal mechanisms for international asset recovery.

States Parties - countries that have ratified the Convention - are expected to cooperate in criminal matters and consider assisting each other in investigations of and proceedings in civil and administrative matters relating to corruption. The Convention further calls for the participation of civil society and non-governmental organisations in accountability processes and underlines the importance of citizens' access to information.

This reinforces the importance of the Makuutu Rare Earths Project to always operate ethically and deploy governance structures that enforce ethical business behaviour in all employees and contractors.

#### *5.3.1.24 The Convention concerning Discrimination in Respect of Employment and Occupation*

Also known as the Discrimination (Employment and Occupation) Convention (ILO Convention No.111) this is an International Labour Organization Convention on anti-discrimination. It is one of eight ILO fundamental conventions.[https://en.wikipedia.org/wiki/Discrimination\\_\(Employment\\_and\\_Occupation\)\\_Convention](https://en.wikipedia.org/wiki/Discrimination_(Employment_and_Occupation)_Convention) - cite note-2 The convention requires states to enable legislation which prohibits all discrimination and exclusion on any basis including of race or colour, sex, religion, political opinion, national or social origin in employment and repeal legislation that is not based on equal opportunities.

This reinforces the importance of the Makuutu Rare Earths Project to be an Equal opportunity employer.

#### *5.3.1.25 The International Covenant on Economic, Social and Cultural Rights (ICESCR)*

This is a multilateral treaty adopted by the United Nations General Assembly that commits its parties to work toward the granting of economic, social, and cultural rights (ESCR) to the Non-Self-Governing and Trust Territories and individuals, including labour rights and the right to health, the right to education, and the right to an adequate standard of living. As of July 2020, the Covenant has 171 parties. A further four countries, including the United States, have signed but not ratified the Covenant. The ICESCR (and its Optional Protocol) is part of the International Bill of Human Rights, along with the Universal Declaration of Human Rights (UDHR) and the International Covenant on Civil and Political Rights (ICCPR), including the latter's first and second Optional Protocols.

The Covenant is monitored by the UN Committee on Economic, Social and Cultural Rights.[https://en.wikipedia.org/wiki/International\\_Covenant\\_on\\_Economic,\\_Social\\_and\\_Cultural\\_Rights](https://en.wikipedia.org/wiki/International_Covenant_on_Economic,_Social_and_Cultural_Rights) - cite note-5

The Makuutu Rare Earths Project has adopted a "Rights Approach" in the ESIA programme consistent with the requirements of this Covenant.

#### *5.3.1.26 The Convention on Road Traffic, commonly known as the Geneva Convention on Road Traffic*

This is an international treaty promoting the development and safety of international road traffic by establishing certain uniform rules among the contracting parties. The convention addresses minimum mechanical and safety equipment needed to be on board and defines an identification mark to identify the origin of the vehicle. The Convention was prepared and opened for signature by the United Nations Conference on Road and Motor Transport held at Geneva from 23 August to 19 September 1949. It came into force on 26 March 1952. This conference also produced the Protocol on Road Signs and Signals. There is a European Agreement supplementing the 1949 Convention on Road Traffic, in addition to the 1949 Protocol on Road Signs and Signals, concluded in Geneva on 16 September 1950.

This is old treaty, but it reinforces the need for the project to ensure that trucks used in road transport are well maintained and fit for purpose; that drivers follow all road rules and; that they are both properly trained and licenced and; fit for work (i.e., not under the influence of alcohol or drugs and not fatigued).

#### *5.3.1.27 The Hostages Convention*

This was formally the International Convention against the Taking of Hostages and is a United Nations treaty by which states agree to prohibit and punish hostage taking. The treaty includes definitions of "hostage" and "hostage taking" and sets out the principle of *aut dedere aut judicare*: a party to the treaty must prosecute a hostage taker if no other state requests extradition for prosecution of the same crime.

While the Project area is not a kidnapping hot-spot, kidnapping is a problem in parts of Uganda and could potentially impact the expatriate workforce in particular.

#### *5.3.1.28 The International Fund for Agricultural Development (IFAD)*

This is an international financial institution and a specialised agency of the United Nations that works to address poverty and hunger in rural areas of developing countries. It is the only multilateral development organization that focuses solely on rural economies and food security.

Headquartered in Rome, Italy, IFAD is involved in over 200 projects across nearly 100 countries.[https://en.wikipedia.org/wiki/International\\_Fund\\_for\\_Agricultural\\_Development](https://en.wikipedia.org/wiki/International_Fund_for_Agricultural_Development) - cite note-2 It funds and sponsors initiatives that improve land and water management, develop rural infrastructure, train and educate farmers in more efficient technologies, build up resilience against climate change, enhancing market accessibility, and more.[https://en.wikipedia.org/wiki/International\\_Fund\\_for\\_Agricultural\\_Development](https://en.wikipedia.org/wiki/International_Fund_for_Agricultural_Development) - cite note-3

IFAD has 177 member states and works in partnership with the Organization of the Petroleum Exporting Countries (OPEC) and members of the Organisation for Economic Co-operation and Development (OECD). Since its foundation in 1977, IFAD has provided US\$22.4 billion in loans and grants and coordinated an addition US\$31 billion in international and domestic co-financing.

IFAD is a group that the Makuutu Rare Earths Project could approach with the intention of collaborating to secure sustainable agriculture and food security in the project area and, to enhance the productivity of leased-land returned to farmers after rehabilitation.

#### *5.3.1.29 The International Renewable Energy Agency (IRENA)*

This is an intergovernmental organisation mandated to facilitate cooperation, advance knowledge, and promote the adoption and sustainable use of renewable energy. It is the first international organisation to focus exclusively on renewable energy,[https://en.wikipedia.org/wiki/International\\_Renewable\\_Energy\\_Agency](https://en.wikipedia.org/wiki/International_Renewable_Energy_Agency) - cite note-1 addressing needs in both industrialised and developing countries.



This agency is of potential interest to the Makuutu Rare Earths Project in the potential use of renewable hydro-power from Jinja in the processing plant.

#### *5.3.1.30 The International Sugar Agreements and similarly named agreements*

These were a series of International treaties that attempted to establish an "orderly relationship between the supply and demand for sugar in the world market." They eventually established the International Sugar Organization.

This is relevant due to the prevalence of sugar cane farming in the proposed project area.

#### *5.3.1.31 The Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa*

Better known as the Maputo Protocol, this is an international human rights instrument established by the African Union that went into effect in 2005. It guarantees comprehensive rights to women including the right to take part in the political process, to social and political equality with men, improved autonomy in their reproductive health decisions, and an end to female genital mutilation. [https://en.wikipedia.org/wiki/Maputo\\_Protocol](https://en.wikipedia.org/wiki/Maputo_Protocol) - cite note-3 It was adopted by the African Union in Maputo, Mozambique in 2003 in the form of a protocol to the African Charter on Human and Peoples' Rights (adopted in 1981, enacted in 1986).

#### *5.3.1.32 The Marrakesh Agreement*

This was manifested by the Marrakesh Declaration signed in Marrakesh, Morocco, by 123 nations on 15 April 1994. It marked the culmination of the 8-year-long Uruguay Round and established the World Trade Organization, which officially came into being on 1 January 1995. [https://en.wikipedia.org/wiki/Marrakesh\\_Agreement](https://en.wikipedia.org/wiki/Marrakesh_Agreement) - cite note-1

The agreement developed out of the General Agreement on Tariffs and Trade (GATT), supplemented by a number of other agreements on issues including trade in services, sanitary and phytosanitary measures, trade-related aspects of intellectual property and technical barriers to trade. It also established a new, more efficient and legally binding means of dispute resolution. The various agreements which make up the Marrakesh Agreement combine as an indivisible whole; no entity can be party to any one agreement without being party to them all.

#### *5.3.1.33 The International Convention on the Protection of the Rights of All Migrant Workers and Members of their Families*

This is a United Nations multilateral treaty governing the protection of migrant workers and families. Signed on 18 December 1990, it entered into force on 1 July 2003 after the threshold of 20 ratifying States was reached in March 2003. The Committee on Migrant Workers (CMW) monitors implementation of the convention, and is one of the seven UN-linked human rights treaty bodies.

#### *5.3.1.34 Convention concerning the Protection of the World's Cultural and Natural Heritage*

This guides the work of the World Heritage Committee. There are no World Heritage areas near the project site, but the protection of cultural and natural heritage is a priority for Uganda and the Makuutu Rare Earths Project.

#### *5.3.1.35 International Convention on the Elimination of all forms of Racial Discrimination*

This promotes understanding among races and outlaws hate speech and membership of racist organisations. The Makuutu Project will promote cross-cultural awareness with expatriate staff in particular and reinforce the need to treat everyone with respect and dignity.

#### *5.3.1.36 Right of Association (Agriculture) Convention*

This is an international Labour Organisation Convention that secures the right of association and combination of agricultural workers to same extent as those rights are extended to industrial workers. It is relevant to the Makuutu Project due to its location on agricultural land occupied by many small landholders.

#### *5.3.1.37 Right to Organise and Collective Bargaining Convention (1949)*

This is one of 8 fundamental International Labour Organisation conventions and will be relevant to the Project workforce.

#### *5.3.1.38 The Convention for the Safeguarding of the Intangible Cultural Heritage is a UNESCO treaty adopted by the UNESCO General Conference on 17 October 2003.*

Intangible cultural heritage refers to "traditions or living expressions inherited from our ancestors and passed on to our descendants, such as oral traditions, performing arts, social practices, rituals, festive events, knowledge and practices concerning nature and the universe or the knowledge and skills to produce traditional crafts".

The Convention works on both national and international levels. At the national level, State Parties are supposed to 'take necessary measures to ensure the safeguarding of the intangible cultural heritage present in its territory.' These measures include identification of the intangible cultural heritage that exists in its territory, adoption of appropriate policies, promotion of education and so on. [https://en.wikipedia.org/wiki/Convention\\_for\\_the\\_Safeguarding\\_of\\_the\\_Intangible\\_Cultural\\_Heritage](https://en.wikipedia.org/wiki/Convention_for_the_Safeguarding_of_the_Intangible_Cultural_Heritage) - cite note-7 Besides, in taking these measures, each state parties must "endeavour to ensure the widest possible participation of communities, groups, and, where appropriate, individuals that create, maintain and transmit such heritage, and to involve them actively in its management".

At the international level, this Convention promotes international cooperation, which includes "the exchange of information and experience, joint initiatives, and the establishment of a mechanism of assistance" to other State Parties.

The protection of intangible cultural heritage is relevant to the Makuutu Project ESIA process.

#### *5.3.1.39 Termination of Employment Convention, 1982*

This is an International Labour Organisation (ILO) Convention. Its purpose is to coordinate minimum levels of job security in the laws of ILO member states.

- art 2, establishes the scope and says short fixed term, probationary or casual workers may be excluded
- art 3, defines termination as at the initiative of the employer
- art 4, says the employer must have a valid reason for termination based on "the capacity or conduct of the worker or based on the operational requirements of the undertaking, establishment or service"
- art 5, prohibits membership of a union, being a representative, seeking to assert a working right, or any discrimination-based reason as becoming a valid reason.
- art 6, temporary absence or sickness is not a reason
- art 7, requires a minimum procedure for any disciplinary based dismissal where a worker has a chance to defend himself or herself
- arts 8-10, require a procedure where a worker can appeal against a termination to an impartial authority
- art 11, requires a reasonable period of notice before termination
- art 12, requires redundancy or severance pay for income protection

- art 13, requires consultation of worker representatives before collective redundancies.

#### *5.3.1.40 The United Nations Educational, Scientific and Cultural Organization (UNESCO)*

UNESCO is a specialised agency of the United Nations (UN) aimed at promoting world peace and security through international cooperation in education, the sciences, and culture. It has 193 member states and 11 associate members, as well as partners in the nongovernmental, intergovernmental, and private sector. Headquartered in Paris, France, UNESCO has 53 regional field offices and 199 national commissions that facilitate its global mandate.

UNESCO was founded in 1945 as the successor to the League of Nations' International Committee on Intellectual Cooperation. Its constitution establishes the agency's goals, governing structure, and operating framework. UNESCO's founding mission, which was shaped by the Second World War, is to advance peace, sustainable development and human rights by facilitating collaboration and dialogue among nations. It pursues this objective through five major program areas: education, natural sciences, social/human sciences, culture and communication/information. UNESCO sponsors projects that improve literacy, provide technical training and education, advance science, protect independent media and press freedom, preserve regional and cultural history, and promote cultural diversity.

#### *5.3.1.41 The Convention on the Elimination of all Forms of Discrimination Against Women (CEDAW)*

This is an international treaty adopted in 1979 by the United Nations General Assembly. Described as an international bill of rights for women, it was instituted on 3 September 1981 and has been ratified by 189 states. [https://en.wikipedia.org/wiki/Convention\\_on\\_the\\_Elimination\\_of\\_All\\_Forms\\_of\\_Discrimination\\_Against\\_Women](https://en.wikipedia.org/wiki/Convention_on_the_Elimination_of_All_Forms_of_Discrimination_Against_Women) - cite note-1 Over fifty countries that have ratified the Convention have done so subject to certain declarations, reservations, and objections, including 38 countries who rejected the enforcement article 29, which addresses means of settlement for disputes concerning the interpretation or application of the Convention.

#### *5.3.1.42 Relevance of International Treaties and Conventions to Project Operation and the ESIA Work Programme*

The Makuutu Rare Earths Project is philosophically aligned to the intent of the multiple conventions that Uganda is a signatory to. These are designed to protect the environment and the rights of workers, local communities and other stakeholders.

## **5.4 International Best Practices**

### **5.4.1 Equator Principles**

The Equator Principles are intended to serve as a common baseline and framework for financial institutions to identify, assess and manage environmental and social risks when financing Projects. The Equator Principles are meant to ensure that the Projects are developed in a manner that is socially responsible and reflects sound environmental management practices. The principles and implications are summarized below (refer Table 17):

Table 17: Equator Principle implications for the Project

Equator Principle	Key Issues and implication to Proposed Project
<p>Principle 1: Review and Categorization</p>	<p>When a Project is proposed for financing, the Equator Principles Financial Institutions (EPFI) will, as part of its internal environmental and social review and due diligence, categorise the Project based on the magnitude of potential environmental and social risks and impacts, including those related to Human Rights, climate change, and biodiversity. The categories are:</p> <p><b>Category A</b> – Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented;</p> <p><b>Category B</b> – Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and</p> <p><b>Category C</b> – Projects with minimal or no adverse environmental and social risks and/or impacts.</p> <p>With the selection of low-risk Option 5 for the Process Plant in a sugar-cane farm owned by one family as opposed to much higher risk Option 1, the proposed project is a <b>Category B</b>. i.e., Project with risks that are site specific, reversible, and readily addressed through mitigation measures.</p>
<p>Principle 2: Environmental and Social Assessment</p>	<p>The EPFI will require the client to conduct an appropriate Assessment process to address, to the EPFI's satisfaction, the relevant environmental and social risks and scale of impacts of the proposed Project (which may include the illustrative list of issues found in Exhibit II). The Assessment Documentation should propose measures to minimise, mitigate, and where residual impacts remain, to compensate/offset/remedy for risks and impacts to Workers, Affected Communities, and the environment, in a manner relevant and appropriate to the nature and scale of the proposed Project. For Category A and, as appropriate, Category B Projects, the Assessment Documentation includes an Environmental and Social Impact Assessment (ESIA). One or more specialised studies may also need to be undertaken. A Climate Change Risk Assessment is required for all Category A and, as appropriate, Category B Projects, and will include consideration of relevant physical risks as defined by the Task Force on Climate-related Financial Disclosures (TCFD).</p> <p><b>Exhibit II: Illustrative List of Potential Environmental and Social Issues to be Addressed in the Environmental and Social Assessment Documentation.</b></p> <p>The Assessment Documentation may include, where applicable, the following:</p> <ol style="list-style-type: none"> <li>1. assessment of the baseline environmental and social conditions</li> <li>2. consideration of feasible environmentally and socially preferable alternatives</li> <li>3. requirements under host country laws and regulations, applicable international treaties and agreements including the 2015 Paris Climate Change Agreement</li> <li>4. protection and conservation of biodiversity (including endangered species and sensitive ecosystems in modified, natural and Critical Habitats) and identification of legally protected areas</li> <li>5. sustainable management and use of renewable natural resources (including sustainable resource management through appropriate independent certification systems)</li> <li>6. use and management of dangerous substances</li> <li>7. major hazards assessment and management</li> </ol>

Equator Principle	Key Issues and implication to Proposed Project
	<p>8. efficient production: total energy consumed per output scaling factor<sup>18</sup>, delivery and use of energy</p> <p>9. pollution prevention and waste minimisation, pollution controls (liquid effluents and air emissions), and waste management</p> <p>10. greenhouse gas emissions level and emissions intensity</p> <p>11. water usage, water intensity, water source</p> <p>12. land cover, land use practices</p> <p>13. consideration of physical climate risks and adaptation opportunities, and of viability of Project operations under changing weather patterns/climatic conditions</p> <p>14. cumulative impacts of existing Projects, the proposed Project, and anticipated future Projects</p> <p>15. consideration of actual or potential adverse Human Rights impacts and if none were identified, an explanation of how the determination of the absence of Human Rights risks was reached, including which stakeholder groups and vulnerable populations (if present) were considered in their analysis</p> <p>16. labour issues (including the four core labour standards), and occupational health and safety</p> <p>17. consultation and participation of affected parties in the design, review and implementation of the Project</p> <p>18. socio-economic impacts</p> <p>19. impacts on Affected Communities, and disadvantaged or vulnerable groups</p> <p>20. gender and disproportionate gender impacts</p> <p>21. land acquisition and involuntary resettlement</p> <p>22. impacts on Indigenous Peoples, and their unique cultural systems and values including impacts to lands and natural resources subject to traditional ownership or under customary use</p> <p>23. protection of cultural property and heritage</p> <p>24. protection of community health, safety and security (including risks, impacts and management of Project's use of security personnel)</p> <p>25. fire prevention and life safety</p>
<p>Principle 3: Applicable Environmental and Social Standards</p>	<p>The Assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues. The EPFI will, with supporting advice from the Independent Environmental and Social Consultant where applicable, evaluate the Project's compliance with the applicable standards as follows:</p> <ol style="list-style-type: none"> <li>1. For Projects located in Non-Designated Countries, compliance with the applicable IFC Performance Standards on Environmental and Social Sustainability (Performance Standards) and the World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines) (Exhibit III).</li> <li>2. For Projects located in Designated Countries, compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues.</li> </ol> <p>This Report highlights the relevant Uganda legislation and the compliance requirements.</p>
<p>Principle 4: Environmental</p>	<p>For all Category A and Category B Projects, the EPFI will require the client to develop and / or maintain an Environmental and Social Management System (ESMS). Further,</p>



Equator Principle	Key Issues and implication to Proposed Project
and Social Management System and Equator Principles Action Plan	<p>an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards. Where the applicable standards are not met to the EPFI's satisfaction, the client and the EPFI will agree to an Equator Principles Action Plan (EPAP). The EPAP is intended to outline gaps and commitments to meet EPFI requirements in line with the applicable standards.</p> <p><b>Implications:</b> The ESIA includes an ESMP and an outline of standalone management plans. The client (contractors and subcontractors) will be responsible for preparing any required standalone management plans to meet requirements.</p>
Principle 5: Stakeholder Engagement	<p>For all Category A and Category B Projects the EPFI will require the client to demonstrate <b>effective Stakeholder Engagement, as an ongoing process in a structured and culturally appropriate manner</b>, with Affected Communities, Workers and, where relevant, Other Stakeholders.</p> <p>For Projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process. The client will tailor its consultation process to: the risks and impacts of the Project; the Project's phase of development; the language preferences of the Affected Communities; their decision-making processes; and the needs of disadvantaged and vulnerable groups. This process should be free from external manipulation, interference, coercion and intimidation.</p> <p>To facilitate Stakeholder Engagement, the client will, commensurate with the Project's risks and impacts, make the appropriate Assessment Documentation readily available to the Affected Communities, and where relevant Other Stakeholders, in the local language and in a culturally appropriate manner. The client will take account of, and document, the results of the Stakeholder Engagement process, including any actions agreed resulting from such process. Disclosure of environmental or social risks and adverse impacts should occur early in the Assessment process, in any event before the Project construction commences, and on an ongoing basis.</p> <p><b>The ESIA process has prepared a Stakeholder Engagement Plan (SEP) to be implemented during the ESIA process and beyond.</b></p>
Principle 6: Grievance Mechanism	<p>For all Category A and, as appropriate, Category B Projects, the EPFI will require the client, as part of the ESMS, to establish effective grievance mechanisms which are designed for use by Affected Communities and Workers, as appropriate, to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance. Grievance mechanisms are required to be scaled to the risks and impacts of the Project, and will seek to resolve concerns promptly, using an understandable and transparent consultative process that is culturally appropriate, readily accessible, at no cost, and without retribution to the party that originated the issue or concern. Grievance mechanisms should not impede access to judicial or administrative remedies. The client will inform Affected Communities and Workers about the grievance mechanisms in the course of the Stakeholder Engagement process.</p> <p><b>Implications:</b> The ESIA has assessed and documented the existing grievance redress mechanisms (formal and informal) and provided recommendations on the grievance redress mechanisms suitable for the proposed project.</p>

Equator Principle	Key Issues and implication to Proposed Project
Principle 7: Independent Review	For all Category A and, as appropriate, Category B Projects, an Independent Environmental and Social Consultant, will carry out an Independent Review of the Assessment process including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation in order to assist the EPFI's due diligence and determination of Equator Principles compliance. The Independent Environmental and Social Consultant will also propose or opine on a suitable EPAP capable of bringing the Project into compliance with the Equator Principles or indicate where there is a justified deviation from the applicable standards. The Independent Environmental and Social Consultant must be able to demonstrate expertise in evaluating the types of environmental and social risks and impacts relevant to the Project.
Principle 8: Covenants	An important strength of the Equator Principles is the incorporation of covenants linked to compliance. For all Projects, where a client is not in compliance with its environmental and social covenants, the EPFI will work with the client on remedial actions to bring the Project back into compliance. If the client fails to re-establish compliance within an agreed grace period, the EPFI reserves the right to exercise remedies, including calling an event of default, as considered appropriate.
Principle 9: Independent Monitoring and Reporting	For all Category A and, as appropriate, Category B Projects, in order to assess Project compliance with the Equator Principles after Financial Close and over the life of the loan, the EPFI will require independent monitoring and reporting. Monitoring and reporting should be provided by an Independent Environmental and Social Consultant; alternatively, the EPFI will require that the client retain qualified and experienced external experts to verify its monitoring information, which will be shared with the EPFI in accordance with the frequency required in Principle 8b.
Principle 10: Reporting and Transparency	For all Category A and, as appropriate, Category B Projects: <ul style="list-style-type: none"> <li>• The client will ensure that, at a minimum, a summary of the ESIA is accessible and available online and that it includes a summary of Human Rights and climate change risks and impacts when relevant.</li> <li>• The client will report publicly, on an annual basis, GHG emission levels (combined Scope 1 and Scope 2 Emissions, and, if appropriate, the GHG efficiency ratio) during the operational phase for Projects emitting over 100,000 tonnes of CO<sub>2</sub> equivalent annually.</li> <li>• The EPFI will encourage the client to share commercially non-sensitive Project-specific biodiversity data with the Global Biodiversity Information Facility (GBIF) and relevant national and global data repositories, using formats and conditions to enable such data to be accessed and re-used in future decisions and research applications.</li> </ul>

#### 5.4.2 World Bank Safeguards

The Project may seek financial support. International financial institutions have environmental and social safeguard policies that are designed to avoid, mitigate, or minimize adverse environmental and social impacts of projects supported by them. These are summarised below (refer Table 18):

Table 18: World Bank Environment and Social Standards triggered by the Project

Environmental and Social Standard (ESS)	Triggered?	How the ESS is triggered and key issues
ESS 1: Assessment and management of Environmental and Social Risks and Impacts.	Yes	Sets out the borrower's responsibility to assess, manage and monitor environmental and social risks and impacts associated with each stage of the project in order to achieve environmental and social outcomes consistent with the ESS. This ESIA report fulfills the requirement to assess potential project risks and impacts.
ESS 2: Labour and Working Conditions.	Yes	Recognises the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. It emphasizes promotion of sound worker-management relationships and enhancing the development benefit by treating workers in the project fairly and providing safe and healthy working conditions.
ESS 3: Resource Efficiency and Pollution Prevention and Management.	Yes	The project activities at the various stages of pre-construction, construction, operation and management will often generate pollution to air, water and land. Mitigation measures must be developed in line with the National Environment (Waste Management) Regulations 2020.
ESS 4: Community Health and Safety.	Yes	This recognises that project activities, equipment and infrastructure can increase community exposure to risks and impacts. Such impacts, for instance, potential road traffic accidents, dust and noise emissions should not affect community health.
ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement.	Yes	This recognises that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons; and in particular, for this project, economic loss is possible. The project will require land for the processing plant. Acquisition of land should be through free, prior and informed consent; and the potentially affected persons should have the right to refuse land acquisition or restrictions on land use that can result into displacement.
ESS 6: Biodiversity Conservation and Sustainable management of Living Natural Resources.	Yes	Recognises that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development. The project areas have some fragile ecosystems such as rivers and wetlands which could be habitats for biodiversity and hence the need for caution.
ESS 7: Indigenous peoples/sub-Saharan African historically Underserved Traditional Local Communities.	No	This applies to a distinct social and cultural group often minor and marginalised. No indigenous peoples as per the ESS7 definition are present in the area.
ESS 8: Cultural Heritage	Yes	This recognises that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. There are physical cultural resources that could be impacted during

Environmental and Social Standard (ESS)	Triggered?	How the ESS is triggered and key issues
		construction works. A chance finds procedure shall be included in case excavations encounter some physical cultural resources.
ESS 9: Financial Intermediaries.	No	Recognises that strong domestic capital and financial markets and access to finance are important for economic development, growth and poverty reduction. This project does not trigger ESS 9.
ESS 10: Stakeholder engagement and information disclosure.	Yes	Outlines a systematic approach to stakeholder engagement that the promoter is expected to build and maintain by way of a constructive relationship with relevant stakeholders. Stakeholder engagement is an inclusive and iterative process that involves, in varying degrees, stakeholder analysis and engagement planning, timely disclosure and dissemination of/access to information, public consultations and stakeholder participation, and a mechanism ensuring access to grievance and remedy

### 5.4.3 Institutional Framework

There are a large number of ministries relevant to the Project (refer Table 19).

Table 19: Key institutions relevant to the Project

Institution	Mandate and Role in Project
Ministry of Energy and Mineral Development	<p>The Directorate of Geological Survey and Mines is mandated to establish, promote the development, and strategically manage and safeguard the rational and sustainable exploitation and utilization of mineral resources for socio-economic development of the people of Uganda. The Directorate of Geological Surveys and Mines is composed of three Departments namely: Department of Geological Surveys; Mines Department; and Geothermal Resources.</p> <p><b>Geological Survey Department (GSD):</b> Is in charge of mapping and confirmation of mineral targets in Uganda as well as attracting investment into the sector by designing information systems that facilitate information sharing with staff and the general public. GSD is made of Geological Division, Laboratory Division, Geodata Division, Geophysics and Seismic Division.</p> <p><b>Mines Department</b> is mandated to license and regulate exploration and exploitation of mineral resources, ensuring compliance to the mining legislation and promotion of sustainable mining and development of the mineral resources.</p> <p><b>The Geothermal Resource Department:</b> Focuses on exploration, promotion and development of the country's geothermal resources.</p>
National Environmental Management Authority (NEMA)	<p>The National Environmental Act 2019 establishes NEMA as the principal agency responsible for coordination, monitoring and supervision of environmental conservation activities. NEMA is under the Ministry of Water and Environment (MWE) but has a cross-sectoral mandate to oversee the conduct of EIAs through issuance of guidelines, regulations and registration of practitioners. It reviews and approves environmental impact statements in consultation with any relevant lead agencies. NEMA works with District Environment Officers and local environment committees at local government levels who also undertake inspection, monitoring</p>

Institution	Mandate and Role in Project
	<p>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:</p> <ul style="list-style-type: none"> <li>• Review and approve the ESIA report</li> <li>• Through Bugweri, Mayuge and Bugiri District Environment Officers, undertake environmental monitoring during project implementation.</li> </ul>
Uganda National Roads Authority (UNRA)	UNRA was established by the National Authority Act, No. 15 of 2006. UNRA became operational on 1st July 2008. The mandate of UNRA is to develop and maintain the national roads network, advise Government on general roads policy and contribute to addressing of transport concerns. UNRA is a key stakeholder in terms of planning and maintaining the road network in the 3 districts to be used by the project.
Ministry of Lands, Housing and Urban Development (MLHUD)	MLHUD is responsible for providing policy direction, national standards and coordination of all matters concerning lands, housing and urban development. It is responsible for putting in place policies and initiating laws that ensure sustainable land management; promote sustainable housing for all; and foster orderly urban development in the country. The project will likely require preparation of a Resettlement Action Plan (RAP) for the processing plant and mining pits. The Valuation Report must be approved by the Chief Government Valuer.
Ministry of Gender, Labour and Social Development (MGLSD)	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 laboratory facilities. The OHS Department in this Ministry will be responsible for undertaking inspections of construction and mining sites to ensure safe working conditions.
Utility Companies and Agencies	There are utility agencies and companies. Such utilities may require relocation in future if they are within the proposed mining areas.
District Local Administration Structures	The proposed project is within the jurisdiction of Bugweri, Bugiri and Mayuge District Local Governments 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, Town Council 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. Local government structures are important for mobilising support for the project as well as monitoring its social-environmental impacts both during construction and operation phases.



## 5.5 Performance Standards

The Makuutu Project will adopt performance standards that meet Ugandan regulatory standards and International Best Practice to meet the requirements of the Makuutu Health and Safety and, Social and Environment Policies and, the “duty of care” obligations to manage the operations in a safe, environmentally and socially appropriate manner. In the absence of local or Ugandan Standards the Project will default to the use of ANZECC water quality guidelines with respect to water discharges <https://www.waterquality.gov.au/anz-guidelines/resources/previous-guidelines/anzecc-armcanz-2000>.

These Standards are designed to secure the protection of ecosystems. Rare Earth Elements (REE) which are largely insoluble in water (refer Section 3) do not have specific standards. These are expected to remain at very low levels in any discharge water but will nevertheless be routinely monitored.

## 6 ENVIRONMENT BASELINE CONDITIONS

### 6.1 Physical Environment

The physical environment parameters in the 3 districts and specifically the Makuutu project area are described in detail below.

#### 6.1.1 Climate

##### 6.1.1.1 Rainfall

The project area experiences two rainy reasons. The first rainy season is from March to May followed by a less pronounced rainy season from September to November. The annual rainfall varies between approximately 1480 mm and 1540 mm (refer Figure 55). Spatially, rainfall is more concentrated in the North Eastern part of the project area, gradually reducing towards the South West.

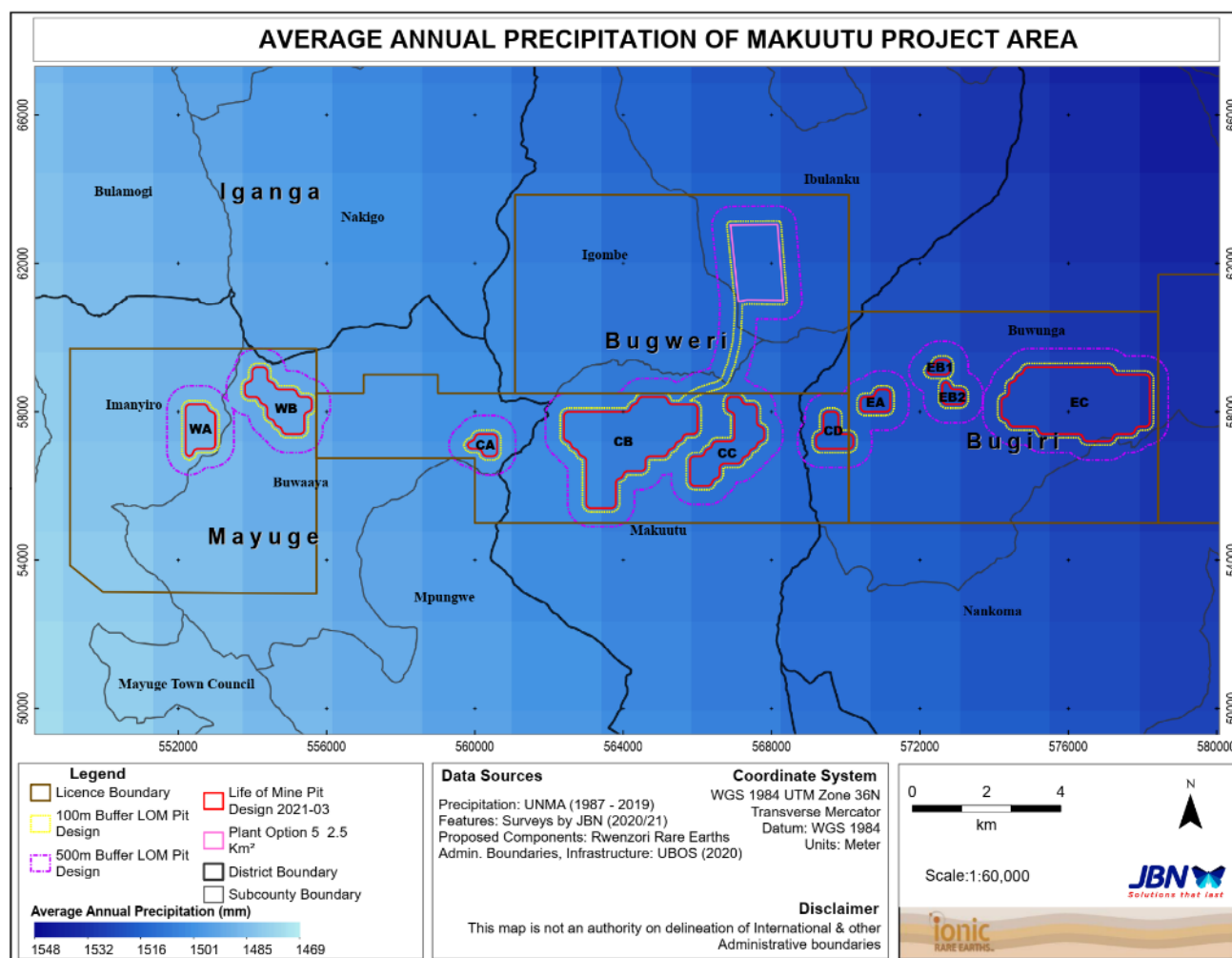


Figure 55: Mean Annual Precipitation in the Project Area

Generally, January and February are dry months with maximum precipitation of about 67 mm. The rainy season commences in March until May where maximum precipitation (about 200 mm) occurs. Between June and July, the precipitation is low at about 75mm, while from September to November, high precipitation is experienced to a peak of about 170 mm. December shows gradual decline in precipitation to a low of about 80 mm (Figure 56).

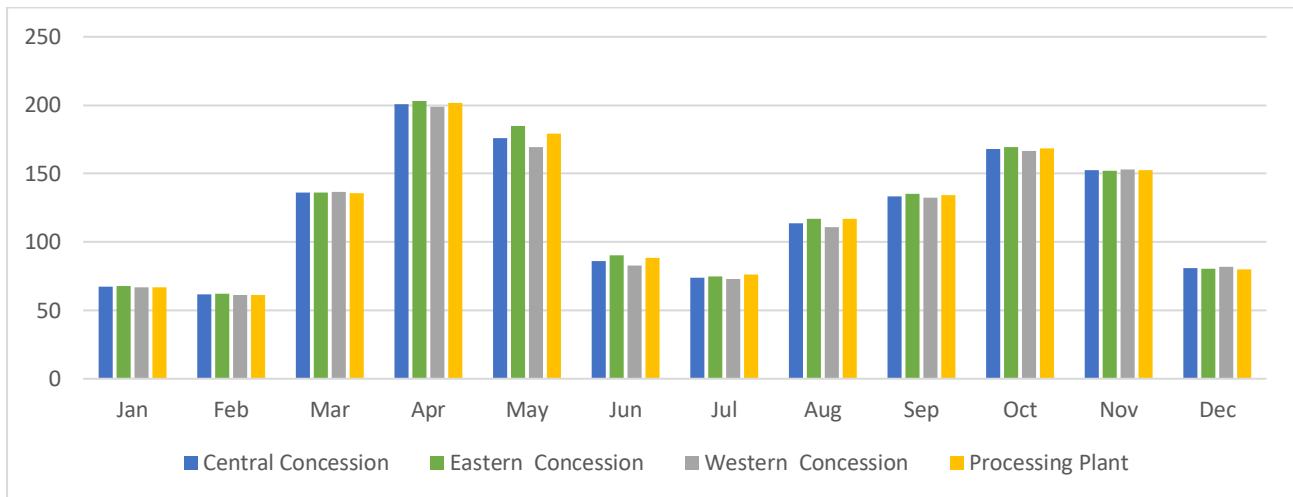


Figure 56: Monthly Precipitation in the Project Area

#### 6.1.1.1.1 Temperature

The project area is estimated to have an annual average maximum temperature of 27.9 °C and an annual average minimum temperature of 16.4 °C. The Monthly ambient temperature varies throughout the year with the high maximum temperatures observed in January, February, March, and October, while the low minimum temperatures occur in December, January, and July (Figure 57).

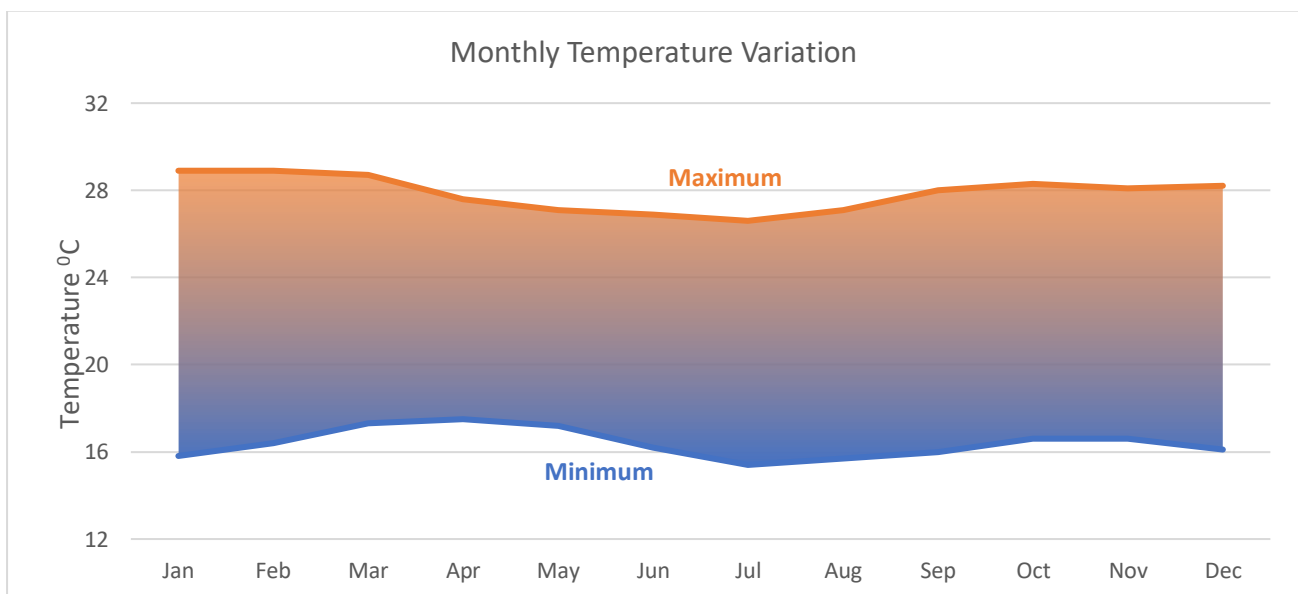


Figure 57: Monthly Temperature Variation in the Project Area

#### 6.1.1.1.2 Evapotranspiration

The reference evapotranspiration for the project area from the CLIMWAT 2.0 database of FAO indicates that the North Eastern part of the project area has high evapotranspiration rates of up to 47 mm/day, which gradually reduces towards the South West to as low as 45 mm/day (refer Figure 58).

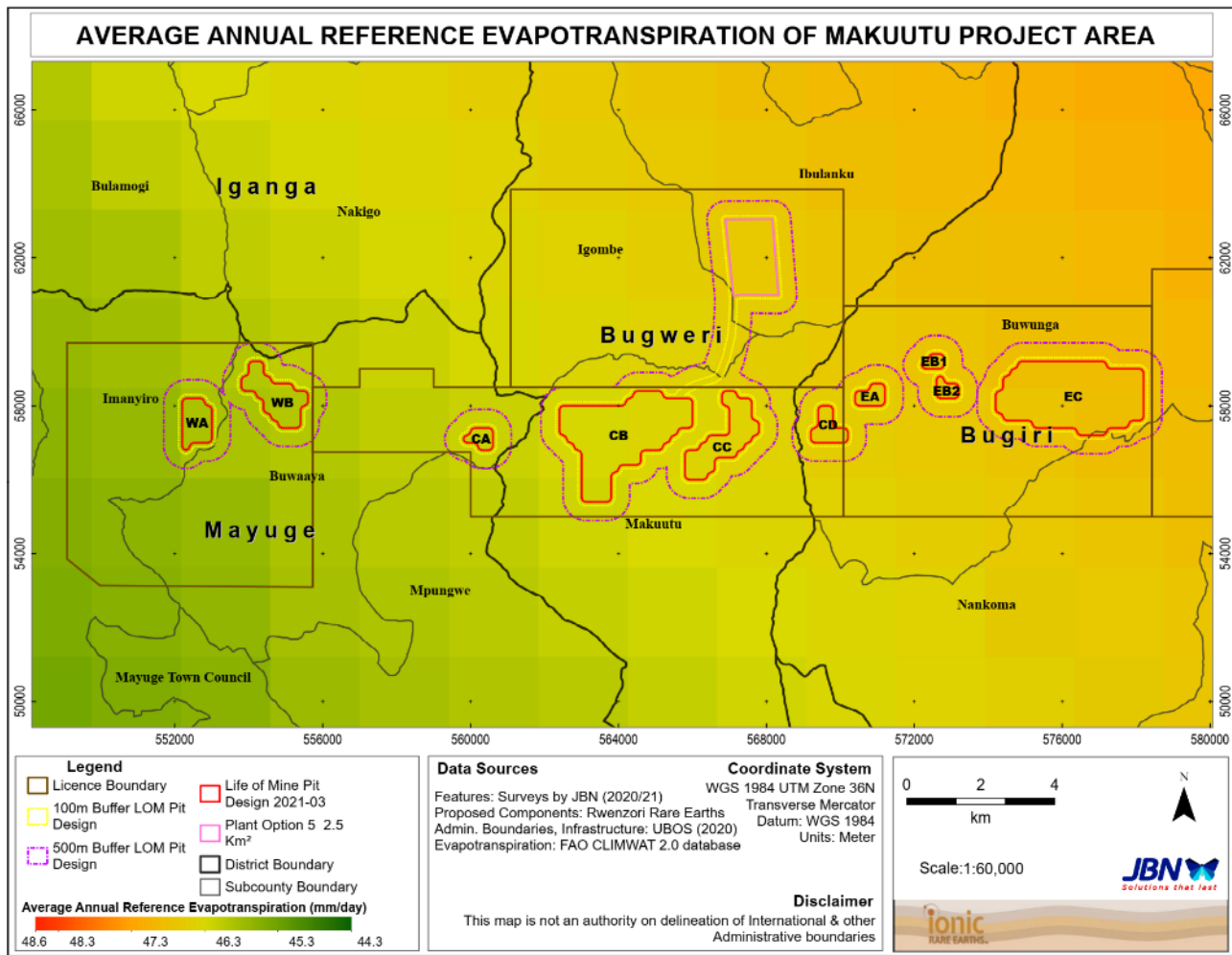


Figure 58: Average Annual Reference Evapotranspiration for the Project Area

### 6.1.2 Climate Change

According to the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5), the climate projections for Uganda indicate a slight decrease in total annual rainfall in the Eastern part of the country under both Representative Concentration Pathways (RCPs) i.e., RCP 4.5 and RCP 8.5. It is predicted that most of Uganda will become dryer in the months of August and September by the end of the 21<sup>st</sup> Century because of a weakening Somali jet and Indian monsoon (IPCC, 2014). It is also projected that the short-rain season of October-November-December will increase by up to 35%. The models further predicted an increase in the mean annual temperature by 1.0 – 3.1 °C by the 2060s. The near-surface temperature is projected in the order of +2°C in the next 50 years, and in the order of +2.5°C in the next 80 years under (RCP) 4.5; and in the order of +2.5°C in the next 50 years, and in the order of +4.5°C in the next 80 years under RCP 8.5.

### 6.1.3 Flood Risk

Given that the regional climate change models predict a change in the rainfall pattern in the eastern Uganda in terms of amount, duration, and intensity, it is projected that the rainfall season will become more pronounced and intense as a result of climate change, and this ultimately has the consequence of increased flood risk in the area. Floods are likely to occur in the area as the intensity of precipitation goes beyond the infiltration rate for and when resultant run off is beyond the hydraulic transmission capacity of water channels (trenches, streams, rivers)

## 6.1.4 Air Quality

### 6.1.4.1 Locations

There are no air quality stations in the 3 districts. Therefore, the Consultant undertook short-term air quality monitoring at selected points within the project area (refer Figure 59). These points shall be used during periodic air quality monitoring during project implementation.

### 6.1.4.2 Parameters

Baseline investigations considered the following parameters: particulate matter, PM (measured as particles with an aerodynamic diameter  $<10\text{ }\mu\text{m}$  ( $\text{PM}_{10}$ ) and  $<2.5\text{ }\mu\text{m}$  ( $\text{PM}_{2.5}$ ), Sulphur Dioxide ( $\text{SO}_2$ ), Nitrogen Dioxide ( $\text{NO}_2$ ), and Carbon Monoxide (CO).  $\text{PM}_{2.5}$  is an important indicator of risk to health from particulate pollution and might also be a better indicator than  $\text{PM}_{10}$  for anthropogenic suspended particles in many areas.  $\text{PM}_{2.5}$  and  $\text{PM}_{10}$  baseline data will be useful in monitoring the dust nuisance in the project area. The baseline for the gases ( $\text{SO}_2$ ,  $\text{NO}_2$ , and CO) will also be useful in monitoring impact of project fleet and other stationery/ mobile sources on ambient air quality.

### 6.1.4.3 Standards

An ambient air quality standard (AAQS) is a limit on the amount of a given pollutant in the air. The results for the air quality monitoring are summarized in the Table below and are compared with the World Health Organization (WHO) Air Quality Guidelines (AQG). Since the WHO has no guidelines for CO, air quality standards have been adopted from other countries for time weighted averages (TWAs). These include the Kenya Air Quality Standards for Residential, Rural & Other areas that are provided in The Environmental Management and Co-ordination (Air Quality) Regulations, 2014 and the National Ambient Air Quality Standards by the U.S Environment Protection Agency (USEPA). Uganda is expected to issue air quality standards later in 2021 which will likely be in force during project implementation.

### 6.1.4.4 Trends

The baseline air quality results reveal limited presence of sources of pollution within the project area. Generally, the project area is not polluted, the air is relatively clean save for dust along the unpaved road network. The main sources of pollutants are of low scale such as brick burning, sugarcane burning, small generators at trading centres and agro-processing facilities at trading centres (refer Table 22 and 23).

### 6.1.4.5 Potential impacts

Exhaust fumes from project fleet and equipment such as generators and mining equipment could temporarily affect local ambient air quality within the project area especially along ore transport routes. The concentration of air pollutants especially dust is expected to be highest within the transport corridors and mining pits and will generally decrease with increasing distance from the emission sources. The presence of heavy-duty trucks in the vehicle fleet influences particulate matter and  $\text{NO}_x$  emission rates and the resulting local ambient concentrations.



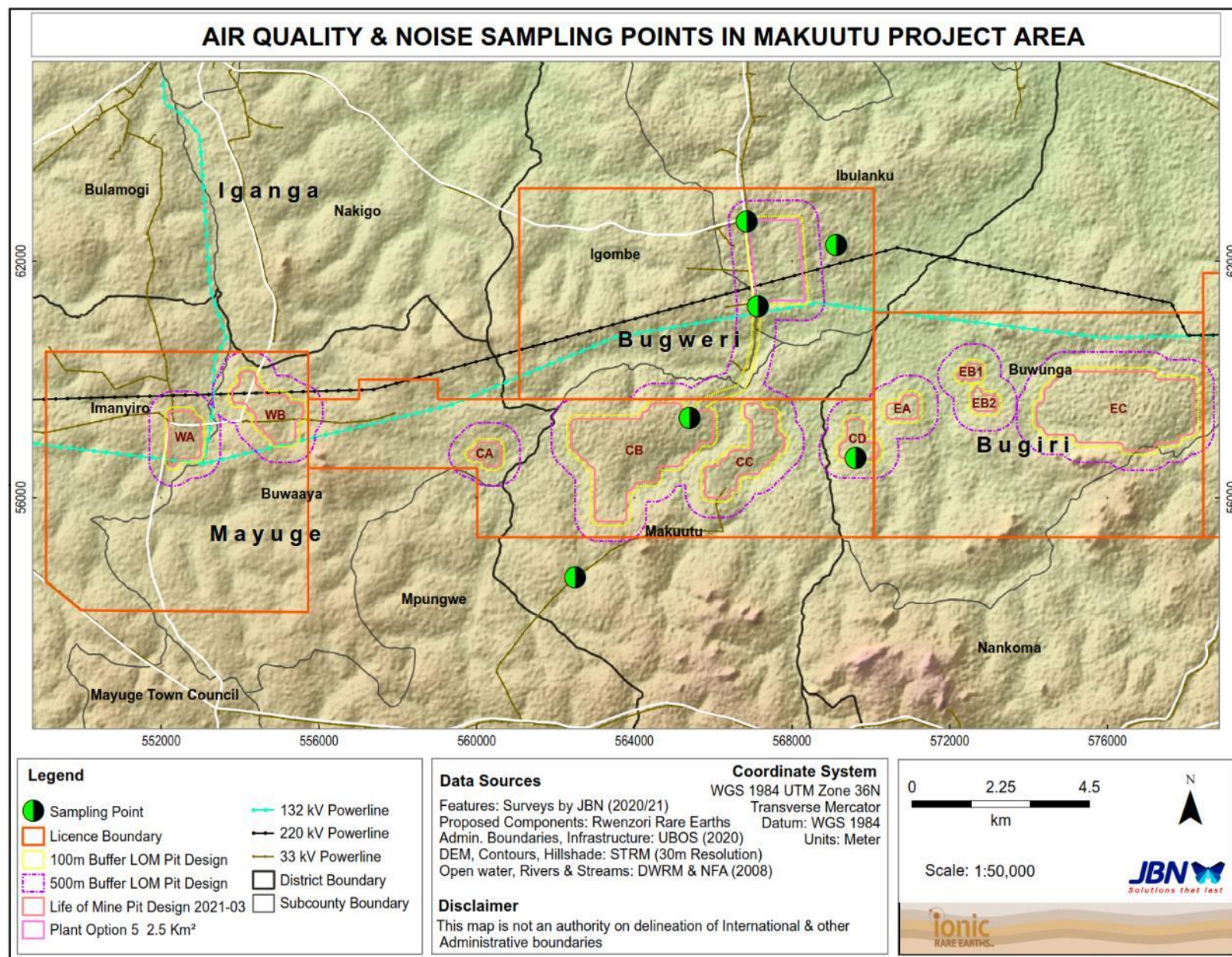


Figure 59: Air quality and noise sampling points

Table 20: Monitoring results for particulate matter (PM)

Location	Date & Run time	PM 2.5 (mg/m3)				PM 10 (mg/m3)				Observations
		Min	Ave	Max	WHO 24-hour AQG	Min	Ave	Max	WHO 24-hour AQG	
Buniantole Primary School	07/04/2021- 08/04/2021 07:00Am – 07:00Pm	0.003	0.006	0.020	0.025	0.003	0.015	0.171	0.05	Vehicle traffic along Buniantole-Nakivumbi Road at the time of assessment
Nakivumbi Trading Center	09/04/2021- 10/04/2021 07:00Am – 07:00Pm	0.003	0.013	0.083	0.025	0.005	0.032	0.272	0.05	Vehicle traffic and grain miller within Nakivumbi Trading Center
Mawololo Trading Center	11/04/2021- 12/04/2021 07:00Am – 07:00Pm	0.002	0.007	0.070	0.025	0.004	0.013	0.083	0.05	Strong winds at the time of assessment that caused dust resuspension.
Namaganda Trading Center	13/04/2021- 14/04/2021 07:00Am – 07:00Pm	0.004	0.008	0.107	0.025	0.003	0.017	0.145	0.05	Strong winds at the time of assessment that caused dust resuspension.
Mawanga Primary School/ HC III/ COU	15/04/2021- 16/04/2021 07:00Am – 07:00Pm	0.003	0.005	0.028	0.025	0.004	0.009	0.042	0.05	Vehicle traffic along main road and strong winds.
Namavundu Trading Center	17/04/2021- 18/04/2021 07:00Am – 07:00Pm	0.004	0.018	0.185	0.025	0.007	0.050	0.333	0.05	Vehicle traffic along Makutu-Namavundu Road at the time of assessment

Table 21: Monitoring results for SO<sub>2</sub>, NO<sub>2</sub> and CO within Makuutu Project Area

Location	Date & Run time	Readings			Observations
		NO <sub>2</sub> (ppm)	SO <sub>2</sub> (ppm)	CO (ppm)	
WHO Permissible limits		Annual mean – 40 µg/m <sup>3</sup> = 0.021 ppm  1-hour mean – 200 µg/m <sup>3</sup> = 0.11 ppm	24-hr mean – 20 µg/m <sup>3</sup> = 0.008 ppm  10-minute mean – 50 µg/m <sup>3</sup> = 0.02 ppm	None	
Kenya Air Quality Standards for Residential, Rural & Other areas (The Environmental Management and Co-Ordination (Air Quality) Regulations, 2014)		24-hour mean – 0.1 ppm  1-hr average – 0.2 ppm  Annual average – 0.05 ppm	24-hour mean – 0.048 ppm /125 µg/m <sup>3</sup>  Annual average – 0.019 ppm/50 µg/m <sup>3</sup>	8-hours average – 2.0 mg/m <sup>3</sup>  = 1.74 ppm	
National Ambient Air Quality Standards by the U.S Environment Protection Agency <sup>1</sup>		1-hour average – 0.1 ppm  Annual mean – 0.053 ppm	1-hour mean – 0.075 ppm  3-hour mean – 0.5 ppm	8-hour average – 9 ppm  1-hour average – 35 ppm	
Buniantole Primary School	07/04/2021- 08/04/2021 07:00Am – 07:00Pm	Min: 0.030 Ave: 0.077 Max: 0.103	Min: 0.00 Ave: 0.08 Max: 0.63	Min: 0.00 Ave: 0.58 Max: 8.73	Vehicle traffic along Buniantole-Nakivumbi Road at the time of assessment
Nakivumbi Trading Center	09/04/2021- 10/04/2021 07:00Am – 07:00Pm	Min: 0.061 Ave: 0.102 Max: 0.140	Min: 0.00 Ave: 0.02 Max: 0.21	Min: 0.00 Ave: 1.22 Max: 14.60	Vehicle traffic and grain miller within Nakivumbi Trading Center

<sup>1</sup> USEPA: NAAQS Table. Available online at: <https://www.epa.gov/criteria-air-pollutants/naaqs-table>

Location	Date & Run time	Readings			Observations
Mawololo Trading Center	11/04/2021- 12/04/2021 07:00Am – 07:00Pm	Min: 0.144 Ave: 0.189 Max: 0.257	Min: 0.00 Ave: 0.01 Max: 0.26	Min: 0.00 Ave: 0.01 Max: 0.26	Smoke from restaurants
Namaganda Trading Center	13/04/2021- 14/04/2021 07:00Am – 07:00Pm	Min: 0.030 Ave: 0.076 Max: 0.101	Min: 0.00 Ave: 0.04 Max: 0.08	Min: 0.00 Ave: 0.46 Max: 6.97	Smoke from chapati makers
Mawanga Primary School/ HC III/ COU	15/04/2021- 16/04/2021 07:00Am – 07:00Pm	Min: 0.035 Ave: 0.093 Max: 0.155	Min: 0.00 Ave: 0.03 Max: 0.44	Min: 0.00 Ave: 0.02 Max: 0.38	Vehicle traffic along main road and strong winds.
Namavundu Trading Center	17/04/2021- 18/04/2021 07:00Am – 07:00Pm	Min: 0.148 Ave: 0.200 Max: 0.272	Min: 0.00 Ave: 0.04 Max: 0.08	Min: 0.00 Ave: 0.03 Max: 0.48	Vehicle traffic along Makutu-Namavundu Road at the time of assessment

### 6.1.5 Noise

The equivalent continuous sound pressure level with A-weighting (i.e., LAeq) was monitored (refer Table 22). Monitoring was done at the nearest sensitive receptors; the same points may be used for monitoring during project implementation. The noise levels were compared with the limits as stipulated in The National Environment (Noise **Standards** and Control) **Regulations 2003**. The results reveal relatively quiet areas except at trading centres. The implication is that the residents may be more sensitive to noise disturbances since their areas are relatively quiet while those at the trading centres already experience relatively high noise levels and these are unlikely to be very sensitive to noise. Noise monitoring is recommended to assess exposure of workers to high noise levels (more than 85 dBA), a level at which ear protection using ear plugs or earmuffs is warranted. Noise monitoring is also important at nearby homes/ residences/ sensitive receptors located less than 200 meters from high noise emissions.

Table 22: Noise Monitoring Results within the Makuutu Project Area

Location	Run time	GPS Coordinates	Equivalent Continuous Sound Pressure Level with A-weighting, LAeq	NEMA day-time limit (dBA)	Field Observations
Buniantole Primary School	07/04/2021-08/04/2021 07:00Am – 07:00Pm	N 0060963 E 0567167	52.9 dB	60	Kids playing at school at the time of assessment
Nakivumbi Trading Center	09/04/2021-10/04/2021 07:00Am – 07:00Pm	N 0060864 E 0567130	69.1 dB	60	Music playing at trading centre and noise from the cinema hall
Mawololo Trading Center	11/04/2021-12/04/2021 07:00Am – 07:00Pm	N 0058024 E 0565398	53.8 dB	60	Kids playing and strong winds blowing
Namaganda Trading Center	13/04/2021-14/04/2021 07:00Am – 07:00Pm	N 0062416 E 0569122	62.3 dB	60	Music playing within the trading center at a music library.
Mawanga Primary School/ HC III/ COU	15/04/2021-16/04/2021 07:00Am – 07:00Pm	N 0057016 E 0569612	60.1 dB	60	Kids playing at school at the time of assessment
Namavundu Trading Center	17/04/2021-18/04/2021 07:00Am – 07:00Pm	N 0053989 E 0562499	67.4 dB	60	Music playing at a music library and occasional vehicle/ motorcycle traffic.

## 6.2 Hydrology

The 3 districts of Bugweri, Bugiri and Mayuge are characterized by wetlands that are crossed by streams and rivers. Hydrological issues are therefore critical to mitigate risks of water and food contamination since most of the wetlands are cultivated.



### 6.2.1 Overall Surface Hydrology

Situated in the Lake Kyoga Basin, within Lumbuye and Naigombwa sub catchments, the project area possesses surface water resources in form of streams and rivers (refer Figure 60). Lumbuye sub catchment covers an area of approximately 1,215km<sup>2</sup> while Naigombwa sub catchment covers an area of about 1,711 km<sup>2</sup>. The sub catchments traverse a wide range of landcover types including settled agricultural areas, grasslands, wetlands of different types and forested areas on land surface that is generally relatively flat, with gentle undulating hills and a few isolated higher residual features with almost flat valleys. Much of the low-lying areas are characterised by wetlands drained by streams (seasonal and permanent) and rivers into Lake Kyoga. There are numerous wetlands in the sub catchments with the main wetland systems being Naigombwa and Lumbuye.

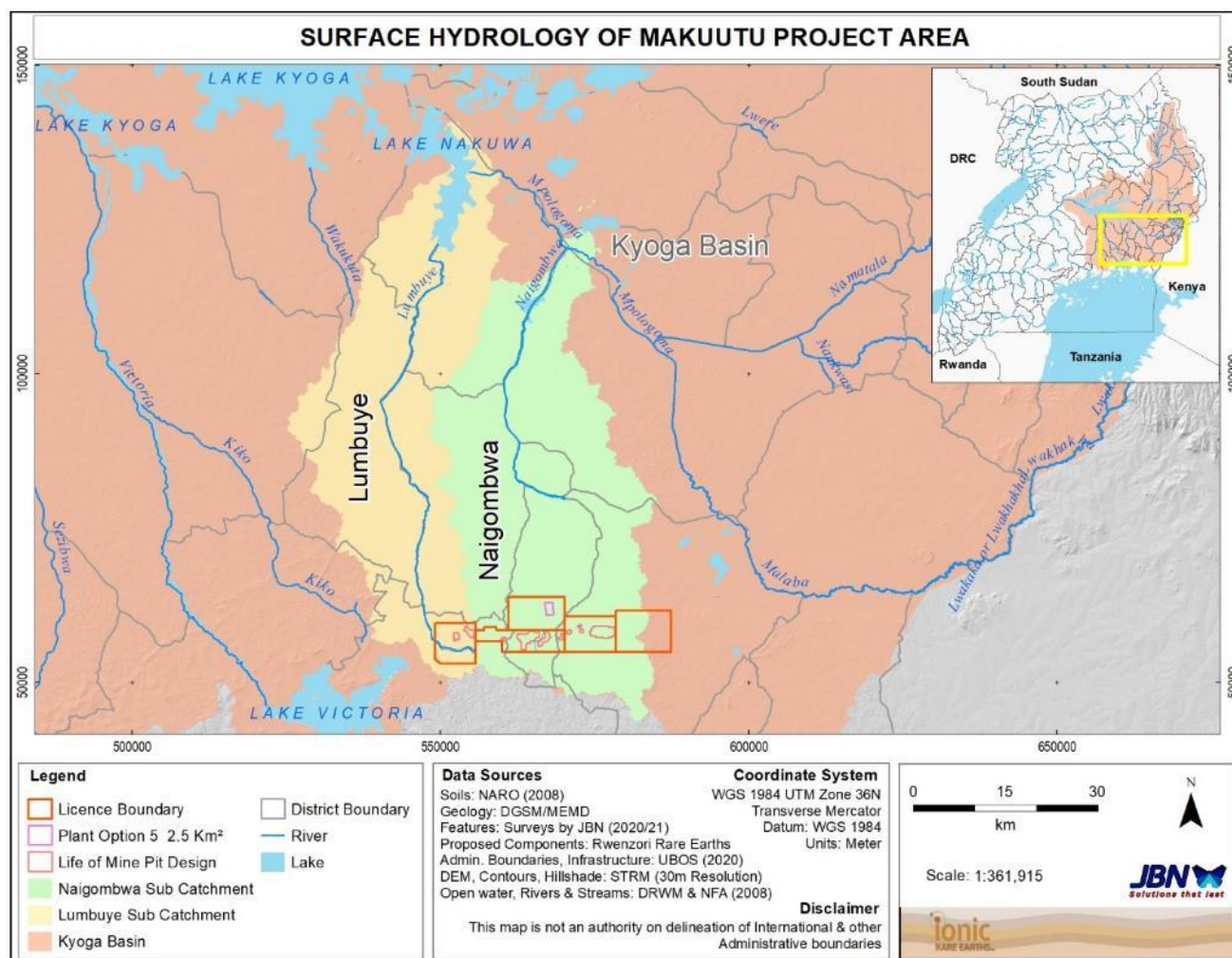


Figure 60: Surface Hydrology of the Project Area

Within the project area, Naigombwa sub catchment covers Bugweri district and parts of Bugiri and Iganga districts, while Lumbuye sub catchment covers parts of Iganga and Mayuge districts. The processing plant, central and eastern mining pit concessions are located in Naigombwa sub catchment (Upper), while the western mining pit concession is located in Lumbuye sub catchment (Upper). The sub catchments have high intra-annual variability, with Lumbuye having high flows of up to 6.7m<sup>3</sup>/s (June) during the wet season and low flows of up to 1.4 m<sup>3</sup>/s during the dry season (March) while, Naigombwa has high flows of up to 23.6 m<sup>3</sup>/s during the wet season (May) and low flows of up to 6.0 m<sup>3</sup>/s during the dry season (March) as shown in Figure 61.

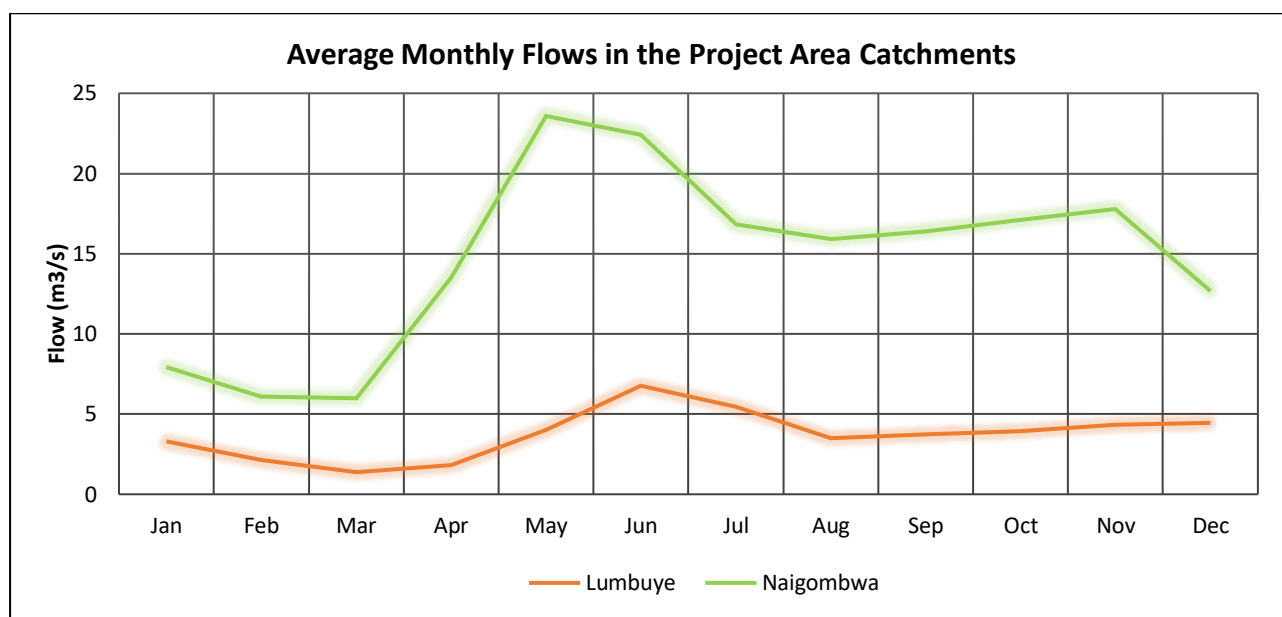


Figure 61: Average Monthly Flows in the Project Area Catchments

Notably, in Naigombwa sub catchment, the monthly flows during a dry year can be up to less than half the flows during an average year, due to inter-annual variability as summarised in Figure 62, each month being a dry month with a 5-year return period (refer Figure 62).

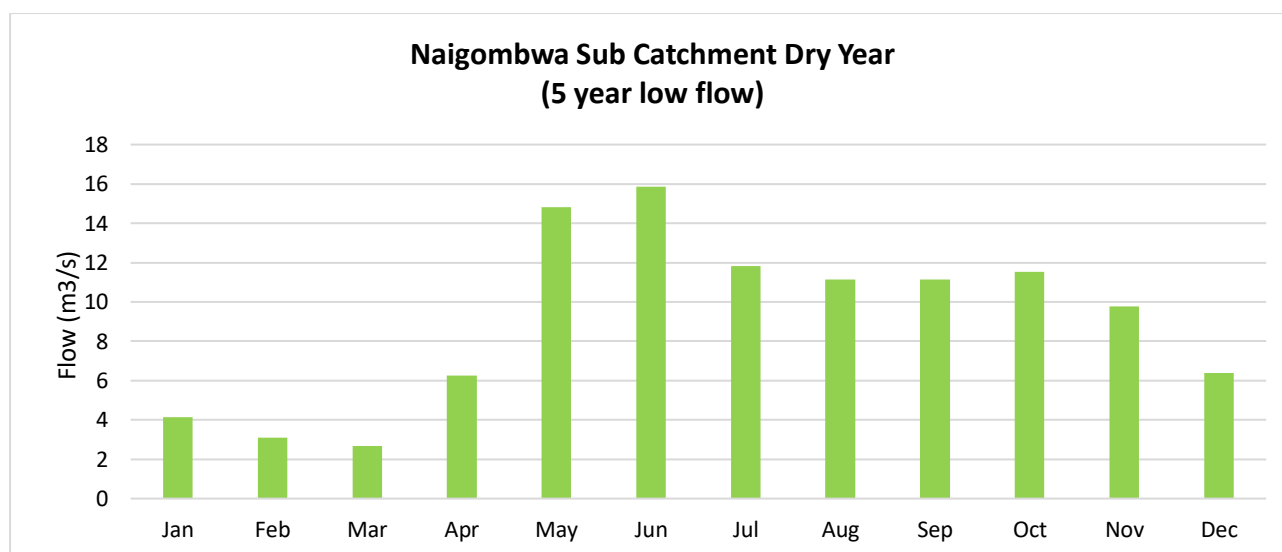


Figure 62: Naigombwa Sub Catchment Dry Year Monthly Flows

## 6.2.2 Project Area Hydrology

### 6.2.2.1 Processing Plant

The proposed processing plant site sits on an area of about 2.5 km<sup>2</sup>, with altitude varying between 1113m and 1169m above mean sea level (AMSL). The highest point is located in the North eastern corner, while the lowest is located along the South eastern boundary of the proposed processing plant area. The site is primarily drained by one perennial stream (S1) which flows in a south eastern direction through the site. The Stream S1 forms the boundary between Buniantole Parish (Buniantole and Kabugweri villages) and Namiganda Parish (Namiganda Village). The water table in this area is generally high, with various springheads forming in the site and draining towards the valley into stream S1. Notably, there are 2 predominant springheads on the site. One is utilized as an unprotected spring for domestic water, while the other (referred to as *Kiyini Kibi*) is used for



watering animals (Figure 63). Much of the valley area along which the stream S1 runs, was previously classified as a wetland according to RCMRD (2015), however it is currently mainly covered by rice paddies as indicated in Figure 64.



Figure 63: Unprotected Springs on the Proposed Processing Plant Site (Left: Kiyini Kibi and Right: Unprotected Spring)



Figure 64: Rice Paddies in the Wetland in along Stream S1

Furthermore, the southwestern part of the site has a slight ridge at about 1136m AMSL which separates its drainage flow direction, converting about 0.13 km<sup>2</sup> towards the southwest. Runoff from this minor area flows to site drainage channel D1, that runs parallel to the Busesa – Nakivumbi road which borders the site to the west. D1 ultimately flows through culverts to cross Nakivumbi trading centre where after it connects to stream S2. S2 originates from wetlands in Businda and Kyabugweri Villages and flows in southeastern direction where it ultimately forms a confluence with stream S1 and the resultant stream (S3), flows further in the same direction for about 2.6 km whereafter it discharges into Kitumbezi river (Figure 65).



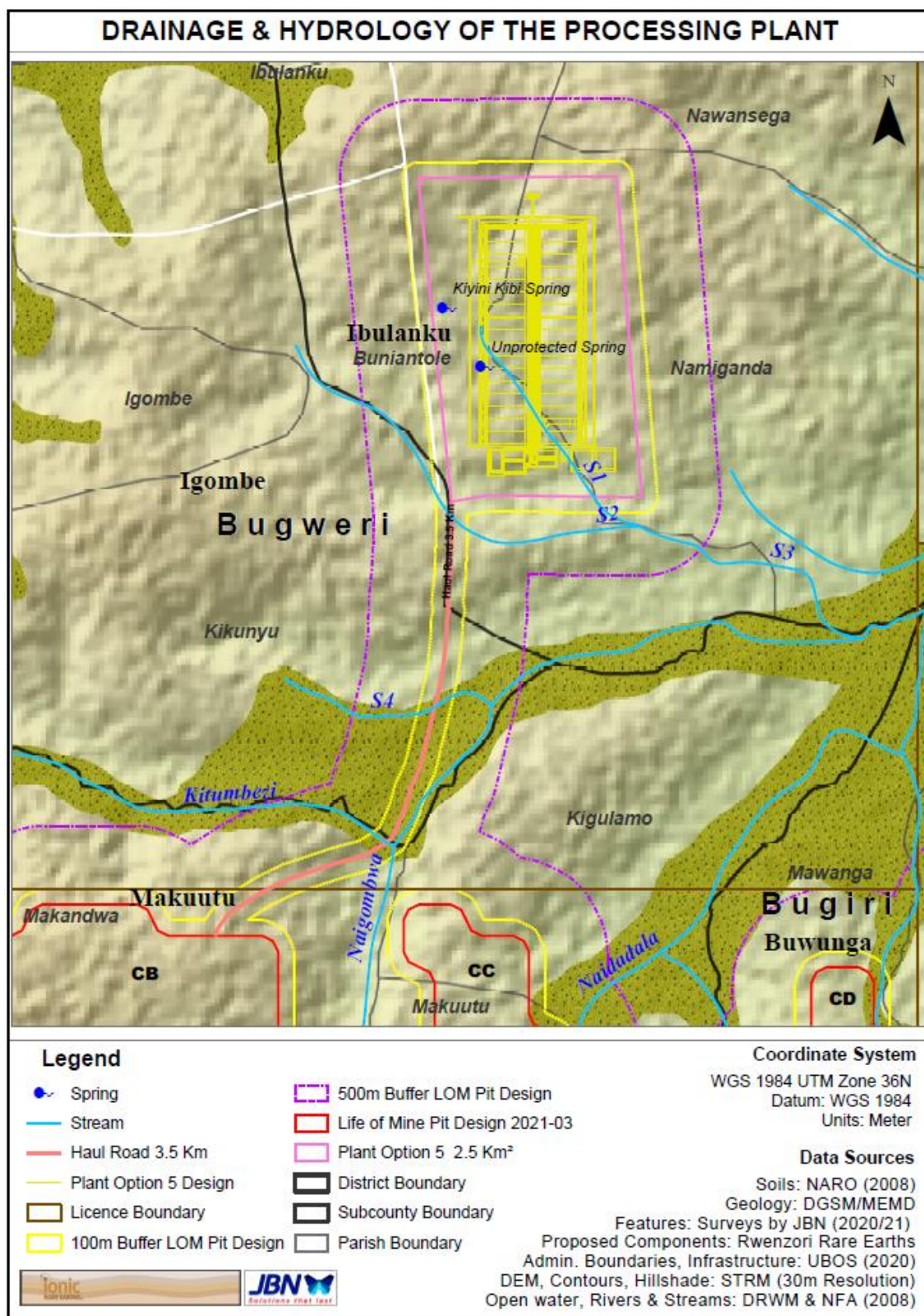


Figure 65: Hydrology of the Processing Plant and Haul Road



Figure 66: Drainage channel D1 that Flows Towards Nakivumbi Trading Centre

#### 6.2.2.2 Haul road

The alignment of the proposed Haul Road is still uncertain but it will be separated from the public road on a parallel route. It will span about 3.5 kms from the proposed processing plant site to the proposed mining pit site CB. Its alignment varies between 1111 AMSL to 1159 AMSL as indicated in Figure 67. The alignment crosses 2 streams (S2 and S4) and Kitumbezi river (just before its confluence with Naigombwa river) as indicated in Figure 67.

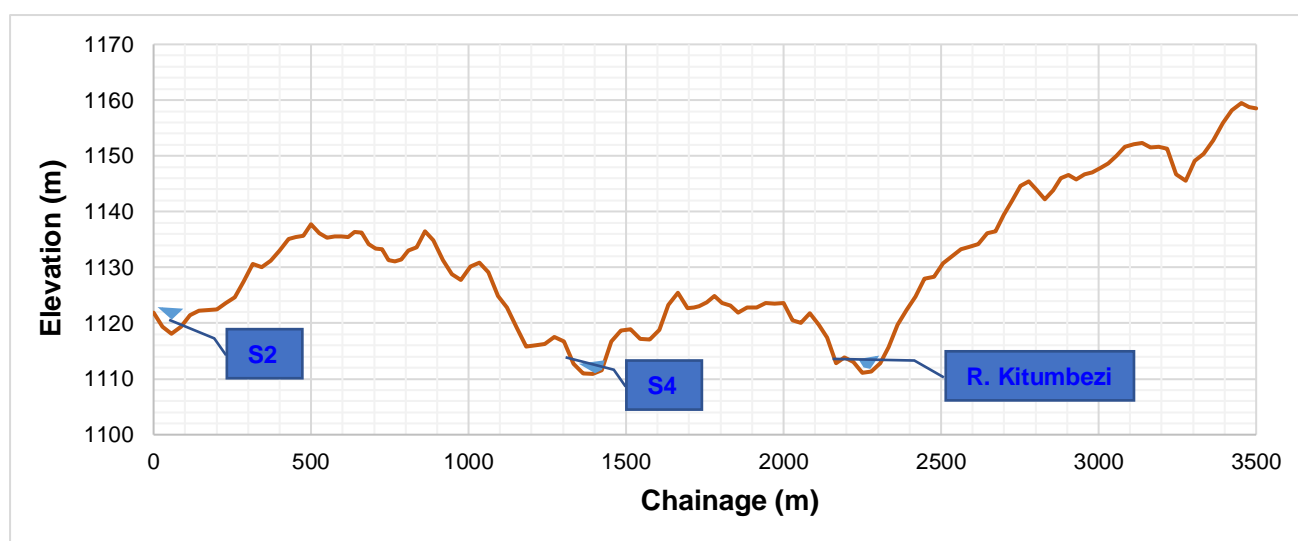


Figure 67: The Haul Road profile and the Water Courses Crossing it

#### 6.2.2.3 Central and Eastern Mine Pit Concessions

The central mine pit concession is mainly drained by R. Kitumbezi and its tributaries in an East to West direction. River Kitumbezi in sequence also discharges into R. Naigombwa. The mining pit CA is drained by R. Nakate to the North, R. Kagago to the South West and R. Kitumbezi to the South East. The closest river to the mining pit, R Kitumbezi, crosses the 500m buffer at a distance of about 220m from the mining pit.

The mining pit CB is drained by R. Kitoto to the West, R. Kitumbezi to the North and R. Naigombwa to the East. The closest river to the mining pit, R Naigombwa, crosses the 100m buffer at a distance of about 90m from the mining pit.



Mining pit CC is drained by R. Naigombwa to the West, R. Kitumbezi to the North and R. Nahidadala to the East. The closest river points to the mining pit along R. Naigombwa and R. Nhidadala cross the 100m buffer at a distance of about 30m and 69m from the mining pit respectively.



Figure 68: River Naigombwa crossing to the West of mining pit CC

Mining pit CD is drained by R. Kituto to the West, R. Nahidadala to the North and Waidangala seasonal stream to the East. Notably, Waidangala seasonal stream originates from within the mining pit formed by springheads in the wetlands of Busambira village. The closest river to the mining pit, R. Kututo, crosses the 500m buffer at a distance of about 310m from the mining pit (refer Figure 69).



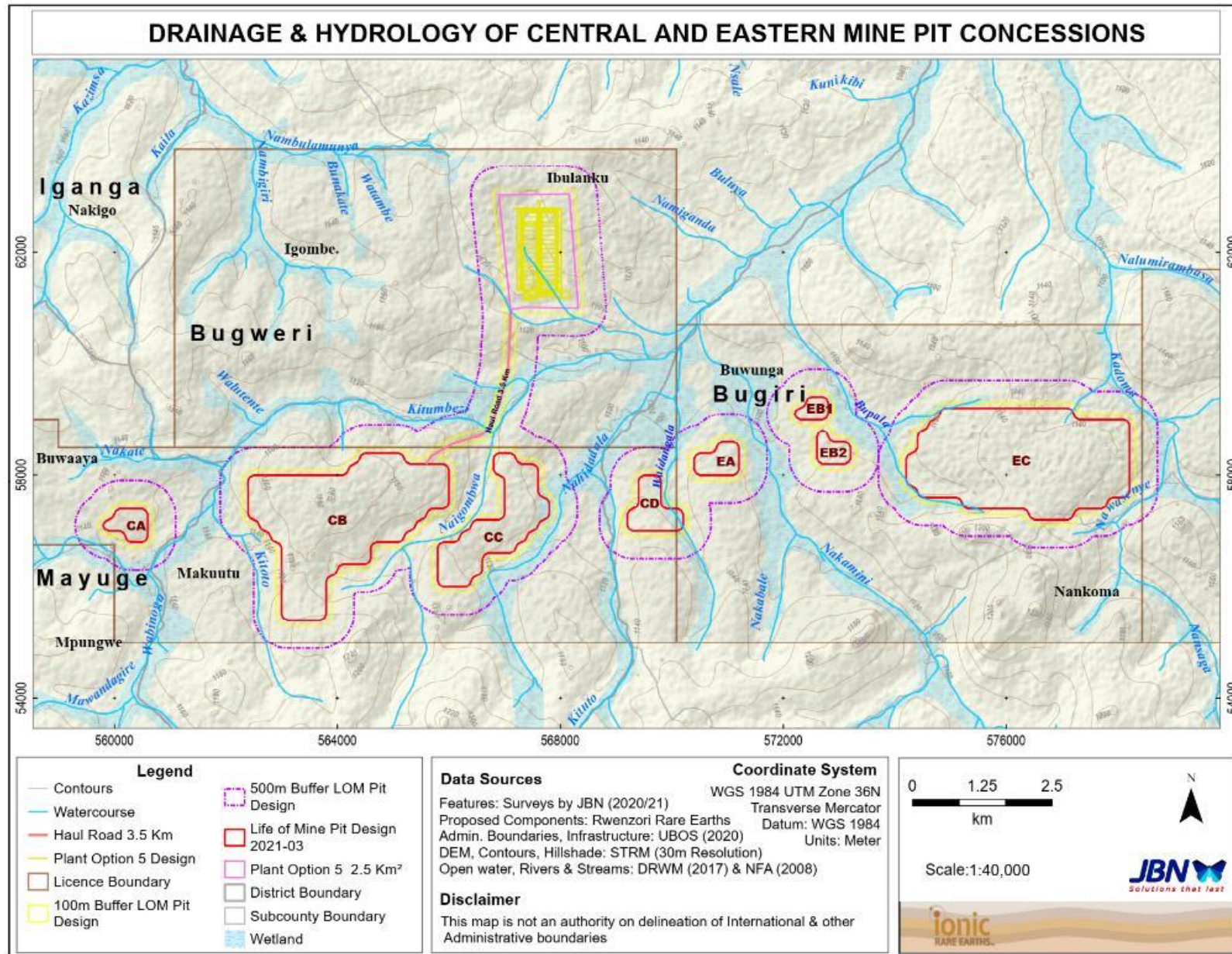


Figure 69: Hydrology of the Central and Eastern Mine Pit Concessions



Mining pit EA is drained by Waidangala seasonal stream to the West and R. Nakamini to the East and North East. The closest stream/ river points to the mining pit along Waidangala seasonal stream cross the 500m buffer at a distance of about 380m from the mining pit and R. Nakamini at a distance of about 510m from the mining pit. Mining pits EB1 and EB2 are drained by R. Nakamini to the West and R. Bupala to the East and North East. The closest river points to the mining pits along R Bupala cross the 500m buffer at a distance of about 360m to mining pit EB1 and 400m to mining pit EB2. The mining pit EC is mainly drained by R. Bupala to the west, R. Nawasenye to the south east and R. Kadoma to the East and North East. An all-year stream drains the mining pit EC to the south East, flowing through the valley separating Wandegaire LCI and Kasonguire LCI (refer Figure 70) and finally into R Nawasenye, while Nakadama seasonal stream originates from within the mining pit, flowing in a north eastern direction into R. Kadoma (refer Figure 71).



Figure 70: Rice Paddies along the stream Between Wandegaire LCI and Kasonguire LCI



Figure 71: Marshes along Nakadama Seasonal Stream

#### 6.2.2.4 Western Mine Pit Concession

Mining pit WA is drained by R. Lumbuye to the South and West and R. Walugogo to the East and North East. The closest river point to the mining pit along R. Walugogo crosses the 500m buffer at a distance of about 109m from the mining pit. Mining pit WB is drained by R. Walugogo to the west and R. Magoola, which originates for the southern end of the pit and drains to the East and North East, eventually discharging into R. Walugogo (Figure 72).



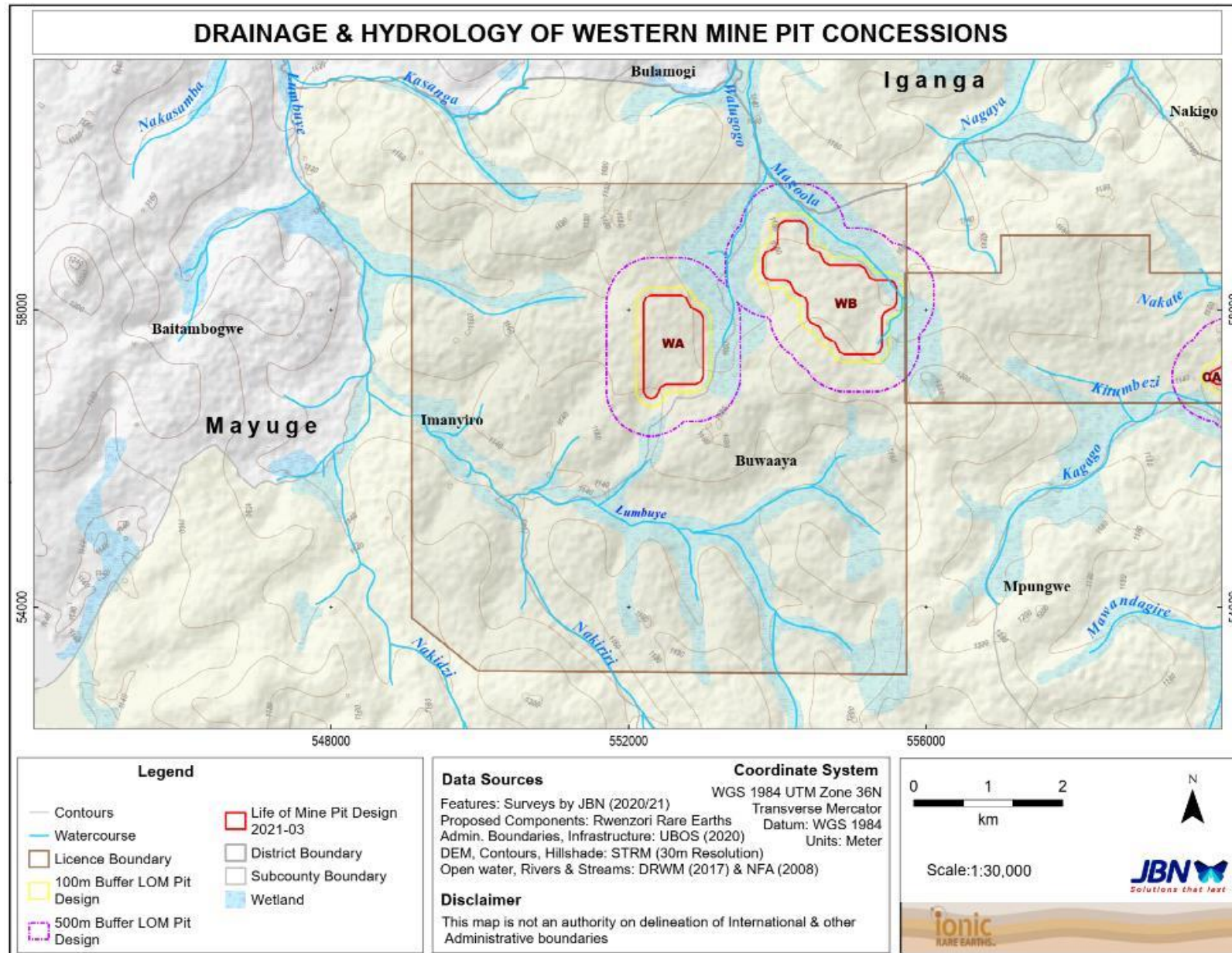


Figure 72: Hydrology of the Western Mine Pit Concessions

### 6.2.3 Wetlands

The wetlands in the project area form part of the main wetland systems of Lumbuye and Naigombwa. In the valleys where they occur, seasonal wetlands are drained by streams, while permanent wetlands are drained by rivers. The major permanent wetlands in the project area include Lumbuye, Kitumbezi, Nahidadala and Nakamini wetlands, with the latter 3 forming part of the Naigombwa wetland system. Within the project area, Lumbuye wetland is located in parts of Buwaaya and Manyiro sub counties (Figure 73). It drains towards Iganga, where it joins with Walugogo wetland that forms part of the main Kyoga wetland system.

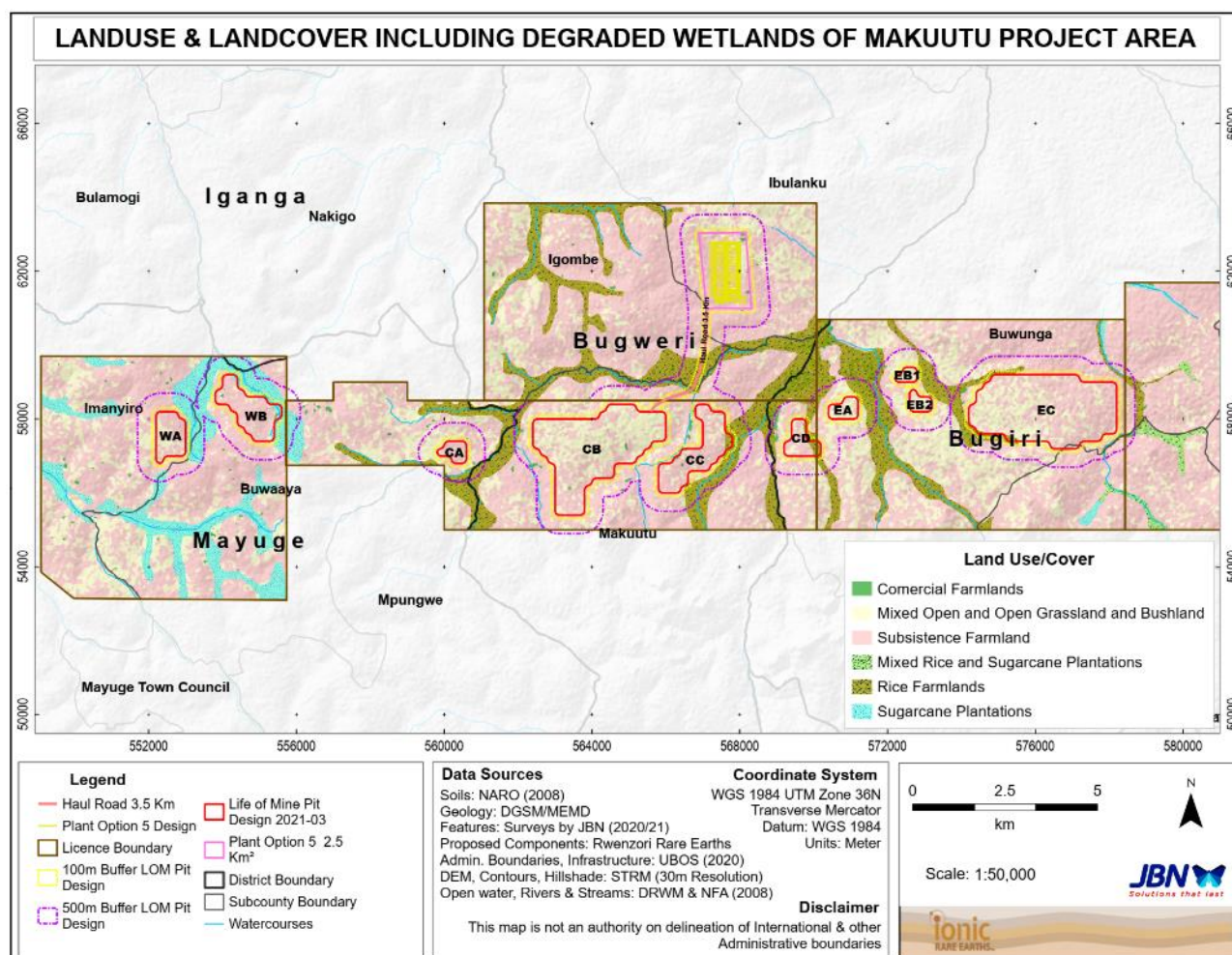


Figure 73: Wetland System in the Project Area

Both the seasonal and permanent wetlands in the project area have been heavily modified with gardens of sugar cane and rice. Moving across the project area from east to west, the wetlands are all heavily cultivated with those in the environs of the eastern and central mining pit concessions covered by rice paddies, while those in the environs of the western mining pit concession are covered by sugarcane plantations (Refer Table 23 and Figure 74).



Table 23: Wetlands and their land/use cover in the project area

Original LULC Class	Description of the LULC	Current LULC Status (Degraded Wetland)	Area (Ha)	Percentage (%)
<b>Grassland</b>	Rangelands, pasturelands, open savannah may include scattered trees shrubs and thickets but with patches of thick closed canopy forests and woodlands	Sugarcane Plantations	1060.65	29.76
<b>Palms and Thickets</b>	Thick or sparse palm trees and or scattered trees and shrubs	Mixed Rice and Sugarcane Plantations	107.88	3.03
<b>Subsistence Farmland</b>	Mixed farmland small holdings in use or recently used with or without trees including patches of Papyrus swamp species	Rice Farmlands	2394.88	67.21
<b>Total</b>			3563.41	100



Figure 74: Cultivated wetlands in the Project Area

## 6.2.4 Groundwater and hydrogeology

### 6.2.4.1 Community water supply

Ground water is available in the sub catchments of the project area. According to JICA (2011) and NWRA (2013), the estimated exploitable groundwater of the aquifer systems varies between 117 million cubic metres (mcm) /year and 390 mcm/year. The project area is in a rural setting without municipal water coverage and therefore the primary sources of water for domestic use are ground sources in form of springs (both protected and unprotected), shallow wells and boreholes.

In Naigombwa sub catchment, there are an estimated 939 boreholes that abstract about 4,695 m<sup>3</sup> per day, 214 protected springs that abstract about 5,136 m<sup>3</sup> per day and 355 shallow wells that abstract about 888 m<sup>3</sup> per day. On the other hand, Lumbuye sub catchment has an estimated 636 boreholes that abstract about 3,180 m<sup>3</sup> per day, 271 protected springs that abstract about 6,504 m<sup>3</sup> per day and 357 shallow wells that abstract about 893 m<sup>3</sup> per day as shown in Table 24.

Table 24: Ground water abstraction in the project area sub catchments

Sub-catchments	No. of deep boreholes	Total abstraction / day <sup>(1)</sup>	No. of protected springs	Total abstraction / day <sup>(2)</sup>	No. of shallow wells	Total abstraction / day <sup>(3)</sup>	m3 consumed and/or discharged	Total abstraction / year from production wells	Total groundwater abstraction / year Rural and urban combined	
							per day	per year		
Naigombwa	939	4,695	214	5,136	355	888	10,719	3,912,253	61,500	3,937,983
Lumbuye	636	3,180	271	6,504	357	893	10,577	3,860,423	6,500	3,823,488

Sources: DWRM 2018a & DWRM 2018b.

**Assumptions:** 1 hand-pump equipped deep borehole abstracts 5 m<sup>3</sup>/day. 1 shallow well abstracts 2.5 m<sup>3</sup>/day. 1 protected spring discharges 24 m<sup>3</sup>/day.

Boreholes are the predominant source of water in the project area, with the Nakigo Sub County having the highest number of about 63 boreholes at a coverage density of about 0.97 borehole per km<sup>2</sup>, followed by Buwunga Sub County with a total of 44 borehole and a coverage density of about 0.37 borehole per km<sup>2</sup>. On the opposite extreme is Imanyiro Subcounty with 25 boreholes and a coverage density of about 0.31 borehole per km<sup>2</sup>. Shallow wells and protected springs are also present in the project area varying in total and density by subcounty as presented in Table 25 and Figure 75.

Table 25: Water Source Point Distribution in the Project Area

District	Subcounty	No. of Households	Area (km <sup>2</sup> )	Boreholes	Shallow Wells	Protected Springs
<b>Iganga</b>	Nakigo	1113	64.63	63	10	3
<b>Bugiri</b>	Buwunga	5670	119.38	44	5	11
<b>Bugiri</b>	Nankoma	2369	91.17	39	0	11
<b>Bugweri</b>	Ibulanku	448	75.00	31	0	2
<b>Bugweri</b>	Igombe	1161	42.14	27	8	3
<b>Mayuge</b>	Buwaaya	3990	56.61	27	8	9
<b>Bugweri</b>	Makuutu	4830	68.65	26	2	5
<b>Mayuge</b>	Mpungwe	1078	57.05	25	8	7
<b>Mayuge</b>	Imanyiro	2287	80.79	25	3	6



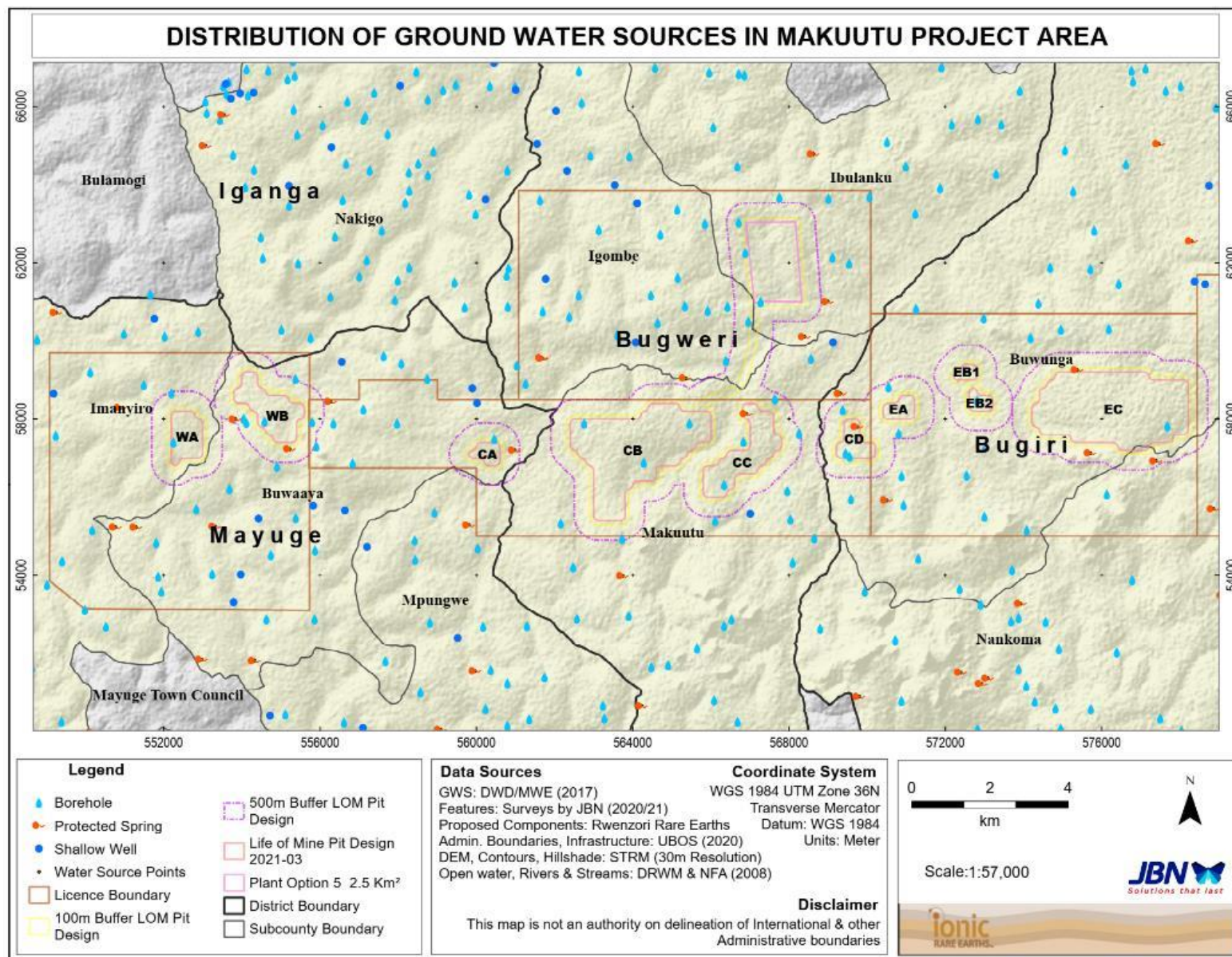


Figure 75: Ground Water Source Point Distribution in the Project Area





Ibrahim Munulo Islamic Secondary School



Makuutu Sub county



Butenkaile Village



Buswiriri Village Mosque

Figure 76: Select Boreholes in the Projects Area

The exploitable groundwater was deemed to be adequate by NWRA (2013), to sustain long-term resource development for domestic rural water supplies. It was estimated that in the Lumbuye sub catchment, about 6-23% of the exploitable groundwater volume is abstracted. A survey by the DWD (2017), focused on ground water resources development in Rural Growth Centres (RGCs) distributed across the project area, determined that the successful rate of borehole in the area was a yield of 2.5 m<sup>3</sup>/hr and more. The average borehole yield in the area was estimated at a minimum of 1.77 m<sup>3</sup>/hr in Nondwe RGC, Makuutu subcounty and maximum of 5.22 m<sup>3</sup>/hr in Busesa RGC, Ibulanku subcounty as shown in Table 26 and Figure 77.

Table 26: Hydrogeological Condition in each RGC and Successful Rate of Borehole in the Project Area

RGC	Average Drilling Depth (m)	Average SWL (m)	Average Yield (m <sup>3</sup> /h)	Max Yield (m <sup>3</sup> /h)	Success Rate for 2.5m <sup>3</sup> /hr Yield (%)
Nabitende Banada	53.6	12.4	3.12	8	46.2
Namung'alwe	55	11.1	2.4	11	20.8
Nambale	59.3	17.5	4.3	12	50
Naigobya	63.6	18.5	1.99	6.12	20
Busesa	57.4	7.9	5.22	9.25	80
Nakivumbi	60.8	13.6	2.45	8.15	40
Nondwe	51.7	12.1	1.77	4.71	22.2

SWL = Static Water Level



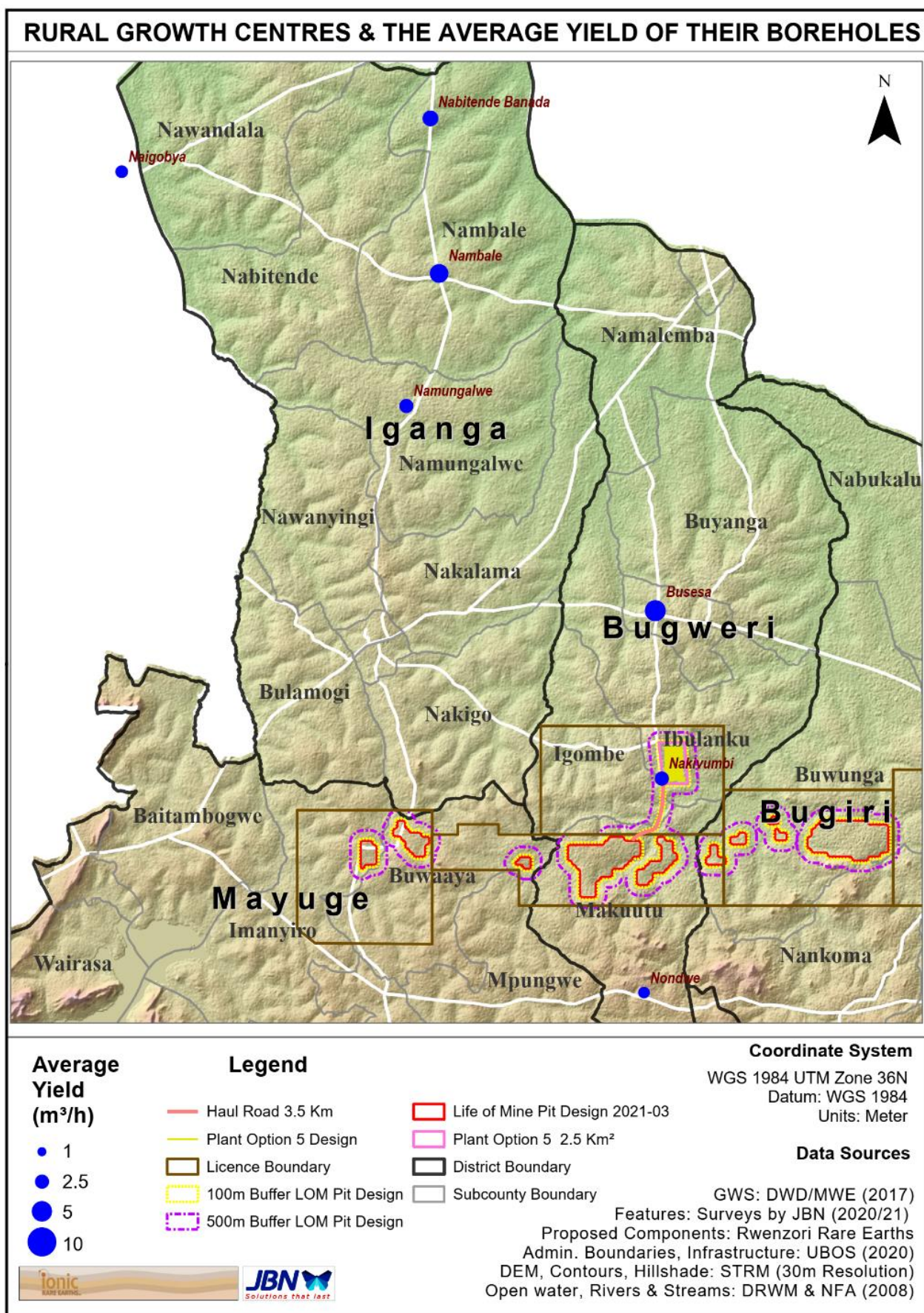


Figure 77: Map of RGCs in the Project Area Surveyed by DWD (2017)

#### 6.2.4.2 Mining area aquifers

While communities in the Project area rely on ground-water for their water supply the ionic adsorption REE clay deposits have low permeability and make poor aquifers. The community ground-water supply points therefore tend to be outside or at the outer edge of planned mining pits (refer Figure 75). The Year 1 to Year 10 Central Makuutu Ore-body for example has three boreholes near the outer edge of the orebody, no Protected Springs and no shallow wells.

The scarcity of high-yielding aquifers within the clay orebody is unsurprising with clay typically having a very low coefficient of permeability in the order of  $10^{-6}$  to  $10^{-7}$  m/day (refer Table 27). A cross-section of the Makuutu Ore-body (refer Figure 78) shows that the top 10 metres or so of the orebody and overburden is non-swelling kaolinite clay while the deeper parts of the orebody are dominated by montmorillonite which is a swelling smectite clay similar to bentonite which has extremely low permeability making it ideal for sealing dams and creating impermeable barriers. When relatively high permeability clay such as kaolinite is mixed with low permeability swelling clay the resultant mixture has low permeability. In one study a 50:50 mix of readily abundant kaolinite when mixed with expensive bentonite clay had a very low permeability of  $10^{-11}$  m/day, equivalent to pure bentonite, and suitable for use as an effective barrier in strong acidic and alkaline environments (<https://ascelibrary.org/doi/abs/10.1061/40519%28293%297>). This material is a factor of a billion less transmissible than the  $10^{-2}$  m/day permeability of open gravel.

Table 27: Example Coefficients of permeability for clay soils  
(<https://www.finesoftware.eu/help/qeo5/en/coefficient-of-permeability-01/>)

Type of soil	Coefficient of permeability $k$ [m/day]	Motion of water particle by 1 cm for hydraulic gradient $i = 1$ per time
Soft sand	$10^2 - 10$	6 s - 10 min
Clayey sand	$10^{-1} - 10^{-2}$	100 min - 18 hrs
Loess loam	$10^{-2} - 10^{-4}$	18 hrs - 70 days
Loam	$10^{-4} - 10^{-5}$	70 days - 2 years
Clayey soil	$10^{-5} - 10^{-6}$	2 years - 20 years
Clay	$10^{-6} - 10^{-7}$	20 years - 200 years



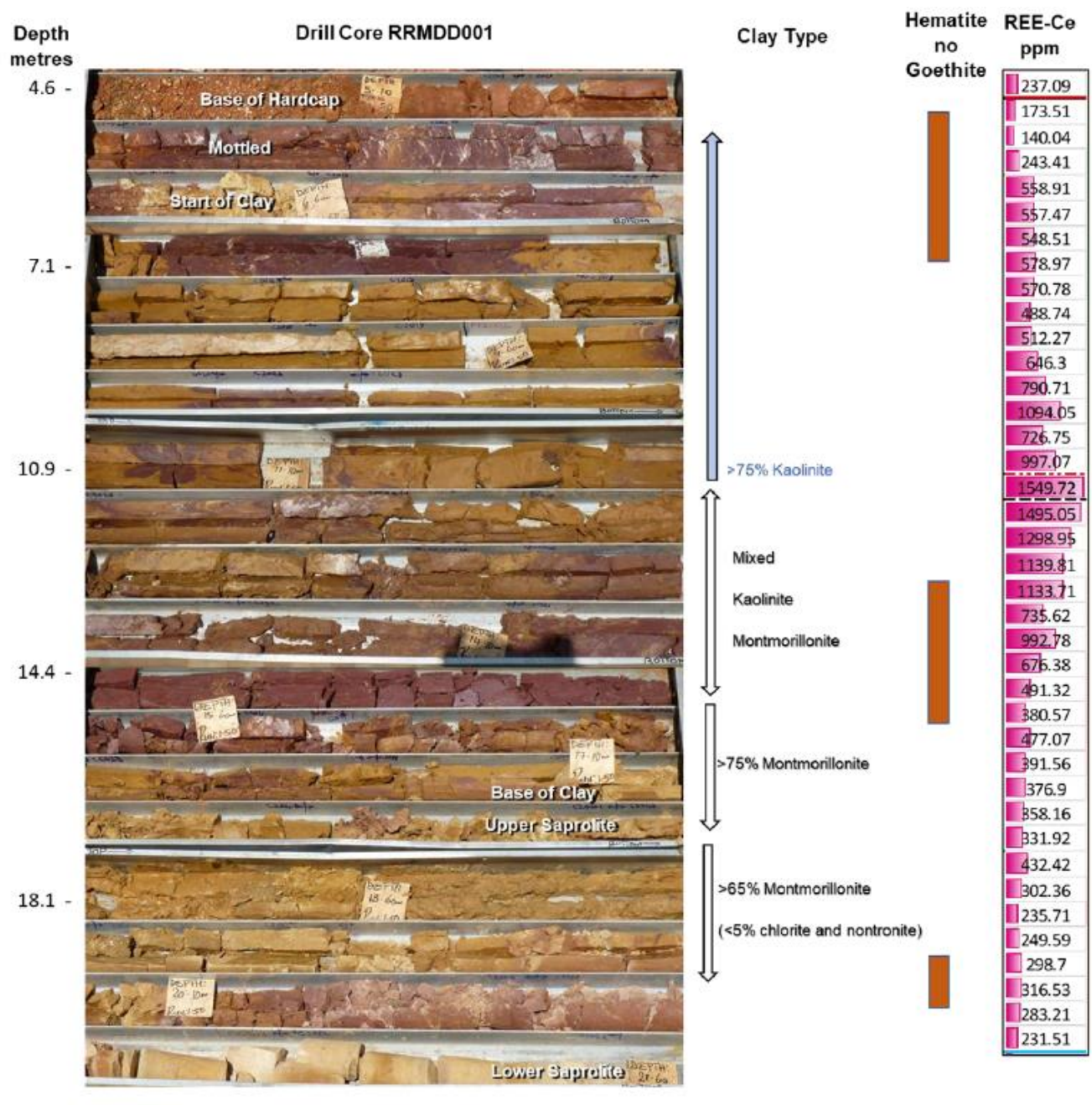


Figure 78: Clay Species within the Clay Regolith Zone (From Makuutu Project Preliminary Economic Study)

While the clay nature of the ore-body makes it an aquitard a detailed assessment of water bore data, geology (refer Figure 78) and previous hydrogeology studies across the Project lease was completed to identify any lenses of sand or gravel that could function as an aquifer within the orebody. While no major aquifers were identified, a number of permanent hydrogeology monitoring bores were installed in minor aquifers and around proposed mining areas and infrastructure locations. These bores will be used to monitor ground-water level and water quality over the life of the project and will not be used for water abstraction. These data will be reported to NEMA and DWRM in annual Environmental Reports.

#### 6.2.4.3 Hydrogeology Test Work

A desk-top assessment of the hydrogeology of the Project in the areas targeted for processing and the first 10 years of mining was completed by the Ugandan Optimum Earth Consultancy who have been engaged by the Project to provide a hydrogeology study plan to provide ongoing data capture, evaluation and hydrogeology study inputs to project design and the Bankable Feasibility Study (BFS). The main objective of the ground water monitoring programme is to plan an adequate number of monitoring wells that will be installed at targeted locations and depths to enable long-term monitoring that would be undertaken over the life of the Project. Other objectives include:

1. Measure the level and quality of groundwater including its annual and seasonal fluctuations.
2. Evaluate weather conditions and water table recharge.
3. Record groundwater extreme event mine impacts like floods and accidental pollution.
4. Observe the point and nonpoint pollutant sources discharge.
5. Store the level and quality data in a safe, relational and friendly way with the user.
6. Provide groundwater management indicators.
7. Provide support to the hydrogeological numerical modelling elaboration.

The Project does not intend to utilise groundwater for Project water supply during operations due to the positive water balance (refer Figure 39) which is driven by high rainfall, large catchment areas and the production of large amounts of Reverse Osmosis water as a by-product of membrane circuit in the Process Plant. This circuit is required to concentrate the REE after its desorption into the ammonium sulphate lixiviant. The Project additionally does not expect to experience significant groundwater inflow into the mining pits within a low permeability clay orebody. It is important nevertheless to identify any aquifers that might be present within any gravel lenses or paleochannels within the orebody.

The Project may, however, initially require some groundwater to support early test-work prior to the establishment of mining pits and the processing plant. An assessment of groundwater resources in the Project area is additionally important for local communities who rely on groundwater for their water supply.

##### 6.2.4.3.1 Hydrogeology overview

The proposed mining areas are on elevated land that gently slopes into the wetlands and valleys in the upstream part of the Kyoga water management zone / basin (refer Figure 80).

The MWE – JICA (2011) groundwater studies in eastern Uganda concluded that alluvial plains, developed along valleys have the highest potential for groundwater with successful boreholes mostly distributed in lowlands along valleys where water is taken from the lower section of strong weathered zones above basement rock. Higher areas have low potential for groundwater (refer Figure 86). The potential for groundwater development in the elevated areas proposed for mining is therefore low consistent with the lack of water-bores in these areas (refer Figure 75).



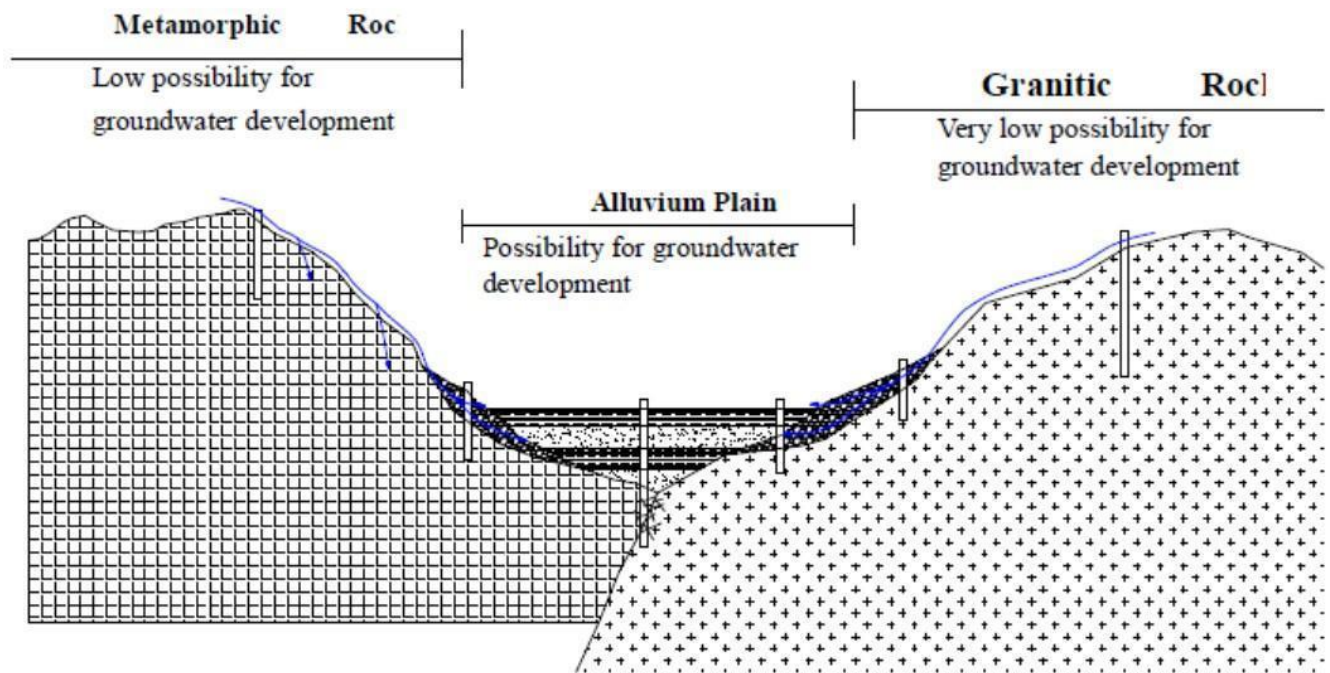


Figure 79: Expected hydrogeological situation

In principle, the hills act as recharge areas and water will flow to the valleys either as surface water or as sub surface flow (refer Figure 80). In some places, water will infiltrate deeper and will exfiltrate again at the springs that have formed at contacts between permeable and non-permeable layers. The rivers and streams will drain the water to the lakes and ultimately the wetlands/streams that discharge the water into Lake Kyoga.

According to the borehole database analysed, average 1st major water strike zone is indicated at 42m, just 10m below the average depth to bedrock/weathered zone. As a result, the weathered / fractured granitic rocks in place are considered a major groundwater aquifer in the area. This is well below the mining depth of about 20 metres which is additional confined to surface clays which function as an aquitard.

#### 6.2.4.3.2 Groundwater Flows

Groundwater flows underground in response to elevation differences (downwards) and pressure differences (from areas of high pressure to areas of low pressure). Near the water table, this means that groundwater usually flows 'downhill', i.e., from a higher level to a lower level, just as it would on the surface. Direction of flow is influenced by the water head. The slope of the water table is called the hydraulic gradient. The static water level map (refer Figure 81) provides an indicative flow of groundwater towards the zones with the lowest static water level which will be confirmed with the collection of detailed information which in turn will enable maps of groundwater flow directions, storage and recharge areas to be created.

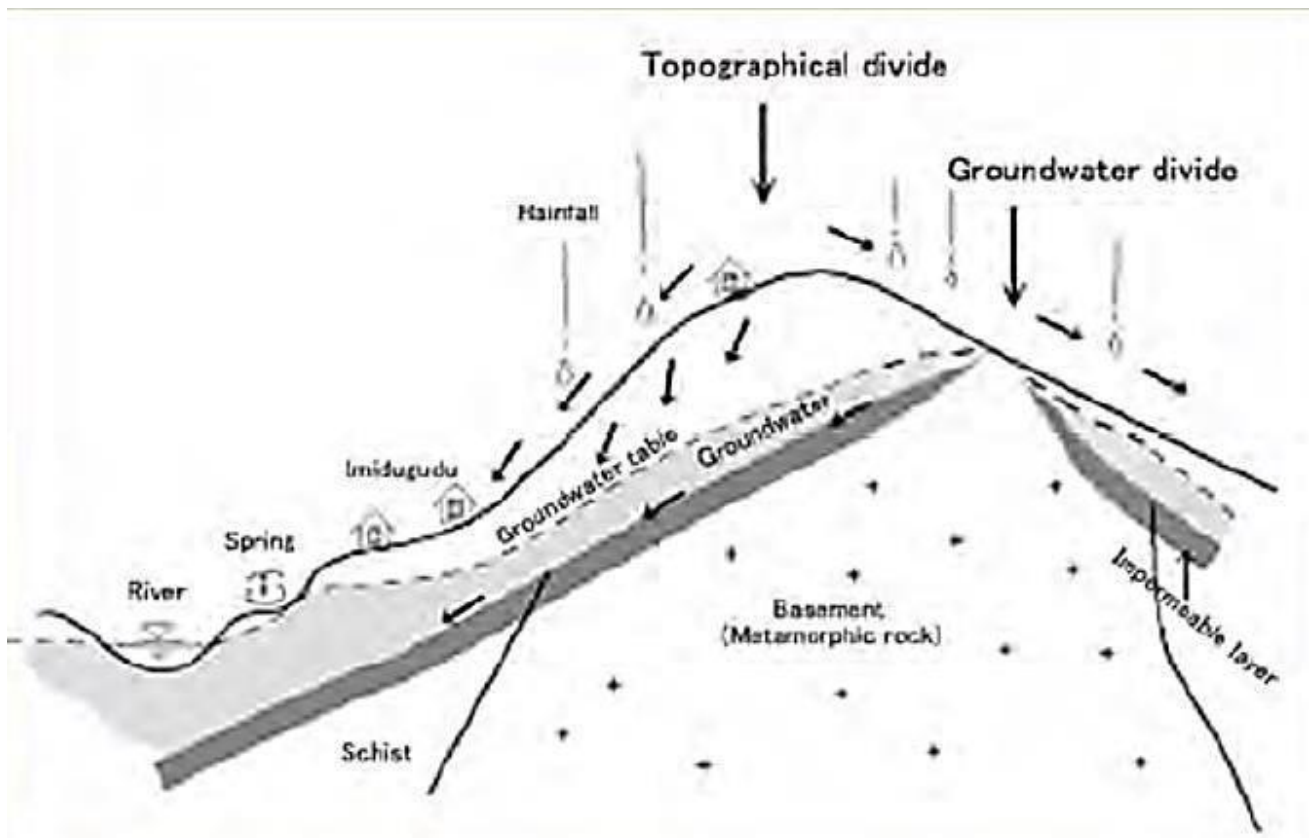


Figure 80: groundwater conceptual model for the mining area on the topographical divide

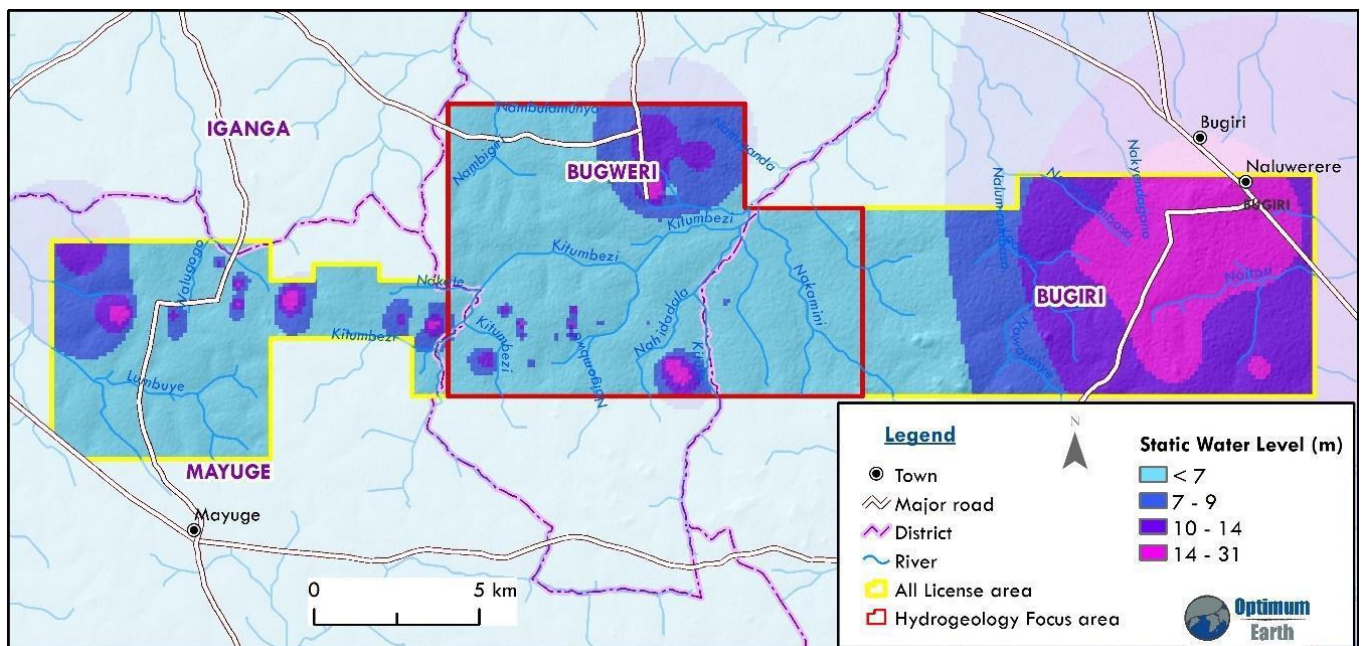


Figure 81: Static water level map of the project areas

#### 6.2.4.3.3 Planning of fieldwork

The Optimum Earth Consultant group has identified 5 potential target sites for geophysical measurements (refer Figure 82) which will be undertaken under the direction of hydrogeologist in late 2021. This team will undertake geophysical fieldwork and pump tests on established water bores.





5. Horizontal and vertical fractured and fissured bedrock in granites. These can be identified by using VES and /or resistivity profiling but more easily by analyses of borehole logs and field assessments.
6. Spring aquifers; these aquifers are not assessed using geophysical measurements but need to be assessed by field identification, yield assessment and yield monitoring.
7. Lineaments identified during the desk study.

Local communities (refer Figure 83) will be briefed prior to test-work to ensure that they have buy-in and understand what is happening.



*Figure 83: Optimum Earth consulting team briefing community leaders at the Makuutu Sub County Offices on the first day of field work.*

#### 6.2.4.3.4 Preliminary Survey Results

At the end of September 2021 three profiles had been completed (refer purple lines in Figure 84).



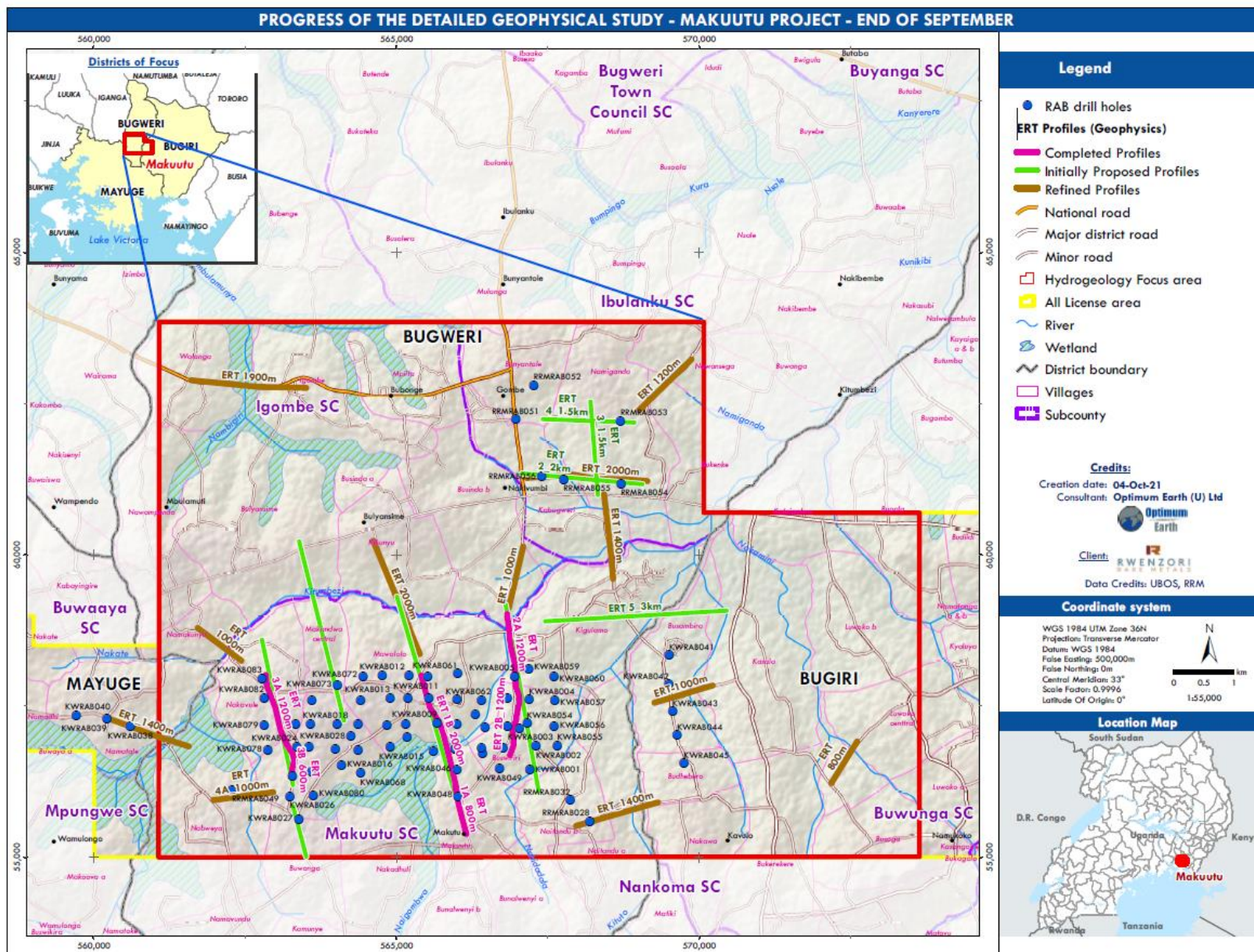


Figure 84: Progress of detailed geophysical study at end of September 2021

ERT 1B running for 2,000m in a 160° – 340° direction (ie, NW) along the road from Makuutu Village traverses the Central Makuutu orebody area in the 1,000m to 2,000 m section of this transect (refer Figure 85). The results, consistent with geological understanding indicate that:

- a) Top layer (0 – 10m) indicates a high resistivity zone interpreted as laterites.
- b) 2nd layer (10 – 50m) indicates a very low resistivity zone (10 to 40 Ohm.m) interpreted as ionic clays.
- c) The underlying layers (50 to 90m) indicates a moderately low resistivity zone (70 to 160 Ohm.m) interpreted as coarse sediments, typically sands and gravel saturated with water.

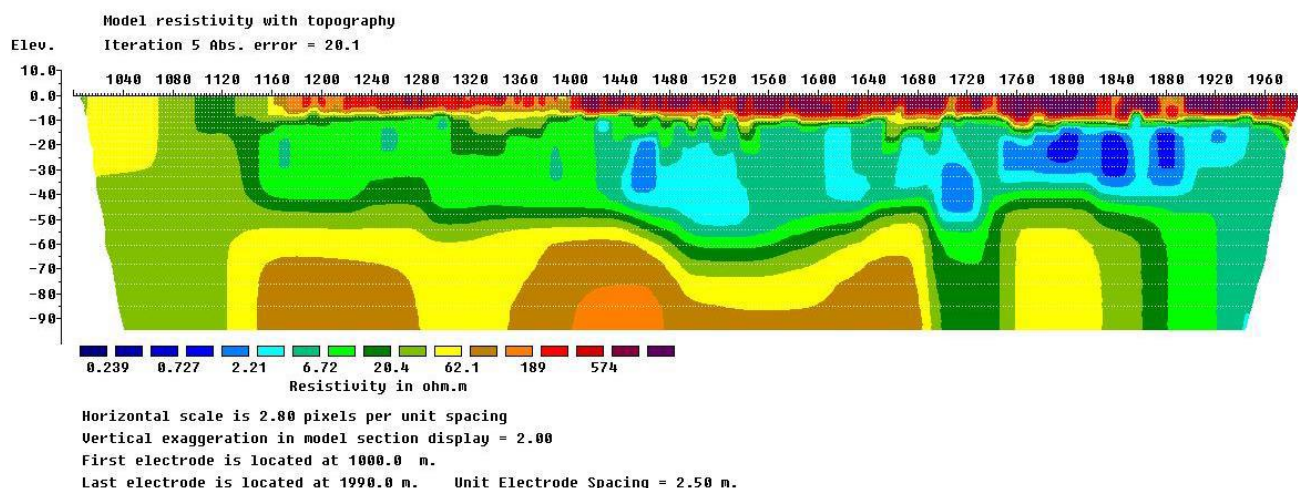


Figure 85: ERT 1B - 1000m to 2000m, Dipole-Dipole array

## 6.3 Topography, Geology and Soils

### 6.3.1 Topography

The Makuutu project area lies in the shore border areas about 12 kilometres north of Lake Victoria. The extensive undulating lowlands, isolated hills, and pediments (a broad, gently sloping expanse of rock debris extending outwards from the foot of a mountain slope) of approximately 115m with linear and convex slopes between 2 and 8%) characterize the project area. There are also flat valley bottoms with slopes less than 2%. The minimum, average and maximum elevations of the project area are 1095m, 1135m and 1176m respectively. The general surface slopes range from 120m in the south-west near Lake Victoria to 100m in the North. The area has rolling landscape with gentle slopes and swallows valleys (occupied by papyrus swamps) of amplitude far less than 115m and large portion of ridges/hilltops, so much so that lot of arable land is available on hill tops, slopes and the valleys and it is where most of socio-economic activities take place. (Refer Figure 86).



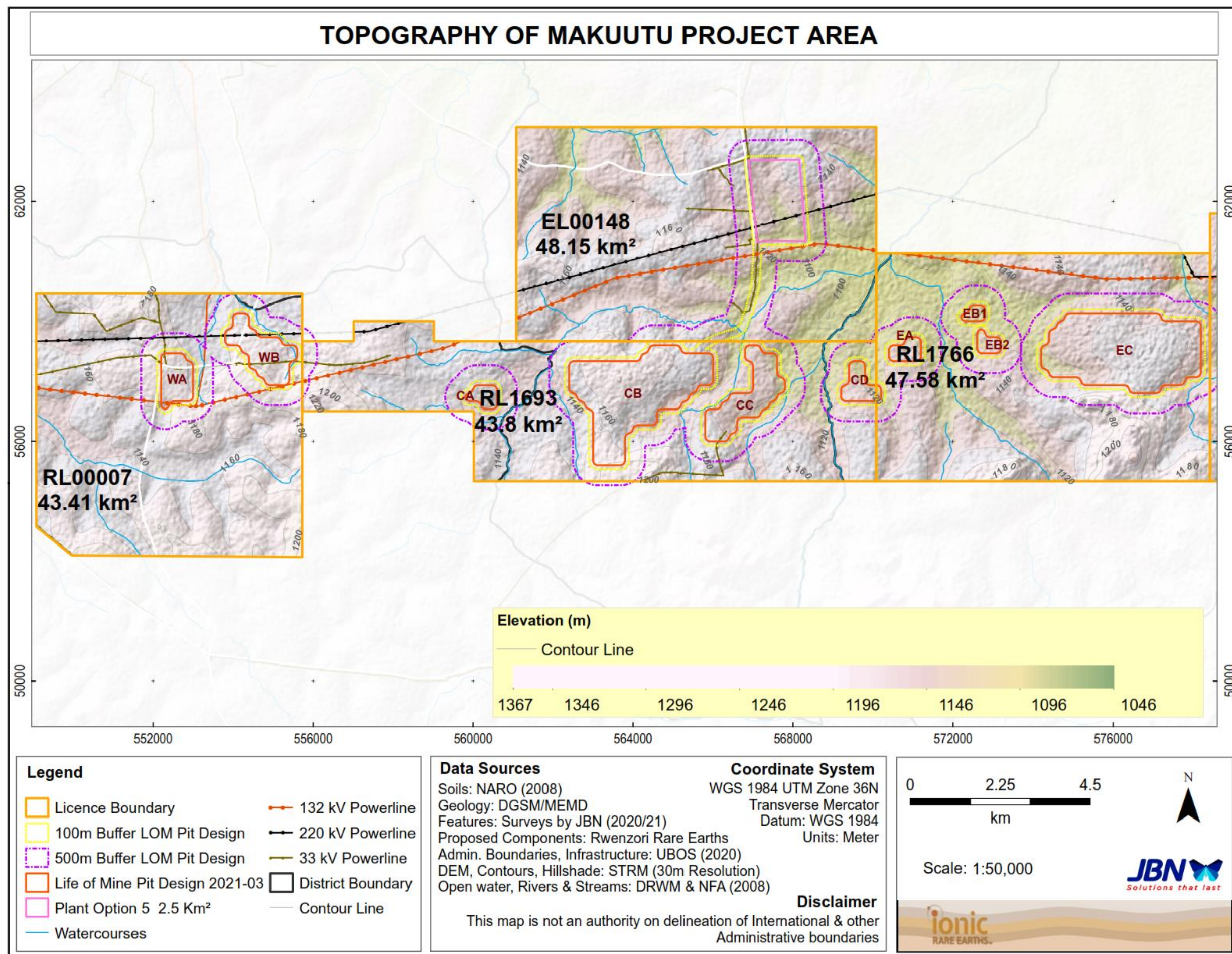


Figure 86: Topography map of the project area

## 6.4 Geology

The Rare Earth Elements are hosted in a typically 6m thick layer of clay within a 15 m layer of regolith overlying basement rock with the presence of sedimentary Karoo rock particularly relevant to REE concentrations in the clay. The geological formation of the largest part of the project area is underlain by Precambrian aged, Undifferentiated gneisses including elements of P(B) in the north granulite facies rocks formerly as part of Metamorphic (Basement Complex). Second largest underlying is the Precambrian aged, Metavolcanics banded ironstones cherty quartzites and greywackes as part of Metamorphic (Nyanzian). It also partly covers the Precambrian aged, Granitoid and highly granitized rocks (Metamorphic). Lastly, it stretches over the Palaeozoic aged, Eccra Series shales seen as Sedimentary (Karoo) which is the element of interest for this project. Refer Figure 87 for details.

## 6.5 Soils

Within the project area, GIS data revealed that the surface soil is typically unconsolidated dark-brown clay loam that can vary in thickness from 0 -1.12m but it is typically greater than 0.3 m thick and capable of supporting agriculture. Lixic Ferralsols, Petric Plinthosols (Acric) and Gleysols are the predominant soil types of relatively high to moderate fertility, they are permeable, with a stable structure, and low erodibility, hence less prone to erosion. These are further categorized as Reddish brown sandy-loams and loams on laterite underlain by Basement complex gneisses and granites that forms the Buruli Catena covering the largest part of the project area. Secondly, the dominant soil type is the deep red clay loam over laterite underlain by gneisses and amphibolites that are under the Buyaga Catena. The area also extends over the Black and grey clays often calcareous underlain by River alluvium which form part of the Undifferentiated Alluvium. Lastly, the smallest portion of the area is formed of Grey-brown and brown sandy loams over laterite underlain by Lake Deposits derived from Basement complex granites, gneisses hence forming the Mazimasa Complex Catena. Generally, all soil types in the project area are of moderate stable structure, low in erodibility and high fertility, with ability to support a wide range of activities such as settlement, farming (animals and crops) and forest establishment. However, due to population increase coupled with poor agronomy practices that range from over farming, monoculture, and deforestation among others, these formerly rich fertile soils have been continuously depleted of natural fertility and rendered less productive than in the past. Details of the soil formations are shown in Figure 88.



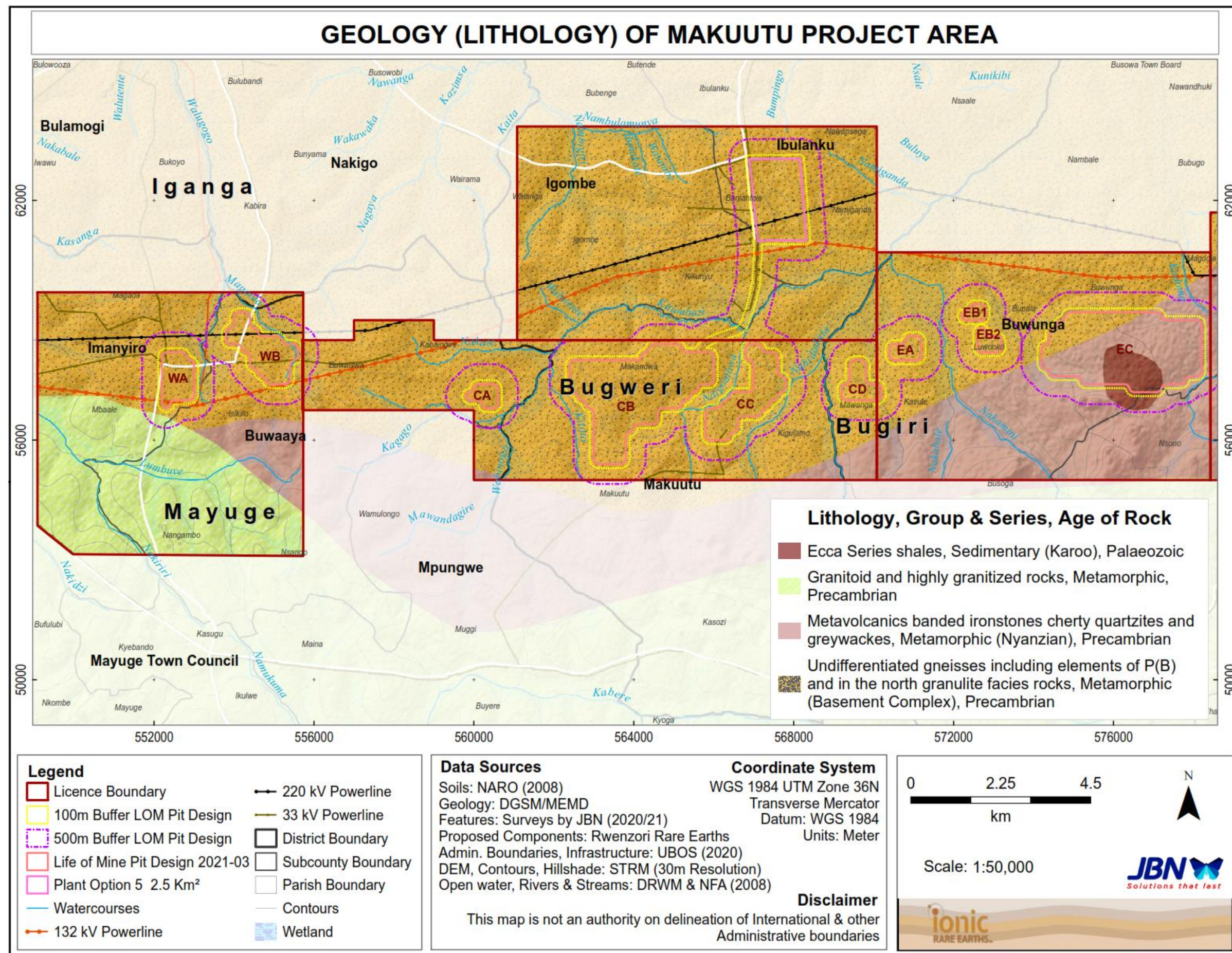


Figure 87: The geological (Lithological) formation of the project area



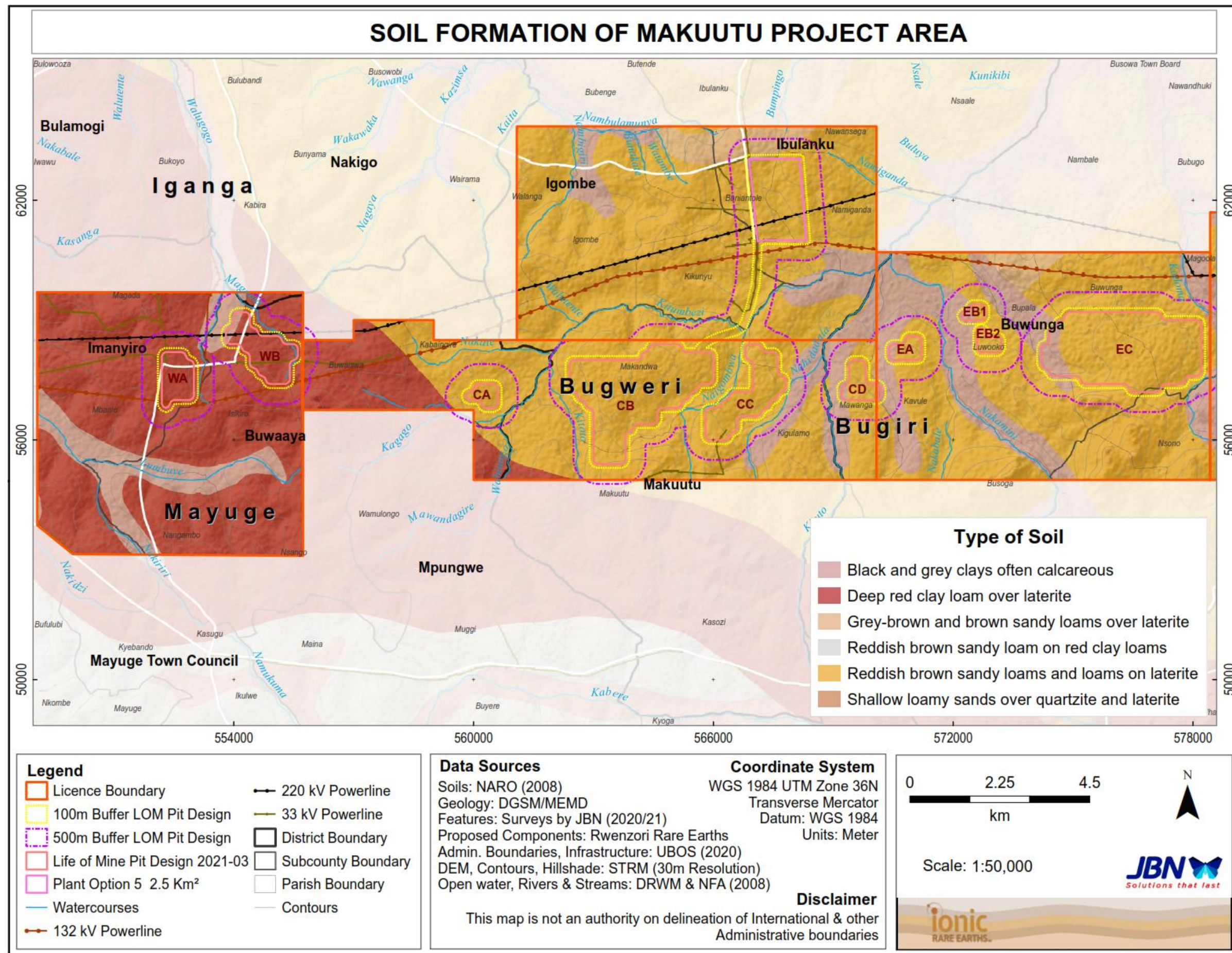


Figure 88: The soil formation of the project area



## 6.6 Health and Safety

### 6.6.1 Status of Roads and Bridges

The project site is served with a vast network of access roads, typically murram roads. These are characteristically narrow, eroded, with potholes and damaged bridges (refer Figure 89 and Figure 90) are widely used to ferry sugarcane from plantations to sugar factories such as Mayuge Sugar. Some sections become almost impassable during the wet season that triggers flash floods that sometimes wash away bridges. Their current condition cannot sustain heavy traffic without being upgraded and/ or expanded. One major access road that crosses the various project sites and mining pits in the 3 districts is the Buwunga – Nakivumbi – Buwaya – Isikiro – Mbaale. This road can be expanded and upgraded and utilised when mining is shifted to the 27-year plan pits. The roads are maintained either by the respective districts (community access roads) and UNRA (feeder and national roads). For example, the Road from Busesa Junction to Nakivumbi Trading Centre is a feeder road maintained by UNRA while the road from Nakivumbi to Makuutu (10 year Planned Pit) is maintained by Bugweri District Local Government. Therefore, road upgrading, and expansion issues will require engagement with UNRA and the respective District Local Governments. Transport of imported materials will likely be via Busesa to Buniantole Junction Road which may require upgrading as well. In addition to the haul routes, several roads (Isikiro to Iganga Road under UNRA) need to be upgraded for easy access of medical, emergency, fire, and rescue services from the nearby facilities (Refer Figure 91).



Figure 89: Road in Buwunga Sub County





Figure 90: Bridge at River Kitumbezi



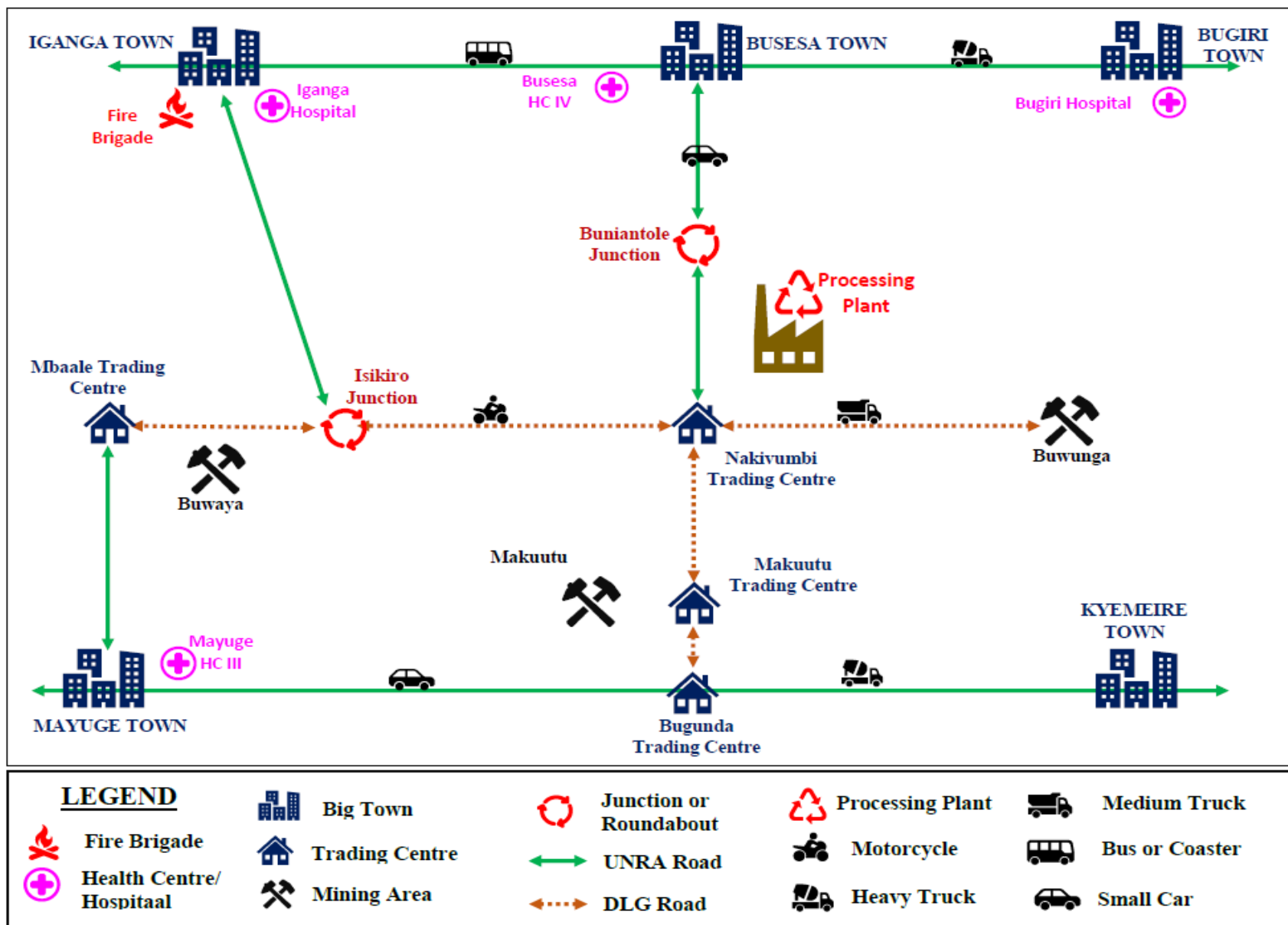


Figure 91: Schematic Diagram of the road network in the mining area

### 6.6.2 Medical Facilities

There are several Health Centres and Hospitals close to the mining site. For the Pits at Buwunga Subcounty, there is Buwunga Health Centre III, which has no casualty ward, no ambulance services and can only handle mild injury cases and refer the most serious ones to Bugiri Hospital. Bugiri Hospital is the main referral hospital for accident cases that may arise from mining operations at Buwunga Subcounty mining pits. Bugiri Hospital handles accident cases as general cases because they do not have a casualty unit and have only one ambulance (see Refer 74). Busesa Health Centre IV is the biggest medical facility in Bugweri District (for handling accident cases from processing plant and central license mining pits) and yet they have no casualty ward, no ambulance but they are improvising 2 double cabins which are also not well maintained. Though, they do not have a casualty ward, they can still handle emergency cases.

For the pits in Mayuge District (Mbaale Parish, Immanziro Subcounty), the nearest Health Centre would be Mayuge Health Centre III, which has been proposed to be upgraded to Health Centre IV in July 2021. They possess three mobile clinics and an ambulance that was donated by the area Member of Parliament. Iganga Hospital is the biggest and the most equipped hospital in Busoga East which can be accessed from all the mining pits. The hospital has one fully functioning ambulance and a casualty unit. The only challenge is that it is not fully furnished, needs new beds, oxygen equipment and theatre (Refer Figure 93 and Figure 94).

From the above findings, it should be noted that the three districts where mining is going to take place are not well equipped to handle accident and emergency cases, because of limited medical resources. The Developer can consider establishing fully equipped medical facilities for the project or to sign an MoU with the respective districts and hospitals or health centres including equipping them with essential emergency equipment.



Figure 92: Bugiri Hospital Ambulance



Figure 93: Iganga Hospital Casualty Unit Beds





Figure 94: Iganga Hospital Casualty Unit Operation Theatre

### 6.6.3 Availability of Fire and Emergency Rescue Facilities

The entire Busoga East Region has only one Fire Engine and a Water Tanker, one ambulance, and 14 Firefighters, available in the regional offices in Iganga (Refer Figure 95). The Regional Fire Officer stated the following as challenges facing Fire and Rescue Services in Busoga East; Difficulty in accessing the fire scene due to poor roads, inadequate equipment, lack of water for firefighting and difficulty in responding in time if the affected persons do not call directly and pass via nearby police outposts (refer Figure 97). The major fire incidents recorded are sugar plantation fires, which are normally hard to put off because of lack of access, inadequate manpower and equipment. There have been about 78 calls since 2019 and according to the Regional Fire Officer, negligence and electrical short circuits are the main causes of fires in Busoga East. The Fire Department has also been conducting campaigns on fires in schools and advising sugar processing plants on how to store bagasse. The summary of fire rescue calls since 2019 is presented in Figure 96 below.





Figure 95: Fire Engine for Busoga East

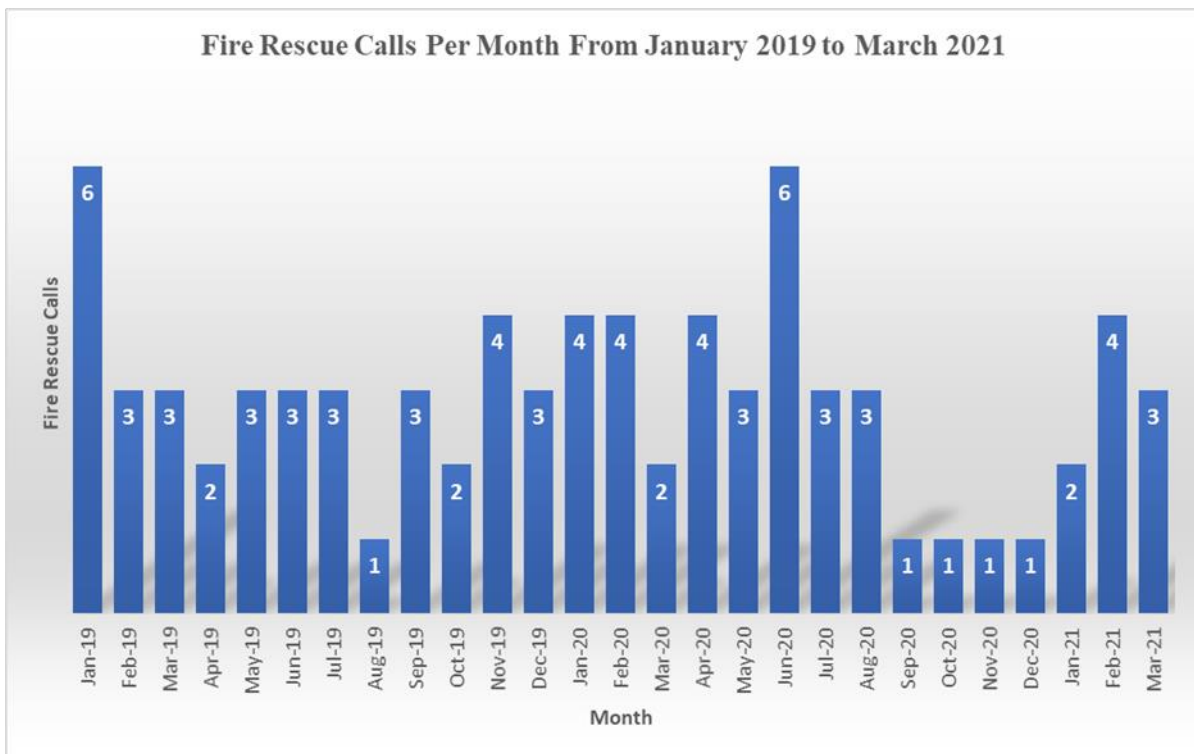


Figure 96: Summary of fire rescue calls since 2019



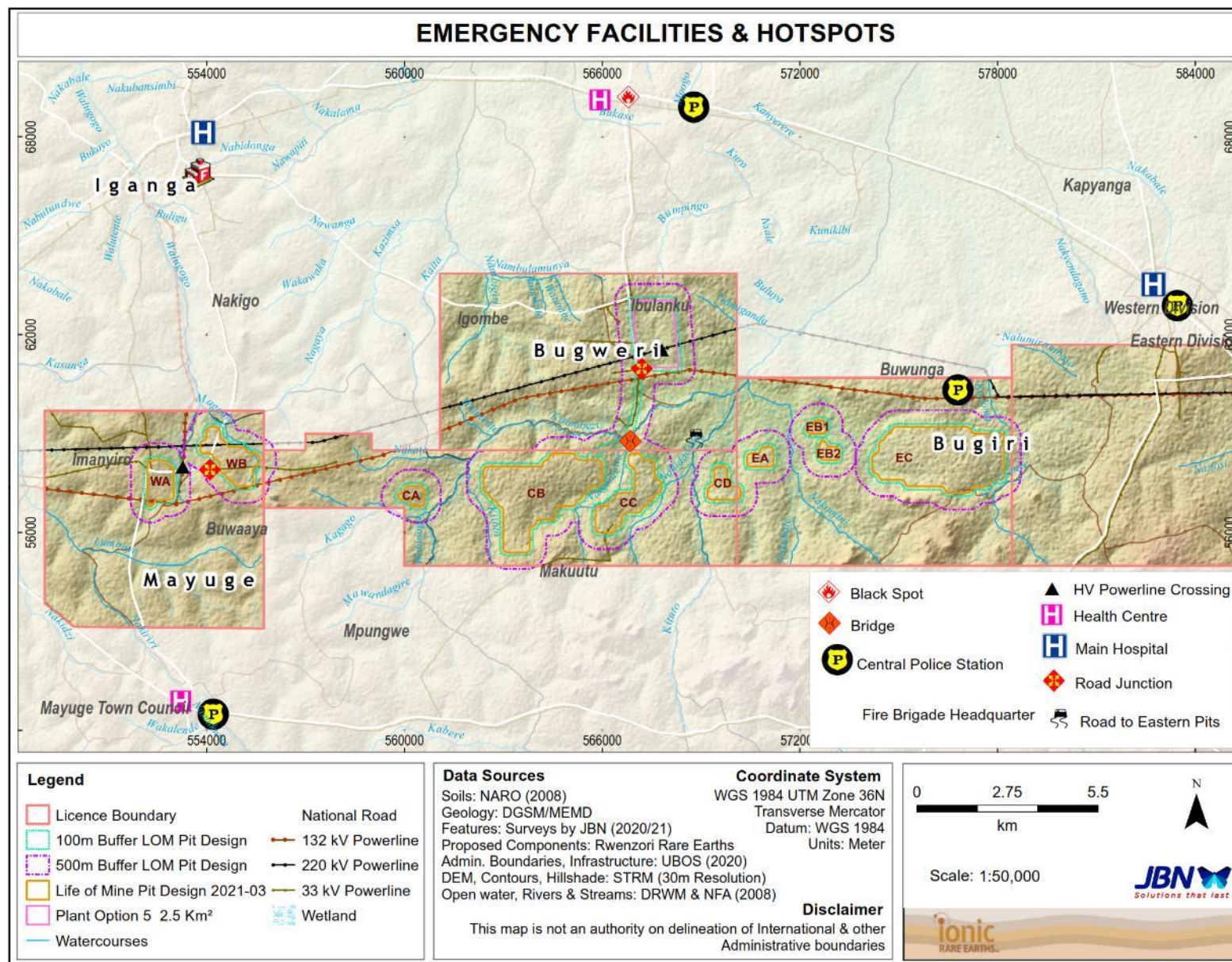


Figure 97: Emergency facilities and hotspots

The assessment results clearly show that, the entire region has limited resources to handle fire and emergency rescue. Therefore, it is advisable that Rwenzori Rare Metals Ltd establishes its own equipped department of emergency and rescue manned by qualified personnel.

#### 6.6.4 Security

The mining area is served by three (03) Central Police Stations located in each district, i.e., Bugiri Central Police Station, Bugweri Central Police Station and Mayuge Central Police Station. These police stations also have outposts in respective towns and sub counties. For example, Nakivumbi Police Outpost, Ibulanku Police Outpost, Buwunga Police Outpost, etc. The fair distribution of police outposts has guaranteed security for the locals, transporters, manufacturers, etc. within their area of jurisdiction. In addition, since the site is close to Iganga, backup deployment of police officers can be requested from Iganga. It is advisable that the Developer establishes its own security department that will work hand in hand with the Uganda Government Security Bodies to handle security at the mining pits and processing plant. It is also advisable that the Developer installs a fence around the pits and processing plant, at the 500-meter buffer zone to restrict access to the site. Security watch towers can be erected at the 100-meter buffer zone to provide site surveillance.

#### 6.6.5 Road Traffic

To understand the composition of traffic along busy junctions in the mining area, direct counting of traffic was conducted. The number of bicycles, motorcycles, small cars, and large vehicles was determined. The traffic volume was estimated for Buniantole Junction, Busesa Junction, Nakivumbi junction and Isikiro Junction. Busesa Junction was chosen since it is a gazetted blackspot and also a point where trucks carrying processed Rare Earth Metals would be joining the main road from (Iganga – Tororo Road), (Refer Figure 98). Buniantole Junction was chosen because this is where trucks from the processing plant join Busesa-Nakivumbi Road (Refer Figure 99). Nakivumbi Junction was chosen because this where trucks from the central licence pits pass while transporting Rare Earth Metal Ores for processing. At this junction, sugar cane trucks from Buwunga and other nearby plantations will be meeting with company trucks ferrying clay from Makuutu to the Processing Plant (Refer Figure 100). Isikiro Junction was selected because all the traffic from Iganga heading to Mayuge pass there and yet it is in the Western License Mining Pits. At this junction, trucks ferrying clay from the pits to the processing plant will be passing there and therefore, there is a higher chance of increase in Traffic Volume (Refer Figure 101). From the analysis of traffic data for all the four junctions in a seven-day period, it was established that the largest mode of transport in the area is by use of motorcycles, followed by bicycles, then small cars and finally big vehicles.

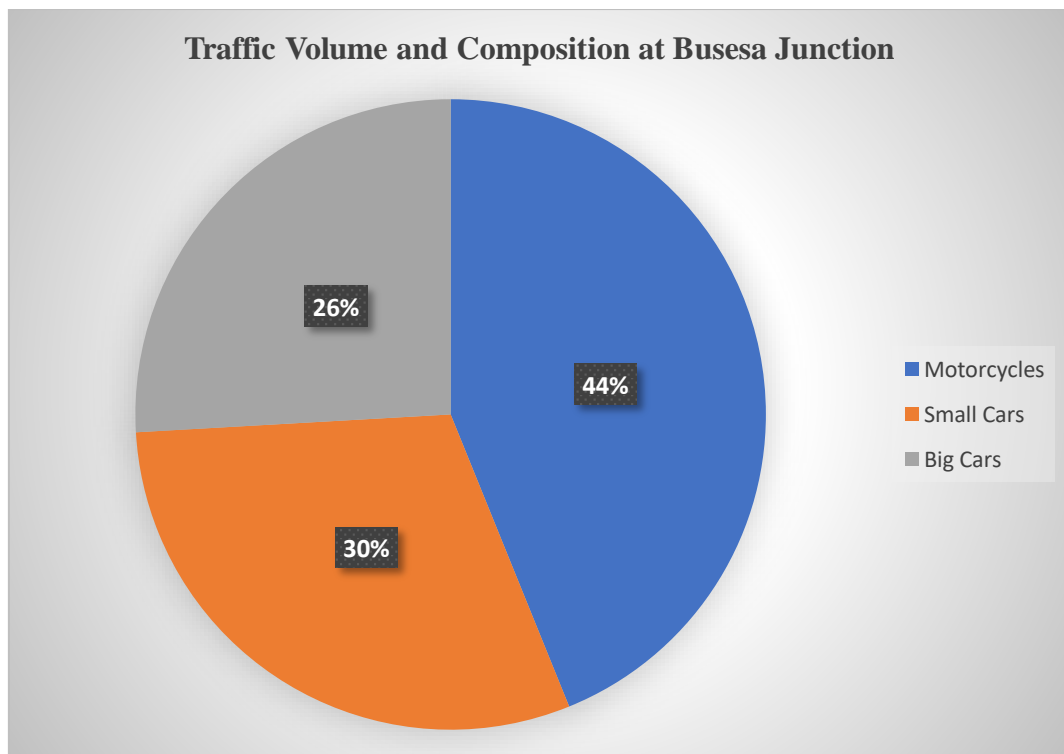


Figure 98: Busesa Junction

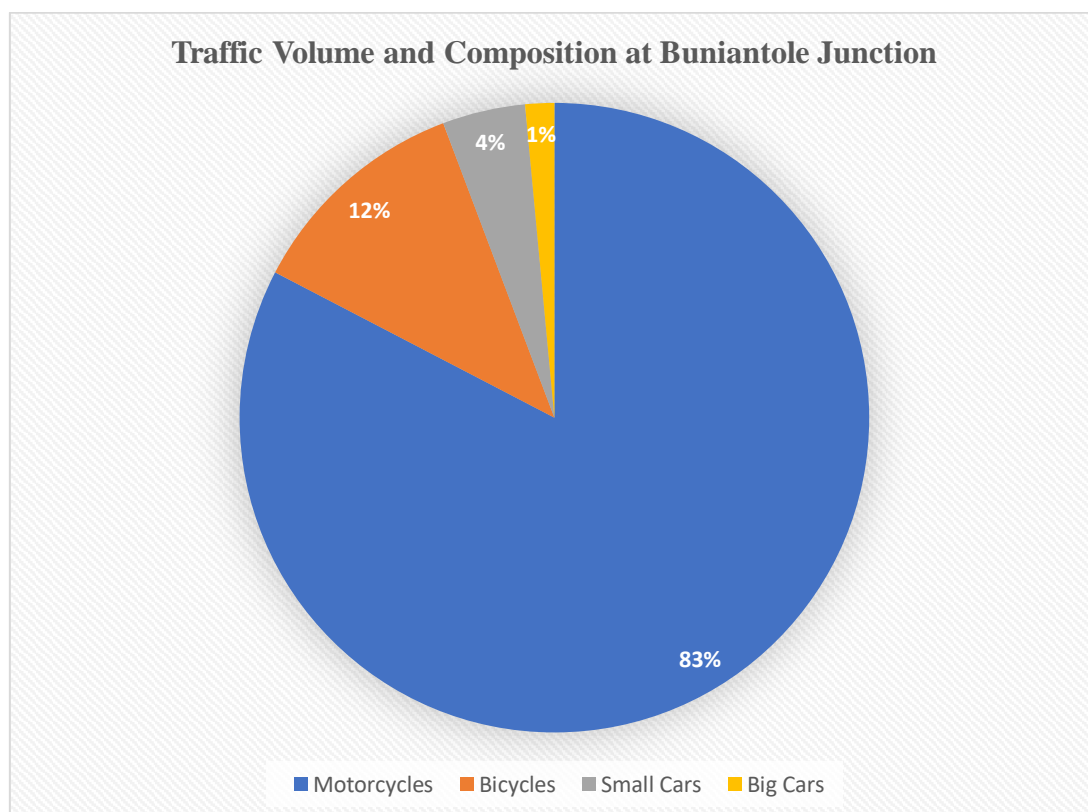


Figure 99: Buniantole Junction



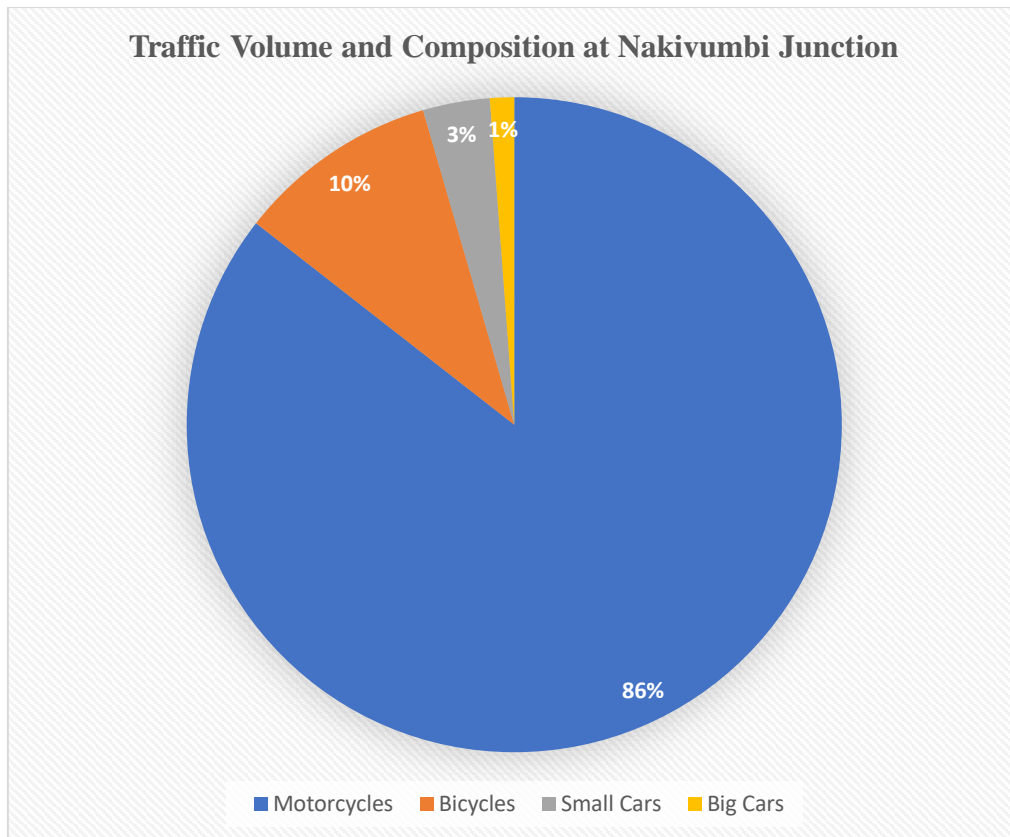


Figure 100: Nakivumbi Junction

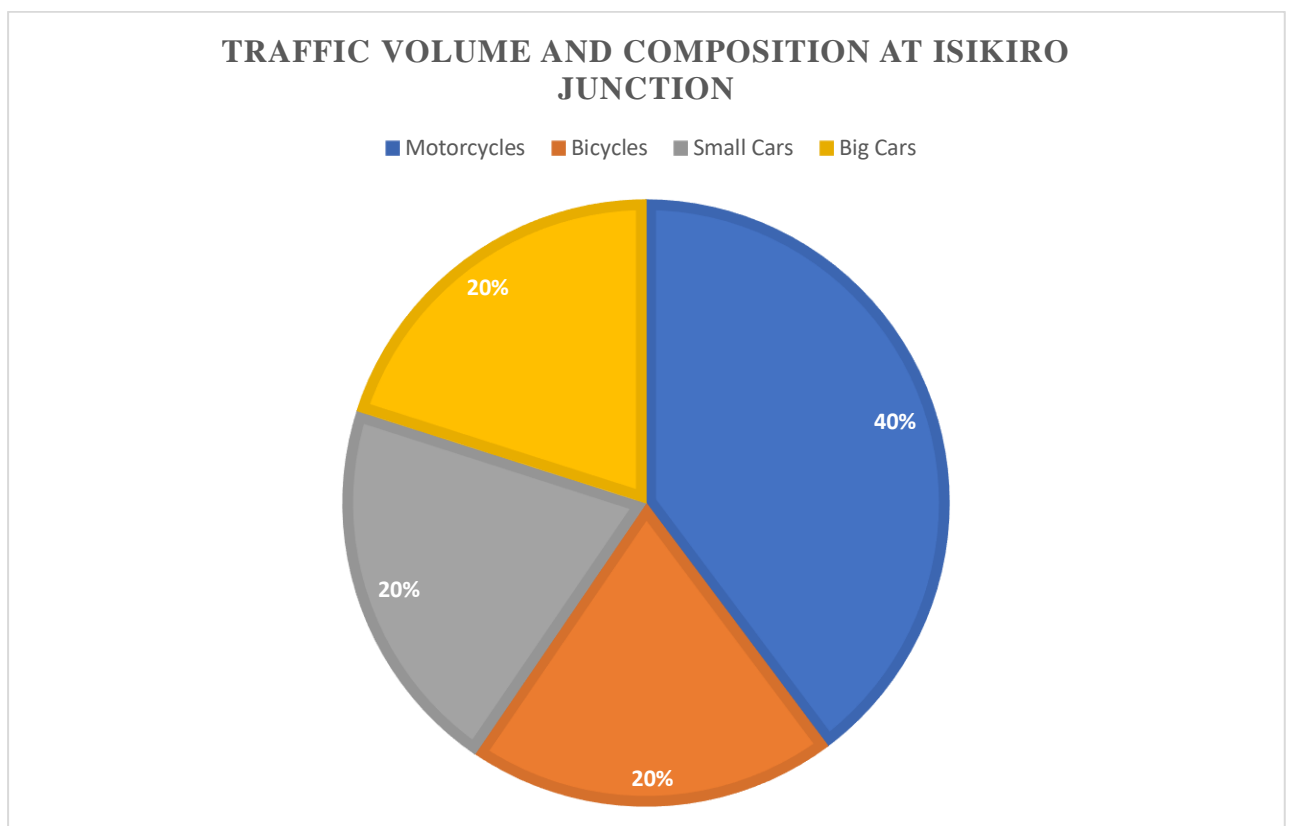


Figure 101: Isikiro Junction

### 6.6.6 Road Traffic Accident Records

Accidents happen within the project site. These are largely due to the behaviours of road users including careless riders, pedestrians, and drivers, who do not want to give way to other road users. Others include cyclists who overload their motorcycles and bicycles (Refer Figure 102), sugarcane trucks that park on the road while being loaded and yet these roads are very narrow. There are also blackspots, for example in Ibulanku Trading Center, Busesa Junction, In front of Bugweri Central Police Station, etc.



Figure 102: Dangerous Loading at Nakivumbi-Busesa Road

There were only three accidents recorded by the end of January 2021 along Busesa – Nakivumbi Road at Ibulanku. One Fatal, one serious and one minor (Figure 103).

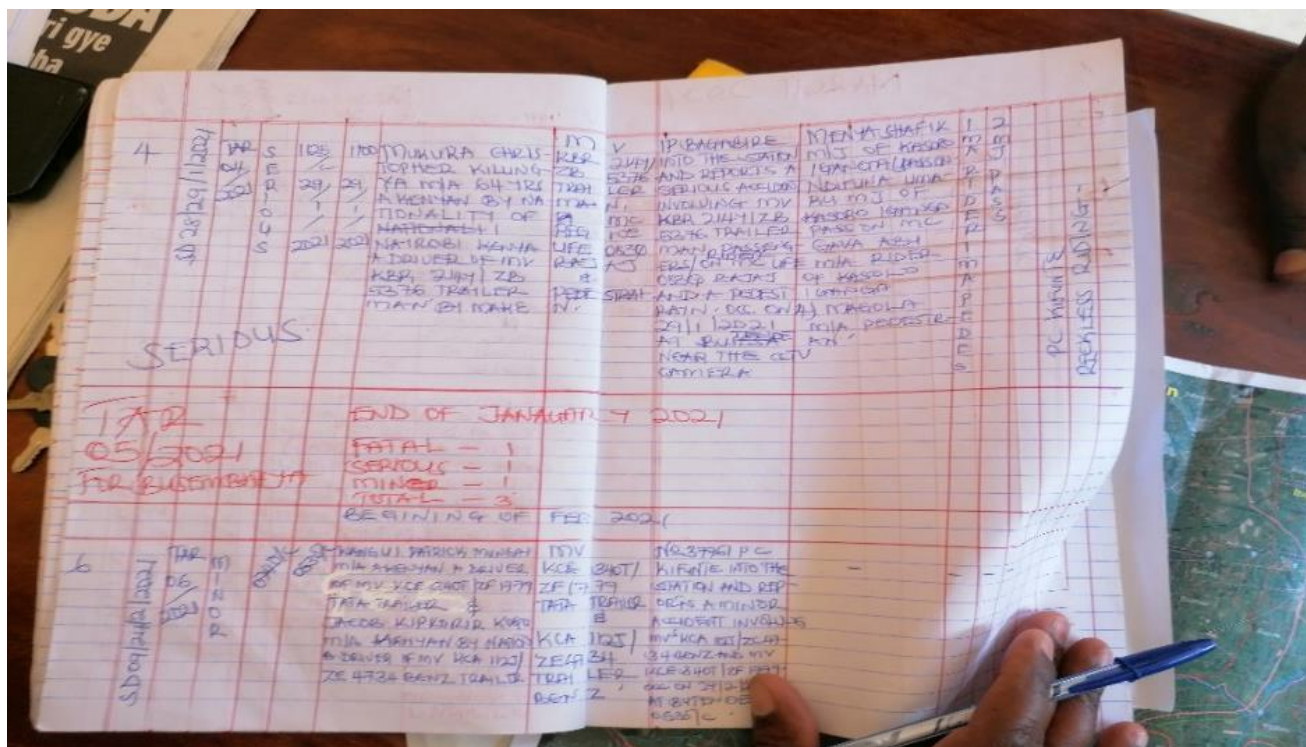


Figure 103: Accidents along Busesa - Nakivumbi Road

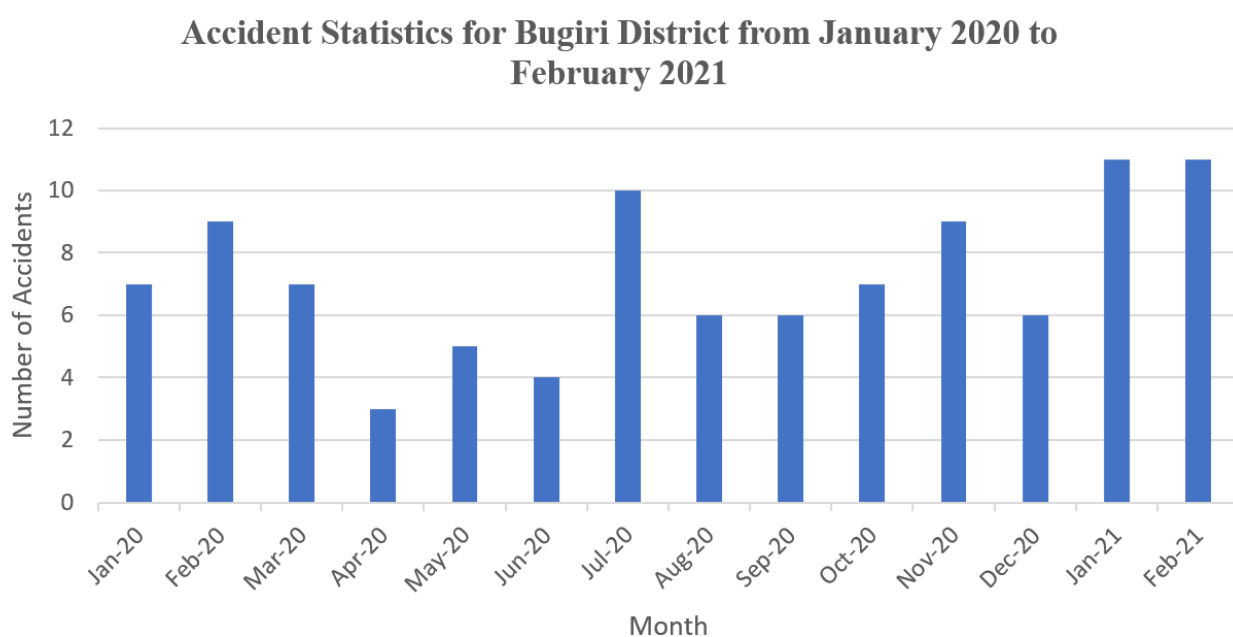


Figure 104: Accident Statistics for Bugiri District

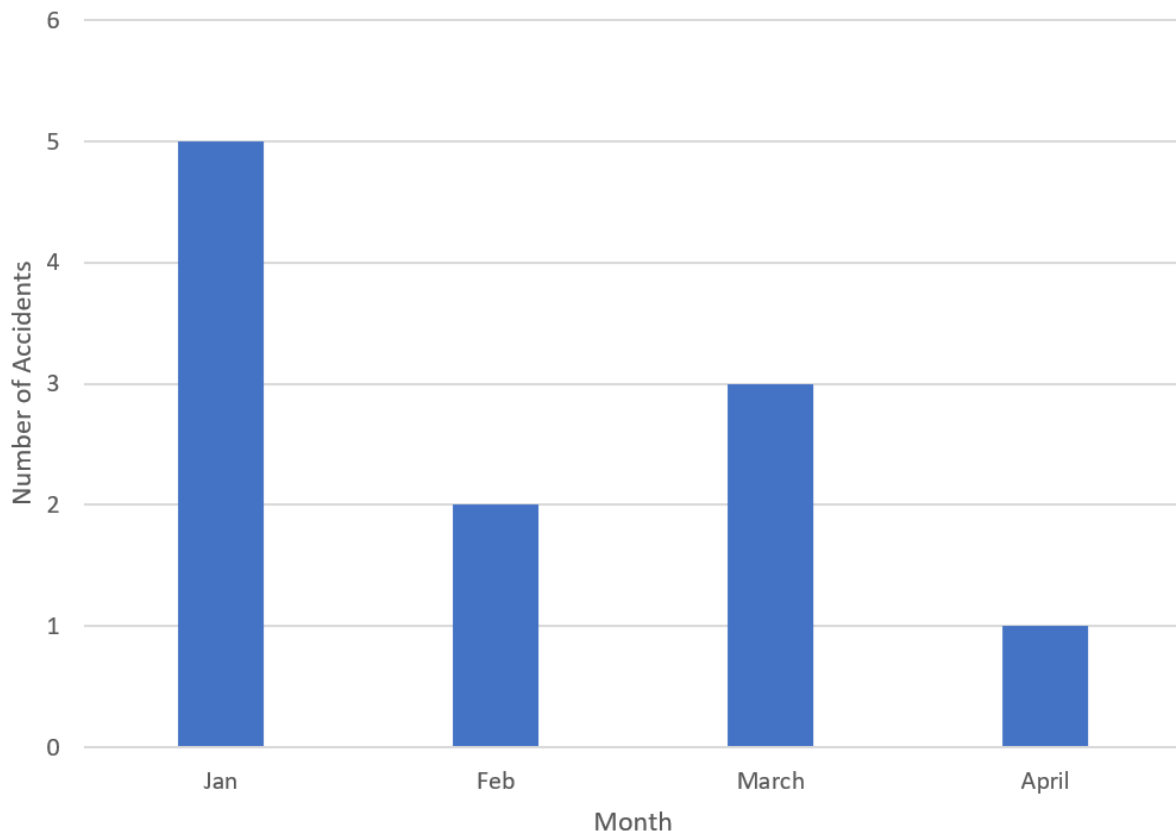


Figure 105: Accident Statistics for Mayuge District from January to April 2021

### 6.6.7 Hydro Electric Powerlines

There are two 132 kV powerlines traversing all the pits and processing plant. The main safety concern is the third line that is crossing the two lines at the buffer zone in the middle of the two western license pits (Refer Figure 106). Another issue is with a new line that is crossing the processing plant at about three quarters. The lines are not high enough and surge, implying that they pose a risk of electrocution and fires (refer Figure 107). The reason behind the surging is the uneven ground where some poles are installed at the top of the hill and the other at the slope. The mines and processing plant will need reliable and sufficient power supply and these two lines traversing the mining area are the main source of power. The Developer should engage with Uganda Electricity Transmission Company Ltd (UETCL) and Uganda Electricity Distribution Company Ltd (UEDCL) to discuss electricity needs and connections. Also, during levelling of ground at the proposed site for the processing plant, the powerline crossing the processing plant may be affected and the Developer may need to sign an MoU with UETCL in case relocation of lines is required for safety reasons. For the case where the new line is supposedly crossing the two parallel old lines at the Western License Pits, underground cables can be installed at the crossing point to avoid short circuits during windy or stormy weather.





Figure 106: Section in the Western Licence Pits where Powerlines Cross Each other



Figure 107: Surging Transmission Lines at the Proposed Site for Processing Plant

## 6.7 Biological Environment

The biological environment section mainly discusses water quality, land use/ cover, fauna, and flora aspects within the project area. Water quality and biodiversity aspects are critical aspects.

### 6.7.1 Water Quality

The detailed water quality analysis is presented in Annex IV with an overview summary presented below.

#### 6.7.1.1 Locations

Fifteen surface water (refer Table 28 and Figure 108) and 10 ground water (refer Table 28 and Figure 109) samples were collected across the Project site to assess the baseline conditions. They were collected from Central, Eastern and Western areas of the Project. The samples were shipped to South Africa for laboratory analysis.

Table 28: Water sampling locations

Sample Code	Source
CSW1	450m downstream Nahidadala-Kitumbezi Confluence
ESW1	Upstream R. Kitumbezi
EGW1	DWD 77237, Katooko Village
ESW2	R. Bupala
ESW3	R. Kaboma
ESW4	Wandegeile Seasonal Stream
EGW2	Borehole in Buffer EB <sub>1</sub> & EB <sub>2</sub>
ESW5	R. Nakamini
CSW2	Discharge from processing plant area
CGW1	Borehole Butenkaile Village
CSW3	All year unprotected spring at processing plant
CSW4	R. Naigombwa before confluence with R. Kitumbezi
CSW5	R. Kitumbezi Before confluence with R. Naigombwa
CSW6	Protected spring at Kigulamo Village
CGW2	Borehole at Mawololo Village
CGW3	Borehole at Buswiriri Village Mosque
CGW4	Borehole at Makuutu S/C
CSW7	Upstream Naigombwa
CGW5	DWD 37181, Borehole at Makandwa Village
CGW6	Borehole in Nawanvubu Village
CSW8	Kitumbezi along Makuutu S/C and Igombe S/C border
WGW1	Borehole at Isikiro Village
WGW2	Borehole at Magada Village
WSW 1	R Walugogo
WSW 2	R. Magoola



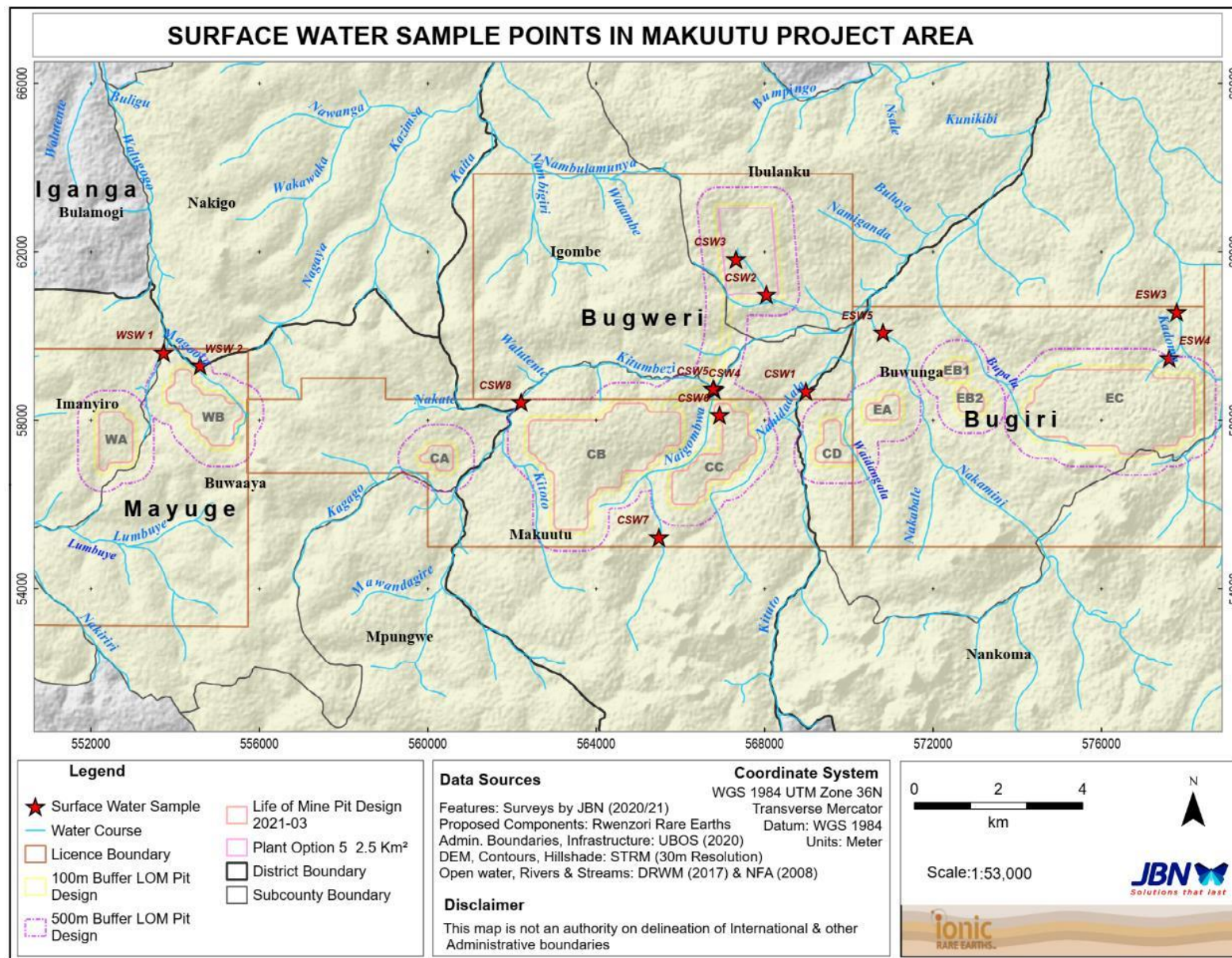


Figure 108: Surface water sample points in Makuutu Project Area







#### 6.7.1.2 Parameters

Baseline investigations considered the following parameters for both surface and groundwater samples relevant to potability and potential pollution: Anions, Cations, Colour, Turbidity, Alkalinity, Total Dissolved Solids, Metals (Aluminum, Arsenic, Barium, Calcium, Cadmium, Chromium, Copper, Iron, Potassium, Magnesium, Manganese, Sodium, Nickel, Lead, Antimony, Selenium, Strontium, Uranium, Vanadium, Zinc, Mercury), Chloride, Fluoride, Nitrite, Nitrate, Sulphate, pH, Ammonia and bacteria (*E.coli*, faecal coliforms, total coliforms and total plate count). Thorium and a full suite of REE were analysed separately in both surface and groundwater.

#### 6.7.1.3 Standards

While it is understood that local people source their drinking water from wells, springs and bores as opposed to rivers and streams the assessed quality of both surface water and groundwater has been compared to World Health Organisation (WHO) Drinking Water Standards. The Ugandan Ministry of Health website also refers to the WHO Standards for Drinking Water.

#### 6.7.1.4 Trends

##### 6.7.1.4.1 Surface water samples

- Surface water was in general fresh (ie. average TDS of 116 mg/L in the Central Project area and similar in other areas) and with close to neutral acidity (ie. pH 7). The neutral pH would be expected from the moderate alkalinity of about 50 mg CaCO<sub>3</sub>/L which will neutralise or "buffer," the carbon dioxide and other acids in the water.
- All surface water samples from the central, eastern and western areas meet WHO drinking water standards for all metals with the exception of mercury which was slightly above the WHO guideline of 0.006 ug/L in a few samples. Uranium, which is a recognised challenge for many hard rock REE Projects was undetectable (ie. <0.01 mg/L) in all samples vs WHO drinking water guideline of 0.015 mg/L. Thorium was undetectable (<0.5 ppb) or very low in all samples with the highest result of 3.8 ppb in the Central Surface Water number 4 sample which had a high turbidity of 330 NTU from suspended clay. Most REE were undetectable (ie. <0.2 ppb) or close to detection with the exception of Scandium which was typically in the 10-20 ppb range which is still low. Scandium has no known human health impacts (refer Table 4).
- The surface waters were fairly turbid (average NTU 175 in the Central area). This is well above the WHO drinking water guideline of 2 and it could generally be considered to be equivalent to about 50 mg/L Total Suspended Solids (TSS) based on the rule of thumb 3 NTU per 1 mg/L (TSS). The elevated turbidity is thought to be a consequence of recent rainfall prior to the collection of the surface water samples.
- Ammonia was not detected in surface water. This is significant because the lixiviant proposed for the Process Plant is Ammonium Sulphate.
- The widespread presence of *E.coli*, faecal coliforms and total coliform bacteria in high numbers is an indication that the surface waters in general could be contaminated with raw sewage or the presence of livestock.

##### 6.7.1.4.2 Groundwater samples

The water quality of the groundwater in the central area was similar to the surface water quality with a similar low TDS of 108 mg/L and it was also low in metals including Uranium which, like the surface water, was undetectable (ie. <0.01 mg/L) in all samples. The average total alkalinity of about 50 mg/L CaCO<sub>3</sub> was similar to that of the surface water but the pH of about 6.2 was lower than the neutral pH surface water.

Some samples had levels of manganese slightly above WHO Drinking Water Standards. The average pH of 6.2 was more acidic than the surface water. There were some coliform bacteria in some groundwater samples that is potentially a result of sample contamination as no bacteria would be expected in groundwater within a clay orebody.

The presence of coliforms including extreme variability from none detected to >2,420 CFU/100mL in CGW3 raises questions about potential sample contamination. There should be no coliforms in the groundwater.

#### 6.7.1.5 Potential impacts

The ore-body containing REE oxides is hosted in a 20m band of oxidized regolith with minimal risk of Acid Mine Drainage from the oxidation of sulphides. The undetectable levels of uranium in both surface and groundwater is consistent with the very low levels of radionuclides in the Makuutu ore-body.

The absence of the ammonia in both surface and groundwater is not unexpected and presents a low baseline against which any future Project emissions of Ammonium sulphate can be measured. The Project does, however, expect to have very good systems to prevent such emissions.

The high turbidity of surface water following rain underscores the challenges that the Project will face in controlling erosion from large areas of disturbed land. This reinforces the importance of installing robust drainage systems and of quickly stabilizing and regrassing any disturbed areas and temporary stockpiles.

#### 6.7.2 Flora

Nineteen (19) transects were randomly generated using the Distance software and overlaid in the proposed processing plant, mining block CC, CB, WB, CA, EC, EBI, EB2, EA, and CD which were used for vegetation sampling (refer Figure 110). **The detailed vegetation report is provided in Annex II.**

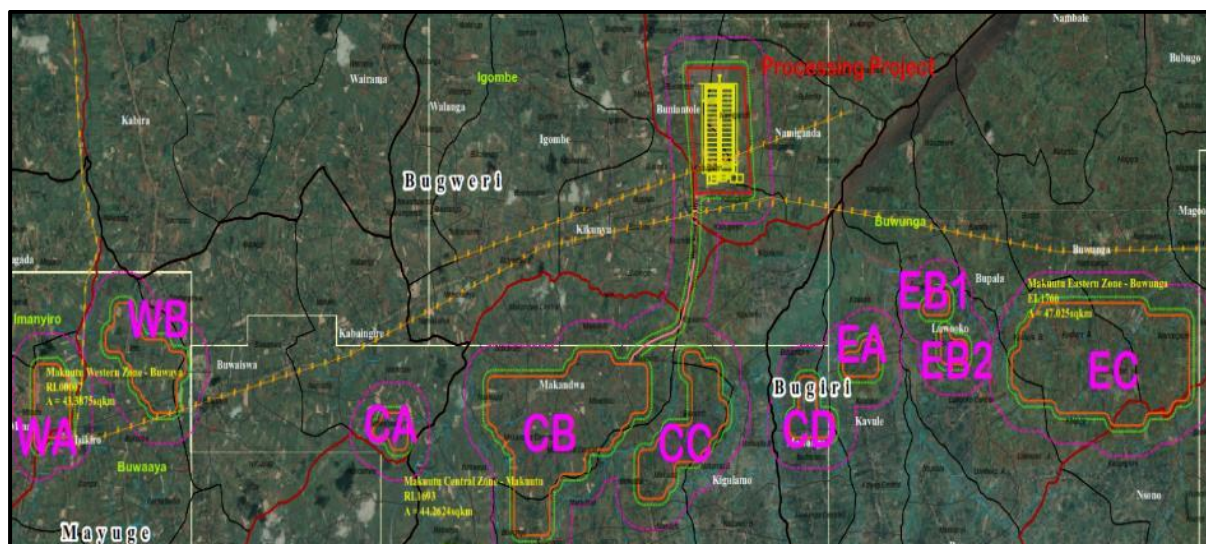


Figure 110: Map of the Areas for Vegetation Sampling

The entire project footprints are dominated largely by modified habitats (about 96%) compared to natural habitats (about 4%) of the land cover, which is a reflective of the significant human activity

within the project area. There are three principal natural terrestrial habitats within the project areas and the surroundings (i.e., the wetlands (heavily cultivated), scrubland/woodland, and grassland. The aquatic habitats present are located outside the proposed mining pit areas, but some are within the mining area buffer zones (100 meters). Wetlands are of conservation importance at the local and regional level and are therefore considered to be priority or critical habitats.

#### 6.7.2.1 Floristic Composition, Distribution, Density and Diversity

From all the surveyed sites, a total of five hundred twenty-eight (528) individual species were recorded from ninety (90) families. Only four (4) species of orchidaceous were registered from all the sampled sites. Herbs or grasses recorded the highest individuals with three hundred ten (310) contributing 59%, followed by trees/shrubs with one hundred fifty-four (154) representing 29%, and lastly liana with fifty (50) species contributing only 12% of the species composition. All the study sites were not rich in terms of plant species diversity. The proposed mining block EC recorded the highest number of individual species with two hundred and twenty-six (226), followed by the Processing Area with one hundred eight five (185), WB one hundred, eighty-four (184), CB one hundred, seventy nine (179), WA with one hundred fifty seven (157), CC one hundred thirty four (134), Access Road with one hundred fourteen (114), EB1 ninety seven (97), CA ninety eight (98), EA eighty six (86), CD seventy seven (77), and lastly EB2 with only sixty eight (68). All the proposed mining blocks differed in area size a factor which determined the number sampling units. Block CB had the highest number of sample units with twenty-nine (29), followed by the processing Area with twenty-eight (28), EC with twenty-two (22), WB had sixteen (16), CC fourteen (14), WA ten (10), the road with six (6), CA six (6), EB2, EA, & CD had four each (4) and EB1 with three.

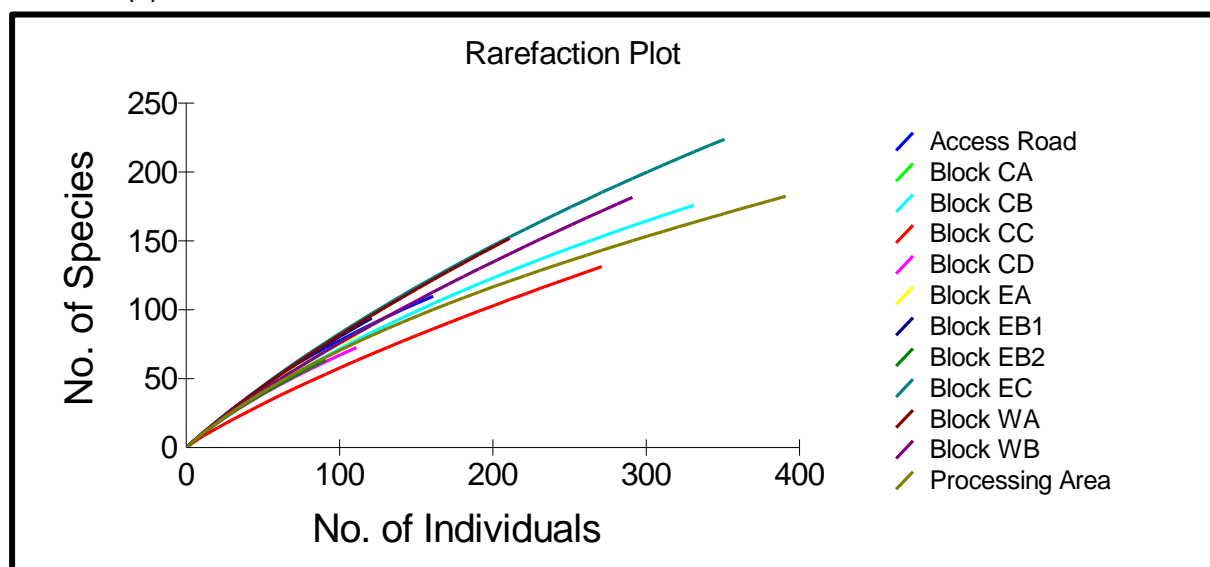


Figure 111: Rarefaction Plot results for sampled vegetation

The figure above (refer Figure 111) shows sampling intensity and species richness in plots from all the study sites. It reveals low species richness accumulatively from the sampled sites. Most sites are cultivated with sugar canes, maize, and cassava among other crops.

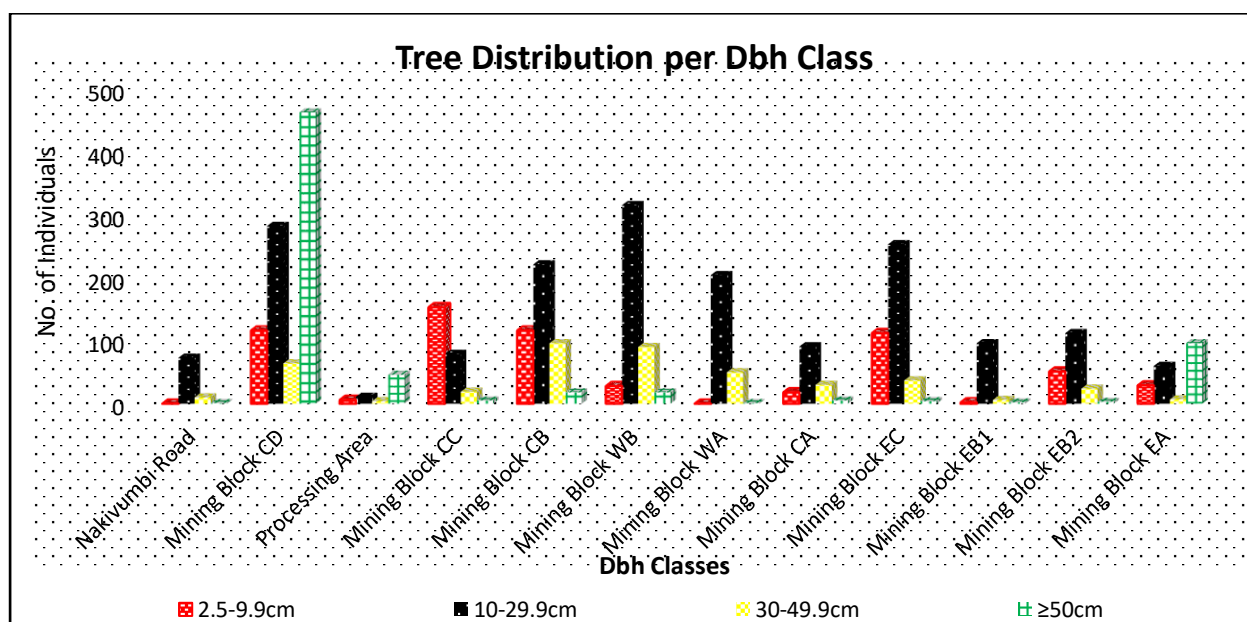


Figure 112: Tree distribution per Dbh class

From the figure above (refer Figure 112), Dbh class  $\leq 29.9\text{cm}$  recorded the highest stem abundance in most proposed mining areas apart from the processing area which shows a relatively higher record of large trees near the boundary. The most dominant indigenous tree species were *Milicia excelsa*, *Maesopsis eminii*, and *Canarium schweinfurthii*. *Eucalyptus grandis*, *Mangifera indica* (mango tree), *Coffea canephora*, *Persea Americana* and *Pinus oocarpa*, were the most dominant exotic tree species.

Table 29: Shannon-Wiener and Alpha diversity values for plants from the project area.

Index	Road	Block CA	Block CB	Block CC	Block CD	Block EA	Block EB1	Block EB2	Block EC	Block WA	Block WB	P. Area
Shannon H' Log Base 10.	2.001	1.9	2.038	1.662	1.777	1.885	1.94	1.744	2.25	2.111	2.105	2.074
Shannon Hmax Log Base 10.	2.057	1.991	2.253	2.127	1.881	1.934	1.99	1.833	2.354	2.196	2.265	2.267
Alpha	151.5	157.2	152.9	101.7	92.25	135.8	193	95.83	266.1	245	207.7	133.56

Diversity of an area is the number of different species. From the field surveys, diversity was high according to the log series. The Fabaceae family registered the highest number of species with 77, followed by Poaceae (Gramineae) 65, Asteraceae (Compositae) 34, Euphorbiaceae 27, Moraceae 25, Malvaceae 24, Cyperaceae 22, Verbenaceae & Cucurbitaceae 13 each, Rubiaceae 12, Apocynaceae, Solanaceae & Lamiaceae 11 each, Acanthaceae 10, Amaranthaceae, Sapindaceae, Commelinaceae, Convolvulaceae, & Dioscoreaceae 7 each, Anacardiaceae, Meliaceae, Myrtaceae & Combretaceae 6 each, the rest registered 5 or less.



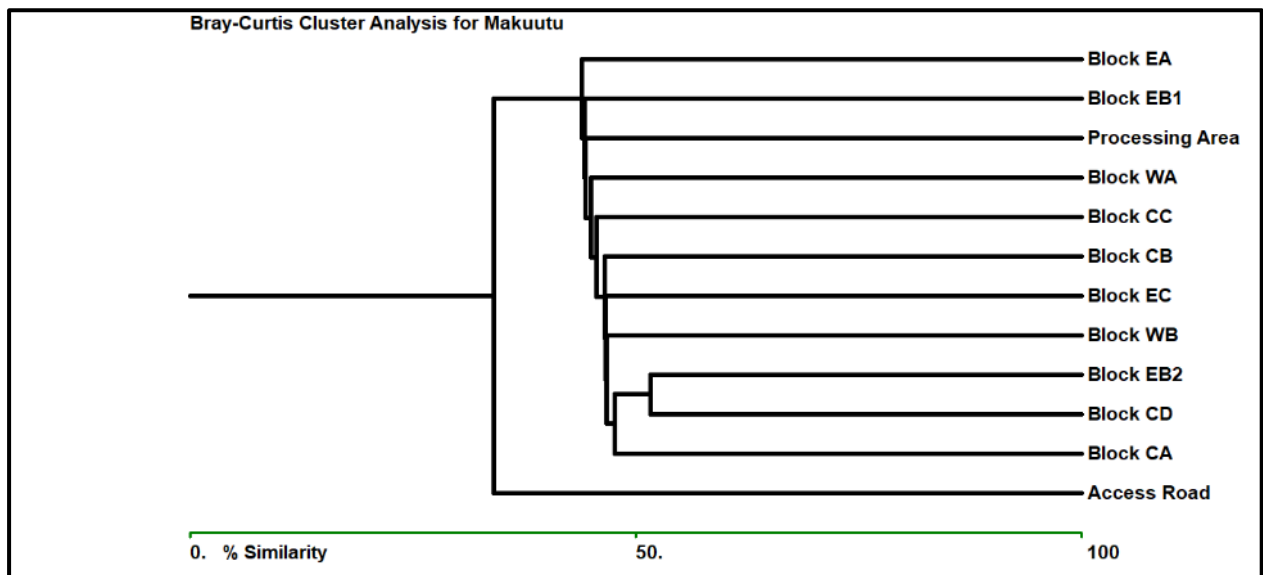


Figure 113: Bray-Curtis Cluster Analysis for the Makuutu project area

All sites were dissimilar at only 30%. Mining block EA was similar to EB1 and processing Area, EB2 was similar to CD, CB was similar to WB in terms of plant communities and species composition. The access road was the most dissimilar in terms species composition.

#### 6.7.2.2 Conservation status of the species

The IUCN Red List Categories and Criteria were developed for classifying species at high risk of global extinction, i.e., for assessment at the global level. All areas smaller than the global level are referred to as "regional". At National level, a list of threatened plant species and other taxa exists.

Table 30: Categories to consider when carrying out global, regional, and national Red List assessment

EX	Extinct
EW	Extinct in the Wild
RE	Regionally Extinct
CR	Critical in the region
EN	Endangered in the region
VU	Vulnerable in the region
NT	Near threatened in the region
LC	Least Concern
RR	Regional Responsibility
DD	Data Deficient
NE	Not Evaluated

Out of the five hundred twenty-eight (528) plant species encountered in the sampled project areas, **only seven (7) species** are listed on the IUCN Redlist of Uganda. The most common are the *Milicia excelsa* (Mvule) trees.

Some of the species were equally distributed and recorded from all the sites. *Milicia excelsa* (Mvule) in Moraceae, globally listed as Near threatened and nationally as (EN A2acd,) was recorded in all sites. One tree of *Cordia millenii* in Boraginaceae, globally listed as Least Concern (LC) and nationally as (EN A2ad,), was recorded in Makadwa in Block CB. *Warburgia ugandensis*, globally listed as Near Threatened and nationally as (VU A2cd) – one young tree with 4 branches was recorded from one spot at Makandwa village in Block CB. *Gambeya albida* (*Chrysophyllum albidum*) Sapotaceae, globally listed as NE, and nationally (VU A2acd), *Tamarindus indica* (Fabaceae), globally as NE, and nationally as (VU A2acd) – several trees of the species were recorded from most of the mining blocks. *Khaya anthotheca* (Meliaceae), globally, VU and nationally as (EN A2acd) – about 13 seedlings were recorded in Block EC, 30 planted mature trees were recorded in Block CD and lastly *Podocarpus latifolius* (Podocarpaceae), globally as LC, and nationally as (VU A2cd), about eleven (11) young trees were planted near a homestead in block CD. All of the above species have high value for timber, food or medicine and in some cases, such as Mvule, all three resulting in their over-exploitation.





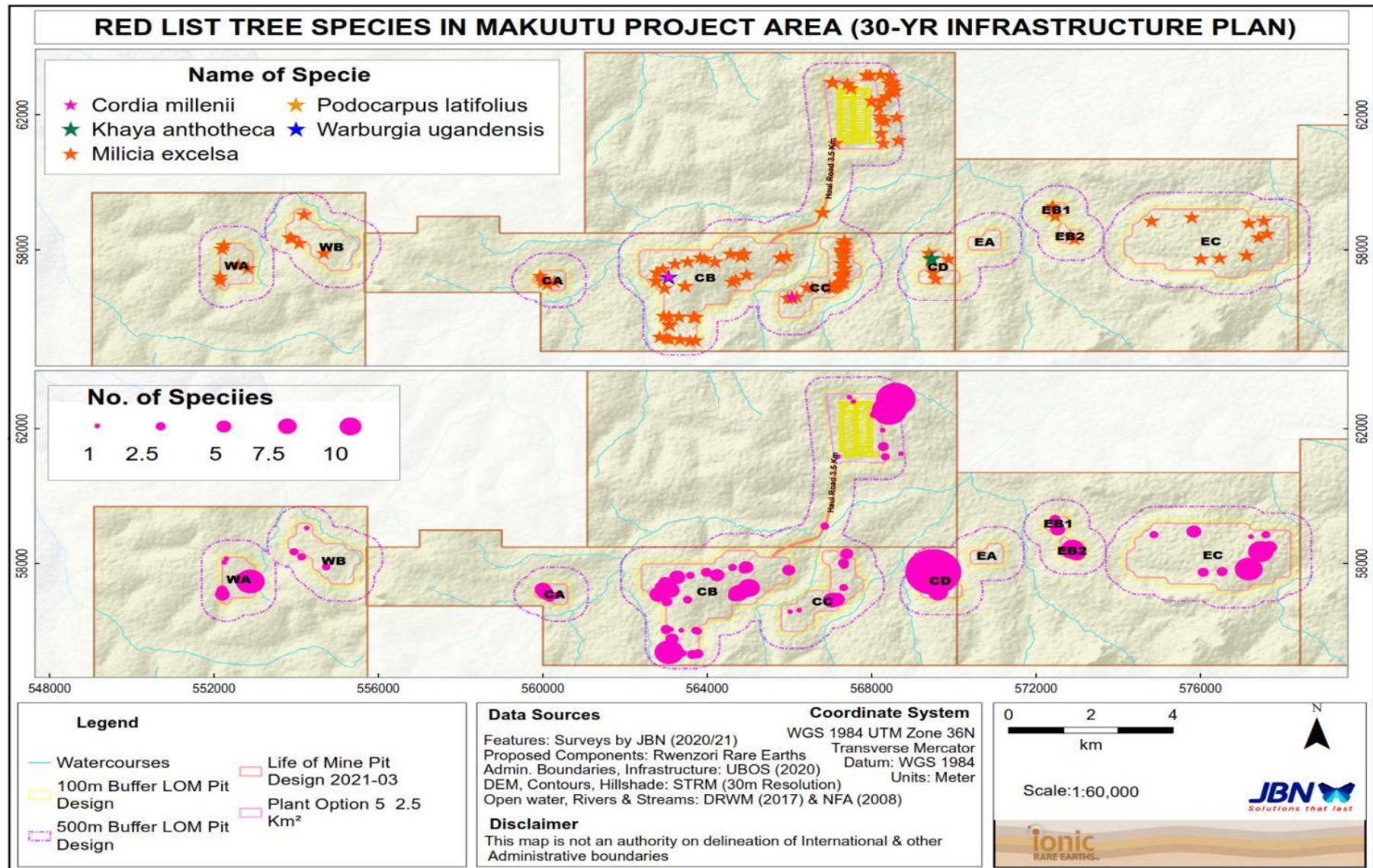


Figure 115: Map showing Distribution of the IUCN threatened species of plants from the entire mining Blocks



### 6.7.2.3 Economic Plants

More than 10% of the total number of economic plants per hectare in the sampled sites were coniferous species of the family Pinaceae (*Pinus ssp*), and Myrtaceae (*Eucalyptus ssp*), Others were Angiosperms including: - *Maesopsis eminii*, (Rhamnaceae), *Coffea robusta* (Rubiaceae), *Saccharum arundinaceum*, and *Saccharum officinarum* (sugarcane). The rest are economic plants in terms of fruit production, or ornamental such as; *Artocarpus heterophyllus* (Jackie fruit tree), *Mangifera indica* (mango tree) *Persea americana* (Avocado), *Syzygium cumini* –Jambura tree (Myrtaceae), *Psidium guajava*, (Myrtaceae), *Citrus limon* (lemon), and *Citrus sinensis* (orange) all in Rutaceae.

Table 31: Checklist of Economic woody plant species Encountered in Makuutu proposed mining areas.

S/N	Family	Scientific Name	Importance	Size
1	Moraceae	Artocarpus heterophylla	Fruits	Small scale
2	Anacardiaceae	Mangifera indica	Fruits	Small scale
3	Lauraceae	Persea americana	Fruits	Small scale
4	Myrtaceae	Eucalyptus grandis	Wood	50 x 70m
5	Pinaceae	Pinus caribaea	Wood	50 x 100m
6	Pinaceae	Pinus oocarpa	wood	70 x 500m
7	Fabaceae	Cassia siamea	Wood/Shed	Alley planting
8	Rutaceae	Citrus sinensis	Fruits	40 x 350m
9	Proteaceae	Grevillea robusta	Wood	Small scale
10	Verbenaceae	Tectona grandis	Commercial	Small scale
11	Rubiaceae	Coffea canefora	Commercial	150 x 200m
12	Fabaceae	Annona muricata	Fruit/Medicinal	Small scale
13	Fabaceae	Schizolobium parahybum	Ornamental	Small scale
14	Rhamnaceae	Maesopsis eminii	Commercial	20 x 50m
15	Burseraceae	Canarium schweinfurthii	Commercial	Small scale
16	Myrtaceae	Syzygium cuminii	Fruit	Small scale
17	Fabaceae	Annona squamosa	fruit	Small scale
18	Meliaceae	Azadirachta indica	Wood/Fruits	Small scale

Among the economic crops encountered within and adjacent the project footprints, *Saccharum officinarum* (sugarcane), was the most encountered grown in large blocks. The entire proposed processing area had several large blocks of sugarcane. *Oryza sativa* (rice) is cultivated commonly grown in wetlands such as; - Kitumbezi and other small seasonal swamps found in the lower part of the proposed processing area. Several species of *Dioscorea* (yams) were often encountered grown near homesteads in Coffee or banana gardens mostly in Bugweri and Mayuge. *Telfairia occidentalis* was one commonly encountered plant found grown host trees near homesteads.

Table 32: Checklist of Crops Plants on Farms Encountered cultivated in proposed project areas.

S/N	Scientific Name	Common Name	Importance	Range of farm size
1	<i>Zea mays</i>	Maize	Food/Commercial	Large fields
2	<i>Manihot esculenta</i>	Cassava	staple Food	Large gardens
3	<i>Ipomoea batatas</i>	Sweet potatoes	Food	Small scale
4	<i>Oryza sativa</i>	Rice	Food	Extensive
5	<i>Phaseolus vulgaris</i>	Bean-seeds	Food	Fairly distributed
6	<i>Saccharum officinarum</i>	Sugar cane	Commercial	Large scale
7	<i>Saccharum arundinaceum</i>	Sugar cane	Commercial	Large scale
8	<i>Musa sapientum</i>	Banana	Food	Fairly distributed
9	<i>Musa paradisiaca</i>		Food	Small scale
10	<i>Colocasia esculenta</i>	Cocoyam	Food	Small scale
11	<i>Dioscorea abyssinica</i>	Yam	Food	Small scale
12	<i>Dioscorea alata</i>	Yam	Food	Small scale
13	<i>Dioscorea baya</i>	Yam	Food	Small scale
14	<i>Dioscorea bulbifera</i>	Yam	Food	Small scale
15	<i>Dioscorea minutiflora</i>	Yam	Food	Small scale
16	<i>Dioscorea odoratissima</i>	Yam	Food	Small scale
17	<i>Dioscorea preussii</i>	Yam	Food	Small scale
18	<i>Telfairia occidentalis</i>	Fluted Gourd	Fruit	Fairly distributed
19	Soya beans	Soya bean	Food	Small scale
20	<i>Solanum lycopersicum</i>	Tomato	Fruit	Small scale
21	<i>Brassica oleracea</i>	Cabbage	Food	Small scale
22	<i>Solanum melongera</i>	Eggplant	Fruit	Small scale
23	<i>Passiflora edulis</i>	Passion fruit	Fruit	Small scale
24	<i>Curcuma domestica</i>	Tumeric	Spice	Small scale
25	<i>Ananas comosus</i>	Pineapple	Commercial	Small scale
26	<i>Citrullus lanatus</i>	Watermelon	Fruit	Small scale
27	<i>Cucurbita pepo</i>	Pumpkin	Food	Small scale
28	<i>Arachis hypogaea</i>	G-nuts	Food/Commercial	Fairly distributed
29	<i>Vigna subterranea</i>	Bambara nut	Food	Small scale
30	<i>Sorghum bicor</i>	Sorghum	Food	Small scale

#### 6.7.2.4 Species Abundance

The species abundance is summarized in the Table below.

Table 33: Individual trees recorded from the eleven sampled sites of Makuutu rare mineral project areas.

Sites	No. of Quadrant	Individuals	No. of trees per Hectare
Access Road	6	84	111.465
Block CD	28	924	262.74
Processing A	14	67	38.103
Block CC	29	256	70.283
Block CB	16	451	224.423
Block WB	10	451	359.076
Block WA	5	255	406.0509
Block CA	22	406	146.9311
Block EC	3	144	382.165
Block EB1	4	106	210.987
Block EB2	4	190	378.184
Block EA	4	192	382.165

#### 6.7.2.5 Flora Survey Recommendations

1. There is need to conserve the IUCN Threatened species within the project area either through avoidance or replanting of the species within the project localities to maintain or upgrade the species status in future.
2. Some invasive species are present within the project sites. An eradication program for invasive species should be incorporated during the mining period.
3. Biodiversity monitoring of vegetation changes overtime is critical including the success of conservation/ replanting activities for species of conservation importance.

### 6.7.3 Fauna

Field sampling was conducted using known scientific methods and international best practices. Fauna species found or living in the project area were registered or recorded. The key highlights of the findings are provided below while the details are provided in **Annex III**.

#### 6.7.3.1 Butterflies

##### 6.7.3.1.1 Species Richness

Twenty-Five species were recorded at the different project areas during the survey. The butterflies are grouped into four (4) families and 15 genera (Figure 116). Butterflies grouped under family Nymphalidae were the majority with sixteen (16) species recorded. Other families include Lycaenidae with one (1) species recorded, Papilionidae with three (3) species recorded and Pieridae with five (5) species recorded. Butterflies appear at different times of the year depending on season. No species with restricted / limited distribution were encountered. Most species are of wide distribution in the country.

The project area is characterized by a modified environment and most of the butterfly species recorded are open habitat species. *Neptidopsis ophione* Scalloped Sailer occurs in forest, woodland, and riverine areas. *Catopsilia florella* African Migrant is a fast-flying butterfly that moves swiftly

between flowers. It often engages in mud-piddling and is at times seen migrating in numbers. Little Commodore, *Junonia sophia* is a butterfly which occurs in gardens and cultivated areas across the region. Tiny Grass Blue, *Zizula hylax* is found in a wide range of habitats, including on lawns and in cultivated areas among weeds to mention but a few.

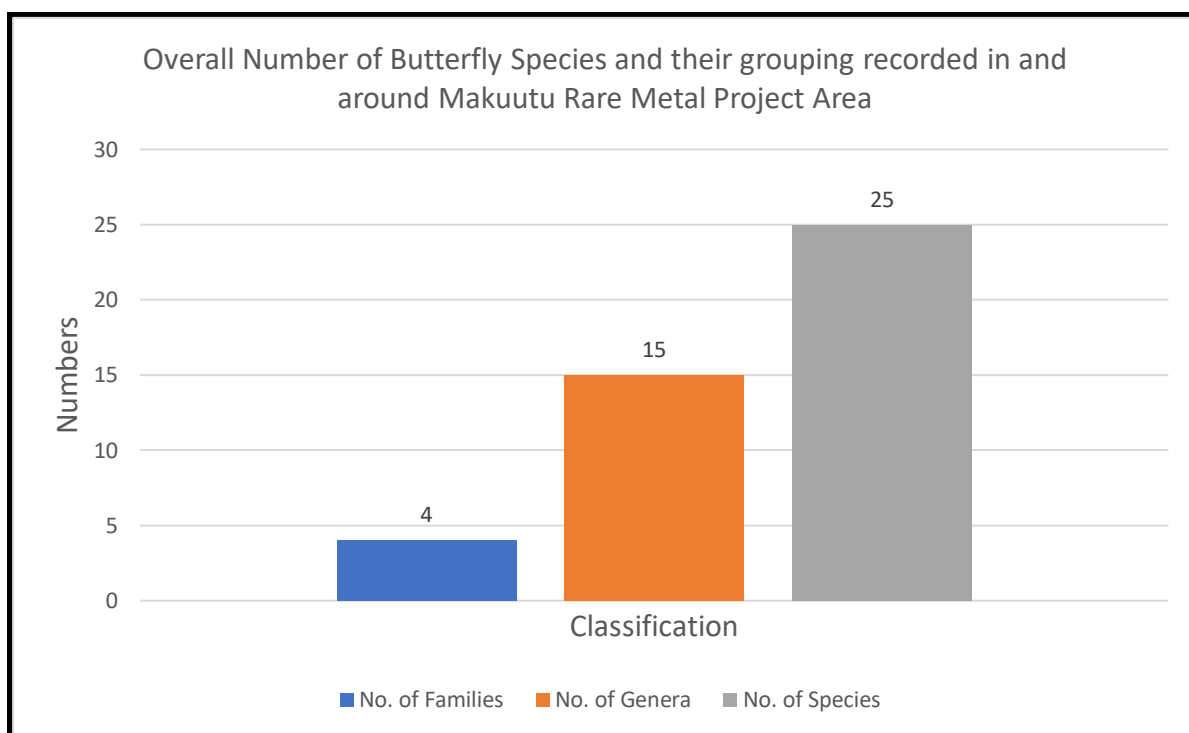


Figure 116: Diversity of Butterfly species in the study area

#### 6.7.3.1.2 Site by Site Representation

Figure 117 shows the site-by-site representation of butterfly species encountered in the project area. The haul road had 12 species recorded during the survey while 14 species were recorded during the survey of the processing plant project site. Species recorded at other project sites were as follows: Mining PIT CA – Only one species, Mining PIT CB – 18 species, Mining PIT CC – 13 species, Mining PIT CD – Nine species, Mining PIT EA – only 2 species, Mining PIT EB1 and EB2 – 3 species, Mining PIT EC – 12 species, Mining PIT WA – 14 species and Mining PIT WB – 12 species. The extremely low numbers at PIT CA, PIT EA and PIT EB1 and PIT EB2 may have been a result of the prevailing weather condition at the time of surveying / sampling. It was cloudy and a bit cool. Butterflies are known to be active when weather is warmed up or in sunny weather when temperature is 13-17°C.



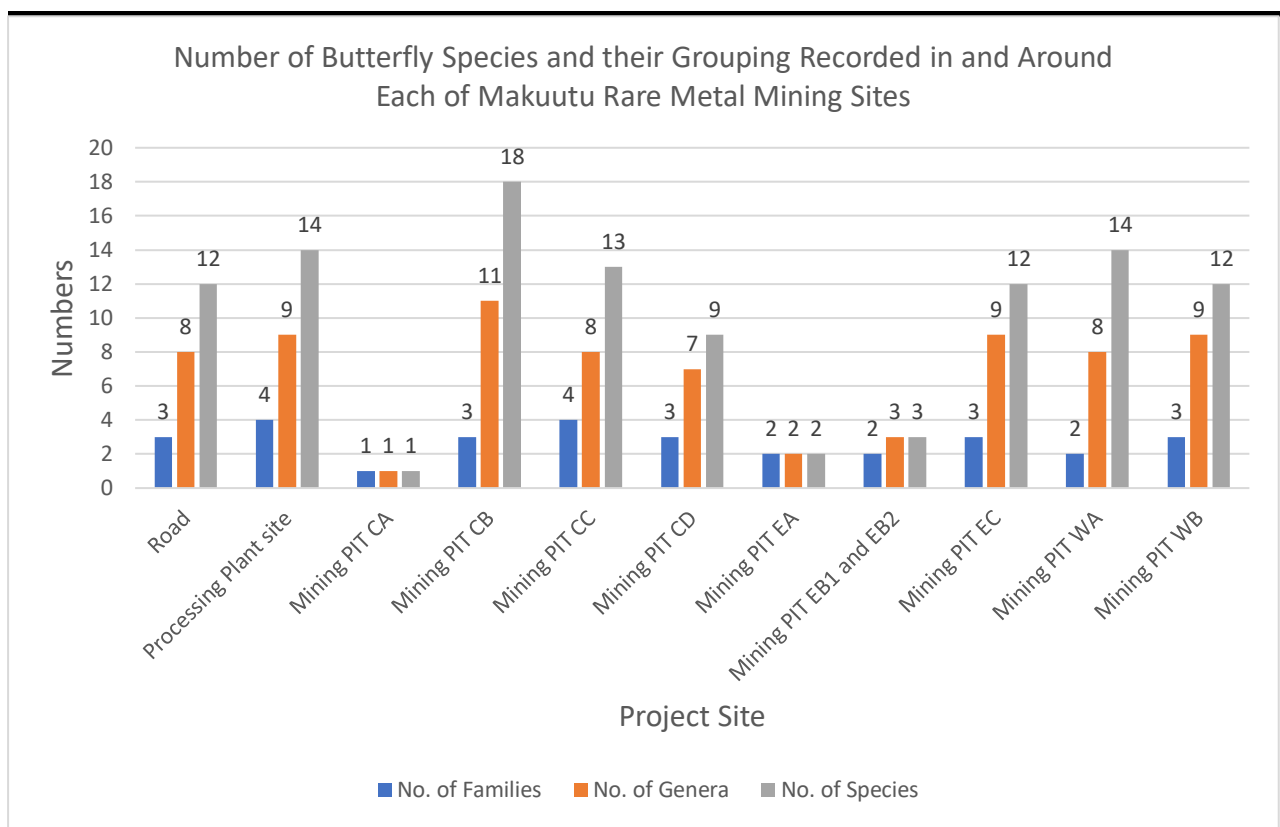


Figure 117: Site by site representation of butterfly species encountered during the study

#### 6.7.3.1.3 Species relative abundance

Relative species abundance refers to how common or rare a species is relative to other species in a defined location or community. During the survey of the project area, Angled Grass Yellow *Eurema desjaridinsi* was the most common species with 133 individuals encountered. Other species which were relatively common include Tiny Acraea *Acraea uvui* with 71 individuals recorded, Brown Pansy *Junonia stygia* with 61 individuals and Sotik Acraea *Acraea sotikensis* with 52 individuals recorded. Among the least common included Gaudy Commodore *Precis Octavia*, Eared Commodore *Precis tugela* Round-winged Orange Tip *Colotis euippe* Guinea fowl Butterfly *Hamanumida Daedalus* African Leopard Fritillary *Phalanta eurytis* Narrow Blue-banded Swallowtail *Papilio nireus* and Common Grass Yellow *Eurema hecabe*; with 1, 1, 1, 2, 2, 2 and 3 individuals registered respectively.

#### 6.7.3.1.4 Species Conservation Status

All the butterfly species recorded during the survey are categorized as Least Concern (LC) by IUCN 2019 Red List of Threatened Species Checklist.

#### 6.7.3.1.5



Figure 118: Photographic catalogue of some butterfly species encountered in the project area

#### 6.7.3.2 Amphibians

##### 6.7.3.2.1 Species Richness

Overall, a total of thirteen (13) species of amphibian were recorded in the project area. They included four toads and nine frogs. The recorded species represent 5 families and 8 genera (Figure 119). There were more species in family Bufonidae recorded during the survey. Four (4) species were recorded. Amphibians were mainly recorded in moist areas in and around wetlands, streams, culvert points and

ponds and pools of water in the project area. Amphibians are secretive creatures, and they require ample time to compile a complete species list for the project area.

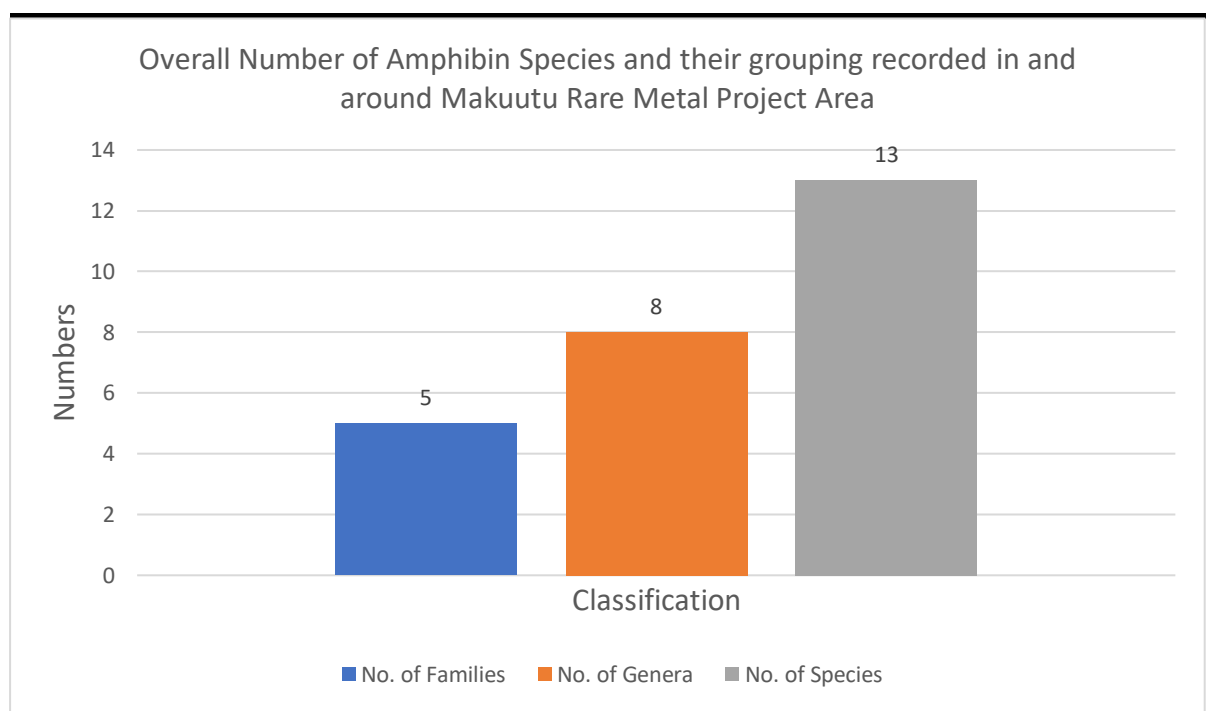


Figure 119: Diversity of Amphibian Species encountered in the project areas

#### 6.7.3.2.2 Site by Site Amphibian representation

Figure 120 shows the number of species recorded at each site. The names of the species recorded at each site are indicated in Annex III. For the haul road, only 4 species were recorded along the route i.e., Natal Puddle Frog *Phrynobatrachus natalensis*, Mascarene Rocket Frog *Ptychadena mascareniensis*, Kivu Reed Frog *Hyperolius kivuensis* and Eastern Groove-crowned Bullfrog *Hoplobatrachus occipitalis*. Ten (10) species were recorded at the processing plant site, three (3) recorded at Mining Pit CA, Six at Mining Pit CB, six at Mining Pit CC, only one at Mining Pit CD, one species at Pit EA, two (2) species at Mining Pit EB1 and EB2, Nine species at Mining Pit EC, Seven species at WA and four species at WB.

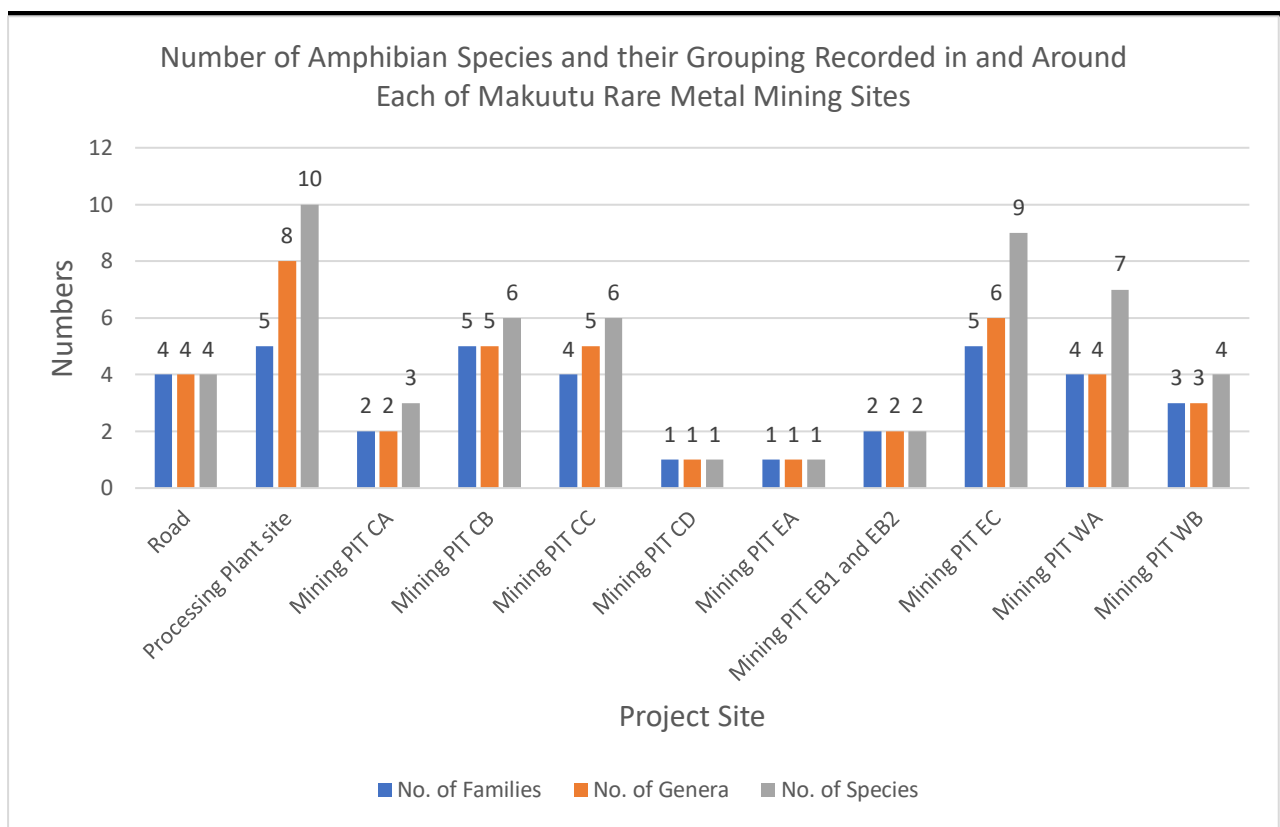


Figure 120: Number of species recorded at each site

#### 6.7.3.2.3 Species relative abundance

The *Ptychadena mascareniensis* Mascarene Rocket Frog had the highest relative abundance with a total of ninety-one (91) individuals recorded during the survey. The was followed by *Phrynobatrachus mababiensis* Dwarf Puddle Frog and *Phrynobatrachus natalensis* Natal Puddle Frog with 78 and 74 individuals recorded respectively. The three species are known for their adoptability and can survive well in degraded wetlands. The species which had the lowest relative abundance include Four-lined Spiny Reed Frog *Afrixalus quadrivittatus*, Kisolo Toad *Sclerophrys kisoensis* and Senegal Kassina *Kassina senegalensis*. Two individuals each were recorded for Four-lined Spiny Reed Frog *Afrixalus quadrivittatus*, and Kisolo Toad *Sclerophrys kisoensis*. Three individuals were recorded for Senegal Kassina *Kassina senegalensis*.

#### 6.7.3.2.4 Species of conservation significance

IUCN 2019 red list of threatened species categorizes all the thirteen species recorded during the survey as Least Concern (LC).





Figure 121: Photographic Catalogue of some amphibian species recorded during the survey

### 6.7.3.3 Reptiles

#### 6.7.3.3.1 Species Richness

Five (5) species of reptiles were physically encountered during the field survey i.e., one chameleon, one Lizard and three skinks. The species represent three families and three genera (Figure 122). The occurrence of seven species was reported by the community. The seven include the Blue Headed Tree Agama *Acanthocercus atricolis*, Red-Headed Rock Agama *Agama agama*, Olive House Snake *Lamprophis olivaceus*, Forest Cobra *Naja melanoleuca*, Williams Hinged Terrapin *Pelusios williami*, Central Africa Rock Python *Python sebae* and Bell's Hinged Tortoise *Kinixys belliana*.

No literature of previous work on reptiles in the project area is available. The descriptions given by the community enabled the fauna ecologists to arrive at the identity of the seven species reported by the community.

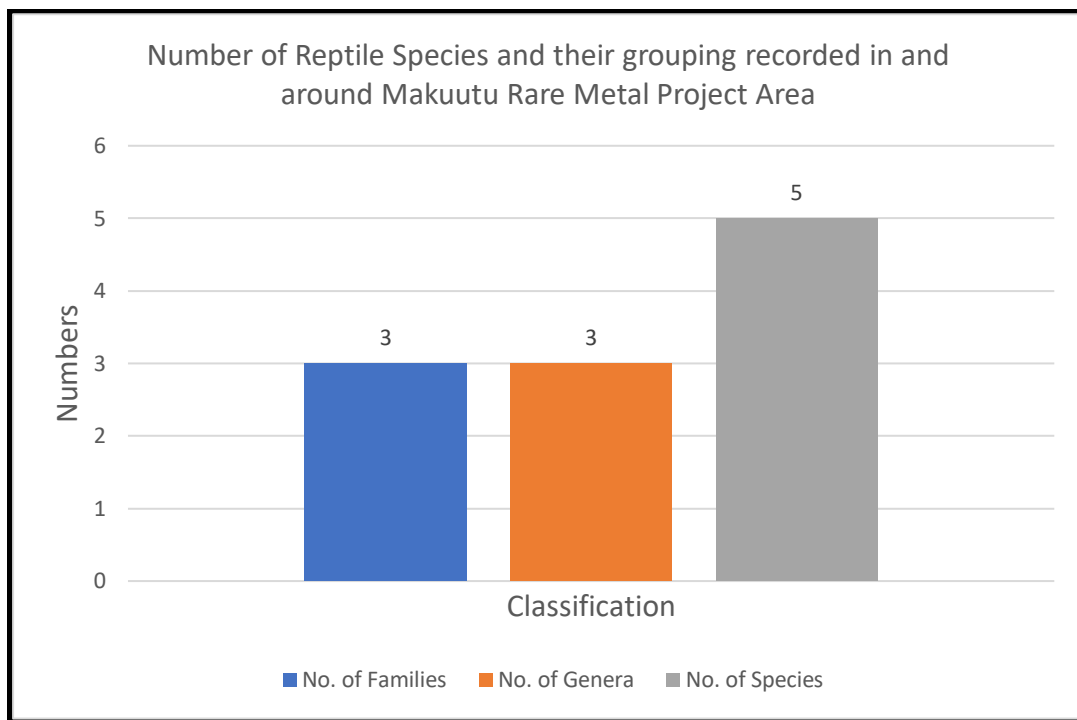


Figure 122: Diversity of Reptile Species encountered in Makuutu Rare Metal Project Area

#### 6.7.3.3.2 Site by Site Reptile representation

Figure 123 shows the number of species encountered by site. Two species were physically encountered during the survey along the proposed haul road i.e., the Rainbow skink *Trachylepis margaritifera* and Nile Monitor *Varanus niloticus*. Three species were reported by the community i.e., the Forest Cobra *Naja melanoleuca*, Red-Headed Rock Agama *Agama agama* and Blue Headed Tree Agama *Acanthocercus atricollis*.

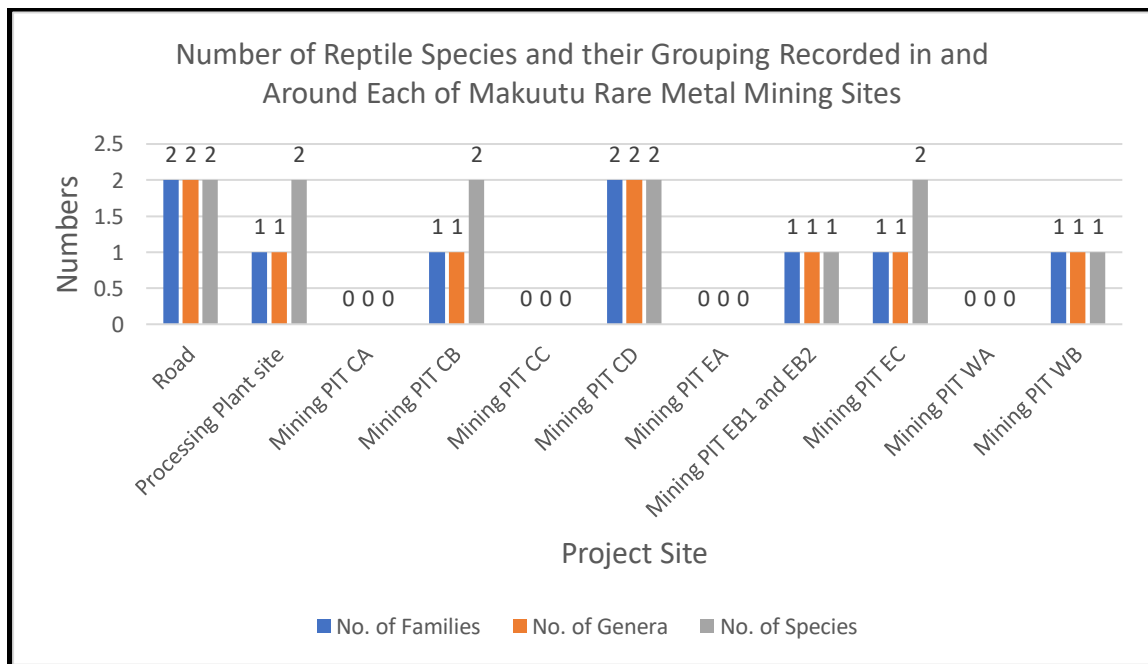


Figure 123: Diversity of reptile species in the mining areas

Processing Plant site: Only two species of reptiles were recorded in the processing plant site. The two were the Striped Skink *Trachylepis striata* and Rainbow skink *Trachylepis margaritifer*.

Mining PIT CA: No species were physically encountered during the survey in mining PIT CA. However, the community reported two species for mining the area i.e., the Nile Monitor *Varanus niloticus* and the Forest Cobra *Naja melanoleuca*.

Mining PIT CB: Two species were physically encountered i.e., the Striped Skink *Trachylepis striata* and Speckled-lipped Skink *Trachylepis maculilabris*. The residents reported that the Forest Cobra *Naja melanoleuca* and Blue Headed Tree Agama *Acanthocercus atricolis* do occur in the project area.

Mining PIT CC: No reptile species was encountered during the field survey in mining PIT CC. The residents however, reported that the Bell's Hinged Tortoise *Kinixys belliana*, Nile Monitor *Varanus niloticus* and Forest Cobra *Naja melanoleuca* do occur in the mining pit area project area.

Mining PIT CD: Only two species were encountered, i.e., the Striped Skink *Trachylepis striata* and the Slender Chameleon *Chamaeleo gracilis*. Four were reported by residents i.e., the Red-Headed Rock Agama *Agama agama*, Blue Headed Tree Agama *Acanthocercus atricolis*, Nile Monitor *Varanus niloticus* and Bell's Hinged Tortoise *Kinixys belliana*.

Mining PIT EA: No species were encountered during the survey of the mining PIT. However, three species were reported by residents that they occur in the mining area. They include the Bell's Hinged Tortoise *Kinixys belliana*, Williams Hinged Terrapin *Pelusios williami* and Forest Cobra *Naja melanoleuca*.

Mining PIT EB1 and EB2: No species were encountered during the survey. Residents reported the occurrence of Forest Cobra *Naja melanoleuca* in the project site.

Mining PIT EC: Two species were recorded for mining PIT EC i.e., the Striped Skink *Trachylepis striata* and Speckled-lipped Skink *Trachylepis maculilabris*. Three individuals; including the Striped Skink *Trachylepis striata* and one individual of Speckled-lipped Skink *Trachylepis maculilabris* were recorded. The Forest Cobra *Naja melanoleuca* was the only species reported as occurring in the project site.

Mining PIT WB: No reptile species was encountered in mining pit WB during the field survey. The residents however, reported the occurrence of the Nile Monitor *Varanus niloticus* and Forest Cobra *Naja melanoleuca* in the project area. Residents also reported that snakes, tortoises, and Chameleons are rare because of the herbicides and pesticides used in Sugarcane growing.

Mining PIT WA: Only one species was encountered for mining pit WA and five were reported as occurring in and around the pit area. Those reported as occurring include Central Africa Rock Python *Python sebae*, Red-Headed Rock Agama *Agama agama*, Forest Cobra *Naja melanoleuca* and Nile Monitor *Varanus niloticus*. One resident said he recently killed an Olive House Snake *Lamprophis olivaceus*. The Striped Skink *Trachylepis striata* was the only species encountered during the survey.

#### 6.7.3.3.3 Species relative abundance

The Striped Skink *Trachylepis striata* and the Rainbow skink *Trachylepis margaritifer* were the most abundant relative to other reptile species encountered in the project area. Thirteen (13) and Nine (9) species were recorded respectively in the project area. The Slender Chameleon *Chamaeleo gracilis* and Nile Monitor *Varanus niloticus* were the least abundant with one individual each recorded.

#### 6.7.3.3.4 Species conservation status

No species of conservation significance were registered during the survey. All species registered are categorized as Least Concern by the IUCN Red List of threatened species. However, the Nile Monitor Lizard *Varanus niloticus* and the Central Africa Rock Python *Python sebae* are listed under the Endangered Species Decree of 1985, which means that international trade of the species is prohibited. The Species are listed under CITES Appendix II (Branch 1998). However, in Uganda the species were down listed from Appendix II because they are still abundant and widespread in the Country.

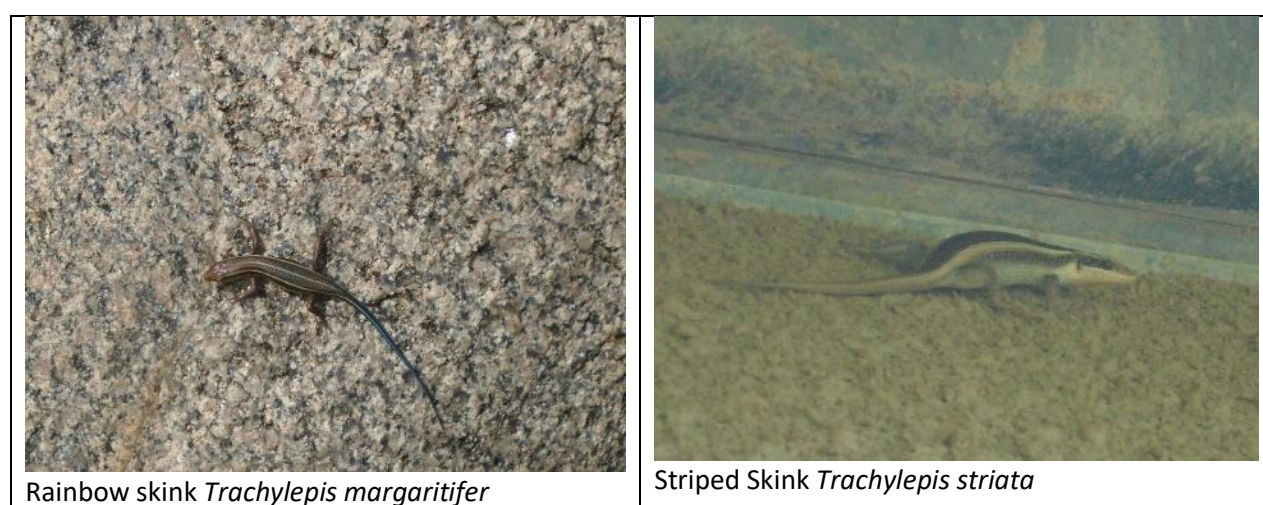


Figure 124: Photographic catalogue of some of the reptile species encountered in the project area

#### 6.7.3.4 Birds

##### 6.7.3.4.1 Species Richness

Overall, sixty-five (65) species of birds were positively identified in the general project area. The birds are grouped into 31 families and 56 genera (refer Figure 125). The project area is generally a modified environment. Indications are that the project area was originally a woodland, interspersed with papyrus wetlands. The woodlands have been modified to provide land for settlements and cultivation. Wetlands have also been degraded for rice and sugarcane growing.

Twenty-five (25) bird's species were recorded in habitats with trees or woodlots on community land in the project area. These comprised forest specialists / generalists and those that prefer trees as an ecological feature. Thirteen (13) bird species were recorded in wetlands / seasonal wetlands and stream areas. These were either wetland specialists or wetland visitors. Twenty-four (24) species were recorded in grasslands or open habitats areas. Also recorded were three (3) Palearctic migrants and two Afrotropical migrants. The Black Kite *Milvus migrans* is categorized as Palearctic migrants but the tropical (or Ugandan) ones are resident. The species is widely distributed in Uganda.



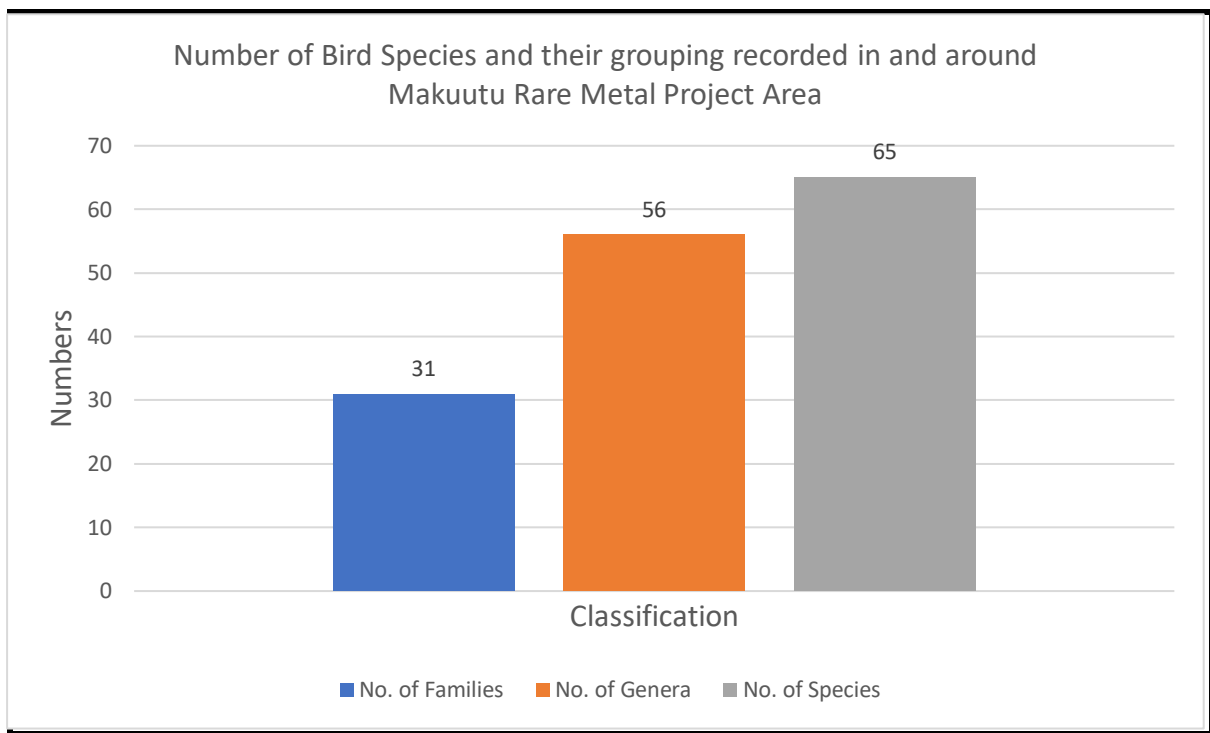


Figure 125: Diversity of bird fauna in and around the project sites

#### 6.7.3.4.2 Site by site bird fauna Representation in the project area

The species of birds recorded at the different project sites are shown in the figure below.

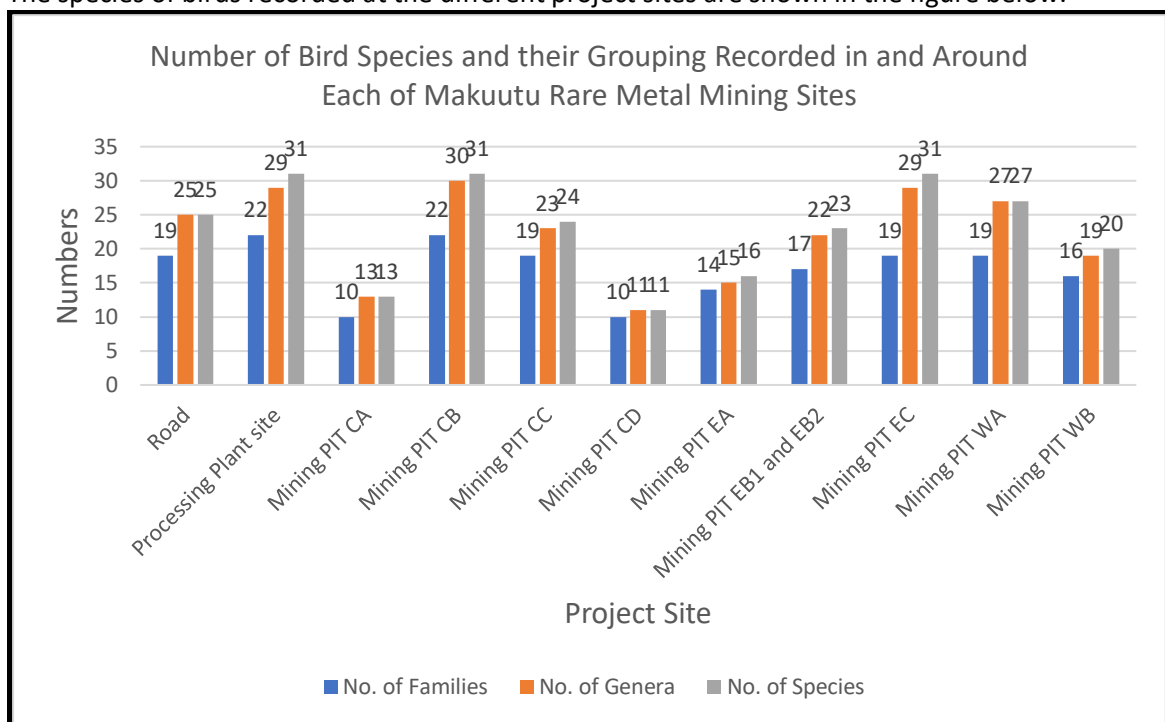


Figure 126: Site by site representation of butterfly species encountered in the project area during the survey

Processing plant site, Mining PIT CB and Mining PIT EC had the highest number of bird species recorded at the project sites with 31 species recorded, while mining PIT CD had the lowest number of birds with eleven species recorded. At other mining PITs, the following numbers of species were recorded; Mining PIT CA – 13 species, Mining PIT CC – 24 species, Mining PIT EA – 16 species, Mining PIT EB1 and EB2 – 23 species, Mining PIT WA 27 species and Mining PIT WB 20 species. It should be noted that the processing plant site, Mining PIT CB and Mining PIT EC are the biggest in terms of size. This may explain why the three sites have the highest number of bird species record.

#### 6.7.3.4.3 Species relative abundance

The Black-Headed Weaver *Ploceus cucullatus* had the highest relative abundance among the recorded birds with 299 individuals counted during the survey. This was followed by the Common Bulbul *Pycnonotus barbatus* and Black-and-White Mannikin *Spermestes bicolor*. Their relative abundance was 185 and 136 individuals, respectively. Nine (9) species were recorded once, and these could be taken as the least abundant relative to other species in the project area. They include African Hawk-Eagle *Aquila spilogaster*, Little Egret *Egretta garzetta*, Alpine Swift *Tachymarptis melba*, Wing-Snapping Cisticola *Cisticola ayresii*, African Stonechat *Saxicola torquatus*, Green-Throated Sunbird *Chalcomitra rubescens*, Hamerkop *Scopus umbretta*, African Wood Owl *Strix woodfordii* and Village Indigobird *Vidua chalybeata*.

#### 6.7.3.4.4 Species conservation status

According to the IUCN 2019 Red List of Threatened species, all the species recorded during the survey are categorized as Least Concern (LC).

#### 6.7.3.4.5 Trees with Bird Nests

Some trees with bird nests were recorded in the project area. By the time the survey was conducted it was the beginning of the breeding season for some birds which were nesting. According to the residents, these trees are used by the birds every year to nest. Old nests are dropped, and new ones constructed. The GPS positions / locations of the trees were taken and are shown in (Refer Table 34).

Table 34: GPS positions of trees used by birds to nest

Project Area	GPS Coordinate	Remarks
Processing Plant Project Site	36 N 0568412, 0061841	Tree with Black-Headed weaver's nests. Residents also informed the Fauna Specialist that the Crested Guineafowl nest and breed in the sugarcane plantations
	36 N 0567074, 0061003	Tree with Lesser Masked weaver nests near Nakivumbi Trading Centre
Mining PIT CA	36 N 0560548, 0057073	Tree with 1 Hadada nest and 4 black-headed weaver nests
Mining PIT CB	36 N 0564647, 0057068	Tree with black-headed weavers nesting. Every year they nest on it and migrate for a while and come back during breeding season
Mining PIT CC	36 N 0567374, 0058199	Mvule tree with Black-Headed Weaver Nests
	36 N 0567267, 0060975	Tree with 35 Black-Headed weaver nests
	36 N 0567459, 0060985	Tree with 80 black-headed weaver nests
	36 N 0567520, 0060993	Tree with 4 black and white mannikin nests
Mining PIT CD	36 N 0569586, 0057694	<i>Markhamia platycalyx</i> tree with over 60 nests belonging to Black-Headed weavers

Project Area	GPS Coordinate	Remarks
Mining PIT EB1 and EB2	36 N 0572635, 0058812	Pine and Gravellia Trees with more than 200 Black-Headed weaver nests. Over 100 weavers recorded
Mining PIT EC	36 N 0574771, 0058872	Mvule tree with black-headed weaver nests. Two other trees with weavers nearby
	36 N 0576488, 0058733	Tree with Black-Headed Weaver nests with over 120 nests
Mining PIT WA	36 N 0552365, 0058037	Mvule tree with Black-Headed weaver nests. The weavers do nest on the tree every year
Mining PIT WB	36 N 0554294, 0059013	Tree with Black-headed weaver nests. Many were busy constructing more nests.
	36 N 0554405, 0058741	Musizi Tree with 63 black-headed weaver nests
	36 N 0554459, 0058522	Mvule tree with 50 nests of Black-headed weavers and 1 nest of Black Kite with two chicks
	36 N 0554499, 0058477	Musizi Tree with black kite nest
	36 N 0554531, 0058463	Big <i>Albizia polialiah</i> tree which works as roosting tree in evenings
	36 N 0554604, 0058394	Big Ficus tree with Unstriped Squirrel (could be its home)
	36 N 0554937, 0057529	Musizi Tree with 83 nests of Black-Headed Weavers
	36 N 0554221, 0058125	Ficus tree with 17 nests of Black-Headed weavers



Long-Crested Eagle *Lophaetus occipitalis*



Abyssinian Ground-Hornbill *Bucorvus abyssinicus*



Black-Headed Heron *Ardea melanocephala*



Little Egret *Egretta garzetta*

Figure 127: Photographic Catalogue of bird species encountered during the survey



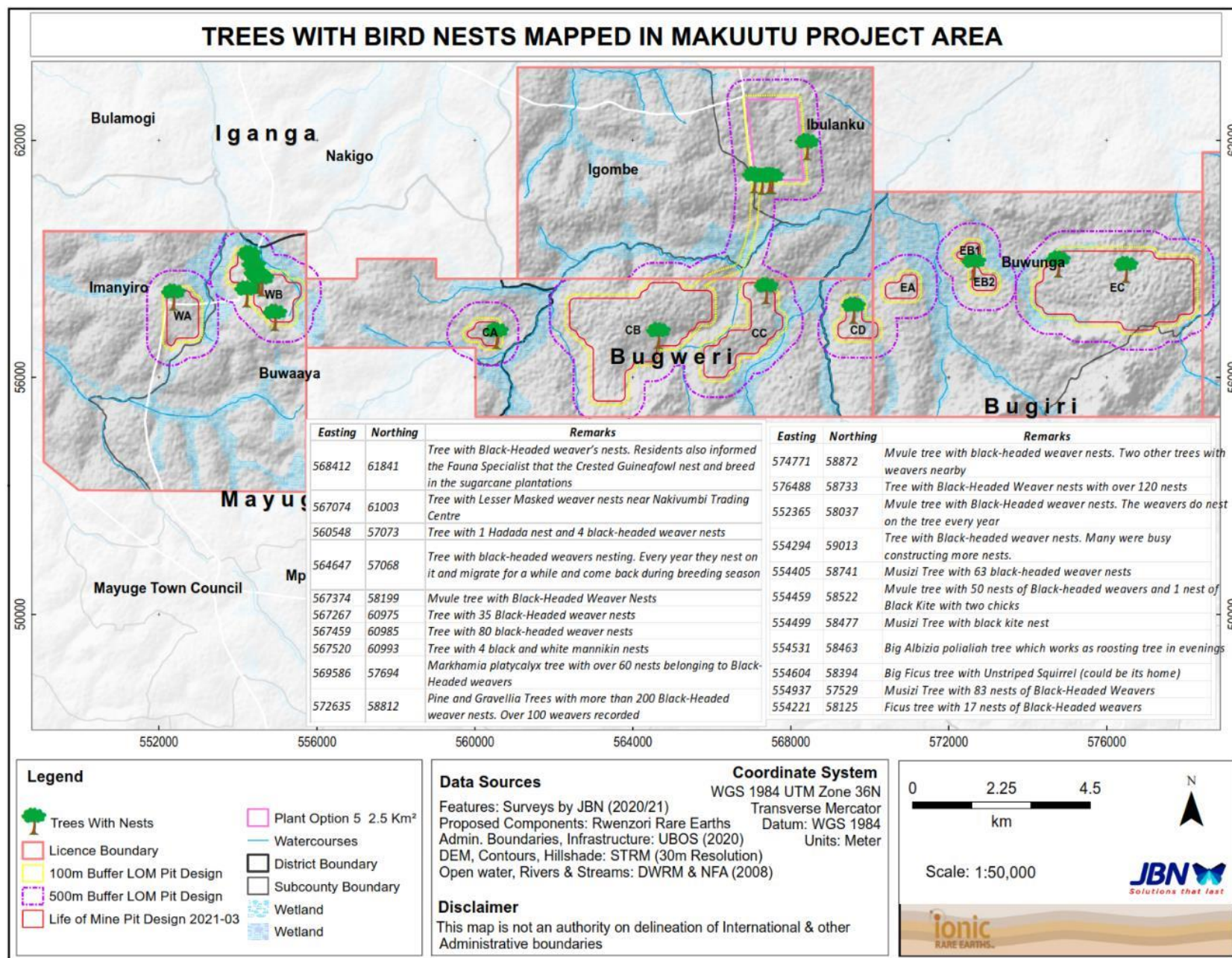


Figure 128: Location of trees with bird nests

#### 6.7.3.5 Mammals

##### 6.7.3.5.1 Species Richness

Only seven mammal species were recorded in the project area. The general scarcity of mammals in the project area is due to habitat degradation. Only one mammal species was reported by the community as occurring in the project area. The mammals are grouped into seven families and seven genera (Figure 129). The Forest Department biodiversity inventory recorded a total of 16 small mammal species including 5 shrew and 11 rodents (Davenport *et al* 1996). These can still range in several parts of the project area. One species of primate (*Chlorocebus pygerythrus* Vervet monkey) was reported as occurring in the project area.

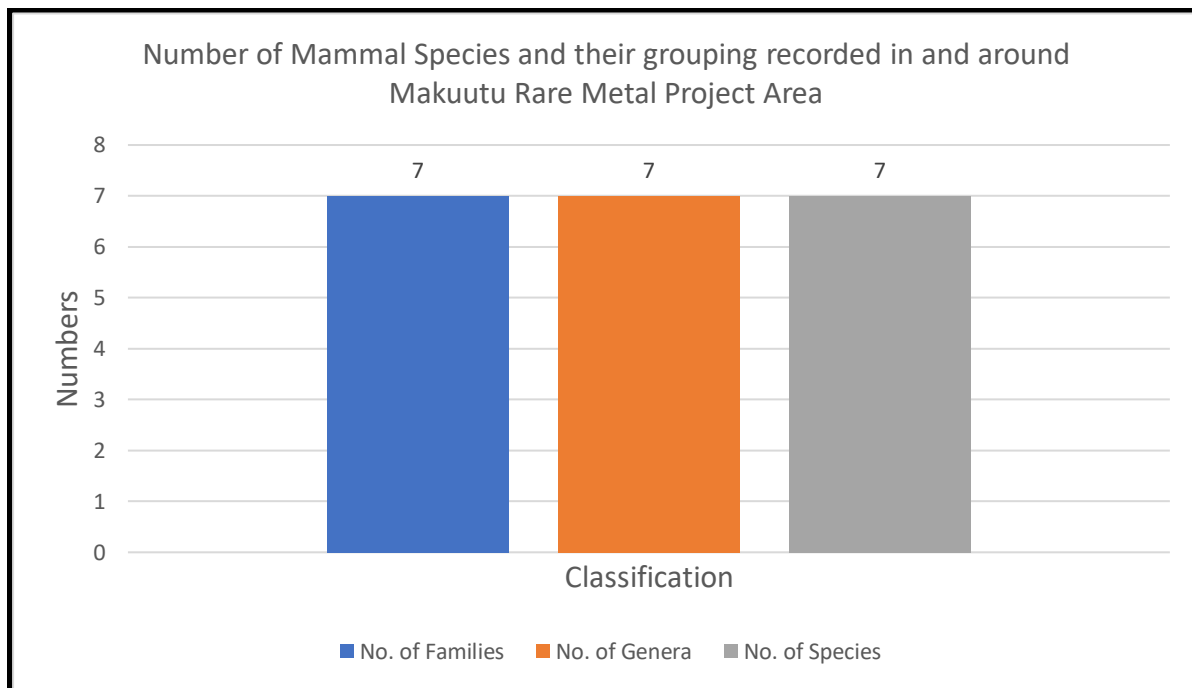


Figure 129: Number of families, genera and species represented in the project area

##### 6.7.3.5.2 Site by Site Representation

Different project sites recorded different mammal species during the survey.

- **The Haul Road:** Two species (Unstriped ground squirrel *Xerus rutilus* and White-bellied House Bat *Scotophilus leucogaster*) were encountered during the survey. The occurrence of three mammal species (Vervet monkey *Chlorocebus pygerythrus*, Black Rat *Rattus rattus* and East African epauletted fruit bat *Epomophorus minimus*) was reported by the community.
- **Processing Plant Site:** Five species were encountered during the survey including Black-Backed Jackal *Canis mesomelas*, Black Rat *Rattus rattus*, Marsh Mongoose *Atilex paludinosus*, Unstriped ground squirrel *Xerus rutilus* and Greater cane rat *Thryonomys swinderianus*.
- **Mining PIT CC:** One species of Rat (*Thryonomys swinderianus* Greater cane rat) was recorded after being trapped. Occurrence of one species (*Canis mesomelas* Black-Backed Jackal) was reported by the community.
- **Mining PIT CB:** Two species were encountered and recorded (East African epauletted fruit bat *Epomophorus minimus* and White-bellied House Bat *Scotophilus leucogaster*) and one species (Black-Backed Jackal *Canis mesomelas*) reported by community.

- **Mining PIT WB:** Two species were encountered and recorded (Black Rat *Rattus rattus* and Unstriped ground squirrel *Xerus rutilus*) and one species (Black-Backed Jackal *Canis mesomelas*) reported by community.
- **Mining PIT WA:** Two species were reported by the community as occurring in the area. The two include Black-Backed Jackal *Canis mesomelas* and Vervet monkey *Chlorocebus pygerythrus*. No species was encountered during the survey.
- **Mining PIT CA:** None encountered during the survey but One species (*Canis mesomelas* Black-Backed Jackal) reported by the community.
- **Mining PIT EC:** Two mammal species were encountered including *Thryonomys swinderianus* Greater cane rat and *Rattus rattus* Black Rat. Occurrence of the Vervet monkey *Chlorocebus pygerythrus* was reported by the community.
- **Mining PIT EB1 and EB2:** No species was encountered but one species Black Rat *Rattus rattus* was reported by the community.
- **Mining PIT EA:** No species was encountered nor reported by the community.
- **Mining PIT CD:** No species was encountered nor reported by the community.

#### 6.7.3.5.3 Species Relative abundance

The Greater cane rat *Thryonomys swinderianus* had the highest relative abundance compared to other species with twelve (12) recorded. This was followed by the Black-Backed Jackal *Canis mesomelas* with nine individuals recorded. The Marsh Mongoose *Atilex paludinosus* and Black Rat *Rattus rattus* were the least abundant with one and three individuals recorded, respectively.

#### 6.7.3.5.4 Species of Conservation Significance

Basing on the IUCN 2019 Red List of Threatened Species, no species of conservation significance was recorded during the survey.



Figure 130: Photographic Catalogue of some mammal species reported during the survey



## 7 SOCIO-ECONOMIC BASELINE

### 7.1 Project Socio-economic Context

The Makuutu Project has a number of Retention and Exploration Licenses along an orebody spanning 40 km across the Districts of Mayuge, Bugweri and Bugiri with exploration drilling continuing (Refer Figure 20). Mineral Processing and the first 15 years of mining will take place in Bugweri District which is also the focus of quantitative household surveys and the initial Year 1 to Year 10 Resettlement Action Plan centred on the indicated resources of the Central Makuutu orebody. Project benefits in the form of social support programmes, employment and infrastructure development will, however, be delivered across all three Districts from the commencement of mining. This section presents the socio-economic context across the future project footprint while the detailed socio-economic baseline for the Central Makuutu area is presented in Section 7.2. The 2014 census reveals that the socio-economic context is broadly similar across all three districts (refer Table 35).

Table 35: Key socio-economic metrics for the Makuutu Project (as per 2014 Uganda National Population and Housing Census)

Parameter	Mayuge	Bugweri	Bugiri	Average
Total Population	473,239	164,886	382,913	340,346
% older than 20 years	37.1%	38.9%	35.7%	37%
Males 6-15 not in school	12.3%	8.4%	9.8%	10%
Females 6-15 not in school	11.7%	7.2%	8.9%	9%
Illiterate males >18 years	24.9%	28.4%	29.2%	28%
Illiterate females >18 years	39%	43.8%	48.3%	44%
Persons >18 years old working	84.4%	81%	85.5%	84%
Males 18-30 using internet	10.7%	4.3%	53%	23%
Females 18-30 using internet	5.3%	2.3%	29.3%	12%
Households >5km to Primary School	12.2%	3.1%	3.6%	6%
Households >5 km from medical centre	24.3%	9.3%	12.7%	15%
Households >5km from police station	31.1%	19.3%	24.5%	25%
Households with at least 1 mosquito net	78.6%	93.5%	82.7%	85%
Access to piped water	7.3%	5.6%	3.8%	6%
Reliant on bore-hole water	44.1%	78.8%	59.8%	61%
Households with no toilet	11.8%	5.6%	7.7%	8%
Proper disposal of solid waste	40.8%	38.9%	42.4%	41%
Dwelling not decent	98.6%	98.4%	99.1%	99%
Semi-permanent dwellings	67.9%	54.6%	10.3%	44%
Owner occupied dwelling	77.9%	79.3%	85.4%	81%
Household with TV	4.3%	5.3%	2.5%	4%
Household with computer	1%	1.2%	0.6%	1%
Household with bicycle	40.6%	42.7%	47%	43%
Household with radio	61.3%	59.2%	55.9%	59%
Main source of information is radio	61.4%	61%	58.5%	60%
Household reliant on subsistence farming	74.2%	76.8%	85.9%	79%
At least 1 member with non-agricultural work	88.1%	91.9%	89.4%	90%
2 or less meals a day	5.6%	6%	6.3%	6%
Access to electrical power	9.7%	9.1%	6.0%	8%
Use tadooba (candle) for light	71.8%	72.4%	80.5%	75%
Household engaged with crop growing	83.7%	94.2%	93%	90%
Household engaged with livestock	60.5%	68.8%	61.2%	64%



The population in all three district is young and growing rapidly with only 37% of the population over 20 years old. With this demographic, the Project focus on securing better education and employment appears to be appropriate.

School attendance appears to be reasonable with only 10% of both boys and girls between the ages of 6-15 recorded as not being at school. High rates of adult illiteracy with 28% of males over 18 and 44% of females over 18 recorded as illiterate, however, reinforce the need for adult literacy and numeracy training programmes to facilitate employment with the project.

An average 84% of people over the age of 18 working indicates a high unemployment rate of about 16%. The project focus on adult skills training and the development of livelihood projects aimed at employing large numbers of people appears to be appropriate (refer Section 11.3).

23% of males and a much lower 12% of females between the ages of 18-30 using the internet is reflective of the subsistence rural context of the Project area and a lack of access to modern technology. This is reinforced by the very low average 1% of households having a computer and this is exacerbated by a very low 8% of households having access to electricity.

Access to key community services is also limited with 6% of households more than 5km from a Primary school, 15% more than 5km from a medical centre and 25% more than 5 km from a Police Station. Access to these services is further exacerbated by a lack of transport with only 43% of households having access to a bicycle presumably requiring most people to walk to key community service providers.

The community is highly reliant on radios for information but only an average 59% of households have a radio leaving large numbers of people with limited access to information.

The whole project area is in a rural setting with an average 79% of households reliant on subsistence farming. The average 90% of households having at least one household member engaged in non-agricultural work indicates some diversification and it is likely that these people are an important source of cash for their families. 6% of households consuming 2 or less meals a day indicates that the subsistence farming is insufficient to prevent food insecurity and hunger. A 2011 survey at Iganga, which included the then Bugweri County, found that 14% of children were severely stunted, 5% were severely underweight, and 2% were severely wasted. <https://dataafrica.io/profile/iganga-uga>. The Project focus on livelihood projects based around agriculture should increase food security in the Project area and address hunger and malnutrition issues in children in particular.

99% of people in the Project area live in a dwelling classified as not decent with a further average 44% of households classified as semi-permanent dwellings. This last is, however, less prevalent in Bugiri District where only 10.3% of dwellings were classified as semi-permanent. There is significant opportunity to improve the standard of housing across the project area and to improve basic services with only an average 8% of households having access to electrical power, 75% relying on tadooba candles for light and, only 6% having access to piped water. 8% of households have no toilet and 41% have no proper disposal system for solid waste.

### 7.1.1 Livelihoods

The Makuutu Project is focussed on supporting independent livelihoods (refer Section 11.3) and will explore opportunities to collaborate with existing livelihood support programmes to maximise benefit to communities and align strategies with the National Development Programme. A large number of initiatives are already underway in the Project area with some examples presented below.

#### 7.1.1.1.1 Mayuge

- Mayuge was among the pioneer districts that benefited from the UWEP program since 2015. In 2018/19, 234,153,500 UGX (US \$85,000) was allocated to 50 women's groups for a range of livelihood projects including: produce buying and selling, art and craft, piggery, poultry, fishing, cosmetology, motorcycle business, vegetable growing, nursery bed growing, sugar cane growing, events management, catering, tailoring, saloon, wholesale/retail business among others.
- The Government of Uganda (GoU) has received a loan from the International Fund for Agricultural Development (IFAD) towards financing a ten-year National Oil Palm Project (NOPP). The project is being implemented by the Ministry of Agriculture Animal Industry and Fisheries (MAAIF) as the Lead Project Agency, in partnership with other agencies, private sector and farmer Organisations. Five hubs will be established including one at Mayuge (Mayuge, Bugiri and Namayingo). <https://www.agriculture.go.ug/wp-content/uploads/2020/09/National-Oil-Palm-Project-NOPP-TORS-for-Buvuma-staff-August-2020-Approved-by-HR-With-components-from-a-II-NOPP-Staff-9.7.2020-1-.pdf> ).
- Farmer Field Schools for Climate Smart Agriculture in Mayuge. Since most Ugandans live in rural areas and practice farming, raising agriculture incomes, a centrepiece of Uganda's National Development Plan, is critical to reducing poverty, boosting prosperity and creating jobs, especially for women and youth. ([https://www.fao.org/farmer-field-schools/knowledge-repository/knowledge-repository-archive/en/?tx\\_mblnewsevent\\_where=74560](https://www.fao.org/farmer-field-schools/knowledge-repository/knowledge-repository-archive/en/?tx_mblnewsevent_where=74560) ).

#### 7.1.1.1.2 Bugweri

- Integrated management of the Fall Armyworm on maize. A guide for Farmer Field Schools in Africa. [https://www.fao.org/farmer-field-schools/knowledge-repository/knowledge-repository-archive/en/?tx\\_mblnewsevent\\_where=74560](https://www.fao.org/farmer-field-schools/knowledge-repository/knowledge-repository-archive/en/?tx_mblnewsevent_where=74560).
- Construction works are planned for the Namiganda multipurpose dam and development of Igogero-Naigombwa irrigation scheme in Bugiri and Bugweri Districts funded by the Islamic Development Bank with an objective of enhancing National food security through increased rice production. This project will facilitate the development of agro-processing and marketing for rice output from small scale producers in Bugiri and Bugweri Districts in the catchment swamp area of Kitumbezi and Igogero (in Bugiri) and Naigombwa (in Bugweri) in Eastern Uganda. A total of 9,000 farmers will benefit from the project (5,000 from Bugiri and 4,000 from Bugweri). <https://www.isdb.org/project-procurement/tenders/2021/spn-cw/construction-works-namiganda-multipurpose-dam-and-development-igogero-naigombwa> .
- The Agriculture Cluster Development Project (ACDP) is a partnership project of the Ministry of Agriculture, Animal Industry and Fisheries and the World Bank, financed by the International Development Assistance (IDA) of the World Bank. The Project was declared effective on January 23, 2017 with the Project Development Objective (PDO) to raise on-farm productivity, production, and marketable volumes of selected agricultural commodities (maize, beans, rice, cassava and coffee), in specified (12) geographic clusters (spanning over 57 districts). Bugweri and Bugiri are in Cluster 2 with a focus on Maize, Rice and Robusta Coffee <https://www.agriculture.go.ug/the-agriculture-cluster-development-project-acdp/>

#### 7.1.1.1.3 Bugiri

- In August 2020 the State Minister for Agriculture, Mr Aggrey Bagire, during a tour of Bugiri District announced that the Cluster Development Project would target 15,000 farmers in the district with each beneficiary receiving agricultural inputs after paying a commitment fee of Shs140,000 (US \$39). This would enable farmers get access to quality seeds and markets for their produce. <https://www.monitor.co.ug/uganda/news/national/15-000-bugiri-farmers-to-benefit-from-government-project-1918988>.
- The integrated farming development programme provides smallholder farmers in Bugiri District with better breeds of piglets and improved maize seeds along with training on the concept of integrated farming. <https://www.f6s.com/integratedfarmingfordevelopment>.
- The Multi-community-based Development Initiative (MUCOBADI) was started in 2000 in Bugiri District by volunteers with a focus on strengthening community capacity in production and post-harvest handling technologies. 1,965 farmers have benefited, 2,015 youth entrepreneurs have benefited from start-up grants and 394 community savings and credit groups have been formed. The programme has enabled USG 557,230,200 (US \$154,000) to be saved by the community <https://mucobadi.org/programs/livelihoods/>.

### 7.1.2 Community Health

In October 2021, it was reported that the Government of Uganda with support from the Government of Korea through the Korea International Cooperation Agency (KOICA), and the World Health Organization (WHO) launched a five-year project to improve Maternal, Child and Adolescent Health Services in select districts in the Busoga sub-region. It is a joint project, with the financial support of \$10 million dollars, (\$9 million from KOICA and \$1 million from WHO), and will be implemented in the districts of Bugiri, Buyende, Iganga, Kamuli and Mayuge. Known as the Health System Strengthening Project to improve maternal, child and adolescent health services, the project aims to; improve health governance and administrative capacity; strengthen health information system in Busoga Region; improve infrastructure and medical equipment for maternal child health; enhance the capacity of RMNCAH health workers and quality of care; and provide Sexual and Reproductive Health and Rights information among adolescents and teachers. The project aims to reach 349,327 in-school adolescent boys and girls aged 10 to 19 years. 687 primary and secondary teachers with accurate information on sexual and reproductive health and rights, and HIV, as well as life skills through the school health program. Of particular relevance to the Emergency Management objectives of the Makuutu Project was the Government of Korea's decision through KOICA to hand over seven ambulances to ensure the continuity of essential health services especially during the COVID-19 pandemic. <https://www.afro.who.int/news/ugandas-ministry-health-support-koica-and-who-launches-5-year-project-improve-maternal-child>

Malaria is the leading cause of death in Uganda and in 2017 accounted for 27% of deaths. In Iganga, which is reflective of the Project area, the prevalence of malaria in children is 53%—far above the national average of 30% (<https://www.intrahealth.org/vital/malaria-doesn%E2%80%99t-stop-nurse-uganda>). Insecticide impregnated mosquito bed nets are particularly important in protecting people and particularly children from malaria but they become less effective over time as the nets develop holes and the insecticide diminishes. In this context the average 85% of households with at least one mosquito net indicates poor protection against mosquito bites. Infants, young children, pregnant women, and HIV-positive people are among the groups most likely to contract and suffer most acutely from malaria. With prompt diagnosis, most cases can be treated effectively with artemisinin-based combination therapies (ACTs). A September 2021 report of the development of emerging artemisinin-

resistant malaria in Uganda is therefore a potentially worrisome development. <https://www.cidrap.umn.edu/news-perspective/2021/09/artemisinin-resistant-malaria-detected-uganda#:~:text=Conducted%20at%20a%20hospital%20in,of%20partial%20resistance%20to%20arte misinin>. Malaria is a major community health challenge in the Project area and is highly debilitating for workers who need high levels of alertness and focus to safely operate large mining machinery. Effective malaria control will therefore be a high priority for the project.

#### 7.1.2.1 Health Priorities

##### 7.1.2.1.1 Mayuge

The Mayuge District local government website (<https://www.mayuge.go.ug/>) presents a number of significant current projects relevant to community health including:

- Piped Water Project funded by the Korea International Cooperation Agency (KOICA) has handed over a 1.8 billion shillings (US \$650,000) on a 3-year piped water project in Bukabooli subcounty based on pumping groundwater to an elevated feeder tank.
- Upgrade of Jagusi HCIII. Jagusi health center II was selected by the government to be one of the health centers to be upgraded because of community need.

Works on the installation of equipment is expected to start soon and shall be supervised by World Vision and the District Engineer. Two production wells have already been drilled at Nawampongo village which amounts to 16,000 liters of water and at Butambula village which amounts to 10,000 liters of water, which will feed into a tank that shall be erected at Matovu village which is at a high altitude in order to distribute water to the surrounding villages by gravity.

##### 7.1.2.1.2 Iganga/Bugweri

A 2019 health report by the Head of Health in the Iganga Municipal Council (<https://igangamc.go.ug/health>) identified the following health priorities:

- Sexual Reproductive Health and rights
- Malaria control and management
- HIV/AIDS and TB control and prevention
- Improve environmental Health, Sanitation and safe water supply to the community.
- Disease surveillance
- School Health
- Health promotion and Education
- Health staff recruitment
- Completion of unfinished projects
- Elevation of Prisons HC II to HC III.
- Improving Immunization both static and outreach

The health department has been focussing on these priorities and reported the following achievements:

- Partial construction of a storied building at Iganga Municipal Council HC III.
- Have managed to continuously handle both preventive and curative services at the facilities.
- Completion of OPD at Prisons HC II.
- Timely supply of essential drugs to health facilities.
- Have been able to visit schools, households and business premises with the aim of educating and sensitizing on hygiene and sanitation.
- Some illegal waste dumping sites were closed e.g. Iganga MC HC III area, Ngobi road junction, moonlight site and water tank area.



- There has been timely payment of wages to garbage collectors and staff available
- Rehabilitation and renovation of Iganga Municipal Council HC III.
- Fencing of Prisons HC II
- Rehabilitation of Walugogo HC II.
- Rehabilitation and maintenance of garbage trucks.

Key recommendations were:

- Involve politicians and communities in planning and controlling garbage in the municipal council.
- Allocate more revenue funds for health department.
- Intensify sensitization of the community health related issues.
- Procurement of new garbage trucks and spare some money to maintain the existing garbage trucks.
- Lobby for more essential medicines for the health facilities.

#### 7.1.2.1.3 Bugiri

In October 2021 it was reported that the Government of Uganda with support from the Government of Korea through the Korea International Cooperation Agency (KOICA), and the World Health Organization (WHO) launched a five-year project to improve Maternal, Child and Adolescent Health Services in select districts in the Busoga sub-region. It is a joint project, with the financial support of \$10 million dollars, (\$9 million from KOICA and \$1 million from WHO), and will be implemented in the districts of Bugiri, Buyende, Iganga, Kamuli and Mayuge.

<https://www.afro.who.int/news/ugandas-ministry-health-support-koica-and-who-launches-5-year-project-improve-maternal-child>

A 2009 report into malaria in Bugiri concluded that malaria was under-diagnosed, late and wrongly treated, with few referrals to higher levels. Greater access to drugs and home-based management could reduce morbidity and save more lives of malaria in under-5 but the mass treatment of children under 5 would contribute to drug resistance of the parasite. Improved diagnosis was needed to reduce unnecessary drug use but long distances to health centres and referral centres 25 km away make this difficult.

[https://www.researchgate.net/publication/40678031\\_Community\\_health\\_seeking\\_practices\\_for\\_the\\_management\\_of\\_malaria\\_of\\_the\\_under-five\\_in\\_Bugiri\\_District\\_Uganda](https://www.researchgate.net/publication/40678031_Community_health_seeking_practices_for_the_management_of_malaria_of_the_under-five_in_Bugiri_District_Uganda)

The Pfizer Project Bugiri aims to reduce mortality among children under 5 from common childhood illnesses. The project is focused on improving demand for and uptake of community-based child health services; strengthening systems and structures that support child health interventions, and strengthening child health information. The project focuses on supportive supervision and on-site video distance learning using open-source content to enable Village Health Teams (VHTs) and health workers to gain necessary skills to support Integrated Community Case Management. The data supports and informs healthcare decision-making at all levels by also integrating with the government's existing District Health Information System (DHIS2).

<https://digitalhealthatlas.org/en/-/projects/1475/published>

### 7.1.3 Education

While the census indicated that only 10% of males aged 6-15 were not in school and 9% of females this is at odds with a report from the Africa Educational Trust (<https://africaeducationaltrust.org/uganda/>) that describes Northern and Eastern regions of Uganda as being continuously ranked lowest in terms of school performance and literacy, and only 30% of children who enter primary school going on to

complete their primary school education. A detailed 2016 report on the state of education in Iganga (covering Bugweri County) and Mayuge Districts assessed schooling patterns and educational outcomes of children living in rural settlements to assist Policy makers in improving the provision of quality basic education for all children living in rural settings in Uganda. ([https://aphrc.org/wp-content/uploads/2019/07/ERP-IV-Final-Report\\_June-2016.pdf](https://aphrc.org/wp-content/uploads/2019/07/ERP-IV-Final-Report_June-2016.pdf)). The report found that the introduction of the Universal Primary Education (UPE) policy in 1996, a free primary education policy in 1997 and compulsory primary education policy in 2008 had improved the primary school net enrolment rate from less than 60% in 1996 to almost 98% in 2012 but there were many opportunities for improvement. Key findings from the study included:

- School enrolment decreased with grade with initial enrolment about double of that by final grade (refer Figure 131).

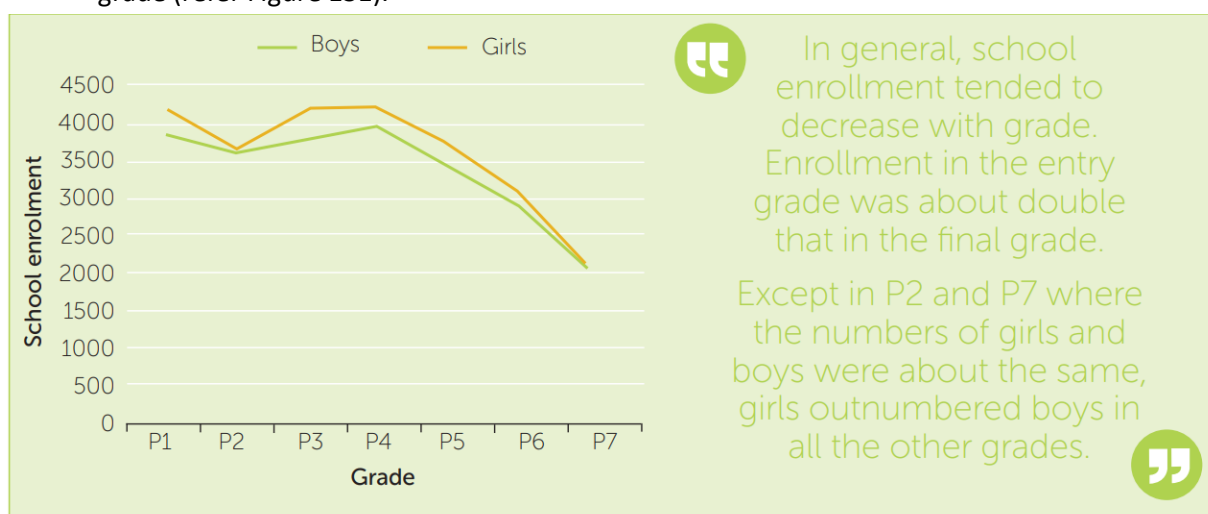


Figure 131: School enrolment by grade and sex

- Only 30% of teachers in public schools had Diploma Level qualifications.

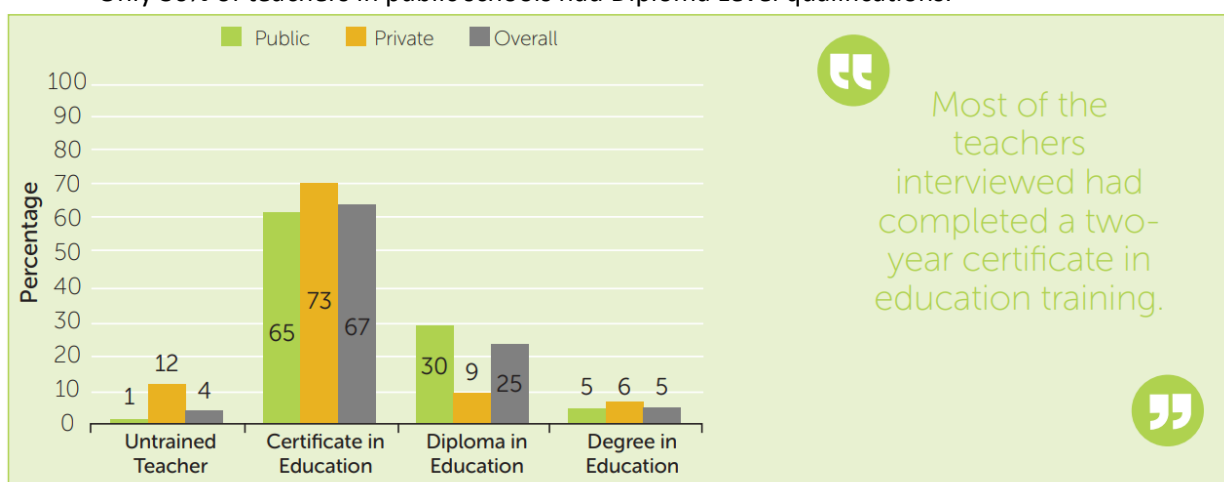


Figure 132: Training Qualifications of Teachers

- Teachers on average taught for an average 1.3 hours per day compared to the Ugandan requirement of 5 hours per day.

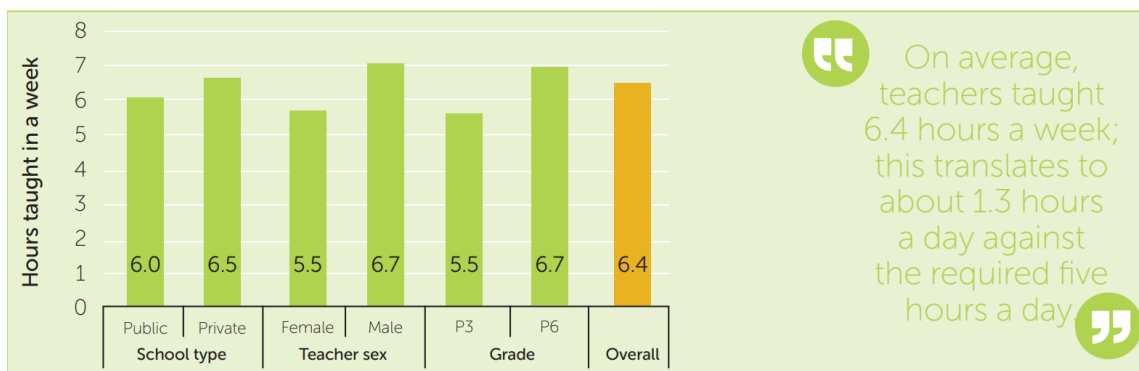


Figure 133: Average teaching hours per week

- 1/3 of public-school teachers were absent for at least 1 day/week (refer Figure 134).

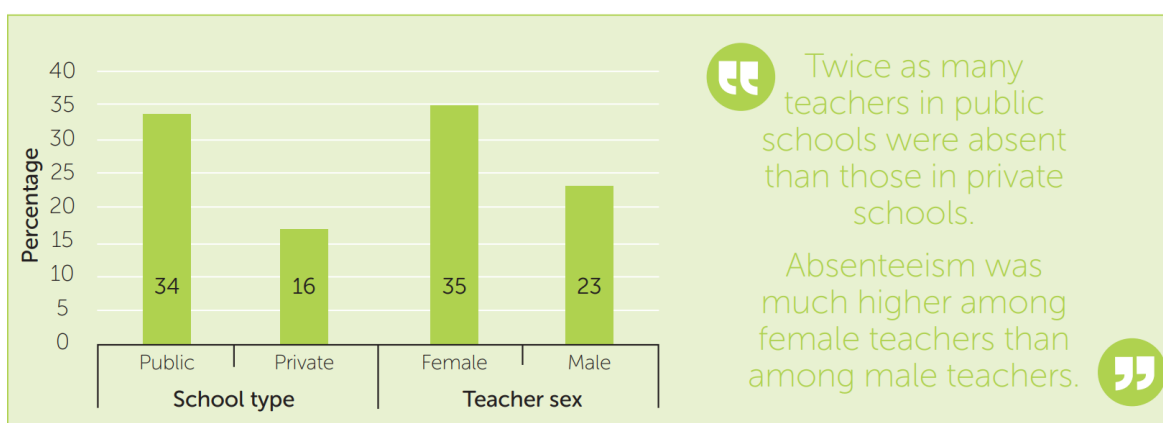


Figure 134: Proportion of teachers absent for at least 1 day per week

Only 1 in 3 (33%) P6 mathematics teachers scored 50% or above in a Primary School mathematics test based on what they were supposed to be teaching (refer Figure 135).

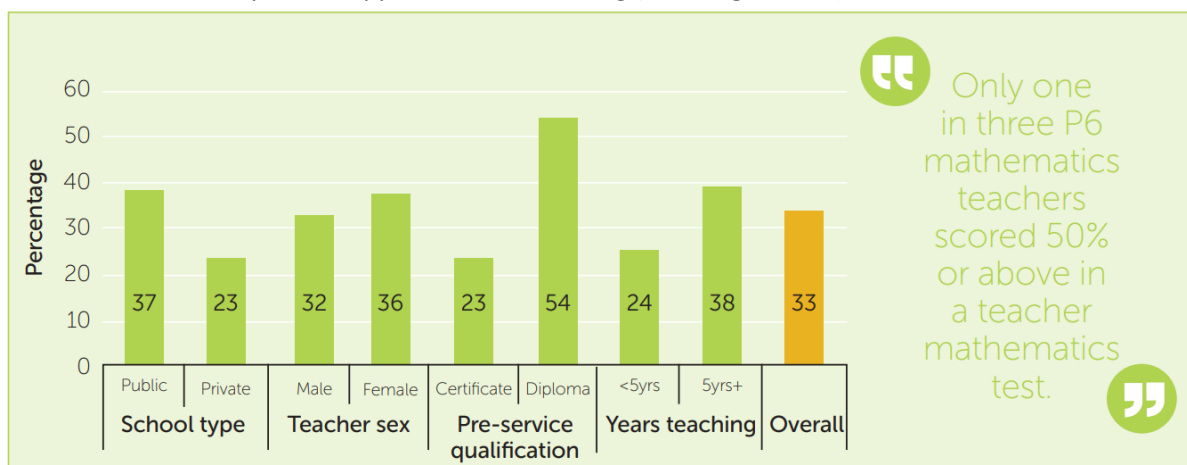


Figure 135 Proportion of P6 mathematics teachers scoring >50% in maths subject knowledge test

- School attendance rates were poor with only 61% of students in Mayuge and 74% in Iganga in attendance (refer Figure 136).

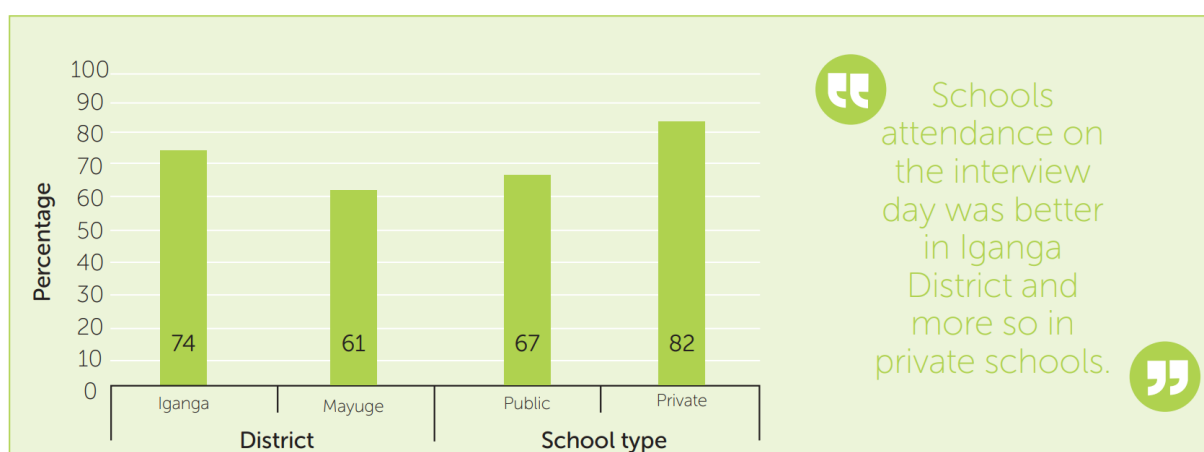


Figure 136: School attendance rates against class registers.

- Overall, only about 8% and 39% of P6 students scored 50% or above in their mathematics and English tests respectively (refer Table 36).

Table 36: Percentage of P6 and P3 students scoring at least 50% in their tests

		P6		P3		
		Math	English	Math	English	Lusoga
Overall		7.6	39.4	50.7	14.7	10.6
School type	Public	6.1	35.2	44.0	9.1	9.7
	Private	13.3	55.3	74.6	34.4	13.7
Student sex	Boy	8.2	40.4	52.6	13.4	10.1
	Girl	7.2	38.6	49.0	15.9	11.0
Household wealth status	Least poor	12.6	46.5	xxx	xxx	xxx
	Middle poor	6.5	39.9	xxx	xxx	xxx
	Poorest	3.7	31.7	xxx	xxx	xxx

- In general, younger students achieved better results in English than older students, regardless of their sex (similar results were obtained for mathematics scores. (refer Figure 137).





Figure 137: Proportion of P6 students who scored at least 50% in the English test by age

- Only a few students who were taught mathematics by high-scoring teachers also scored well in mathematics.

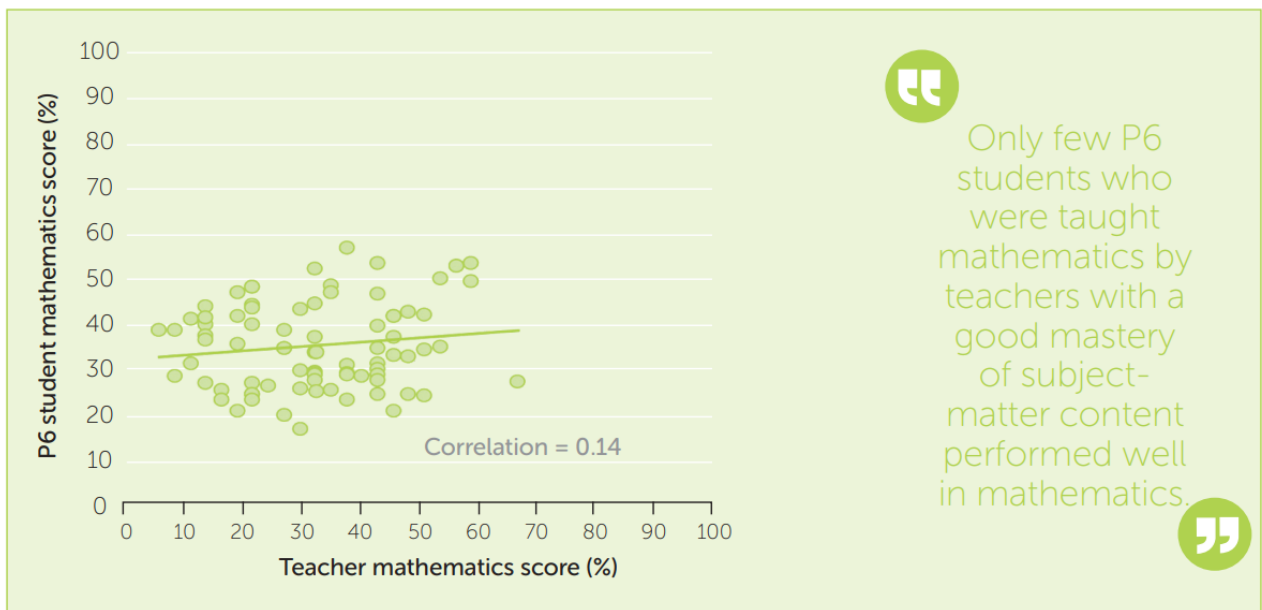


Figure 138: Relationship between P6 teacher and student mathematics score

#### *7.1.3.1 Conclusions about learning barriers*

Parents and teachers identified a number of key learning barriers (refer Table 37) including:

- Quality of learning is more of a challenge in public schools compared to private schools.
- Classroom overcrowding compromised the quality of learning.
- There was a lack of parental support and particularly with respect to providing learning materials and school attendance.
- Child labour was a challenge and particularly with respect to sugar cane farms and particularly with respect to public schools.
- Household poverty was a challenge with respect to the provision of learning materials.
- Long distance to schools was a challenge for both teachers and students.
- Poor teacher-parent relationship was a problem because it led to inadequate parental support.

Table 37: Thoughts of parents and teachers about learning barriers

Thematic areas	Parents	Teachers
Quality of learning	<ul style="list-style-type: none"> <li>Parents did not see quality of learning as a challenge in private schools. However, they perceived the quality of learning to be low in public schools.</li> <li>Parents associated the better quality of learning with smaller class sizes in private schools.</li> </ul>	<ul style="list-style-type: none"> <li>Like parents, teachers thought that the quality of learning was a challenge in public schools but not in private schools.</li> <li>Teachers associated the better quality in private schools to the commitment of the teachers and smaller class sizes</li> </ul>
Overcrowding	<ul style="list-style-type: none"> <li>Parents thought that overcrowding was rampant and a key learning barrier, especially in public schools</li> </ul>	<ul style="list-style-type: none"> <li>Teachers felt that overcrowding compromised the quality of learning.</li> </ul>
Inadequate parental support	<ul style="list-style-type: none"> <li>Lack of parental support or parental participation in children's education was noted by parents.</li> <li>Specifically, parents in public schools said that some among them were not supportive of their children's education in provision of learning materials and ensuring that the children attended school regularly.</li> </ul>	<ul style="list-style-type: none"> <li>Teachers complained of lack of parental support.</li> <li>Teachers mentioned that they were burdened by students' problems that were beyond their control and that should be solved by parents.</li> </ul>
Child labor	<ul style="list-style-type: none"> <li>Parents said that child labor was common in sugarcane farms.</li> <li>Parents thought child labor was a key learning barrier, especially among children attending public schools.</li> </ul>	<ul style="list-style-type: none"> <li>Teachers also identified child labor as a key learning barrier.</li> <li>Teachers (especially those in private schools) felt that child labor was perpetuated by parents who did not value education</li> </ul>
Household poverty	<ul style="list-style-type: none"> <li>Parents (especially those with children in public schools) believed that they were unable to afford learning materials because of poverty.</li> </ul>	<ul style="list-style-type: none"> <li>Teachers thought that parents could not afford food and learning materials for children because of poverty, especially in public schools.</li> </ul>
Distance to school	<ul style="list-style-type: none"> <li>Parents linked distance to school to incidents of overage school enrollment and student absenteeism.</li> </ul>	<ul style="list-style-type: none"> <li>Teachers believed that distance to school made both teachers and students tired for effective learning.</li> </ul>
Poor parent-teacher relationship	<ul style="list-style-type: none"> <li>Parents perceived poor parent-teacher relationships to be a key learning barrier because they led to inadequate parental support for the schools.</li> </ul>	<ul style="list-style-type: none"> <li>Poor parent-teacher relationships were also of great concern to the teachers.</li> </ul>

## 7.2 Detailed Socio-economic Baseline Report for the Central Makuutu Mining Pit and Processing Plant

This section summarises key information in the socio-economic assessment with the heritage section appended (refer Annex X). A comprehensive socio-economic baseline report was completed for the Central Makuutu Mining Pit and Processing Plant areas by a team of experts under the oversight of Atacama Consulting.

The Processing Plant is a long-term facility that will be in place for at least the 27-year period currently proposed for the life of the Project. The Indicated Resources of the Central Makuutu Pit (refer Figure 22) will support the first 10 years of mining with an additional 5 years likely in immediately adjacent areas. The initial Compensation and Resettlement Action Plan (RAP) will focus on the Central Makuutu Pit with additional RAPs to be completed in advance of mining operations expanding into other locations. Detailed socio-economic assessments will be completed in support of these future RAPs to ensure currency of information.

### 7.2.1 Direct Area of Influence

The proposed Project's direct area of influence is defined to include the Project footprint in Bugweri District (refer Figure 22), i.e.:

- The 350 hectares of land for the proposed Central Mining Pit;
- The 200 hectares of land for the proposed Processing Plant; and
- The land for the proposed access (haul) road.

This land will need to be acquired from various landowners that will be determined during the cadastral land, asset valuation, and legal due diligence surveys that will be undertaken as part of the Resettlement Action Plan (RAP) studies, which will be the subject of a separate study.

### 7.2.2 Indirect Area of Influence

The indirect area of immediate influence for the socio-economic assessment included Bugweri District, sub-counties, villages, and communities in close proximity with the direct area of influence, which may in one way or the other be impacted by the implementation of the proposed Project and/or experience induced or cumulative changes in combination with activities not under the direct control of the proposed Project, from where local labour could be sourced and the neighbouring public facilities and settlements that could be impacted as a result of Project development. The Project will also indirectly impact communities across the whole Project footprint (refer Figure 19) who will benefit from Makuutu social support programmes, employment and general infrastructure development (Refer Section 11.3).

### 7.2.3 Methodology

The detailed socio-economic report included a Literature Review and a household socio-economic census survey of 496 Project Affected Households within the Year 1- Year 10 Central Makuutu Mining Pit (refer Figure 139). These households would be progressively resettled to a good house in a resettlement village in line with the expanding mining pit during the first 10 years of operation.



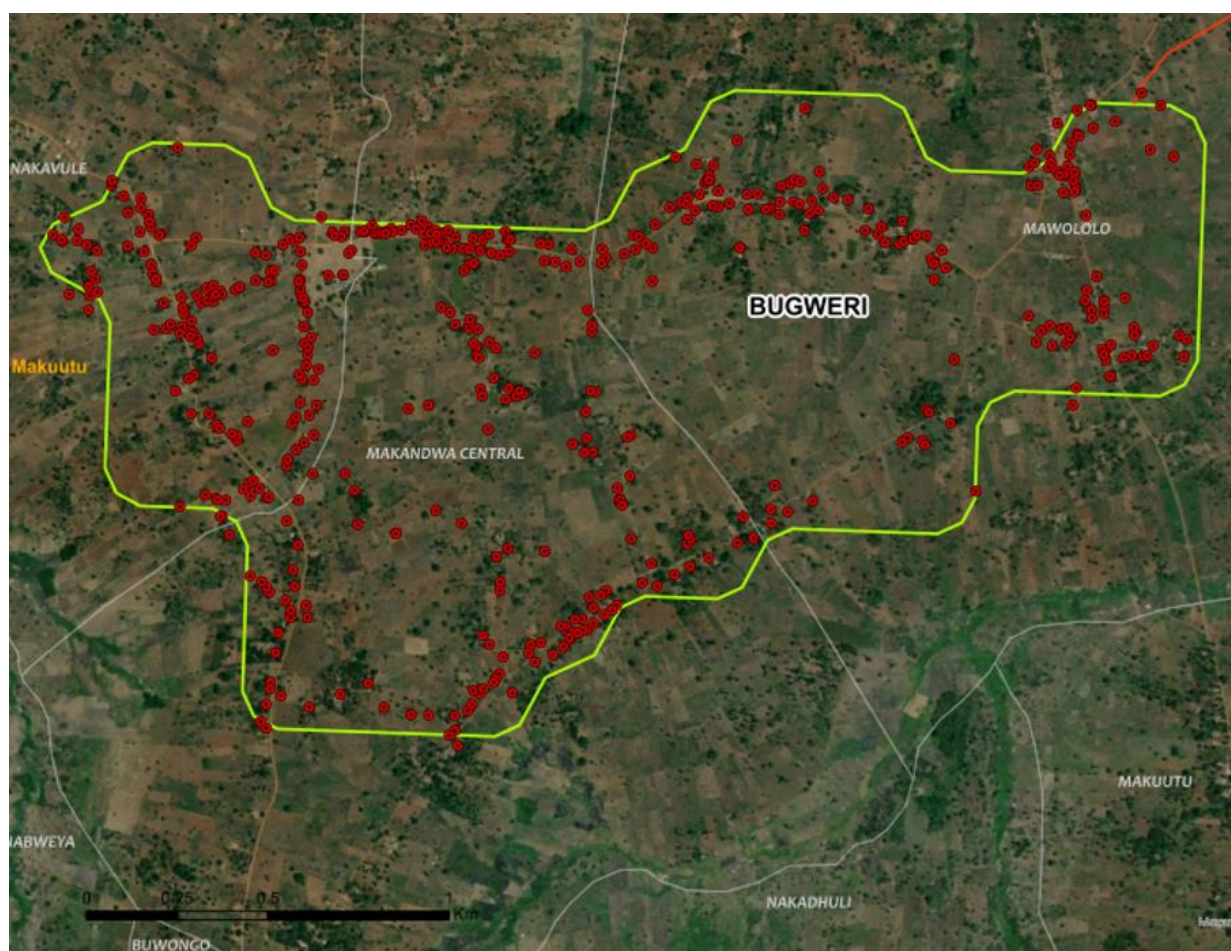


Figure 139: Surveyed households within the Year 1- Year 10 Mining Pit

Focus Group Discussions were held with key informant groups (refer Table 38).

Table 38: Key Informant Interviews and Focus Group Discussions

Position	Date of Engagement
Key Informant Interviews (KIs)	
Bugweri District Agricultural Officer	24th August 2021
Bugweri District Veterinary Officer	
Bugweri District Natural Resources Officer	
Bugweri District Senior Labour Officer	
Bugweri District Ag. District Education Officer	25th August 2021
Bugweri District Ag. Senior Education Officer	
Bugweri District Development Planner/Senior Planner/Ag. Head of Planning	
LC 1 Chairman, Mawololo village	
LC 1 Chairman, Buyayu village	26th August 2021
LC 1 Chairman, Nakavule village	
Focus Group Discussions (FGDs)	
Women Group, Mawololo village	25th August 2021
Sub-county officials, Makuutu Sub-county	26th August 2021
Youths, Buyayu village	

Position	Date of Engagement
<b>Key Informant Interviews (KIs)</b>	
Crop Farmers, Nakavule village	27th August 2021
Village Savings and Loan Groups' survey	
Business' survey	27th August 2021

#### *7.2.3.1 GIS and Mapping*

Spatial data such as district, sub-county and village boundaries, as well as Project shapefiles, was used to generate maps. These were used by the specialists to identify potentially affected villages and households or assets. In addition, where applicable spatial data was collected, maps were developed for inclusion into this socio-economic baseline. Unless otherwise specified, all coordinates are presented in Datum WGS 84.

### **7.2.4 Governance**

#### *7.2.4.1 District and Lower Government Structure*

Bugweri District comprises one county, three (3) Town Councils, five (5) sub-counties, 48 parishes and 133 villages. The study area focussed on the three sub-counties of Makuutu (Mawololo, Buyayu, Makandwa Central and Nakavule villages), Ibulanku (Buniantole, Kabugweri, and Namiganda villages), and Igombe (Businda B village).

#### *7.2.4.2 Community Governance Structure*

Bugweri District is located within Busoga Kingdom which is headed by a hereditary King called Kyabazinga and his cabinet. The Kingdom, with the capital in Bugembe town, is governed by a royal council that is composed of eleven traditional leaders that include the heads of five royal families and six tribal chiefs. The Katukiro (Prime Minister) of Busoga is the head of the kingdom's government and the spokesperson for the Kyabazinga and the kingdom.

### **7.2.5 Demographics**

#### *7.2.5.1 Project Area Population*

The population of the sub-counties (SC) that are potentially affected by the proposed Project as of 2014 (UBOS, 2017) is indicated below (refer Table 39).

Table 39: Population of the Sub-counties potentially affected by the proposed Makuutu Rare Earth Project – Central Mining Pit and Processing Plant

Sub-county	Population		
	Male	Female	Total
Makuutu S/C	13,576	14,286	<b>27,862</b>
Igombe S/C	8,223	8,844	<b>17,067</b>
Ibulanku S/C	6,725	17,815	<b>34,540</b>

Informant interviews (refer Table 40) with the Bugweri District Planner indicate that:

- The population growth rate of the district is 2.9% which is lower than the national population average growth rate 3.0% (UBOS 2014);
- The population estimate as of 2020 was 200,168 people and is projected to be greater than 500,000 people by 2030;
- The land area of the district is 378.9km<sup>2</sup>, and the average population density is 512/km<sup>2</sup>. However, Makuutu Sub-county has a higher population density at circa 600/km<sup>2</sup>. According to UBOS 2014, the population density was 173 persons per square kilometre;
- Life expectancy: Men (62.4) and Women (62.6).
- Under 5 mortality: 74.8/1000.
- Infant mortality: 50.2/1000, which is lower than the national infant mortality rate (53/100), according to UBOS 2014;
- Fertility rate is 6.3, and the target is to reduce it to 4.1 by 2040. According to UBOS 2014, the national fertility rate was 5.8; and
- 36.4% of the population live in absolute poverty.

A total of four hundred ninety-six (496) households were surveyed (Refer Table 40) in Makuutu Sub-county, of which nearly more than half (50.81%) were residing in Makandwa Central village. The surveyed households had a total of three thousand three hundred fifty-five (3,355) household members, of which 48.64% were from households residing in Makandwa Central village. More than two thirds (81%) of the surveyed household (HH) heads were male which indicates a patrilineal society.

Table 40: Surveyed Population in the villages traversed by the proposed Makuutu Rare Earths Project - Central Mining Pit

Village	Households	% of Surveyed households	Surveyed households' population	% of Surveyed households' population
Makandwa Central	252	50.81	1,632	48.64%
Nakavule	93	18.75	615	18.33%
Mawololo	90	18.15	626	18.66%
Buyayu	60	12.10	475	14.16%
Buwongo	1	0.20	7	0.21%
<b>Grand Total</b>	<b>496</b>	<b>100%</b>	<b>3,355</b>	<b>100%</b>

### 7.2.5.2 Age and Gender

The proportion of males to females across the various age groups is relatively similar within the surveyed population with a slightly greater proportion of females (Table 41). The greater proportion of children aged between 5 and 9 years (18.33%) compared to children between 10 and 14 (17.70%) is typical of Uganda's youthful population where 46.5% are aged 0 to 14 years, 51.54% aged 15 to 64 years, and only 1.96% were 65 years old and older.

Table 41: Age and Gender of the Surveyed Population

Age Group	Female	Male	Total	Female %	Male %	Total %
00-04	248	265	513	48.34%	51.66%	15.29%
05-09	321	294	615	52.20%	47.80%	18.33%
10-14	313	281	594	52.69%	47.31%	17.70%
15-19	213	186	399	53.38%	46.62%	11.89%
20-24	151	124	275	54.91%	45.09%	8.20%
25-29	100	109	209	47.85%	52.15%	6.23%
30-34	83	60	143	58.04%	41.96%	4.26%
35-39	70	55	125	56.00%	44.00%	3.73%
40-44	49	42	91	53.85%	46.15%	2.71%
45-49	58	43	101	57.43%	42.57%	3.01%
50-54	30	51	81	37.04%	62.96%	2.41%
55-59	25	34	59	42.37%	57.63%	1.76%
60-64	29	31	60	48.33%	51.67%	1.79%
65-69	15	19	34	44.12%	55.88%	1.01%
70-74	6	7	13	46.15%	53.85%	0.39%
75-79	6	5	11	54.55%	45.45%	0.33%
80-84	9	4	13	69.23%	30.77%	0.39%
85-89	3	2	5	60.00%	40.00%	0.15%
90-94	0	2	2	0.00%	100.00%	0.06%
95-99	0	1	1	0.00%	100.00%	0.03%
100-104	1	0	1	100.00%	0.00%	0.03%
(blank)	3	7	10	30.00%	70.00%	0.30%
<b>Grand Total</b>	<b>1,733</b>	<b>1,622</b>	<b>3,355</b>	<b>51.65%</b>	<b>48.35%</b>	<b>100.00%</b>

### 7.2.5.3 Household Size and Living Arrangement

The average household size among the surveyed households was 6.76 (refer Table 42), which is slightly higher than the national average size at 4.7 (UBOS, 2016). Generally, the surveyed households were arranged as either a single-family permanently residing in a compound or a single homestead arrangement. The single families residing in a single homestead are mostly comprised of a father, mother and children, while compound homesteads tend to comprise grandfathers, grandmothers,



fathers, mothers, children and other extended family members. The average household size for polygamous families living in a single house setting was the highest, with approximately 9.5 members.

**Table 42: Household Size and Living Arrangements of the Surveyed Population**

Living Arrangement	Households	% Households	Average HH size	Minimum	Maximum
Single family living in a single house	271	54.64	5.99	1	16
Single family living in a compound	200	40.32	7.81	1	21
Polygamous family living in a compound	7	1.41	6.86	1	11
Borrowing / caretaking / renting household	6	1.21	5.83	4	9
Polygamous family with a single house	6	1.21	9.50	5	16
Blank	6	1.21	5.17	1	10
<b>Grand Total</b>	<b>496</b>	<b>100</b>	<b>6.76</b>		

#### 7.2.5.4 Family Structure

Surveyed households were typically based on a patriarchal kinship system, with the male heads constituting 81.25% of all household heads. Children of the household head constituted the largest proportion (58.87%) of the total surveyed population, while spouse of the household head and grandchildren comprised 11.89% and 10.64%, respectively (refer Table 43).

The category “Son/Daughter of the Household Head” and “Grandchild of Household Head” is not exclusively limited to persons under the age of 18 but also comprises adult children (18+) residing at the same homestead as their parents or deliberately registered in this survey.

**Table 43: Relationship with the Household Head among the Surveyed Households**

Relationship	No. of Persons			Population Percentage		
	Female	Male	Total	Female %	Male %	% Grand Total
Household Head (HH)	93	403	496	5.37	24.85	14.78
Spouse of HH	383	16	399	22.10	0.99	11.89
Son/Daughter of HH	992	983	1,975	57.24	60.60	58.87
Son/Daughter-in-law of HH	22	13	35	1.27	0.80	1.04
Grandchild of HH	190	167	357	10.96	10.30	10.64
Parent of HH	7	3	10	0.40	0.18	0.30
Grandparent of HH	3	3	6	0.17	0.18	0.18
Brother/Sister of HH	15	20	35	0.87	1.23	1.04
Brother/Sister-in-law of HH	9	3	12	0.52	0.18	0.36
Nephew/Niece of HH	13	8	21	0.75	0.49	0.63
Cousin of HH	2	0	2	0.12	0.00	0.06
Adopted/Foster/Step Child	1	0	1	0.06	0.00	0.03

Relationship	No. of Persons			Population Percentage		
	Female	Male	Total	Female %	Male %	% Grand Total
Other Relative	2	1	3	0.12	0.06	0.09
Friend of HH	1	2	3	0.06	0.12	0.09
Grand Total	1,733	1,622	3,355	100.00	100.00	100.00

#### 7.2.5.5 Marital Status

The majority (65.61%) of the surveyed adult population were married, while slightly more than a quarter (26.08%) were single/unmarried. Considering household heads, 79.23% of them were married (refer Table 44) of whom males constituted the highest proportion (92.56%). Most of the female household heads (50.54%) were widowed. There were no records of married children (below 18 years) in the surveyed population. The youngest of the household heads amongst the surveyed population was 20 years.

Table 44: General Population and Household Heads' Marital Status in the Surveyed Population

Marital Status	Household Heads Percentages			Adult Population Percentages		
	%Female	%Male	%Grand Total	Female %	Male %	% Grand Total
Single/ Unmarried	8.60%	2.98%	4.03%	22.53%	29.92%	26.08%
Married	21.51%	92.56%	79.23%	64.67%	66.62%	65.61%
Widowed	50.54%	0.99%	10.28%	8.48%	0.60%	4.70%
Divorced	6.45%	1.24%	2.22%	1.53%	0.90%	1.23%
Separated	12.90%	2.23%	4.23%	2.50%	1.95%	2.24%
Cohabitant	0%	0%	0%	0.28%	0.00%	0.14%
<b>Grand Total</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>

#### 7.2.5.6 Residency

The majority (92.25%) of the surveyed population in the proposed Project area (Central Mining Pit) classified themselves as permanently resident at their homestead (refer Table 45). "Permanent residency" in this case refers to household members living in the homestead in which they were enumerated all the year through. This indicates that there is no significant temporary movement of people from their homes. Where stated, non-permanence as a resident is generally limited to sending children to boarding schools or where a family member is temporarily absent, primarily for trading or other employment.

Table 45: Residence Status of the Surveyed Households

Residential Status	Proportion of Population		
	%Male	%Female	% Grand Total
Always living at the homestead	93.36%	91.06%	92.25%
Boarding school in another district	2.60%	4.38%	3.46%
Boarding school in Bugweri District	0.00%	0.06%	0.03%
Migrant worker in another district	0.63%	0.92%	0.77%
Migrant worker in other country	0.69%	0.49%	0.60%
Student in another country	0.00%	0.00%	0.00%
Temporarily absent family member	2.71%	3.08%	2.89%
<b>Grand Total</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>

### 7.2.5.7 Ethnicity

Ethnicity is associated with an individual's cultural background. Basoga are the most prevalent tribe found in eastern Uganda, comprising approximately 8.8% of the total population in Uganda (UBOS, 2014). The predominant tribe within the surveyed population was Basoga (refer Table 46) Other ethnicities included the Acholi, Badama, Baganda, Bagisu, Bagwere, Balamogi, Banyankole, Banyole, Banyoro, Basiki, Itesot, Jaluo, Japadhola, Karamojong, Lugbara and Samia.

Table 46: Ethnic Background of the Surveyed Household Heads and Spouse or Next of Kin

Ethnicity	No. of Persons			Population Percentage		
	HH	Spouse or Next of Kin	Total	% HH	% Spouse or Next of Kin	%Total
Basoga	363	361	724	50.14%	49.86%	72.98%
Banyole	52	38	90	57.78%	42.22%	9.07%
Bagwere	13	12	25	52.00%	48.00%	2.52%
Baganda	6	9	15	40.00%	60.00%	1.51%
Samia	12	15	27	44.44%	55.56%	2.72%
Acholi	2	0	2	100.00%	0.00%	0.20%
Badama	4	1	5	80.00%	20.00%	0.50%
Bagisu	2	3	5	40.00%	60.00%	0.50%
Balamogi	7	5	12	58.33%	41.67%	1.21%
Banyankole	1	5	6	16.67%	83.33%	0.60%
Banyoro	1	0	1	100.00%	0.00%	0.10%
Basiki	0	4	4	0.00%	100.00%	0.40%
Itesot	12	6	18	66.67%	33.33%	1.81%
Jaluo	1	0	1	100.00%	0.00%	0.10%
Japadhola	13	10	23	56.52%	43.48%	2.32%
Karamojong	0	2	2	0.00%	100.00%	0.20%
Lugbara	0	1	1	0.00%	100.00%	0.10%
(blank)	7	24	31	22.58%	77.42%	3.13%
<b>Grand Total</b>	<b>496</b>	<b>496</b>	<b>992</b>	<b>50.00%</b>	<b>50.00%</b>	<b>100.00%</b>

### 7.2.5.8 Indigenous Peoples

The International Finance Corporation (IFC) Performance Standard 7 (IFC, 2012) refers to ‘indigenous people’ as a distinct social and cultural group with the following characteristics in varying degrees:

- Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
- Collective attachment to geographically distinct habitats or ancestral territories in the proposed Project area and to the natural resources in these habitats and territories;
- Customary cultural, economic, social, or political institutions that are separate from those of the mainstream society or culture; or
- A distinct language or dialect, often different from the official language or languages of the country or region in which they reside.

The Batwa, Benet, Basongora, Banyabindi and the Ik communities are not known to traditionally own land/reside in Bugweri District. During the socio-economic baseline surveys, none of the households comprised an individual classified as indigenous as per the International Finance Corporation (IFC) Performance Standard 7 (IFC, 2012).

### 7.2.5.9 Language

Uganda is home to more than forty indigenous languages, falling into the three main language families of Bantu, Nilotic and Central Sudanic. English was adopted during colonisation as the common language and remained an official language. Swahili, which has regional significance, is also an official language, and Luganda is a commonly spoken language of a large proportion of the Ugandan population, particularly in the central region.

Within the larger proposed Project area (Busoga region), Bantu languages are the most prevalent, with Lusoga being the commonest. Specifically, within Bugweri District, Lusoga is the most commonly spoken language.

The dominant language spoken by the surveyed household heads and their spouses/next-of-kin was Lusoga (92.34%), followed by Japadhola (1.21%), as indicated below (refer Table 47). The dominance of the Lusoga language is attributed to the Project being located in Busoga region (Busoga Kingdom).

Table 47: Primary Languages of the Surveyed Household Head and Spouse or Next of Kin

Home Language	HH Head	Spouse or Next of Kin	Total of HH Head and Spouse or Next of Kin	% HH Head	% Spouse or Next of Kin	% Grand Total of HH Head and Spouse or Next of Kin
Lusoga	462	454	916	50.44%	49.56%	92.34%
Japadhola	8	4	12	66.67%	33.33%	1.21%
Lucholi	1	0	1	100.00%	0.00%	0.10%
Ludama	4	3	7	57.14%	42.86%	0.71%
Luganda	4	3	7	57.14%	42.86%	0.71%
Luganda, Lusoga	2	1	3	66.67%	33.33%	0.30%
Lugisu	1	0	1	100.00%	0.00%	0.10%
Lugwere	5	3	8	62.50%	37.50%	0.81%



Home Language	HH Head	Spouse or Next of Kin	Total of HH Head and Spouse or Next of Kin	% HH Head	% Spouse or Next of Kin	% Grand Total of HH Head and Spouse or Next of Kin
Lugwere, Lusoga	1	0	1	100.00%	0.00%	0.10%
Lulamogi	1	1	2	50.00%	50.00%	0.20%
Runyankore	0	1	1	0.00%	100.00%	0.10%
Lunyole	1	2	3	33.33%	66.67%	0.30%
Lunyoro	1	0	1	100.00%	0.00%	0.10%
Lusomya	1	4	5	20.00%	80.00%	0.50%
Lusiki	0	1	1	0.00%	100.00%	0.10%
Lusoga, English	1	0	1	100.00%	0.00%	0.10%
Lusoga, Lugwere	1	1	2	50.00%	50.00%	0.20%
Lusoga, Lunyole	1	2	3	33.33%	66.67%	0.30%
Samia, Lusoga, Luganda	1	0	1	100.00%	0.00%	0.10%
Not specified	0	16	16	0.00%	100.00%	1.61%
<b>Grand Total</b>	<b>496</b>	<b>496</b>	<b>992</b>			<b>100.00%</b>

#### 7.2.5.10 Religion

Religion plays a vital role in the cultural life of different spaces. It is deeply rooted in people's experiences and influences the socio-economic and political directions of society. Uganda is a religiously diverse nation, and the freedom of religion is guaranteed by the Constitution of the Republic of Uganda. According to the 2014 census, Christianity is the most widely professed faith, with over 84% of the population being Christian while about 14% of the population adhered to Islam. Generally, there is a fear to be associated with traditional religion, which is regarded as witchcraft, and thus the absence of those who follow traditional or indigenous religions could be attributed to 'modernisation'. Several modern worship centres (churches and mosques) were observed within the Project area (refer Table 48).

Table 48: Modern Worship Centres identified within the Study Area

Location	Name	Description	Coordinates	
Mawololo village	Masjid Hadiya	Mosque	565386.10m E	57676.06m N
	St Peter Church of Uganda (CoU)	Anglican Church	565485.77m E	58085.41m N
	St. Jude Catholic Church	Catholic Church	565393.84m E	57815.54m N
	Baptist Church of Uganda	Anglican Church	565124.04m E	57733.72m N
Buyayu village	Masjid Faladausi	Muslim	564474.74m E	57862.57m N
Makandwa Central village	Masjid Jamil Faladausi	Madarasa School	563381.66m E	57844.15m N

Location	Name	Description	Coordinates	
	Masjid Jamil Faladausi	Muslim	563466.30m E	57706.95m N
	Makandwa CoU	Anglican Church	563609.61m E	57649.57m N
	Lords Favour Church	Born again	563955.10m E	57348.37m N
Nakavule village	Masjid Salaaf	Muslim	563308.66m E	57630.16m N
	Fellowship Church	Born again	563230.71m E	57670.30m N
	Masjid Hadija	Muslim	563016.44m E	57713.61m N
Namiganda village	Nakivumbi Sub Centre Church	Catholic	568757.72m E	60933.96m N
	Deliverance Church	Born again church	569046.19m E	62828.87m N
Buniantole village	Buniantole CoU	Anglican church	567126.63m E	63462.52m N
	Life Giver Fellowship Church	Born again/	566874.33m E	63152.15m N
	Masjid Salim	Muslim	566830.26m E	63021.45m N
	Semayira Mosque	Mosque	566236.35m E	62850.03m N
Kabugweri village	Taqwa Masjid	Muslim	567316.46m E	60987.51m N
	Noorhuda Masjid	Muslim	567086.56m E	61001.43m N
	Munulo Masjid	Muslim	567226.41m E	60477.18m N
Businda B village	Bubinga Open Bible	Born again church	565948.45m E	60749.39m N
	Liberty Baptist Church	Born again church	566209.28m E	60795.01m N

The majority of people from the surveyed households identified themselves as belonging to the modern religion denominations such as Muslims (55.35%), Anglican (23.99%) and Catholic (11.12%) irrespective of gender (Refer Table 49).

Table 49: Religious Affiliation of the Surveyed Household Population

Religion	Percentage Population by Gender		
	% Female	% Male	%Total
Muslim	55.57%	55.12%	55.35%
Anglican	24.35%	23.61%	23.99%
Catholic	10.16%	12.15%	11.12%
Pentecostal	7.39%	7.09%	7.24%
Seventh Day Adventist	2.19%	1.85%	2.03%
Blank	0.35%	0.18%	0.27%
<b>Grand Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

#### 7.2.5.11 Education

Uganda's education system follows a four-tier system (UBOS 2014). The first tier comprises seven (7) years of primary education, followed by four (4) years of Ordinary Level secondary education, two (2)

years of Advanced Level secondary education and the final tier is three (3) to five (5) years of Tertiary education. Each level is nationally examined, and certificates awarded (UBOS 2014).

The GoU introduced Universal Primary Education (UPE) in 1997 to offer free education at the primary level, and later in 2007, Universal Secondary Education (USE) was introduced. University and Tertiary education are offered by both public and private institutions (UBOS 2014).

An informal education system is also in place offering a range of practical/hands-on skills including the Functional Adult Literacy (FAL) programme in the Ministry of Gender, Labour and Social Development and Adult Basic Education for Karamoja (ABEK), among others (UBOS 2014).

Less than 60% of age-relevant children are engaged in early childhood learning, while 87% of Ugandan children of primary age attend school (UBOS, 2016). Results from the 2014 National Housing and Population Census indicate that the national literacy rate stood at 72%, with males having a higher literacy rate (77%) than females (68%).

Education institutions identified in the Project area are listed below (refer Table 50).

Table 50: Education Institutions identified within the Study Area

Sub-county	Village	Institution
Makuutu	Makandwa Central	Makandwa Church of Uganda (C/U) Primary School
		Madarasa Schools affiliated to
		Makuutu Seed Secondary School
Ibulanku	Namiganda	Nakivumbi Primary school
	Buniantole	Buniantole Primary School
		Ibrahim Secondary School
Igombe	Businda B	Brightstar Nursery & Primary School

One primary school (Makandwa Church of Uganda (C/U) Primary School) (refer Figure 140) serves the residents of Makandwa Central, Nakavule, Buyayu and Mawololo villages.



Figure 140: Makandwa C/U Primary School

#### 7.2.5.12 School Enrolment and Attendance

##### 7.2.5.12.1 School-age children

50.16% of the children of school-going age (5-18 years) had attained lower primary school education (P1-P4) while 26.49% were attending or had attained upper primary school education (P5-P7), and only 8.38% were attending or had attained post-primary education, i.e., secondary education (refer Table

51). This reflects the prioritisation of primary school education and the low level of accessibility to secondary education within the affected villages. Additionally, results from FGD indicates that youth drop out of secondary school to engage in labour (trade, sugar cane cutting) due to peer pressure, and many of the teenage girls end up in early marriages or teenage pregnancies because they are enticed by small goodies, and some of the girls get defiled. While more males than females were enrolled or had attained lower primary education (54.31% vs 46.41%), more females than males were enrolled or had attained upper primary education among the surveyed households (29.35% vs 23.32%), as well as secondary education (9.99% vs 7.14%). This could be an indication of higher school dropout rates for boys than girls. Results from FGDs indicates that absenteeism is very high in schools, and girls attend more than boys; this is because boys are involved in working for money, e.g., sugarcane harvesting, petty trade, sand mining and brick making. The youths mentioned that peer pressure pushes youths to engage in labour (e.g., trade, sugar cane cutting).

Despite the relatively fair enrolment in primary school, access to higher secondary education for both genders drops rather significantly. This indicates that there is a higher dropout rate, which is particularly higher for female children as they advance on the education ladder.

**Table 51: Education Profile of Children of School Going Age (5 - 18 years)**

<b>Education Level (5-18 yr old)</b>	<b>Female</b>	<b>Male</b>	<b>Total</b>	<b>% Female</b>	<b>% Male</b>	<b>% Grand Total</b>
None	30	44	74	3.65%	5.93%	4.73%
Pre-Primary School	87	69	156	10.60%	9.30%	9.98%
Primary (P1-P4)	381	403	784	46.41%	54.31%	50.16%
Primary (P5-P7)	241	173	414	29.35%	23.32%	26.49%
Secondary (S1-S4)	81	50	131	9.87%	6.74%	8.38%
Secondary (S5-S6)	1	3	4	0.12%	0.40%	0.26%
<b>Grand Total</b>	<b>821</b>	<b>742</b>	<b>1,563</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>

#### 7.2.5.12.2 Education Profile of the Surveyed Adults

A total of 10.98% of the adult surveyed population had not attained any formal school education. More women (14.6%) than men (7.07%) had no formal education. And while slightly more women attained lower and upper primary school combined (56.88% vs 52.93%), many more men had attained secondary education than women (35.04% vs 26.15%). While the attainment of post-secondary education was low among the adult population (3.11%), still more men had attained tertiary education (4.06%) than women (1.39%) (refer Table 52). In the FGD with women in Mawololo, all the older women (born before 1986) said they were not literate. The younger women were literate. Three-quarters of the women said they could read Luganda, and half could read English. The women mentioned that men, in general, are more literate than women in the community. This is because women drop out of school due to high teenage pregnancy rates and the refusal to go back to school due to stigmatisation. The women group also mentioned that women who have attained primary level education eventually forget what they learnt because they rarely read (practice). The disparities in education levels among men and women are evidently a result of a number of factors, including the historical prioritisation of males over women in terms of accessing education.



Table 52: Education Profile of the Surveyed Adults

Adult Education Level	Female	Male	Total	% Female	%Male	%Total
None	105	47	152	14.60%	7.07%	10.98%
Pre-primary School	4	3	7	0.56%	0.45%	0.51%
Primary (P1-P4)	106	80	186	14.74%	12.03%	13.44%
Primary (P5-P7)	303	272	575	42.14%	40.90%	41.55%
Secondary (S1-S4)	178	206	384	24.76%	30.98%	27.75%
Secondary (S5-S6)	10	27	37	1.39%	4.06%	2.67%
Tertiary Education	13	30	43	1.81%	4.51%	3.11%
<b>Grand Total</b>	<b>719</b>	<b>665</b>	<b>1,384</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>

### 7.2.5.12.3 Transport Means for the School-going Children

Slightly more than three-quarters of the school-going children go to school on foot/walking while 10.14% use boda boda/motorcycle (refer Table 53).

Table 53: Transport Means used by Children to go to School

Transport means	Number of Students/Pupils	% Students/Pupils
Bicycle	62	4.22%
Boda boda/motor cycle	149	10.14%
Vehicle/Car	19	1.29%
Foot/Walking	1,161	78.98%
Taxi/public transport	39	2.65%
Unspecified	40	2.72%
<b>Grand Total</b>	<b>1,470</b>	<b>100.00%</b>

Related to the time taken to travel to school, the majority (41.7%) of the children from the surveyed households from Mawololo, Buyayu, Makandwa Central and Nakavule villages indicated that the children used between 10 to 30 minutes to travel to school while just a handful (5.65%) used more than one hour to travel to school. 4.42% reported attending boarding school (refer Table 54).

Table 54: Time Taken for Children to Travel to School

Time to Reach School	Number of Students/Pupils	% Students/Pupils
0 – 10 minutes	314	21.36%
10 – 30 minutes	613	41.70%
30 – 60 minutes	361	24.56%
More than 1 Hour	83	5.65%
Boarding School	65	4.42%
N/A	0	0.00%
Unspecified	34	2.31%
<b>Grand Total</b>	<b>1,470</b>	<b>100.00%</b>

Results from KIIs with Bugweri District Education Officials indicated that the literacy rates in Bugweri District are very low, at about 16%, making Bugweri District worse off than its neighbouring districts.

The Education Officials mentioned that the pass rates in the district were as follows:

- Primary Leaving Examination (PLE): Divisions 1-3 are at 60%; Division 4 is at 80%;
- Ordinary (O) level: 82%; and
- Advanced (A) level: 90% (with at least 1 Principle pass).

Discussions with the district officials, the Chairman of Buyayu village and FGDs with women from Mawololo village and youth from Buyayu Village revealed a number of factors that affect the education system in the district. These included:

- High poverty levels: Despite the GoU support under UPE and USE, parents' support of children education is very limited. Parents fail to provide scholastic materials and food for the pupils. Further to that, parents involve children in income-generating activities, and this leads to high absenteeism rates;
- The attitude among parents is that government should pay for all the educational needs;
- COVID-19 lockdown has exposed children to high risks such as increased teenage pregnancies, and inadvertently, increased school dropouts. Most of the children are involved in petty trade. Parents have failed to control and protect their children;
- The officers in the education department are all in acting positions since the district is new; this compromises performance. The District Service Commission (DSC) is not yet in place, so staff are not recruited. Additionally, most Head Teachers are acting as caretakers;
- School infrastructure (including equipment) is too old and insufficient. There is overcrowding in schools and poor sanitation, which make the learning environment unconducive. Only one school in the district (Nangobwa Secondary School in Namalembe Sub-county has computers;
- The school facilitation grant has been gradually dwindling; this compromises the quality of education service offered;
- Most of the schools in the district do not hold land titles of the land on which they are located; hence there is a high risk of land grabbing. Some schools do not have sufficient land because neighbouring communities have been grabbing the land gradually.
- The district faces a problem of nepotism. Parents usually reject staff from other districts and prefer teachers from their area. Additionally, sometimes the communities neighbouring schools are hostile; this occasionally translates into vandalism of school infrastructure.
- Teaching staff also lack accommodation at schools, which leads to absenteeism and late coming;
- The teachers also face demotivation from unsupportive parents, a harsh teaching environment (including poor classrooms) that limits teacher innovativeness, understaffing and underpayment – all such challenges affect teacher performance;
- The District Education officials also mentioned political interference in the education system, whereby politicians advocate to chase Head Teachers when schools underperform; and
- They also mentioned that Makuutu Sub-county is the most hard-to-reach Sub-county in the district because of very poor road infrastructure; therefore, monitoring of schools is hardly done in the sub-county;

About the issue of school attendance and completion, discussions with the District Education officials and FGDs with women in Mawololo village and youths in Buyayu village revealed a number of issues as broken down below:

- School completion rates are very low, e.g., if 150 pupils start Primary One, only about 35 pupils complete Primary Seven. The FGDs findings tally with the findings of the household survey where a relatively fair number of pupils enrolled in primary school but enrolment in secondary education

for both genders drops rather significantly (Refer Table 54). A number of factors affect school completion, as elaborated below:

- Few children attend school regularly. Absenteeism is very high. Girls attend more than boys; this is because boys are involved in working for money, e.g., sugarcane harvesting, petty trade, sand mining and brick making. The youths mentioned that peer pressure pushes youths to engage in labour (trade, sugar cane cutting); and
- Early marriages affect educational attainment in the area. Many of the teenage girls end up in early marriages or teenage pregnancies because they are enticed by small goodies, including snacks. Some of the girls get defiled. When defilement leads to pregnancy, parents give the girls up for marriage. The youths mentioned that some perpetrators of defilement are fined about UGX 1.5 million by parents, and the perpetrators are allowed to marry the girls. However, on some occasions, when parents do not want their defiled girls to get married at a tender age, some girls were said to elope when the parents try to stop them. The youths and women mentioned that the average age of marriage is 13 years and above.
- The district officials mentioned that the district society being mainly Muslim, with large polygamous families, also affects educational attainment. Parents usually fail to sustain their families, leading to a high incidence of child neglect;
- The high levels of unemployment among the educated people have made people lose trust in the value of education, leading to home environments that are unsupportive to learning;
- There are too many bars in the villages; the youth are easily enticed to these facilities, which inadvertently builds vices in them that do not enable them to pay attention to their education; and
- Some homes have insufficient light at night to support student learning.

#### 7.2.5.13 Skills Profile

The range of skills among the community is varied, with 41.25% of the total surveyed population claiming to have a specific skill. However, just a handful (5.78%) of these have a qualification to accompany the said skill (Refer Table 55). The range of claimed skills is related to common livelihoods adopted by the surveyed households, notably commercial farming. While a third of skilled personnel claim to be 'commercial' farmers, this is likely to suggest that crops are traded, and they are not true 'commercial' operators.

Other claimed skills are related to small-scale service provision in the villages, including shops, taxi services/driver, sewing/clothes making, shop keeper/trader, hairdressing, among others. Such small-scale services are likely to be undertaken by one or two members of the households, and this typically functions as a secondary livelihood strategy. Medium to high-end skills (accounting, computer skills, business management, engineering, teacher, tourism/hospitality, Nurse, midwife, doctor, pharmacist, electrician, carpenter, construction, repairman (cars/motorcycles/bicycles) and repairman (phones, radios, TV)) with claimed accompanying formal qualification are limited to 9.74% of the surveyed population (Refer Table 55).

Table 55: Claimed Skills Profile amongst Adults of the Surveyed Households

Skills	Members	No. of Persons with Formal Qualification	Average years of Experience	% Members (1,384 Adults)
Commercial Farmer	464	11	17.27	33.53%
Subsistence Farmer	58	1	20.50	4.19%

Skills	Members	No. of Persons with Formal Qualification	Average years of Experience	% Members (1,384 Adults)
Administration	2	2	1.50	0.14%
Accounting	3	0	26.00	0.22%
Computer Skills	4	2	2.75	0.29%
Business management	50	4	10.28	3.61%
Engineering	6	4	12.50	0.43%
Teacher	22	10	8.91	1.59%
Commercial Fishing	4	0	4.25	0.29%
Shop Keeper / Trader	41	1	8.18	2.96%
Tourism / Hospitality	2	0	19.50	0.14%
Nurse	4	2	10.00	0.29%
Midwife	1	0	12.00	0.07%
Doctor	1	1	1.00	0.07%
Pharmacist	1	0	1.00	0.07%
Electrician	1	0	6.00	0.07%
Carpenter	4	1	19.75	0.29%
Construction	18	5	10.94	1.30%
Sewing / Clothes Making	53	9	10.40	3.83%
Artisanal Goods Makers	6	2	12.17	0.43%
Repairman (Cars/Motorcycles/Bicycles)	8	0	17.38	0.58%
Repairman (Phones, Radios, TV)	10	1	4.00	0.72%
Baking and cooking	22	2	5.86	1.59%
Hairdressing	35	9	6.50	2.53%
Taxi Service / Driver	35	4	7.86	2.53%
Security	10	3	11.30	0.72%
Herbal Medicine Expert	11	2	16.36	0.79%
Barber	1	0	14.00	0.07%
Boda boda Rider	9	0	7.22	0.65%
Brick laying	1	0	1.00	0.07%
Brick making	3	0	13.67	0.22%
Casual Worker	2	0	7.50	0.14%
Crop Farmer	29	3	22.46	2.10%
House worker	5	0	2.20	0.36%
Livestock Farmer	1	0	5.00	0.07%
Mat weaver	2	0	3.50	0.14%
Peasant farmer	5	0	22.40	0.36%
Traditional Healer	1	0	20.00	0.07%
(Unspecified)	22	0	3.05	1.59%
Others	3		0.00	0.22%



#### 7.2.5.14 Economic Activities and Livelihoods

The overall range of livelihoods that have been adopted by the surveyed households is presented in below (refer Table 56). The level of importance was directly assigned by each interviewed household covered in the household survey.

Crop farming was the main livelihood activity within the surveyed households, and it was undertaken by almost all (98.19%) of the surveyed households. For most households, crop farming was the primary means of securing daily household food needs, whereby the majority of the households that undertook crop farming ranked the activity as being of high importance (81.72%) in sustaining the household. Crop farming as a form of livelihood is explored further below.

Table 56: Livelihoods Profile of the Surveyed Households

Livelihoods	% Households	Level of Importance		
		% High	%Moderate	%Low
Crop Farming	98.19%	81.72%	10.06%	0.41%
Use of Trees and Tree Farming	92.34%	45.63%	41.48%	0.00%
Livestock Rearing	80.24%	52.76%	35.68%	1.26%
Fishing	0.81%	25.00%	75.00%	0.00%
Collecting Materials from the Bush	87.90%	39.68%	46.33%	0.69%
Small Businesses and Trading	56.05%	41.01%	26.62%	0.72%
Employment	21.57%	41.12%	15.89%	0.93%

Livestock rearing was undertaken by 80.24% of the surveyed households, who focus on rearing cattle, goats, chickens, ducks, sheep, and pigs. Livestock rearing was ranked by 52.76% of the households engaged in the activity as of high importance, and another 35.68% ranked it as of medium importance. Livestock rearing is a key source of protein as well as income.

Tree farming or harvesting tree products (such as fruit, firewood, and building wood, etc.) was undertaken by almost all households as well (92.34%). However, trees are not usually planted in great numbers for the purposes of generating income, but rather households retain a low number of productive trees to supplement household food and income while using wild trees for firewood, charcoal-making, construction, and medicinal purposes.

Closely linked with the collection of natural resources was collecting materials from the bush, which was undertaken by 87.90% of the surveyed households, and was ranked as being of moderate importance by 46.33%. A range of natural resources are collected to supply and supplement household energy food needs, and at the same time, contribute to trade or construction needs. In the case of natural resources, the surveyed households do not specifically own the resource but rather harvest materials from communal areas or neighbours' privately-owned land.

More than half (56.05%) of the surveyed households were involved in business/trade, and 41.01% rated it as of high importance. This suggests that trade and business are of high importance for households.

#### 7.2.5.15 Crop Farming

During the KII with the District Agricultural Officer, it was noted that there was a gradual change towards selling the agricultural surplus, and the majority of households in Makuutu Sub-county were

venturing into trade/selling of crops. The main commercial crops observed included coffee, maize, rice, sugarcane and pineapples. Over 40 crops are grown with maize dominant and grown on all the fields (19.17%), followed by beans (18.25%), bananas (matooke) (14.88%), and cassava (11.62%). Cowpeas, pawpaws, aubergines and pumpkins were grown only on secondary fields. Thus, it is evident from the data that maize meal, cassava and matooke are key staple foods in the surveyed area, while coffee is the key cash crop.

#### *7.2.5.16 Farming Practices*

Busoga region has two agricultural seasons. The first season runs from February to July, and the second from August to December. First season planting starts from February to March with weeding in April and harvesting in July. Second season planting occurs between August and September with weeding in October and harvesting in December.

Farmers mainly use hand hoes (refer Figure 141) and oxen to plough land with oxen are hired at UGX 50,000 per acre. The use of tractors is largely limited to farmers with large acreage. There are three government-owned tractors in the district, and these are hired to farmers at a cost of UGX 80,000 per acre. Only a few other farmers own tractors, and these tractors can be hired out at a cost of UGX 100,000 per acre.

Farmland preparation by surveyed households was mainly undertaken using a hand hoe as well as hired cattle (oxen plough), rated at 48.13% and 41.08%, respectively (refer Table 57).

**Table 57: Land Preparation Methods used by the Surveyed Households**

<b>Land Preparation Method</b>	<b>%HH Method</b>
Hand hoe	48.13%
Hired cattle (oxen plough)	41.08%
Hired tractor	7.47%
Own tractor	0.00%
Communal tractor	0.00%
Government-owned tractor	0.21%
Own cattle (oxen plough)	2.90%
Communal cattle (oxen plough)	2.49%
Slash and Burn	1.87%
Unspecified	0.41%



Figure 141: Use of hand hoe and tractor in study area farms

Over a third (38.38%) of the crop farming households indicated that they do not add any manure or fertilisers to the soils. However, 10.79% stated that they apply organic manure, while 59.13% claimed to apply industrial fertilisers to their gardens to increase production. The District Agricultural Officer reported that fertilisers are mainly applied in maize, pineapple and rice gardens as well as for rehabilitation of coffee plantations. The use of pesticides was also reported amongst rice, maize and coffee farmers. The District Agricultural Officer added that pineapple farmers in Makuutu Sub-county were still growing the pineapples organically.

As a main characteristic of peasant farming, nearly all surveyed households depended entirely on rain-fed irrigation (refer Table 58). Mechanical irrigation was not common. When farmers grow tomatoes and vegetables in the dry season, irrigation is manual by drawing water from wetlands. The dependence on seasonal rainfall poses a significant risk of drought-related vulnerability.

Table 58: Irrigation methods used by surveyed households

Irrigation Method	%Household Use
Rain-fed	96.68%
Well/borehole	2.49%
River / stream	2.07%
Other	0.21%
(Unspecified)	0.21%

Surveyed households mainly saved seed from one season to be planted during the next crop growing season (refer Table 59). Donated seed also made a significant proportion of planting material among surveyed households. While the surveyed households never indicated the sources of the donated seeds, feedback from the qualitative interview indicated that there are NGOs in Makuutu Sub-county, such as the Multi-purpose Empowerment Project, a vegetable growing initiative (focussed on improving nutrition) that offers training and seeds to farmers.

Table 59: Sources of Planting Material among the Surveyed Households

Planting Material	% Household
Saved Seeds	64.94%
Donated Seeds	35.06%
Government-supplied Seeds	3.32%
Offcuts	2.70%
Buy Seeds	1.66%

### 7.2.5.17 Farm Labour Profile

The household socio-economic baseline survey indicated that crop farming was undertaken by males and females in almost similar proportions (refer Table 60). However, there is a slightly greater dependence on female labour for all stages of the farming cycle except land clearing and selling.

Table 60: Labour Breakdown for Crop Farming among the Surveyed Households

Labour Type	% Households				
	Clearing Land	Sowing Crops	Processing/ Weeding	Harvesting	Selling
Male	91.16%	86.11%	89.68%	90.11%	66.32%
Female	78.32%	92.84%	92.42%	92.21%	33.47%
Male Children Below 18 yrs	38.32%	44.21%	45.68%	47.79%	1.68%
Female Children Below 18 yrs	33.89%	41.68%	42.11%	42.95%	1.26%
Other family members	0.00%	0.00%	0.00%	0.00%	0.00%
Hired Local Labour Male	40.21%	29.47%	34.11%	31.79%	1.68%
Hired Local Labour Female	17.68%	22.74%	24.00%	22.11%	1.47%
Community Members	0.00%	0.00%	0.00%	0.00%	0.00%

Children of the surveyed households provide additional labour input into all stages of the cropping cycle, albeit at lower intensities (less than 50% of surveyed households) than both adult males and females. Another key source of labour used by the surveyed households were casual labourers. Both men and women provided casual labour, although male labour was more frequently used, with 40.21% of the crop farming households hiring males for labour-intensive activities such as land clearing.

### 7.2.5.18 Crop Storage and Processing

The storage of agricultural goods is critical for households to protect produce from potential post-harvest damage by pests or rot. The District Agricultural officer mentioned that post-harvest handling used to be poor, but improvements were observed from farmers who now use tarpaulins or stores owned by farmer groups.

The majority (82.75%) of the surveyed households stored their produce in bags or grass baskets inside their house while 4.31% of households piled their produce inside of the house with no attempt at covered or secured storage, and 2.26% stored their produce in unprotected piles outside the house (refer Table 61).

Table 61: Crop Storage Profile among Surveyed Households

Crop Storage Method	% Household
Unprotected pile outside house	2.26%
Unprotected pile in house	4.31%
Bags or grass basket outside the house	5.95%
Bags or grass basket inside the house	82.75%
Storage container traditional	1.64%
Storage container modern	1.23%
Storage shed	2.46%
Granary	0.82%
Selling after harvesting	0.21%
Sells from garden	0.21%



Most of the surveyed households undertook a range of produce processing techniques (refer Table 62) relevant to the crop type, which included; shelling, sun-drying, chopping, etc.

Table 62: Profile of Crop Processing

Crop Processing Method	% Household
Shelling	4.52%
Roasting/Cooking	2.46%
Sun drying	67.56%
Fermenting	0.41%
Juicing	0.41%
Milling	12.73%
Pressing/Grinding	2.26%
Cutting/Graters/Chopping	4.93%

Sun drying was the most commonly used crop preservation method by 67.56% of the households surveyed. Post-harvest produce-handling methods are low technology, and the only mechanised form of processing used by farmers was milling or grinding maize and cassava to make flour. These (millers) can be large village-based mills or smaller, individually owned portable machines.

It was noted during the KII with the Bugweri District Agricultural Officer that the GoU, through the Agriculture Cluster Development Project (ACDP) had constructed stores for the identified agriculture clusters in the district. There is a maize store in Makandwa Parish, Makuutu Sub-county, and it is planned that a store will be constructed in Kasozi Parish, Makuutu Sub-county. At these stores, value addition machinery will be installed. In Makuutu Sub-county, these machines were installed at Makandwa and Nondwe Trading Centres. However, the machine in Makandwa Trading Centre was not yet operational at the time of the study because the electricity grid had not been extended there yet.

Intra-village trade is common and undertaken by 86.77% of households, while 11.64% of households also trade in markets in the neighbouring villages (refer Table 63). Trade in the markets normally happens on a weekly basis and is likely undertaken at the main weekly markets located in the areas within or surrounding the study area.

Table 63: Crop trade and market profile

Market Location	Proportion	Average Visits per Month
Markets/households in the same village	86.77%	3.05
Markets/households in the neighbouring villages	11.64%	3.76
Local Main Town	7.14%	3.44
Elsewhere in Bugweri District	1.59%	1.20
Elsewhere in Busoga	6.88%	1.92
Outside Busoga	1.85%	4.00
Other Regions	4.76%	1.17

Crop farmers in Nakavule village and the Bugweri District Agricultural Officer mentioned that crop produce was mainly sold in Iganga, Mayuge and Bugiri districts, and in Busesa in Ibaako Parish, Ibulanku Sub-county, Bugweri District. Usually, it is men who take produce to markets. The following crops (refer Table 64) were reported to be sold at the respective markets.

Table 64: Crop trade ascertained from the FGDs and KII

Crop	Point of Sale	Buyer	Destination
Maize	Farmgate	Middlemen	Mainly Kenya
Rice	At the mill	Middlemen	Busoga Region, Kampala and Kenya
Coffee	Farmgate	Middlemen	Kampala
Pineapples	Farmgate	Company	Kayunga
Cassava	Farmgate	Middlemen	Agro ways Company
Cotton	Farmgate	Ginnery, which provides input	Nakivumbi
Sugarcane	Farmgate	Middlemen	Mayuge
Tomatoes	Farmgate	Middlemen	Nakivumbi
Cabbage	Farmgate	Middlemen	Nakivumbi

#### 7.2.5.19 Extension Services

The women FGD at Mawololo village mentioned that the standard of living in the community had worsened because of poor crop yields due to climate change-related impacts. The District Agriculture Officer indicated that the eight sub-counties in Bugweri District are served by five extension workers in the ratio of approximately 1:1500 farmers. However, there are also NGOs providing extension services to selected beneficiary communities, e.g. One Acre Fund, which supports maize growing through the provision of inputs at a cost in addition to providing crop plantation advice to farmers as well as the Multi-purpose Empowerment Project, a vegetable growing initiative in Makuutu, focusing on improving nutrition by offering agricultural training and crop seeds to farmers.

In Makuutu Sub-county, two community-based facilitators were recruited to offer extension services to farmers under the Ministry of Agriculture, Animal Industries and Fisheries (MAAIF) Agriculture Cluster Development Project (ACDP).

#### 7.2.5.20 Key Challenges that Farmers Face

The District Agricultural Officer, crop farmers in Nakavule village and Women in Mawololo village, reported that the key challenges that farmers face in Makuutu Sub-county and the district in general are:

- Climate change which has led to prolonged drought over the last five years;
- Soils are exhausted/depleted of nutrients due to over-cultivation and yet fertilisers and pesticides are expensive; this is further exacerbated by an increase in crop pests and diseases, which farmers associate with climate change;
- Fluctuating prices of produce, yet farmers usually need quick money and thus sell their produce immediately after harvest at very low prices. Because of fluctuating prices and an unreliable market (where prices vary up and down) for sugarcane, some farmers were slashing their plantations to grow alternative crops;
- Striga, a parasitic weed locally known as Kayongo; and
- Poor access to markets due to poor road network.

#### 7.2.5.21 Livestock Rearing

Fifty-eight percent of Ugandan households depend on livestock for their livelihoods. However, most of these households are subsistence-oriented smallholders. The main livestock reared includes cattle, goats, sheep, poultry and pigs (MAAIF and UBOS, 2018 cited in FAO, 2019).

Cattle is the most important livestock sub-sector in Uganda, contributing to over 40% of the value of livestock production and about 7% to the value of agricultural production (UBOS, 2017 cited in FAO, 2019). The cattle also provide income, food, insurance and savings, social capital and other goods and services to the population. Livestock rearing of cattle, goats and poultry is practiced in the Project area (refer Table 65) and more broadly across the Bugweri District.

Table 65: Livestock kept by the Surveyed Households

Animals	Exotic			Local	
	Households	Men	Women	Men	Women
Chickens	358	1.12%	2.23%	58.10%	57.54%
Ducks	16	0.00%	0.00%	68.75%	37.50%
Cattle	216	2.78%	1.85%	71.30%	38.89%
Goats	293	1.02%	2.39%	57.34%	49.15%
Pigs	16	18.75%	0.00%	68.75%	25.00%
Rabbits	4	0.00%	0.00%	75.00%	50.00%
Pigeons	19	0.00%	0.00%	42.11%	26.32%
Sheep	10	0.00%	0.00%	100.00%	40.00%
Turkey	5	0.00%	0.00%	100.00%	20.00%

Livestock rearing was reported by the surveyed households to be a key source of protein as well as income. Over half (52.75%) of the surveyed households in the four villages that reared livestock rated the activity to be of high importance in sustaining the livelihoods of the households (refer Table 66).

Table 66: Relative Importance of Livestock Rearing among the Surveyed Households

HHs Engaged and Perceived Level of Importance	Makandwa Central	Nakavule	Buyayu	Mawololo
High Importance	48.39%	52.63%	59.65%	60.76%
Medium Importance	38.17%	38.16%	33.33%	30.38%
Low Importance	2.22%	0.00%	2.94%	4.17%

#### 7.2.5.22 Livestock Use

Various uses were assigned to the major livestock (cattle, goats, sheep, pigs and chicken) reared by the surveyed households. Livestock were kept mainly for household wealth as well as food and trade (refer Table 67). Sheep are the main livestock kept for cultural purposes, while only cattle are used for ploughing (refer Figure 142).

Table 67: Uses assigned to Livestock Reared by the Surveyed Households

Livestock Type	HH Use (%)						
	Household Wealth	Cultural practices	HH Food	Trade	Food & trade	Ploughing	Hides & skins
Cattle	35.19%	0.93%	4.63%	21.76%	38.89%	2.31%	0.93%
Goats	38.91%	1.02%	3.07%	26.28%	30.72%	0.00%	0.34%
Sheep	30.00%	20.00%	0.00%	20.00%	50.00%	0.00%	0.00%
Pig	37.50%	0.00%	0.00%	37.50%	25.00%	0.00%	0.00%
Chicken	24.02%	1.40%	5.03%	8.10%	62.29%	0.00%	0.00%



Figure 142: Use of Cattle for Ploughing Fields in the Study Area

#### 7.2.5.23 Livestock Feeding

The District Veterinary Officer, during a KII indicated that there is very limited movement of animals in search of pasture since it (pasture) is generally abundant in the district, except at the peak of the dry season (around January). However, he added that Makuutu Sub-county is generally drier than other sub-counties and thus may experience periodic pasture shortage.

#### 7.2.5.24 Trade in Livestock & Livestock Products

Trade in livestock and livestock products is undertaken at regional and district markets or farm gate sales with intermediaries buying live animals for onward sale to abattoirs or private buyers. Trade in livestock and livestock products is a key income source for 46.57% of the households that rear livestock. The sale of live animals is the commonest source of income, undertaken by 53.68% of the households that rear livestock (refer Table 68). However, households are not limited to the sale of live animals but also engage in the sale of various animal products; cow milk and chicken eggs are the leading livestock products sold by 51.95% and 44.16% of the households that rear livestock, respectively. Fresh meat (goat/beef/pork and mutton) was not sold by any of the surveyed households.

Table 68: Livestock and Livestock Products' Trade Profile

Livestock/Products Sold	Households	% Households
Cow milk	120	51.95%
Goat milk	5	2.16%
Chicken eggs	102	44.16%
Skins and Hides	2	0.87%
Butter/ghee/yoghurt	1	0.43%
Live Animals	124	53.68%
Manure	7	3.03%



#### 7.2.5.25 Livestock and Livestock Products' Market Profile

According to the Bugweri District Veterinary Officer, about 98% of the farmers are subsistence farmers. Only about 2% keep animals on a commercial scale. Nonetheless, animals are usually sold when there is a need for money; livestock act as banks for farmers because they can easily be converted into cash. The livestock and livestock products are sold both to households and at the markets. Households that trade in livestock /livestock products commonly sell at the household (farmgate). Where sellers have to travel, they commonly sell at markets outside Busoga region in Uganda (14.30 average visits per month). Visits to buyers within the same villages are nearly as frequent as those beyond the village.

#### 7.2.5.26 Livestock Labour Profile

Men and women within livestock keeping households provide the necessary labour. However, females provide most of the labour except for selling, where males dominate (refer Table 69). Children, mostly males, also assist with livestock rearing activities, and a few households are also reliant on the use of locally hired labour in livestock rearing and, in such cases, hired labour are mostly males. The qualitative survey indicated that within households of livestock keepers, men (household members or hired labourers) graze cattle and goats.

Table 69: Livestock Labour Profile (for cattle, goats, sheep)

Labour Type	% Households			
	Watering	Feeding	Herding	Selling and Trade
Male	56.53%	57.54%	57.29%	56.28%
Female	67.34%	70.35%	62.56%	39.95%
Male Children (below 18 years)	37.44%	36.18%	34.42%	3.52%
Female Children (below 18 years)	23.37%	23.87%	20.10%	2.51%
Hired Local Labour (Male)	4.77%	4.77%	4.02%	0.25%
Hired Local Labour (Female)	0.50%	0.50%	0.50%	0.00%

#### 7.2.5.27 Water for Livestock

Focusing on livestock that require substantial amounts of water (cattle, goats, sheep and pigs), the survey data indicated that communal boreholes are the main sources of water during both the wet and dry seasons for all livestock (refer Tables 70 and 71 respectively).

Table 70: Water Sources for Livestock during the Wet Season

Livestock Type	Shallow Open Well	Deep Open Well	Private Borehole	Communal Borehole	Stream/Rivers	Lake	Water Harvesting	In the bush	Piped/Tap water	Dam/Spring
Cattle	19.44%	5.56%	2.31%	61.57%	5.09%	1.39%	6.48%	0.46%	4.17%	0.00%
Goats	15.02%	5.46%	2.39%	60.41%	2.73%	0.00%	1.02%	0.34%	3.75%	0.34%
Sheep	40.00%	0.00%	0.00%	90.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Pigs	18.75%	6.25%	0.00%	56.25%	6.25%	0.00%	0.00%	0.00%	0.00%	0.00%

Table 71: Water Sources for Livestock during the Dry Season

Livestock Type	Shallow Open Well	Deep Open Well	Private Borehole	Communal Borehole	Stream/Rivers	Lake	Water Harvesting	In the bush	Piped/Tap water	Dam/Spring
Cattle	17.13%	5.56%	2.78%	66.20%	5.09%	2.78%	4.17%	0.46%	0.00%	0.00%
Goats	13.65%	5.12%	3.07%	62.12%	3.07%	0.00%	0.68%	0.34%	1.37%	0.34%
Sheep	30.00%	10.00%	10.00%	90.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Pigs	12.50%	12.50%	0.00%	56.25%	6.25%	0.00%	0.00%	0.00%	0.00%	0.00%

During the dry season, 3.83% of households that rear livestock claimed to travel for more than an hour to the nearest water source (refer Table 72).

Table 72: Travel Time to Water Sources for Livestock during the Dry Season

Travel Time	Percentage of HH rearing livestock	Livestock			
		Cattle	Sheep	Goats	Pigs
0-10 minutes	37.46%	33.3%	40.0%	36.5%	43.8%
10-30 minutes	37.46%	42.6%	70.0%	32.8%	18.8%
30-60 minutes	21.24%	21.8%	20.0%	16.7%	18.8%
More than 1 hour	3.83%	3.2%	10.0%	3.1%	6.3%

#### 7.2.5.28 Risks to Livestock

The rearing of livestock is generally an activity that involves risk. Some risks encountered by farmers that limit income realised from livestock include diseases and pests, reported by more than half (55.0%) of the households that rear livestock as well as wild animal attacks (refer Table 73). Only 5% of the households that rear livestock considered drought as a risk to livestock productivity.

Table 73: Risks reported to be associated with Livestock Rearing

Risk	No. of Households	% Households
Drought/Water Shortages	20	5.0%
Diseases and Pests	219	55.0%
Stock Theft	35	8.8%
Wild Animal Attacks	66	16.6%
Injuries/Accidents	46	11.6%
Poison	1	0.3%

According to the Bugweri District Veterinary Officer, the main diseases affecting livestock in Bugweri District generally are tick-borne diseases, including anaplasmosis, babesiosis, East-coast Fever and lumpy skin and intestinal worms. Despite the prevalence of diseases, veterinary services are not readily available partly due to the limited veterinary officers and the relatively high costs for the services. There are two (2) veterinary officers at the district, and five (5) others serve all sub-counties in Bugweri. Makuutu and Igombe sub-counties are served by one veterinary officer in addition to community animal health workers (diploma and certificate level holders), who offer private services. However, community animal health workers need further training in disease diagnosis and treatment to ensure efficiency.

Animal theft was reported by the Bugweri District Veterinary Officer to be on the increase because the price of meat has been increasing and so has poverty amongst the community.

#### 7.2.5.29 Tree Planting/Holdings

##### 7.2.5.29.1 Tree Products Profile

Of the surveyed households, 92.34% (458 households) utilise tree products, and almost half of the surveyed households (45.63%) ranked trees and their products as of high importance to their households' livelihoods. The tree products utilised range from fruit, firewood, wood poles as well as other traditional building materials (refer Table 74) which are principally sourced from household owned trees (refer Figure 143). Firewood and fruit are the most commonly used tree products. There is limited reliance on communal lands for sourcing tree products, and amongst all products, craft materials and medicinal plants are the commonly collected products from communal lands.

Table 74: Tree Products and the Relevant Sources

Type of Tree Products	Households (%)	Source of Tree Products		
		Communal (%)	Owned Trees (%)	Communal and Owned (%)
Firewood	95.20%	6.65%	80.50%	12.84%
Fruit	82.53%	7.14%	83.07%	9.79%
Medicinal	33.62%	11.69%	77.27%	11.04%
Wood poles	33.41%	7.84%	83.01%	9.15%
Bananas and beans	25.33%	4.31%	84.48%	11.21%
Traditional building materials	19.00%	13.79%	65.52%	20.69%
Craft materials	9.17%	14.29%	73.81%	11.90%
Seeds	7.86%	5.56%	94.44%	0.00%
Other products	1.09%	20.00%	80.00%	0.00%



Figure 143: Trees owned by one of the surveyed households

#### 7.2.5.29.2 Tree Product Uses

The use of tree products is determined by the nature of the tree product. The surveyed households use firewood, seeds and medicinal plants, fruit, wood poles, craft materials and traditional building materials, for both household consumption and trade (refer Table 75). Wood poles, bananas and building materials are also used for ceremonies such as weddings.



Table 75: Tree Product Use Profile

Type of Tree Products	Product Use (%)					
	Household Use	Trade/Selling	Ceremonies	House Use and Trade	Construction	Other
Fruit	66.14%	0.79%	0.00%	30.69%	0.00%	0.00%
Firewood	75.46%	1.83%	0.00%	19.50%	1.15%	0.00%
Wood poles	34.64%	3.92%	11.11%	1.31%	4.58%	0.00%
Seeds	66.67%	5.56%	0.00%	19.44%	0.00%	0.00%
Medicinal	76.62%	1.95%	0.00%	14.94%	0.00%	0.00%
Craft Materials	50.00%	7.14%	0.00%	40.48%	0.00%	0.00%
Other Products	40.00%	20.00%	0.00%	40.00%	0.00%	0.00%

Tree products were mainly (70.16%) sold in markets/households in the same village with 11.29% sale products to markets/households in the neighbouring village and 9.27% sale in the local main town.

Men are the major providers of labour associated with trees and tree products use (refer Table 76) including planting, collecting products, processing products and selling of products. Females and children of the surveyed households as well as hired labour are also involved in the provision of labour in tree management. Females and children provide most of the labour during the collection of products. Firewood collection in the study area, as is a characteristic of most Ugandan rural settings, is mainly a woman's role.

Table 76: Labour Breakdown for Tree Management

Labour Type	% Households			
	Planting	Collecting Product	Processing Product	Selling Product
Male	88.94%	85.18%	58.54%	55.28%
Female	57.29%	80.90%	40.20%	23.37%
Male children below 18 years	31.16%	42.71%	15.33%	3.27%
Female children below 18 years	25.63%	40.20%	12.31%	3.02%
Hired local labour (male)	9.05%	9.80%	6.53%	1.51%
Hired local labour (female)	4.77%	4.27%	2.26%	0.75%

#### 7.2.5.30 Fishing

Fishing in Uganda is important both for subsistence and commercial livelihoods for many people engaged in the fishing supply chain (small and industrial-scale fish processing, fish trading, boat-building, net making, trading in fishing equipment and extension activities provided by the GoU). Of the national fisheries, Lake Victoria is by far the largest and economically most significant. Other important water resources include large lakes such as George, Edward, Albert and Kyoga, the River Nile, and a great variety of swamps and streams. Results from the surveyed households indicated that fishing is undertaken by only three (3) households (0.6%).

#### 7.2.5.31 Natural Resource Harvesting

At the national level, natural resources play a significant role in the subsistence of rural communities by reducing vulnerability and providing safety nets and subsistence (food, firewood and income) for

communities who depend on the natural resources for livelihoods and in fulfilling gender roles (provision of food, collection of water and firewood, child care and health care, among others).

Bugweri District is endowed with natural resources ranging from wetlands, hills and various tree species. The KII with the Bugweri District Natural Resources Officer pointed to various existing environmental concerns in Makuutu Sub-county including rampant deforestation for fuelwood and charcoal, and to create land for farming and to remove the shade and allow crops to grow. Soil erosion in the hilly areas of Makuutu, climate change, and wetland degradation through rice and sugarcane farming (this is the biggest cause of wetland degradation) were also highlighted.

The Natural Resources Officer also mentioned the problem of lack of political will to control environmental degradation among the area politicians and the fact that communities misunderstand environmental sensitisation to be solely about controlling tree cutting and wetland drainage, leading them to avoid meetings aimed at community sensitization on environmental management. While shade and fruit tree seedlings are given out to farmers annually, tree planting is considered not very successful because of the severe land fragmentation as well as the low survival rates of seedlings due to poor management.

Despite the concerns above, the district has not done much to restore the environment due to a lack of finance and human resources.

Nearly all surveyed households claimed to harvest natural resources (i.e., collect materials from the bush) (refer Table 77). More than a third of the surveyed household (39.68%) ranked collecting materials from the bush as of high importance to their households' livelihoods.

The most commonly collected natural resources included firewood for domestic use (94.61%), followed by wild fruits, vegetables or mushrooms (54.96%) and wood for charcoal making (35.78%). One household reported hunting animals and birds.

Table 77: Natural Resource Harvesting Profile for the Surveyed Households

Natural Resource	Households	% Households
Firewood for domestic use	439	94.61%
Wild fruits, vegetables or mushrooms	255	54.96%
Wood for charcoal making	166	35.78%
Medicinal plants	153	32.97%
Grass for thatching	123	26.51%
Building /fencing poles	99	21.34%
Timber	79	17.03%
Firewood for sale/brick making	56	12.07%
Papyrus/palm leaves/ropes/fibres for crafts	30	6.47%
Clay for pottery/brick making	15	3.23%
Sand/stones for construction	18	3.88%
Wood for artisanal items	8	1.72%
Hunting animals and birds	5	1.08%
Collecting shells from the lake	3	0.65%

Mineral excavation/mining	1	0.22%
Grass for feeding livestock	2	044%

Since wood is the main source of cooking energy in the region (refer Table 78) it is logical that firewood is the most collected natural resource by the surveyed households. In addition, during the qualitative interviews, traditional remedies were reported to be popular for treating malaria, diabetes, hypertension and ulcers. Access to modern health services was reported to be constrained by distances to health facilities as well as limited availability of essential medicine at the facilities.

#### *7.2.5.32 Sources of Natural Resources*

There are no specifically defined communal areas that are allocated to natural resources harvesting within the study area. Most natural resources are harvested within the village or in direct proximity to the village (refer Table 78) notably firewood, wild fruits and vegetables, wood for charcoal making, medicinal plants and thatching grass.

**Table 78: Location of Natural Resources Collected among the Surveyed Households**

Natural Resource	Where Natural Material is Collected (%)				
	Inside the village	Near the village (less than 1km)	Near the village (less than 1 - 5 km)	Away from the village (more than 5km)	In another district
Firewood for domestic use	89.01%	2.37%	0.43%	0.00%	0.00%
Wild fruits, vegetables or mushrooms	52.80%	1.51%	0.22%	0.00%	0.00%
Wood for charcoal making	34.48%	0.86%	0.00%	0.00%	0.00%
Medicinal plants	31.68%	0.65%	0.00%	0.00%	0.00%
Grass for thatching	25.00%	1.08%	0.22%	0.00%	0.00%
Building /fencing poles	21.12%	0.43%	0.00%	0.00%	0.00%
Firewood for sale/brick making	11.21%	0.22%	0.00%	0.00%	0.00%
Timber	16.16%	0.43%	0.00%	0.00%	0.00%
Wood for artisanal items	1.51%	0.22%	0.00%	0.00%	0.00%
Hunting animals and birds	0.86%	0.22%	0.00%	0.00%	0.00%
Clay for pottery/brick making	2.37%	0.43%	0.00%	0.00%	0.00%
Sand /stones for construction	3.23%	0.65%	0.00%	0.00%	0.00%
Collecting shells from the lake	0.43%	0.22%	0.00%	0.00%	0.00%
Papyrus/ palm leaves/ ropes/fibres for crafts	5.60%	0.65%	0.00%	0.00%	0.00%
Mineral excavation/mining	0.22%	0.00%	0.00%	0.00%	0.00%
Grass for feeding	0.22%	0.00%	0.00%	0.00%	0.00%
Collecting Grass for Animals	0.22%	0.00%	0.00%	0.00%	0.00%

#### *7.2.5.33 Use of Natural Resources*

Utilisation varies depending on the type of natural resources (refer Table 79). Most of the collected materials are for household use, but some are collected for both household use and trade.

Table 79: Natural Resources Utilisation among the Surveyed Households

Natural Resources	Household Use (%)	Trade (%)	Household Use and Trade (%)	Traditional Medicine (%)
Firewood for domestic use	79.96%	1.72%	9.91%	0.00%
Wild fruits, vegetables or mushrooms	44.61%	0.65%	8.19%	0.00%
Medicinal plants	22.20%	0.43%	4.96%	4.96%
Firewood for sale/brick making	2.59%	5.17%	4.31%	0.00%
Building/fencing poles	13.58%	1.29%	5.60%	0.00%
Timber	5.17%	4.31%	7.54%	0.00%
Wood for artisanal items	0.86%	0.43%	0.65%	0.00%
Grass for thatching	20.69%	1.51%	3.66%	0.00%
Hunting animals and birds	0.86%	0.22%	0.22%	0.00%
Clay for pottery/brick making	1.51%	0.22%	1.51%	0.00%
Sand/stones for construction	1.72%	0.86%	1.29%	0.00%
Papyrus/palm leaves/ropes/fibres for crafts	2.16%	1.29%	3.02%	0.00%
Mineral excavation/mining	0.00%	0.22%	0.00%	0.00%
Grass for feeding livestock	0.44%	0.00%	0.00%	0.00%

#### 7.2.5.34 Labour Profile

Natural/wild resources are mainly harvested by adult females (80.39%) (refer Table 80) while males and children of the household may also provide additional labour in the activity. In a few cases (9.06%), male and female labour was said to be hired.

Table 80: Natural Resources Harvesting Labour Profile among the Surveyed Households

Labour Type	Households	% Households
Men In HH	204	43.97%
Women in HH	373	80.39%
Boys in HH	169	36.42%
Girls in HH	183	39.44%
Hired Local Labour Male	41	8.84%
Hired Local Labour Female	1	0.22%

#### 7.2.5.35 Trade

According to the Draft Bugweri District Development Plan (2015-2020), 908 retail businesses were registered in Bugweri District as of the year 2020. Most of the businesses are reported to be very small (sole traders and family micro-enterprises) and further constrained by the underdeveloped physical infrastructure like roads and energy. The majority of the businesses cannot generate appropriate employment opportunities for the population.

The surveyed households engage in a range of trade activities within their residential structures, compounds, along roads or gazetted markets (refer Table 81). The households engage in small-scale trade, mostly comprised of ad-hoc trade in surplus of crops, fruit, livestock and natural resources and trade in general merchandise.



Selling of agricultural goods at a stall/shop is undertaken by 6.05% of all surveyed households, and this occurs mostly at the family home. Sewing/weaving (3.02%) and household goods stall/shop (2.82%) are also undertaken mainly at the family home. The sale of agricultural goods at a stall/shop elsewhere in and outside the village is undertaken by 9.07% and 3.36% of the households, respectively.

Non-food based enterprises are generally limited to; taxi/transportation services, construction, carpentry and hairdressing /salon, among others.

**Table 81: Types of Trade activities Undertaken by the Surveyed Households**

Type of Enterprise	% HH at family home	%HH elsewhere in the village	%HH elsewhere outside the village
Agricultural Goods Stall/Shop	6.05%	9.07%	3.63%
Taxi/Public Transportation/Boda boda	0.60%	0.81%	5.24%
Construction and Carpentry	0.60%	0.40%	2.02%
Hair Dressing/Salon	0.60%	0.40%	2.62%
Household Goods Stall/Shop	2.82%	3.23%	0.81%
Restaurant/Eating place	1.61%	0.00%	1.41%
Food Processing	1.81%	2.02%	1.21%
Electronics Shop (Phones/Radio)	0.20%	0.00%	0.40%
Butchery Stall/Shop	0.00%	0.81%	1.01%
Fish Stall/Shop or Fish Monger	0.81%	1.01%	0.00%
Sewing/Weaving	3.02%	1.21%	0.81%
Artisanal Goods and Handcrafting	1.01%	0.20%	0.00%
Traditional Medicine	1.61%	1.61%	1.01%
Trees/Ornamental Plant's Nursery	0.20%	0.81%	0.00%
Bar/Joint/Alcohol Selling//Local Brew	0.20%	0.00%	0.00%
Mineral Trade	0.40%	0.00%	0.00%
Hardware Store	0.00%	0.20%	0.20%
Sell Stones	0.20%	1.41%	0.60%
Sale of Bricks	0.20%	0.00%	0.00%
Bakery	0.40%	0.40%	0.40%
Boutique Shops	0.00%	0.20%	0.00%
Chapatti Seller	0.40%	0.20%	0.20%
Charcoal Selling	0.20%	0.20%	0.60%
Drug Shop	0.40%	0.00%	0.00%
Informal trading (Hawking)	0.00%	1.01%	0.20%
Mobile Money Shop	0.00%	0.20%	0.20%
Pancake Selling	0.00%	0.20%	0.20%
Repairing Roads	0.00%	0.20%	0.00%
Repairman (phones, bicycles, motor cycles, radios, etc.)	0.00%	0.20%	0.00%
Tomato Trading	0.00%	0.20%	0.00%
Vending Clothes	0.20%	0.20%	0.00%
Mechanic	0.00%	0.60%	0.40%

A survey of five (5) sample enterprises in and around the study area (Nakivumbi Trading Centre, Makandwa Central Trading Center, Nondwe Trading Centre, and Mawololo Trading Centre) revealed that the main business activities are wholesale and retail merchandise shops, as well as the sale of clothes and operation of restaurants/eateries. The businesses basically purchase and resell products. The main sources of goods are Iganga, Bugiri, Mayuge and Bugweri Towns, and Kampala City. Most of the enterprises started after the year 2000, and none of them were formally registered. Most operate in rented premises in the trading centres and employ few people (ranging from none to 5 employees). Competition is a major factor affecting the businesses because most of them sell similar products and services, yet the purchasing power among the surrounding communities is low. The main clients are from the immediate communities and other communities in the district. In general, the business owners indicated that their client numbers had been increasing over the years. However, increased poverty among the population means that purchasing power is low. Average profits were higher for wholesalers than retailers. The profits ranged from UGX 150,000 - UGX 4 million in bad months and UGX 300,000 - UGX 6 million in good months.

Poor roads and transport services, stiff competition, and limited capital were the major problems that the business owners faced. Additionally, poverty within the communities translates into limited clientele, which also exacerbates the mentioned problem of defaulting clients.

#### *7.2.5.36 Household Income Sources*

Surveyed households in Mawololo, Buyayu, Makandwa Central and Nakavule villages have a diversity of income sources, with the primary income sources being the sale of crops and vegetables (65.73%), and this correlates with the main occupation of the surveyed households where 74.90% alluded to crop farming as the dominant form of livelihood followed by the sale of live animals (33.06%) and animal products (26.81%) (refer Table 82) the results correlates with the trade in livestock and livestock products as a key income source for 46.57% of the households that rear livestock. The major income sources for the surveyed households were primarily land-based.

**Table 82: Profile of Household Income Sources**

<b>Income Source</b>	<b>No. of HH</b>	<b>% HH</b>
Sale of crops and vegetables	326	65.73%
Sale of livestock	164	33.06%
Sale of animal products	133	26.81%
Self employed	70	14.11%
Donations	62	12.50%
Trade/Shop	55	11.09%
Sale of fruits	58	11.69%
Migrant remittance - within Uganda	45	9.07%
Casual worker	48	9.68%
Sale of livestock meat	43	8.67%
Credit or loans	38	7.66%
Informal Trading/Hawking	32	6.45%
Sale of Thatch/Grass/Trees/Poles	33	6.65%
Salaries (any other organisation)	20	4.03%
Tree Seedlings/Ornamental	17	3.43%
Salaries (Government)	16	3.23%
Craftsman	16	3.23%
Rental of Property/Land	15	3.02%
Sale of fish	10	2.02%

Income Source	No. of HH	% HH
Salaries (Private Companies)	2	0.40%
Migrant remittance - Outside Uganda	5	1.01%
Sale of bush meat	2	0.40%
Pensions / Social Grants	2	0.40%
Sale of land assets	1	0.20%
Sale of sand/stones	9	1.81%
Chapati selling	1	0.20%
Boda boda/Transportation	6	1.21%
Repairing radios/Bicycle mechanic	1	0.20%
Construction	1	0.20%
Sale of charcoal	1	0.20%
Sale of firewood	1	0.20%
Traditional healer	3	0.60%
Alcohol/bar shop	1	0.20%
Baking/restaurant	1	0.20%
Sewing/weaving	3	0.60%
Sale of medicine	3	0.60%
Food processing	2	0.40%

Credit and loans were mentioned by 7.66% of the household as an income source. Many people in the community are members of Village Savings and Loan Associations (VSLA). A rapid survey of five VLSAs in the potentially affected villages of Mawololo, Nakavule, Buyayu, and Makandwa Central (the villages potentially affected by the proposed Central Mining Pit) revealed that most of the surveyed VLSAs came into existence between 2000-2019. Average membership in the VSLA ranges between 30-40 members, open to both men and women, typically adults. To gain membership, typically one has to pay membership fees, be a registered citizen of Uganda (with a national Identification (ID) and be an adult (18 years and above). Money to invest in the VSLA by members is typically obtained from farming and business.

The VSLAs operate income-generating activities for the groups, mainly in service provision and farming. The VSLAs typically meet weekly, some monthly. All the surveyed groups operate loan services to members. Typically, members borrow amounts ranging from UGX 10,000 – UGX 50,000 from these groups. The loans are mainly used to meet household needs and emergencies (medical expenses or school fees payments) and to invest in personal businesses. Most groups require loan repayment at monthly intervals. The interest rates range between 5-10% per month.

Benefits accruing to members include the income from loan interest, group members support each other in times of bereavement or other functions by availing group property (such as tents and plates) for use in such functions, but also financially supporting the affected members. VSLA members were optimistic that the proposed project would support organised groups by boosting their capital base and supporting their income-generating activities.

#### *7.2.5.37 Occupations*

Occupations, in the context of this report, covers a person's primary day-to-day activity and is not solely limited to what is usually understood to be a person's main form of employment. Given that 61.88% of the surveyed population is aged below 18 years it is expected that the largest daily occupation would be as either a pre-school child or a student/scholar.

Crop farming is the main occupation of 74.90% of the surveyed population and is by far the dominant form of livelihood adopted by the surveyed households, followed by trade/business (7.99%) and casual labour (5.54%). Employment in private companies or government was only indicated for 6.52% of the population. Livestock farming was only claimed as an occupation for only 2.2% of the population (refer Table 83). The crop farming results correlate with the results from the economic activities and livelihoods of the surveyed households where crop farming was the main livelihood activity within the surveyed households, and it was undertaken by almost all (98.19%) of the surveyed households as previously discussed.

**Table 83: Daily Occupations Profile of the Economically Active Population (18 years & above)**

Main Occupation	Female	Male	Total	%Female	%Male	Total %
Crop Farmer	541	378	919	83.10%	65.63%	74.90%
Own Business / Trade	49	49	98	7.53%	8.51%	7.99%
Casual Labourer	10	58	68	1.54%	10.07%	5.54%
Livestock Farmer	9	18	27	1.38%	3.13%	2.20%
Employed – private company	12	24	36	1.84%	4.17%	2.93%
Contract Worker – private company	10	16	26	1.54%	2.78%	2.12%
Employed – Government	0	14	14	0.00%	2.43%	1.14%
Contract Worker – Government	2	2	4	0.31%	0.35%	0.33%
Fishermen/women	0	3	3	0.00%	0.52%	0.24%
Houseworker/Caregiver	10	3	13	1.54%	0.52%	1.06%
Retired (with pension)	0	1	1	0.00%	0.17%	0.08%
Boda boda	0	2	2	0.00%	0.35%	0.16%
Herbalist	0	1	1	0.00%	0.17%	0.08%
Traditional Healer	0	2	2	0.00%	0.34%	0.16%
(Unspecified)	6	3	9	0.92%	0.52%	0.73%
<b>Grand Total</b>	<b>651</b>	<b>576</b>	<b>1,227</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>

#### *7.2.5.38 Areas of Household Expenditure*

Most of the surveyed households (84.27%) used the generated income to cover medical expenses (Refer Table 84). This may indicate a high level of morbidity among the population or high cost of health services. Despite the fact that health services are supposed to be free at government health facilities, the community continue to spend significant proportions of their income to access health services. Households also used cash to obtain other necessities such as food (65.73%), clothes (61.69%) and school fees, uniforms, books/equipment (57.86%), among others. More than a third of the surveyed households use their income to contribute to savings (in VSLAs or banks).

**Table 84: Profile of Household Areas of Expenditure**

Expenditure	Households	%HH
Medical expenses	418	84.27%
Food	326	65.73%
Clothes	306	61.69%
Telephone (cellular)	288	58.06%
School fees, uniforms, books/equipment	287	57.86%
Agricultural expenses (seeds)	222	44.76%
Personal Items	199	40.12%



Expenditure	Households	%HH
Transport	189	38.10%
Savings society/banks	176	35.48%
Agricultural expenses (livestock)	131	26.41%
Household energy	125	25.20%
Funeral expenses	107	21.57%
Furniture/household equipment	76	15.32%
Rental (housing/accommodation)	55	11.09%
Water	27	5.44%
Buying land/assets	24	4.84%
Alcohol expenses	22	4.44%
Settling a dispute/paying a fine	18	3.63%
Bride wealth/marriage ceremony	15	3.02%
Others	3	0.60%

#### 7.2.5.39 Valued Movable Household Assets

Respondents were asked whether they owned a pre-determined list of movable assets in working condition. Male-headed households own more assets in working condition than female-headed households (refer Table 85). Assets in working condition owned by most of the female-headed households include; plough (50%), paraffin cooker (50%), satellite dish (33.33%) and fridge (33.33%). No female headed household own a motor car in working condition.

Table 85: Movable Assets Owned by the Surveyed Households

Assets available in	Assets available in Working Condition		Assets available NOT in Working Condition	
	Female HH	Male Headed	Female HH	Male Headed
Motor Car	0.00%	100.00%	100.00%	0.00%
Bicycle	13.26%	86.74%	44.44%	55.56%
Television	11.90%	88.10%	25.00%	75.00%
Radio	16.51%	83.49%	40.00%	60.00%
Satellite Dish	33.33%	66.67%	100.00%	0.00%
Sewing Machine	22.22%	77.78%	50.00%	50.00%
Fridge	33.33%	66.67%	0.00%	0.00%
Mobile Phone	17.28%	82.72%	0.00%	100.00%
Bed with Mattress	20.15%	79.85%	0.00%	0.00%
Motorcycle (Boda boda)	9.82%	90.18%	66.67%	33.33%
Plastic Chairs	15.98%	84.02%	0.00%	100.00%
Wooden Furniture	17.63%	82.37%	0.00%	100.00%
Electric/gas/Paraffin cooker	20.00%	80.00%	0.00%	0.00%
Tractor	0.00%	100.00%	0.00%	0.00%
Plough	50.00%	50.00%	0.00%	0.00%
Oxen	0.00%	66.67%	0.00%	0.00%
Generator	0.00%	100.00%	0.00%	0.00%
Basin	0.00%	100.00%	0.00%	0.00%
Solar battery/Panel	0.00%	100.00%	0.00%	0.00%
Hand hoe	0.00%	100.00%	0.00%	0.00%
Paraffin cooker	50.00%	50.00%	0.00%	0.00%

#### 7.2.5.40 Ownership and Tenure

Uganda recognises formal and informal land ownership rights. Land tenure systems include Mailo, freehold, leasehold, customary and public land as defined in Uganda's 1995 Constitution and governed under the Land Act (1998).

##### 7.2.5.40.1 Freehold Tenure

Freehold land tenure refers to the holding of registered land in perpetuity with full powers of ownership, subject to statutory and common law requirements. It enables the holder to use and develop the land, including selling, leasing or subdividing the land. Freehold tenure also allows giving away the land to any person by will.

##### 7.2.5.40.2 Mailo Tenure

Mailo land tenure refers to the holding of registered land in perpetuity and allows for separation of ownership of the land from ownership of developments on the land made by a lawful or a bona fide occupant. It also enables the holder to pass down his/her title to successors with the same ownership rights, subject to the customary and statutory rights of those persons at the time the tenure was created. Under Mailo ownership, informal rights are also recognised through kibanja/ bibanja rights; tenants who settled on 'mailo' land with either full knowledge of the mailo owner or succession or purchase from the former bibanja holders. The 1995 Constitution protects tenure rights of lawful and bonafide occupants on Mailo land, freehold or leasehold land.

##### 7.2.5.40.3 Leasehold Tenure

Leasehold tenure is created by contract or by operation of law. It enables holding of land for a given period from a specified date of commencement, on such terms and conditions as may be agreed upon by the lessor and lessee. This type of tenure arrangement is usually, but not necessarily, provided in return for a rental payment.

##### 7.2.5.40.4 Customary Tenure

Customary Tenure refers to a system of land tenure regulated by customary rules and not governed by law. It applies local customary rules to ownership, use and occupation of, and transactions on land. It also provides for communal ownership of land. A certificate of customary ownership may be acquired by any individual, household or community holding land under customary tenure on former public land. Results from the sample socio-economic household survey indicated that the crop farming households own land under the land tenure types indicated below (refer Table 86). Most of the surveyed households (48.96%) own the land with written customary rights, while 9.96% owned Freehold titled land.

Table 86: Land Tenure of the Crop Farming Households

Land Ownership	% Households (482 crop farming HHs)
Customary Right (Verbal)	28.63%
Customary Right (Written)	48.96%
Titled Land / Freehold	9.96%
Formal Leasehold	1.24%
Informal Rental	15.56%

Land Ownership	% Households (482 crop farming HHs)
Borrowing	0.83%
Sharing Land	3.53%
No Permission/Squatting	0.41%
Don't Know	0.41%
Inherited	0.21%
Unspecified	0.62%

#### 7.2.5.41 Land Use

The dominant land use types within Bugweri District and the sub-counties potentially affected by the proposed Project are agriculture, settlement, urbanisation, and natural resources conservation. Some of the livelihood activities such as crop farming and livestock rearing are land-based. Over three quarters (76.21%) of the surveyed households owned fields used as farmland, mainly developed for subsistence use.

Results from the KIIs with Mawololo, Buyayu, and Nakavule LC I chairpersons and FGDs with Makuutu Sub-county leaders indicated that the district and the project area experience the following issues related to land use and land access:

**Increase in land value and speculation:** All the three LC I Chairpersons (of Buyayu, Mawololo and Nakavule) who were interviewed indicated that the demand for land in their areas of jurisdiction had increased over the recent years, and so had the cost of buying land. The average cost of an acre of land in the three villages had increased from an average UGX 1.5 million in 2015/16 to UGX 5 – UGX 7 million in 2021. The LC I Chairmen also indicated increased land transactions in 2020-2021; while this could be a result of natural population increase and increased demand for land for farming (especially sugarcane, rice, and, of recent, pineapple farming), project-related speculation cannot be ruled out, especially since some of the buyers are from neighbouring districts.

**Land Renting:** The proposed Project area has a sizeable land rental market. Land is mainly rented by people from outside the proposed Project area or by wealthier farmers among the proposed Project areas population for sugarcane growing. Land for sugarcane cultivation is rented out at UGX 600,000/acre for four (4) years. In Mawololo village, the LC I Chairman mentioned that an acre could also be rented out for a period of 10 years at only UGX 700,000 – UGX 800,000. Sugarcane is mainly grown on rented land, and the owners rent out their land because they have no capital to invest in sugar plantations. The people who rent the land are both from within the proposed Project area communities but also from outside the community. The Chairmen indicated that renting out land for sugarcane growing was on the decline because the price of sugarcane had decreased. However, they maintained that land purchases were on the increase.

**Land Disputes:** The LC I Chairpersons mentioned that land disputes were localised and easily resolved by the LCs. Disputes were mainly among family members, arising from inheritance-related matters. However, the Makuutu Sub-county staff mentioned that land disputes were rampant, mainly resulting from inheritance contestations. Depending on the nature of the dispute, they are handled at a family level, then LC I, II, or III, and more complex disputes are handled in the courts of law. Noteworthy is that by the time of the survey (23rd to 27th August 2021), there was a land dispute in Makandwa Central village, which involved a contestation about a piece of land within the trading centre. The dispute seemed to be about land contested between a local church and other claimants who were

constructing buildings on the same land. Because of the sensitivity of the issue at the time, the survey team avoided discussions over the issue.

## 7.2.6 Public Health

The structure of Uganda's public health system includes Village Health Teams (VHT) at the village level, Health Centre (HC) II at parish level, Health Centre III at sub-county level, Health Centre IV at county level, Hospital at district level, Regional Referral Hospital at regional level and one National Referral Hospital (Mulago National Referral Hospital in Kampala).

### 7.2.6.1 Health Facilities

Bugweri District is served by twenty-nine health facilities providing general health services. The facilities include one (1) HC IV located in Bugweri Town Council, six (6) HC IIIs, nine (9) HC IIs, seven (7) private not for profit, and nine (9) private for-profit health facilities. The district does not have a hospital. With the aforementioned facilities, 50% of the district population have access to health services within a 5 Km walking distance (draft Bugweri District Development Plan, 2015-2020).

Government health facilities exist in Igombe, Ibulanku, and Makuutu sub-counties where the proposed Project facilities will be located. The government facilities receive support from the GoU in the form of medicines and supplies, human resources for health services (staff are on the government payroll), and health infrastructure developments. There are also private clinics within the above-mentioned sub-counties that provide health services (at a fee) to those who cannot make it to the government facilities. The health facilities within the study area are mainly permanent structures with standard building materials. However, the nearest referral hospital is Iganga Hospital in Iganga District (approximately 25 km from the study area).

The major facilities within the study area that were assessed during the socio-economic baseline survey are presented below (refer Table 87 and Figure 144).

**Table 87: Major Health Facilities within the Study Area**

Health Facility	Location	Level	Date of Assessment
Makuutu HCIII	Makuutu Sub-county	III	24th August 2021
Kasozi HC II	Makuutu Sub-county	II	24th August 2021
Ibulanku HC III	Ibulanku Sub-county	III	25th August 2021
Namiganda HC II	Ibulanku Sub-county	III	25th August 2021
Igombe HC III	Igombe Sub-county	III	25th August 2021
Bulyansime HC II	Igombe Sub-county	II	27th August 2021



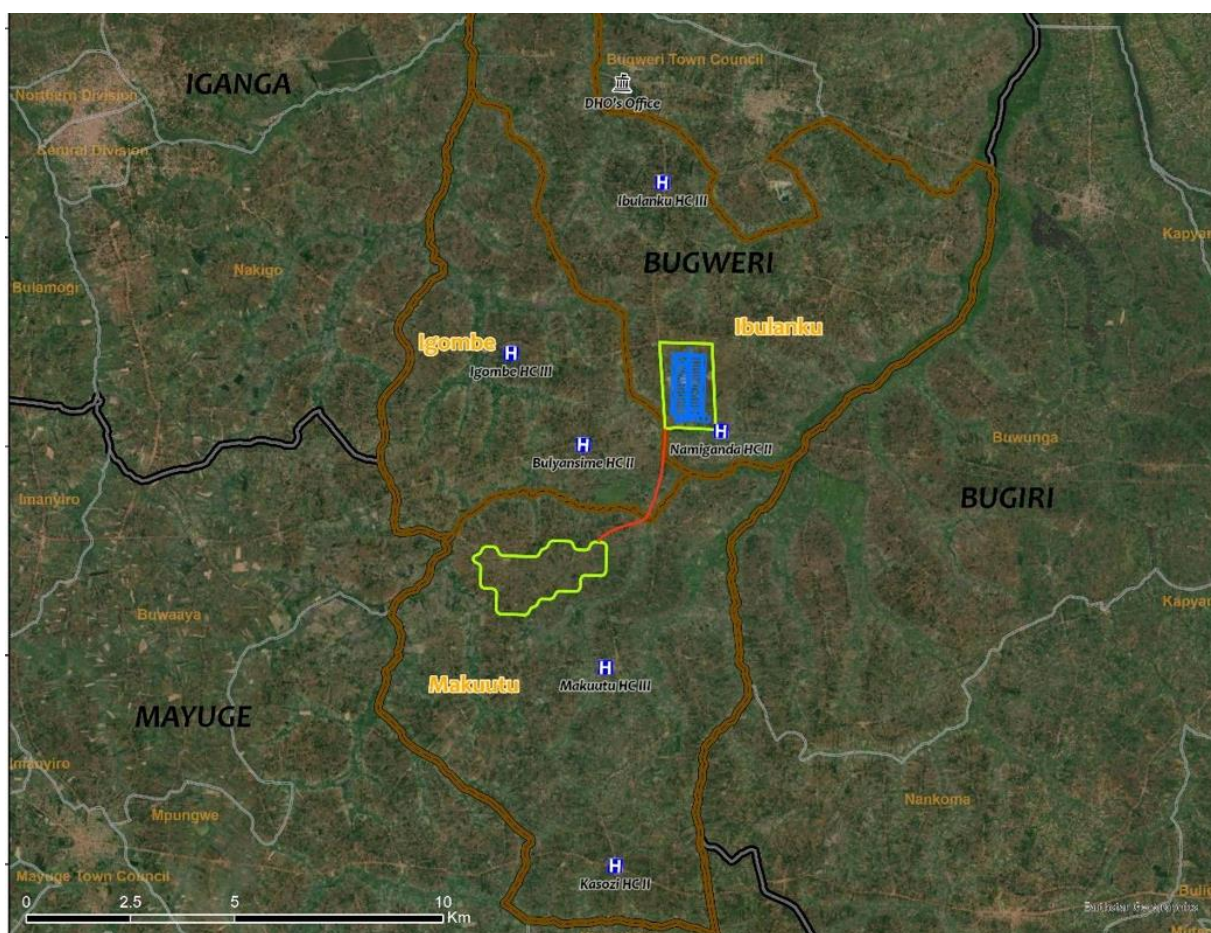


Figure 144: Major health centres within the project area

#### 7.2.6.1.1 Makuutu HC III

Makuutu HC III is a level III government-owned health facility (located in Makuutu Sub-county) that provides both outpatient, inpatient, and maternity services. The outpatient unit provides medical services to an average of 300-400 clients per week, which gradually reduces to about 100 clients per week when the stock of essential medicines is depleted. The facility is open 24 hours a day, has seven (7) inpatient beds (four (4) adult and three (3) children). The unit has space for dispensing medicine and provides outreach services to pregnant/breastfeeding women and immunisation for eligible children.

The facility offers growth monitoring services (height or weight) and has the capacity to assess severe diseases and refer cases to the district hospital. The facility has so far registered a total of 191 HIV-positive clients that are retained in care.

To guide the diagnosis and treatment of common disease conditions, the facility had the current Uganda Clinical Guidelines (2016) as well as the current Consolidated Guidelines for Prevention and Treatment of HIV in Uganda (2016). The facility also had the capacity to diagnose tuberculosis (TB) using the microscopy technique and also refer smear-negative samples for GeneXpert analysis for TB at Iganga Hospital.

A total of four (4) staff (three (3) midwives and one (1) enrolled nurse) are accommodated at the health facility premises. There was no evidence of rapid testing for COVID-19 and there were no ambulance services at the facility.

#### 7.2.6.1.2 Kasozi HC II

The facility is a level II health facility located in Nondwe village, Makuutu Sub-county along the Busia – Musita highway. It mainly offers outpatient services. The facility serves an average of 110 clients per week and mainly offers screening for malaria and HIV.

Complicated disease conditions are referred to either Makuutu HC III or Busesa HC IV in Ibaako Parish, Ibulanku Sub-county. The facility does not offer inpatient or maternity services but offers antenatal care/immunisation services. Growth monitoring and assessment of malnutrition is integrated into outpatient and antenatal care services.

Pregnant women who test HIV positive during antenatal care are referred to Makuutu HC III for treatment initiation and further assessment.

There were no ambulance services, no capacity to diagnose TB, and no capacity to test for the level of CD4 cells among clients that have newly tested positive for HIV.

Although there is no designated space for staff accommodation, there was a small room at the facility which accommodates one (1) midwife. There was no evidence of rapid testing for COVID-19.

#### 7.2.6.1.3 Ibulanku HC III

Ibulanku HC III (in Ibulanku Sub-county) is a private, not-for-profit level III health facility affiliated to the Uganda Protestant Medical Bureau (UPMB) but owned by a Ugandan businessman. The facility is open 24 hours a day and offers outpatient services to an average of 10 clients a day. It has an inpatient capacity of 25 beds, and of these, 12 beds are reserved for antenatal/maternity services, six (6) beds for the children's ward, three (3) beds for the male ward, and five (5) beds for the female ward.

There was evidence of capacity to deliver 30 pregnant women per month. The facility had the capacity to store blood at the recommended temperature as well as sufficient room for storage of medicines and adequate space for dispensing.

The facility offered both static and outreach antenatal/immunisation services (one outreach per week) and had the capacity to assess for malnutrition and diagnose HIV and malaria. The facility had a total of 193 HIV-positive clients who were active in care and receiving lifelong HIV medications.

The facility also had the capacity to diagnose TB using the microscopy technique and also offer treatment to those who are diagnosed with TB.

A total of 12 staff reside within or near the health facility premises. Additionally, the facility has a nursing school with a capacity of 400 nursing students and offers 3-year certificate nursing courses. There was no evidence of rapid testing for COVID-19 in Ibulanku HC III.

#### 7.2.6.1.4 Igombe HC III

Igombe HCIII is a government-owned health facility located in Igombe Sub-county. The facility serves an average of 45-70 clients per day through the outpatient department, which offers basic treatment services for mainly malaria, respiratory tract infections, skin infections, HIV, and TB.

The facility conducts an average of 25-30 deliveries per month and provides both static and outreach antenatal/immunisation services as well as growth monitoring to identify malnourished cases. Malnourished cases are referred to Busesa HC IV for further management.

The facility had a total of 86 HIV-positive clients who were active in care and receiving lifelong treatment. However, the facility had no capacity to offer CD4 testing services to newly identified HIV-positive clients.

Three out of the ten staff were accommodated at the health facility. There was no evidence of rapid testing for COVID-19.

#### 7.2.6.1.5 Bulyansime HC II

Bulyansime HC II is a private health facility located in Igombe Sub-county, offering mainly outpatient, antenatal, and maternity services and is equipped with two delivery beds in the maternity unit. There was evidence of delivery of about 8-10 mothers monthly.

The health facility also had the capacity to offer rapid testing for HIV and malaria but no capacity to diagnose TB and other respiratory diseases. There was no evidence of rapid testing for COVID-19.

The facility had space for dispensing but lacked ambulance services, and there was no capacity to test for the level of CD4 cells among newly identified HIV-positive clients.

Two of the six staff were accommodated at the health facility.

#### 7.2.6.1.6 Namiganda HC II

Namiganda HC II is a government-owned health facility located in Ibulanku Sub-county. The facility serves an average of 50 outpatients per week and mainly offers treatment services for malaria, fungal skin infections, respiratory tract infections, and acute diarrhoea. The facility also offers antenatal/immunisation services at both the facility and community levels. However, the facility had no capacity to offer maternity services, blood transfusion services, functional ambulance services, and CD4 cell testing.

Pregnant women who attend antenatal care services receive HIV testing services, and those who turnout HIV positive are referred to Ibulanku HC III for further management.

No staff were accommodated within the health unit premises as there was no room for accommodation.

### 7.2.6.2 Health Facility Infrastructure

#### 7.2.6.2.1 Makuutu HC III

The main source of water for this facility is a hand pump that is located within the facility premises. The facility also harvests rainwater which is temporarily stored in a 5000-litre Polyvinyl Chloride (PVC) water tank. The facility is connected to the national grid and also has a back-up solar power installation that only supports lighting and powering of refrigerators. To support the refrigeration of vaccines and other laboratory reagents, the facility has a functional refrigerator which are shared by the laboratory and the Expanded Programme of the immunisation department. A maternity block/department to support the provision of maternity services at the facility is also available.

Key laboratory equipment available at the facility included the microscope and the glucometer machine which were in good condition. The colorimeter machine which is used in assessing haemoglobin levels was not available at the time of the socio-economic baseline survey (from 23rd to 27th August 2021) because it had been shipped to the manufacturer for repair.

A facility-held landline phone was also available. The phone supports communication with HIV-positive clients who are reneging on their ARV dosage commitments as well as pregnant women that fail to return for their scheduled antenatal care visits.

#### 7.2.6.2.2 Kasozi HC II

The major source of water for this facility was a hand pump which was located 400 meters away from the facility. Water is collected from the hand pump using jerrycans and stored in jerrycans at the facility for use. The facility was connected to the national grid and also had solar power backup installed.

Vaccines were kept at recommended temperatures using one facility-held refrigerator. There was a patient waiting area but no evidence of a fixed or mobile phone to support communication and follow-up of clients.

#### 7.2.6.2.3 Ibulanku HC III

The facility harvests groundwater. The water is pumped into three 10,000 litre PVC tanks which supply the water to the entire health facility through PVC pipes. The unit is also connected to the national grid as the main source of power but also has backup solar power installed to support lighting at all user departments. To support the refrigeration of vaccines, blood products and laboratory reagents, the unit is equipped with three refrigerators. The unit also has one landline phone and one mobile phone to support communication with other health facilities and follow-up with clients. The laboratory is equipped with a Complete Blood Count (CBC) machine, a glucometer, and a microscope, and these were all in good condition.

#### 7.2.6.2.4 Igombe HC III

The main source of water for the facility was a borehole which was located within the health facility premises. The facility also harvests rainwater that is stored in a 1000 litre water tank. The facility is only powered by solar energy which is entirely used for lighting.

Vaccines are stored in a gas-powered refrigerator, and the facility has a fixed landline telephone to support communication with sister health facilities and for the follow-up of clients/patients. To support disease diagnosis, the facility has a microscope to aid microbiological investigations, a glucometer for measurement of blood glucose, and a colorimeter to analyse haemoglobin levels.

#### 7.2.6.2.5 Bulyansime HC III

The main source of water supply at this facility is a hand pump which is located about 5 km away from the facility. The facility is powered by solar energy, which is entirely used for lighting. The unit has one refrigerator which is used to store vaccines for the National Expanded Programme for Immunisation (EPI). There was no evidence of a health facility-held landline or mobile phone to support inter-facility communication and for follow-up of clients/patients. Due to the absence of microscopy services, the unit only conducts rapid testing to screen for malaria among symptomatic clients/patients.

#### 7.2.6.2.6 Namiganda HCII

This is a small HC II whose main source of water is a ground well that is about 500 meters away from the facility. The facility also harvests rainwater which is stored in a 50-litre tank. The facility is mainly powered by solar energy, which is used to support lighting. According to the health facility in-charge, there were plans to connect the facility to the national grid.

Refrigeration of vaccines is supported by a gas-powered refrigerator. There was no evidence of a health facility landline or mobile phone that supports inter-facility communication and follow-up of client appointments.

#### 7.2.6.2.7 Staffing

The expected number of technical health workers as recommended by the District Service Commission (DSC) for a HC III is 19 staff, while nine (9) health workers are required in a HC II facility. This number includes a security officer and two porters for both HC III and HC II.

**Makuutu HC III** had a total of twelve staff, translating to a staffing norm of 63%. The Financial Year (FY) 2020/2021 staff list included two clinical officers, one registered nurse, one enrolled nurse, and three midwives. The facility also had one laboratory technician, one medical records assistant but did not have a dispenser. The facility also had two (2) cleaners/porters and one (1) security officer.

At **Kasozi HC II**, of the expected staffing norm of nine (9) health workers as stipulated by the DSC, there was a total of six (6) health workers translating to a staffing norm of 67%. Of the expected five technical staff, the facility had two staff, and these were registered nurses.

**Ibulanku HC III** had a total of 29 staff, translating to a staffing norm of 153%. In addition to the minimum requirements for a HC III, Ibulanku HC III also had a medical officer, three (3) dispensers, three (3) laboratory assistants, four (4) porters, one (1) accountant, and one (1) medical records assistant.

**Igombe HC III** had a total of 11 staff, translating to a staffing norm of 58%. At the time of the socio-economic baseline survey (from 23rd to 27th August 2021X), the health centre had one (1) clinical officer, two (2) enrolled nurses and two (2) midwives. The facility also had one (1) laboratory technician, one (1) health assistant, one (1) medical records assistant, two (2) cleaners and one (1) security officer.

**Bulyansime HC II.** The facility had a total of five (5) staff (three (3) technical staff and two (2) non-technical staff), translating to a staffing norm of 56%.

**Namiganda HC II** had a total of six (6) staff (four (4) technical staff and two (2) non-technical staff), translating to a staffing norm of 67% (refer Table 88).



Table 88: Staffing of Identified Health Facilities within the Study Area

Health Facility	Responsibility	Number recommended by the District Service Commission	Actual number Deployed
Makuutu HC III	Clinical officer	2	2
	Registered nurse/midwife	2	1
	Enrolled nurse	2	1
	Enrolled midwife	4	3
	Health assistant	1	0
	Laboratory technician	2	1
	Dispenser	1	0
	Cleaner/porter	2	2
	Security personnel/Askari	2	1
	Medical records assistant	1	1
	Other (specify): None	0	0
Kasozi HC II	Clinical officer	0	1
	Registered nurse/midwife	0	0
	Enrolled nurse	2	2
	Enrolled midwife	2	0
	Health assistant	0	0
	Laboratory technician	0	0
	Dispenser	0	0
	Cleaner/porter	2	0
	Security personnel/askari	2	1
	Medical records assistant	1	1
	Other (specify); Nursing assistant	0	1
Ibulanku HC III	Medical officer	0	1
	Clinical officer	2	1
	Registered nurse/midwife	2	2
	Enrolled nurse	2	5
	Enrolled midwife	4	6
	Health assistant	1	0
	Laboratory technician	2	3
	Dispenser	1	3
	Cleaner/porter	2	4
	Security personnel/askari	2	2
	Medical records assistant	1	1
	Other (specify); Nursing assistant	0	1
Igombe HC III	Clinical officer	2	1
	Registered nurse/midwife	2	0
	Enrolled nurse	2	2
	Enrolled midwife	4	2
	Health assistant	1	1
	Lab technician/assistant	2	1
	Dispenser	1	0
	Cleaner/porter	2	2
	Security personnel/askari	2	1
	Medical records assistant	1	1
	(Other specify); Nursing assistant	0	0
	Clinical officer	0	0

Health Facility	Responsibility	Number recommended by the District Service Commission	Actual number Deployed
Bulyansime HC II	Registered nurse/midwife	1	0
	Enrolled nurse	1	0
	Enrolled midwife	2	1
	Health assistant	1	0
	Laboratory technician/assistant	0	0
	Dispenser	1	0
	Cleaner/porter	1	1
	Security personnel/askari	1	1
	Medical records assistant	1	0
	(Other specify); Nursing assistant	0	2
Namiganda HC II	Clinical officer	0	0
	Registered nurse/midwife	1	0
	Enrolled nurse	1	1
	Enrolled midwife	2	1
	Health assistant	1	0
	Laboratory technician/assistant	0	0
	Dispenser	1	0
	Cleaner/porter	1	1
	Security personnel/askari	1	1
	Medical records assistant	1	0
	(Other specify); Nursing assistant	0	2

### 7.2.6.3 Community Health

Indicators of community health within the health facilities are presented below (refer Table 89).

#### 7.2.6.3.1 Referrals

The health facilities identified within the proposed Project area referred unmanageable sick cases to other health facilities, as indicated below (refer Table 89).

Table 89: Referral Hospitals within the proposed Project Area of Influence

Health Facility	Main Referral Facility	Time to Referral Health Facility	Main Means of Transport	Cost of Transportation (UGX)
Namiganda HC II	Iganga Hospital	1 hour	Taxi	10,000
Kasozi HC II	Iganga Hospital/Busesa HC IV	2 hours	Motorcycle	12,000
Ibulanku HC III	Busesa HC IV	10 minutes	Motorcycle	5,000
Bulyansime HC II	Busesa HC IV	40 minutes	Motorcycle	10,000
Igombe HC III	Busesa HC IV	45 minutes	Motorcycle	10,000
Makuutu HC III	Iganga Hospital/Busesa HC IV	2 hours	Motorcycle	20,000

### 7.2.6.3.2 Utilisation of Health Facilities

Among the surveyed households in Makuutu Sub-county, the most commonly utilised health facility for common illnesses is Makuutu HC III (refer Table 90). Makuutu HC III is still the most commonly utilised health facility for serious diseases, accidents, and injuries.

Table 90: Profile of Health Facilities used by the Surveyed Households in Makuutu Sub-county

Health Care Facility	Percent of Surveyed Households by Health Problem Type				
	Common Diseases	Serious Diseases	Accidents and Injuries	Maternal Health Care	Child Health Care
Makuutu HC III	41.13%	50.00%	29.84%	6.25%	57.86%
Makandwa Central Clinic	14.72%	6.45%	7.06%	0.20%	2.82%
Clinic in Makandwa	5.04%	0.40%	1.81%	0.00%	2.82%
Makandwa Drug shop	4.84%	1.41%	0.81%	0.00%	0.20%
Zulaika's Clinic	4.23%	3.02%	3.83%	0.81%	2.22%
Drug Shop-Makandwa	4.03%	1.21%	0.81%	0.00%	0.20%
Buwongo Clinic	2.42%	2.62%	1.01%	0.00%	0.00%
Private Clinic	2.22%	0.00%	0.20%	0.00%	0.20%
Betty HC	0.81%	0.81%	0.20%	0.20%	0.00%
Busesa HC IV	0.81%	1.01%	2.22%	1.01%	0.00%
Nakavule HC	0.81%	0.40%	5.85%	0.81%	0.40%
Faisal Health Care	0.60%	0.40%	0.60%	0.40%	0.00%
Busana Medical Clinic	0.40%	0.40%	0.00%	0.00%	0.00%
Buwongo Drug Shop	0.40%	0.20%	0.00%	0.00%	0.20%
Iganga Main Hospital	0.40%	8.47%	15.93%	1.61%	0.81%
Makandwa Private Clinic	0.40%	0.00%	0.00%	0.00%	0.00%
Makuutu Clinic	0.40%	0.00%	0.00%	0.00%	0.00%
Mawololo Clinic	0.40%	0.40%	0.00%	0.00%	0.20%
Mulago Clinic	0.40%	0.40%	0.40%	0.40%	0.00%
Bamudaziza HC III	0.20%	0.20%	0.20%	0.20%	0.00%
Bulyansime HC III	0.20%	0.00%	0.20%	0.60%	0.60%
Bunokano Clinic	0.20%	0.20%	0.00%	0.00%	0.00%
Busesa HC III	0.20%	0.40%	1.81%	2.22%	2.02%
Clinic-Igombe	0.20%	0.00%	0.00%	0.00%	0.00%
Emma HC	0.20%	0.20%	0.00%	0.00%	0.00%
Ibulanku Clinic	0.20%	1.61%	0.40%	0.00%	0.00%
Kawempe Clinic	0.20%	0.00%	0.00%	0.00%	0.00%
Kibada Clinic	0.20%	0.00%	0.00%	0.00%	0.00%
Nakagolo's Clinic	0.20%	0.00%	0.00%	0.20%	0.20%
Noho	0.20%	0.00%	0.00%	0.00%	0.00%
Private Drug Shop- Buwongo	0.20%	0.00%	0.00%	0.00%	0.00%
Tom Clinic	0.20%	0.00%	0.00%	0.00%	0.00%
Benson Clinic	0.00%	0.20%	0.00%	0.00%	0.00%
Bugembe	0.00%	0.00%	0.00%	0.00%	0.20%
Bulowoza Clinic	0.00%	0.20%	0.00%	0.00%	0.00%
Buluba HC	0.00%	0.20%	0.00%	0.00%	0.00%
Buwaya HC III	0.00%	0.00%	0.00%	0.20%	0.00%
George Clinic	0.00%	0.20%	0.00%	0.00%	0.00%

Health Care Facility	Percent of Surveyed Households by Health Problem Type				
	Common Diseases	Serious Diseases	Accidents and Injuries	Maternal Health Care	Child Health Care
Iganga HC III	0.00%	0.81%	0.00%	0.00%	0.00%
Iganga Islamic Clinic	0.00%	0.00%	0.20%	0.00%	0.00%
Igombe HC III	0.00%	0.00%	0.20%	0.00%	0.00%
Jane's Clinic	0.00%	0.20%	0.00%	0.00%	0.00%
Jinja Referral Hospital	0.00%	0.00%	0.40%	0.00%	0.00%
Jinja Whisper Hospital	0.00%	0.20%	0.00%	0.00%	0.00%
Luiyala Clinic	0.00%	0.00%	0.20%	0.00%	0.00%
Mayuge Clinic	0.00%	0.20%	0.00%	0.00%	0.00%
Emergency Hospital Iganga	0.00%	0.20%	0.00%	0.00%	0.00%
Mirror Clinic	0.00%	0.20%	0.00%	0.00%	0.00%
Musana Medical Centre	0.00%	0.20%	0.20%	0.00%	0.40%
Nakivumbi Clinic	0.00%	0.00%	0.20%	0.00%	0.20%
Namakunu	0.00%	0.20%	0.00%	0.00%	0.00%

#### 7.2.6.4 Diseases

In the six months preceding the socio-economic baseline household survey (23rd to 27th August 2021), malaria was the leading cause of morbidity among the surveyed households in the study area, with 16.5% of the surveyed population reported having suffered from malaria (refer Table 91) followed by 2.98% who reported to have suffered from respiratory tract infections, including flu and the common cold.

The most common diseases in all age groups in the health centres within the study area were malaria, upper respiratory tract infections, gastritis and non-communicable diseases like hypertension, typhoid fever, fungal skin infections, sexually transmitted infections like syphilis, gonorrhoea, urinary tract infections and diabetes.

Table 91: Persons Affected by Common Diseases Six Months Preceding the Socio-economic Baseline Household Survey

Disease /Illness	No. Affected	Percentage of Total Population (3,355 people)
Malaria	554	16.51%
Respiratory Infections/Flu /Cold	100	2.98%
Stomach upsets/vomiting	37	1.10%
Skin Infections	34	1.01%
Back/joints/limb pains	33	0.98%
High Blood Pressure	30	0.89%
Diarrhoea	27	0.80%
Typhoid	20	0.60%
Accidents/injuries	18	0.54%
Eye infection	18	0.54%
Syphilis	17	0.51%
Tuberculosis (TB)	16	0.48%
Diabetes	16	0.48%
Child birth difficulties	12	0.36%
Intestinal Worms	9	0.27%
Yellow Fever	6	0.18%
Uclers	5	0.15%



Disease /Illness	No. Affected	Percentage of Total Population (3,355 people)
Mental illness	4	0.12%
Bilharzia	2	0.06%
Asthma	2	0.06%
Brucella	1	0.03%
Pneumonia	1	0.03%
Toothache	1	0.03%
Tetanus	1	0.03%
Kidney disease	1	0.03%
Measles	1	0.03%
Hepatitis B	0	0.00%
COVID-19	0	0.00%

In addition to the results above (refer Table 92) the main health problems that women faced as reported during the women FGD include ulcers, cough, candida, pressure, typhoid, diabetes, and tubal infections, and the main health problems that children face included measles, yellow fever, and hernia. Diarrhoea was attributed to poor hygiene and poor hand and food washing habits within homes.

Table 92: Community Health Indicators depicted from Data from the Health Facilities within the Study Area

Indicator	Makuutu HC III	Ibulanku HC III	Kasozi HC II	Igombe HC III	Bulyansime HC II	Namiganda HC II
Estimated number of people that have access to this facility	33,030	24,558	11,050	The facility has a sub-county catchment population of 22,310 people, which is shared with two other lower-level private health facilities (Bulyansime and Bubenge HCIIIs).	1,772, but the total catchment population for the parish is 6,603 people.	The In-charge Officer at the facility did not have information on the total population in the catchment area.
Main challenges faced by the community	The major health challenges, according to the In-charge Officer at the facility, were: Erratic supply of essential medicines; Limited immunisation/antenatal outreaches; and Lack of community awareness of the health services offered by the facility.	High cost of health care; Poor health-seeking behaviour considering that a significant number of pregnant women still seek health services from Traditional Birth Attendants (TBAs); High prevalence of malaria; Poverty; Poor latrine and bathroom coverage; and No local waste disposal pits.	Erratic supply of essential medicines; The facility is located along the Busia- Musita highway, which increasingly registers a significant number of road traffic accident cases; Poor access to water as the main source is hand pumps; and Poor latrine coverage of 40%, according to the In-	Reported poor latrine coverage; Poor access to clean and safe water as much of the supply is from unprotected wells and hand pumps; There was observed community resistance to immunisation for both adults and children based on the belief that vaccines cripple children; High rates of teenage pregnancies (the main	Long distances to water sources; and Poor food security as the majority of families in the parish have one meal a day.	Long distance to the health facility; Lack of transport for clients from distant villages; Malnutrition due to food insecurity; and Lack of access to clean and safe water.

Indicator	Makuutu HC III	Ibulanku HC III	Kasozi HC II	Igombe HC III	Bulyansime HC II	Namiganda HC II
			charge Officer of the facility.	perpetrators were sugarcane plantation workers); and High cases of gender-based violence (GBV).		
The five most common diseases in children under five (5) years	Malaria, Upper respiratory tract infections, fungal skin infections, malnutrition and acute diarrhoea.	Malaria, pneumonia, diarrhoea and sickle cell disease – based on monthly District Health Information data as provided by the in-charge.	Malaria, acute diarrhoea, Upper respiratory tract infections, pneumonia and flu.	Malaria, Pneumonia, and malnutrition	Malaria, Upper respiratory tract infections and acute diarrhoea.	Malaria, upper respiratory tract infections, acute diarrhoea and trachoma.
The five most common diseases in all age groups	Malaria, Upper respiratory tract infections, gastritis and non-communicable diseases like hypertension and diabetes.	Malaria, gastritis, hypertension, diabetes and typhoid fever.	Malaria, Upper respiratory tract infections, diarrhoea and fungal skin infections.	Malaria, sexually transmitted infections like gonorrhoea, urinary tract infections, diabetes and hypertension.	Malaria, hypertension, gastritis and urinary tract infections.	Malaria, gastritis, sexually transmitted infections – mainly syphilis, upper respiratory tract infections and fungal skin infections.
Treatment plans that are in place to support treatment of common diseases	The facility had a copy of the 2016 Uganda Clinical Guidelines, which is used to guide clinicians on criteria for diagnosis and management of common disease	The following guidelines were available onsite: IMCI guidelines, the 2016 Uganda Clinical Guidelines and the Uganda	The facility had the 2016 Uganda Clinical Guidelines and the IMCI Guidelines but did not have the current national consolidated	The facility had the 2010 Uganda Clinical Guidelines to support diagnosis and treatment of common illnesses, the national consolidated	The facility had both the 2016 Uganda clinical guidelines and national guidelines for integrated disease	The facility had the 2016 Uganda Clinical guidelines, the national guidelines for management of COVID-19 and the

Indicator	Makuutu HC III	Ibulanku HC III	Kasozi HC II	Igombe HC III	Bulyansime HC II	Namiganda HC II
	conditions. The facility also had the national Integrated Management of Childhood Illness (IMCI) Guidelines as well as the national consolidated Guidelines on Treatment of HIV.	Family Planning guidelines.	guidelines on HIV treatment.	guidelines on treatment of HIV as well as the IMCI guidelines.	surveillance and response. There were no guidelines for management of COVID-19.	current IMCI guidelines.
Measures in place to deal with disease outbreaks	The measures in place included a focal person for surveillance, case definitions for common outbreak prone disease conditions and guidelines on what to do when an outbreak is detected.	The facility had a triage room, had an isolation room for suspected COVID-19 patients, had the capacity to offer rapid testing for COVID-19 and offer oxygen therapy to those who needed it. The facility also generates and submits a monthly surveillance report to the district biostatistician.	A weekly surveillance report is submitted to the district biostatistician which includes notifiable diseases like cholera, typhoid and polio. The In-charge Officer at the facility also doubles as the facility surveillance focal person and medical records assistant.	The facility health assistant, who also doubles as the unit surveillance focal person, collects and submits weekly surveillance data through the existing m-trak system.	The facility had a surveillance focal person who submitted a weekly surveillance report to the district biostatistician.	There was no evidence of a functional surveillance system as there were no weekly surveillance reports.
Status of violence against women	There was no evidence of screening for gender-based violence, but according to police reports and the number	The facility had assessment tools for GBV and a register to document victims of GBV and services	Reportedly high numbers of GBV against women considering the increasing number	There was no GBV register onsite, but according to the In-charge Officer at the facility, there was an	No evidence of documentation of gender-based violence cases.	Reportedly very high, especially physical violence whose root cause



Indicator	Makuutu HC III	Ibulanku HC III	Kasozi HC II	Igombe HC III	Bulyansime HC II	Namiganda HC II
	of GBV assessments from Police, GBV cases in which women are the victims were on the increase.	received. However, this was not actively being updated. It was difficult to assess whether violence against women was increasing or decreasing.	of police forms received at the facility to support assessment of rape and other forms of violence. However, there was no register for GBV.	increase in the number of GBV cases.		is alcohol abuse and poverty.
Community support for local health initiatives	There were no existing health initiatives at the Sub-county level. The facility reportedly receives support from a community-based organisation based in Iganga, which supports follow up of lost HIV positive clients.	None in the Sub-county.	None.	None.	None.	None.
If you had 1-5 wishes to improve health care in the communities that you serve, what would they be?	Better access to, and increase in the number of essential medicines; Increase resource allocation to Public Health, non-wage support to community immunisation/antenatal outreaches; and Construct HCIs at parish level targeting parishes without HCIs.	Improve sanitation through community sensitisation; Improve services for vulnerable children and the elderly as these are most at risk for falling sick; Complete phase out of traditional birth attendants; and	Facilitate village health teams to conduct community health education and health promotion; Upgrade the unit to a HC III to increase access to maternity and inpatient services;	Improve staff housing by building staff houses; Provide an ambulance to support the referral of very sick patients; Expand space for storage of essential medicines; Expand power back up system to support	There were ongoing earthworks to expand outpatient and maternity services through the development grant received by the local government; Improved access to water;	Build staff houses as the facility had none and the majority of health workers lived far away from the facility; Community sensitisation on health promotion and early seeking

Indicator	Makuutu HC III	Ibulanku HC III	Kasozi HC II	Igombe HC III	Bulyansime HC II	Namiganda HC II
		Government support to the health unit wage bill to reduce on costs of hiring health workers.	Increase resource allocation to essential medicines from UGX 1.4 million per annum to say UGX 10 million per annum; and Recruit and fill in the human resource gaps as per wage provision.	laboratory equipment; and Recruit additional human resources to support the HIV chronic care clinic.	Connection of the health facility to the national grid; and Support procurement of delivery and inpatient beds.	of health services when sick; and Strengthen identification, linkage and referral of GBV cases.

#### 7.2.6.4.1 Malaria

The survey respondents were highly aware of the ways through which malaria was transmitted. The majority (82.46%) were aware that the disease is transmitted through mosquito bites (refer Table 93). However, there were still some misconceptions on the causes of malaria, including; being infected by another sick person (indicating contagiousness), working in the sun, being in the rain and dirty surroundings. There were also some respondents (4.03%) who stated that they did not know the causes of malaria.

Table 93: Respondent Perception on the Causes of Malaria

Causes of Malaria	% Households
Mosquito bites	82.46%
From another person who has malaria	8.06%
Being in the rain	7.46%
Dirty surroundings	5.85%
Insect bites (any insect)	5.65%
Getting Cold	2.62%
Drinking dirty water	1.41%
Working in the sun	1.01%
From eating too much junk food	0.40%
Don't know	4.03%

Since the majority of the respondents were cognisant that malaria was spread/transmitted through mosquito bites, nearly all of them (95.36%) said that their household members had mosquito nets. However, of the households that said they had mosquito nets, 6.55% stated that not all household members slept under the nets. Various reasons were attributed, as indicated below (refer Table 94). Some of the household members did not sleep under a mosquito net because their mosquito nets were perceived to be too old (61.9%), while others had never received the mosquito nets (23.81%), presumably from the GoU. Some of the family members (4.76%) were wary of inhaling chemicals from the net.

Table 94: Why some Household Members do not sleep under Mosquito Nets

Response	Percent of Households
Mosquito nets have become old	61.90%
Fear inhaling the chemical in the mosquito nets	4.76%
Not enough for the family members	4.76%
Never received	23.81%
Nets were stolen	4.76%

#### 7.2.6.4.2 HIV/AIDs

HIV was reported by women in Mawololo to be an issue in the community and was mainly attributed to irresponsible and unprotected sex by both women and men. Commercial sex workers, who are usually in the spotlight for spreading HIV, were reported to undertake the activity from the urban centres such as Nondwe, Bugiri and Idudi.

The majority (97.38%) of the respondents of the surveyed households had heard about HIV/AIDS, and 86.9% knew of a local place where to receive HIV testing services, including counselling and lifelong treatment (refer Table 95). Knowledge of the role of condom use in HIV prevention was also high (88.91

%). However, 4.03 % said condoms or abstinence were not an effective method for HIV prevention, and another 0.2% were not sure of the role of condoms and abstinence in the prevention of HIV.

Table 95: Knowledge of HIV/AIDS amongst Respondents of the Surveyed Households

Knowledge Parameter	% Households				
	Yes	No	No Response	Don't Know	Not Sure
Have you ever heard of the disease called HIV/AIDS?	97.38%	0.81%	1.81%	0.00%	0.00%
Does the use of a condom/abstinence help prevent HIV/AIDS?	88.91%	4.03%	2.62%	4.23%	0.20%
Do you know of a local place where a person can be tested for HIV/AIDS?	86.90%	10.69%	0.60%	1.81%	0.00%

#### 7.2.6.4.3 COVID-19

Nearly all the surveyed households (97.58%) were aware of the COVID-19 pandemic (refer Table 96) while a small proportion (1.21%) reported lack of awareness of the disease.

Table 96: Awareness of the COVID-19 Pandemic by Respondents of the Households Surveyed

Response	Proportion of Households (%)
Yes	97.58%
No	1.21%
Don't know	0.4%
No response	0.81

In addition to being aware of the COVID-19 pandemic, 77.62% of the surveyed households responded that inhaling droplets from the mouth/nose of another person who has COVID-19 was one of the ways through which the disease is spread from one person to another (refer Table 97).

Table 97: Knowledge of the Spread of COVID-19 by Respondents from the Households Surveyed

Ways through which COVID-19 is spread	Percentage Households
Inhaling droplets from the mouth/nose of another person who has COVID-19	77.62%
Getting cold	5.85%
Working in dusty places	4.84%
Crowding	1.61%
Getting close to someone infected with COVID-19	0.81%
Insect bites (any insect)	0.60%
Drinking dirty water	0.40%
Not wearing a mask	0.40%
Through air	0.40%
Sharing money	0.20%
Moving from one place to another	0.20%
Don't know	12.70%



The majority of the surveyed respondents were cognisant of the different ways through which the spread could be controlled. The majority (85.69% and 79.44%, respectively) reported that wearing a face mask when interacting with other people and washing hands with soap and water frequently were effective ways to prevent the spread of COVID-19 from one person to another (refer Table 98).

Table 98: Awareness of the Methods to Prevent the Spread of COVID-19 by the Respondents of the Household Survey

Prevention of COVID-19	Households	Proportion of Households
Wear a face mask when you interact with other people	425	85.69%
Wash hands with soap and water frequently	394	79.44%
Sanitise hands frequently	276	55.65%
Practice social distancing	268	54.03%
Avoid being in crowded places	235	47.38%
Wear warm clothes	13	2.62%
Drink a lot of water	10	2.02%
Avoid insect bites	5	1.01%
Don't touch the soft parts of the body like the nose	1	0.20%
Don't Know	24	4.84%

#### 7.2.6.4.4 Actions Taken when Sick

The surveyed households took multiple actions (more than one) when a given member of the family reported being sick. Up to 94.96% of the surveyed households preferred to take sick persons to a medical care facility for care and treatment, and 43.55% of the households reported undertaking self-medication by buying drugs at the nearest drug store/pharmacy (refer Table 99). Herbal remedies were opted for by 14.31% of the households, while 4.84% preferred going to traditional healers and none of the surveyed households turned to religious facilities/prayer for healing.

Table 99: Main Action undertaken by the Households Surveyed when a Person is Sick

Action Taken when a HH member is Sick	Household	% Household
Take the person to a medical care facility	471	94.96%
Purchase treatment from drugs store/chemist/pharmacy	216	43.55%
Provide herbal/home remedy	71	14.31%
Give the person plenty of food/water	51	10.28%
Seek treatment from a traditional healer	24	4.84%
Take the sick person to church/priest for prayer	6	1.21%
No action	2	0.40%

If a household did not take a sick person to a medical facility, the reasons provided below (refer Table 100) were raised. The majority (32%) claimed that the health facility was too far and the household lacked transport to get to the facility. This is consistent with the previously presented 38.1% of generated income of surveyed households being used on transport and 84.27% of generated income being used to cover medical expenses.

Table 100: Reasons by the Respondents of the Households Surveyed for not taking the sick person to a Health Facility

Reason	Households	% Households
Health facility is too far and no transport	32	32.00%
Too expensive	21	21.00%
No facility is available	15	15.00%
No medicine	12	12.00%
Not enough health workers and medicine	8	8.00%
No medical personnel	6	6.00%
Treatment unnecessary	6	6.00%
Other (Specify):	0	0

During the FGD with women in Mawololo village, traditional remedies were reported to be popular for treating malaria, diabetes, hypertension, and ulcers.

#### 7.2.6.5 Food Security

Hunger is described as experiencing scarcity of food at least once a month. The women FGD in Mawololo village mentioned that many households produced enough food, except during years with extreme climate conditions. The food insecure months are February - May when the previous harvests are getting finished. During these months, men travel to other districts and buy cassava flour or fresh cassava as well as maize grain which are usually the hunger savers.

Respondents were asked if there were times in the past year (2020) when their household members went hungry or did not have enough food, which months those were, and what the cause of the hunger was. Less than half (42.14%) of the surveyed households reported experiencing hunger (refer Table 101).

Table 101: Profile of Households that Experienced Hunger in 2020

Hunger Status	Households	% Households
No hunger	285	57.46%
Went hungry	209	42.14%
Not specified	2	0.40%
<b>Grand Total</b>	<b>494</b>	<b>100.0</b>

There is no month in the year 2020 when no household experienced hunger (refer Table 102). However, most of the households claimed to have experienced hunger in the months of March (30.62%), April 2020 (60.77%), May (42.11%), and June (30.62%). The months when the least number of households experienced hunger were November and December 2020.

Table 102: Months within which the Surveyed Households Experienced Hunger in 2020

Month (2020)	HH that experienced Hunger	% HH
January	14	6.70%
February	18	8.61%
March	64	30.62%
April	127	60.77%
May	88	42.11%
June	64	30.62%
July	38	18.18%
August	26	12.44%
September	18	8.61%
October	13	6.22%

Month (2020)	HH that experienced Hunger	% HH
November	10	4.78%
December	7	3.35%

The majority (60.77%) of the households that experienced hunger mainly attributed it to natural calamities (drought, diseases, pests and too much rain) followed by the inability to produce enough food (42.58%) (refer Table 103). Other causes of hunger included land and labour shortage as well as lack of money to buy food.

Table 103: Causes of Hunger in 2020 among the Surveyed Households

Reason for Hunger	Households	% Households
Natural calamities (bushfire, drought, disease and pests, much rain)	127	60.77%
Could not produce enough food	89	42.58%
No money to buy food	14	6.70%
Not enough land	5	2.39%
Not enough labour	3	1.44%

However, interviews with some of the local chairpersons of the affected villages indicated that food insecurity had increased due to climate change deaths in families (which could depict a reduction in critical labour) and land shortage. In addition, since 2017, land has been diverted to sugarcane growing, and less food crops are grown.

#### 7.2.6.5.1 Nutrition

The survey results indicated that most households consumed fruits and vegetables daily (72.18%) (refer Table 104). Over a quarter of the households surveyed consumed fish once a week (27.22%), and another quarter consumed fish once a month (24.19%). Almost a third of the households said they consumed meat once a week (31.05%) and others once a month (29.23%). Only 0.60% of the surveyed households said they never consumed fruits and vegetables, while households that never consumed meat and fish were 2.22% and 7.06%, respectively.

Table 104: Frequency of Consumption of Meat, Fish, Fruits and Vegetables among the Surveyed Households

Frequency	Proportion of Households		
	Meat (Chicken, Beef, Pork)	Fish	Fruits and Vegetables
Never	2.22%	7.06%	0.60%
Daily	3.02%	8.27%	72.18%
Once a week	31.05%	27.22%	6.05%
Once a month	29.23%	24.19%	1.21%
More than once a week	16.94%	16.73%	14.52%
Uncertain	16.13%	16.13%	4.84%

## 7.2.7 Public Services

### 7.2.7.1 Energy Resources

According to UBOS 2014, the majority of households in Uganda use wood fuel as the main source for cooking. Overall, 71% of the households used firewood for cooking. This percentage stands at 85% in rural areas and 31% in urban areas. This shows a decline in the usage of firewood from 82% registered in 2002.

There is access to grid power in Businda B, Namiganda, Buniantole and Kabugweri villages, potentially affected by the proposed Processing Plant. However, the four villages (Mawololo, Buyayu, Makandwa

Central and Nakavule) potentially affected by the proposed Central Mining Pit did not have access to grid power at the time of the socio-economic survey (23rd to 27th August 2021X).

The closest 33Kv supply is a terminal point (565832.01m E, 59252.62m N) in Businda B village, Igombe Sub-county, which is approximately 2km from Mawololo Trading Centre (Makuutu Sub-county) as well as the terminal point in Makuutu Sub-county from Busima at the Makuutu SEED School (566318.41m E 56198.07m N), which is 5 km away from the proposed Central Mining Pit project area.

There was very limited use of generators for electricity generation in the proposed Central Mining Pit Area and consequently few electrical appliances or machinery. However, Buggade Savings and Credit Cooperative Organisation (SACCO) in Businda B village, Igombe Sub-county and two entertainment halls (Igombe and Kasim) in Kabugweri village, Ibulanku Sub-county (where the proposed Processing Plant is to be located) have generators which run in the event of a power outage.

There is a fuel station in Nakivumbi Trading Centre in Kabugweri village, Ibulanku Sub-county; this serves the motorcyclists and the few cars that ply the route via Nakivumbi Trading Centre and households in need of kerosene. The other villages in the study area, especially Mawololo, Makandwa Central, Buyayu and Nakavule in Makuutu Sub-county) peddle fuel in bottles especially for the motorcyclists (boda boda), which are the main mode of motorised transport in these communities (refer Figure 145).



Figure 145: Fuel Station in Nakivumbi Trading Centre and bottled petrol in Nakavule Village.

The communities in the study area generally rely on kerosene as well as small solar kits for domestic lighting. Wood fuel is the main source of energy for cooking.

However, there are GoU programme facilities that have been put up in Makuutu Sub-county that shall require the presence of grid power in order to function, e.g., the Agricultural Cluster Development Project facility located in Makandwa Central village, which is a milling and storage facility – it is an indicator that Makuutu Sub-county may be connected to the grid sooner than later.

Among the surveyed households, the main sources of energy for cooking/heating were collected wood and charcoal, used by 92.94% and 26.41% of the surveyed households, respectively. The main sources of energy for lighting were paraffin/kerosene (35.28%) and solar systems (15.52%).



#### *7.2.7.2 Communication*

The telecommunication networks servicing the proposed Project area (processing plant and central mining pit) include MTN and Airtel. There are three evident mobile phone communication masts, one within Makandwa Central village (Airtel) one in Nakivumbi Trading Centre (MTN) and another other in Nondwe village (Makuutu Sub-county) (MTN). Public address systems were observed in Nakivumbi Trading Centre (TC) as well as at several mosques.

Most FM stations, especially from the neighbouring districts of Jinja, Mbale, Iganga, and Bugiri were received in the study area. Radios most listened to included NBS radio, BABA FM, Busoga FM, and RFM. There is digital television coverage in the study area (refer Figure 146).



Figure 146: Satellite Television in Businda B village, Igombe Sub-county

#### *7.2.7.3 Transport*

Bugweri District has a total road length of 100 km, of which 65 km are feeder roads (draft Bugweri District Development Plan for the period 2021- 2015). The Makuutu Rare Earth Project sites (proposed Central Mining Pit and Processing Plant) in Bugweri District can be accessed via two major highways, i.e., Jinja -Tororo Highway (A109) at Busesa Trading Centre and the newly constructed Musiita-Busia Highway at Busiima Trading Centre.

The two towns (Busesa, off the A109 Jinja -Tororo Highway and Busiima, off the Musiita- Busia Highway) are connected by a 19 km 24ft wide murram road (Refer Figure 147), which also goes through the proposed Project (Central Mining Pit and Processing Plant) sites. Another 15 km 24ft murram road connects to the proposed Project area (Central Mining Pit and Processing Plant) from Iganga Town to Buniantole village in Ibulanku Sub-county and rejoins the Busesa-Busiima Road.



Figure 147: The Road Network Connecting the proposed Project Area

There is a network of murram roads that interlink the villages in which the proposed Central Mining Pit will be located (refer Figure 148).

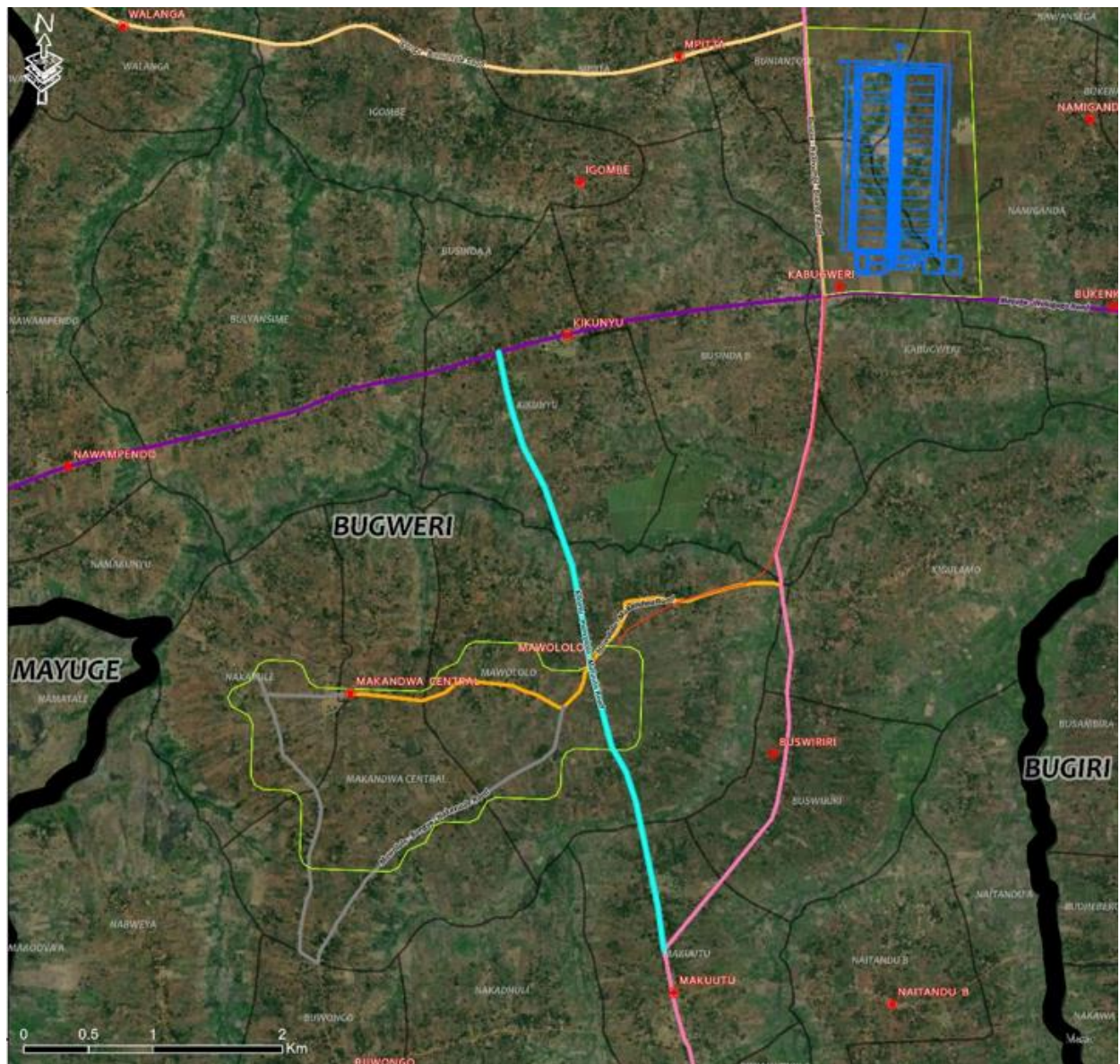


Figure 148: Access Roads in the proposed Central Mining Pit Villages



Access to the proposed Processing Plant site from the proposed Central Mining Pit site from Mawololo Trading Centre is via a 12ft wide unlevelled murram road with a poor crossing at River Kitumbezi before joining the Makuutu-Nakivumbi Road.

Daily traffic flow in the Mining Pit area (in Mawololo village, at the junction to Makandwa Central village) was light, comprising mainly of motorcycles, bicycles and light-duty cars (refer Figure 149).

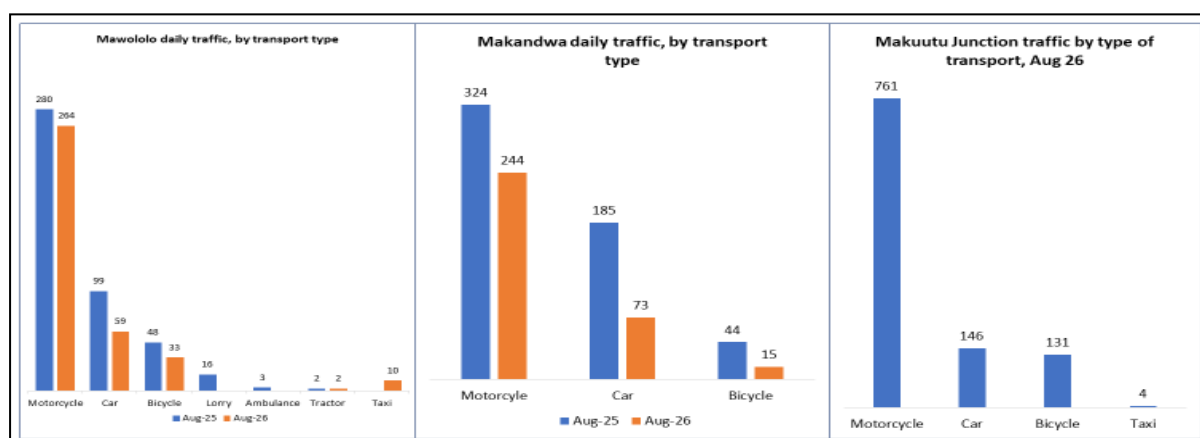


Figure 149: Daily Traffic Flow by Transport Type at the Three Survey Points within the proposed Central Mining Pit Study Area

#### 7.2.7.4 Water for Domestic Use

Water is normally classified as safe if it is drawn from a tap (piped), boreholes or protected wells and or springs. Access to safe water and sanitation are very important in maintaining hygiene within the household. Information on access to water sources has been classified into improved and unimproved water sources. The improved water sources include piped water and water drawn from protected springs as well as from deep boreholes. Open water sources, like unprotected wells and surface water (rivers, streams, ponds and lakes) are more likely to carry disease-causing agents and are categorised as unimproved sources.

Overall, according to UBOS (2017), the highest proportion (34%) of households in Uganda used borehole water for drinking while 29% used water from unimproved water sources. A relatively large proportion (33%) of households in the rural areas used water from unimproved water sources compared to residents in urban areas (16%). The proportion of the population with access to an improved water source is higher in urban areas (85%) than in rural areas (67%).

##### 7.2.7.4.1 Domestic Water Use in the Study Area

There was no piped water in Ibulanku and Igombe sub-counties. The main water sources for domestic use were boreholes and protected and unprotected springs (refer Table 105).

Table 105: Identified Domestic Water Sources near the Proposed Processing Plant Project Area in Ibulanku and Igombe Sub-counties

S/N	Name of the Water Source	Description	Number	Coordinates (UTM, WGS 84, 36N	
				Easting	Northing
Namiganda village					
1.	Namiganda Community Borehole	Borehole	2809-2018	569297.09	60974.19
2.	Kagali	Protected Spring	Note available	569323.41	62709.92
3.	Sebbowa	Protected Spring	Note available	568466.17	60969.05
4.	Walumbe	Protected Spring	Note available	569175.57	61209.77



S/N	Name of the Water Source	Description	Number	Coordinates (UTM, WGS 84, 36N)	
				Easting	Northing
5.	Wagena	Protected Spring	Note available	569048.70	62879.80
6.	Namiganda Central	Borehole	Note available	569288.26	62450.65
7.	Nakivumbi Primary School	Protected Spring	Note available	568745.23	60903.48
8.	Katebure	Protected Spring	Note available	568984.74	60945.15
<b>Buniantole village</b>					
1.	Salim	Borehole	Note available	566689.02	63474.74
2.	Sheikh Swalik	Borehole	8631	567097.45	63441.39
3.	Prof Bakwesewa	Borehole	Note available	567910.86	63557.60
4.	Ibrahim Senior School	Borehole	2021-1442	566855.92	62788.63
5.	Buniantole SS	borehole	Note available	566830.87	62852.59
6.	Masjid Salim	Borehole	Note available	566830.26	63021.45
7.	Iganga Road	Borehole	Note available	566759.83	63020.24
8.	Saemayiru Dhakaba	Borehole	2/73/420	566236.35	62850.03
<b>Kabugweri village</b>					
1.	Nakivumbi trading Centre	Bore hole	Note available	567292.64	61003.99
2.	Noorhuda Masjid	Borehole	Note available	567085.91	61002.65
3.	Munulo Masjid	Borehole	Note available	567173.06	60476.63
4.	Kabugweri 2	Borehole	id 253	568243.96	60368.41
5.	Kabugweri 3	Borehole	Note available	567873.57	60346.42
<b>Businda B village</b>					
1.	Businda B	Borehole	Note available	565929.36	60771.88
2.	Brightstar Primary School	Shallow well	Note available	566307.20	60679.05
3.	Nawandyo	Protected Spring	Note available	566753.02	60794.79
4.	Nyagweso	Protected Spring	Note available	566968.49	60677.03

There is a permanent river (River Kitumbezi) within the project area of influence that is also a source of water for domestic use. In addition, on rainy days, some households, especially those with permanent dwellings, harvest rainwater from the rooftops into relatively small plastic tanks.

Similar to Ibulanku and Igombe Sub-counties, there was no piped water in Makuutu Sub-county (proposed Central Mining Pit location). However, the identified domestic water sources are indicated in the table below (refer Table 106).

**Table 106: Identified Domestic Water Resources in the Proposed Central Mining Pit Area**

S/N	Name of the Water Source	Description	Number	Coordinates (WGS 84 36N)	
				Easting	Northing
Mawololo village					
1	Masjid Hadiya	Borehole	Note available	565473.79	57888.08
2	Ewa Mukasa	Borehole	DWD1229	565100.31	58462.31
3	Muhammad Mukwana	Borehole	2020-1835	565767.42	58578.29
4	Buyinza	Borehole	DWD 29960	566044.90	58368.0
5	Abiyudi	Borehole	Note available	566403.23	57412.53
6	Kasooko	Borehole	Note available	565561.93	57499.04
7	Busekekera	Protected Spring	Note available	565085.11	58162.98
Buyayu village					
1	Masjid Faladausi	Borehole	DWD 48394	564444.33	57882.18
2	Buyayu	Borehole	Note available	564866.76	57817.09
3	Buyayu	Borehole	24671	564776.76	58673.07
Makandwa Central village					
1.	Masjid Jamil Faladausi	Borehole	Note available	563361.30	57806.19
2.	Makandwa borehole	Borehole	VPL-02-95	564308.50	56884.94
3.	Makandwa borehole	Borehole	DWD 3781	563477.50	55986.48
4.	Karubare borehole	Borehole	Note available	563386.45	58064.30
Water sources in Nakavule village					
1.	Masjid Hadija	Borehole	Note available	562980.90	57714.89
2.	Nakavule borehole	Borehole	13385	562782.54	57894.23
3.	Nakavule borehole	Borehole	9161	562423.26	58182.29
4.	Nakavule spring	Unprotected spring	Note available	-	-

The main water sources for domestic use are communal boreholes and springs. The women in Mawololo indicated that each water source has a Water User Committee, and households are required to pay for the repair of the respective water source whenever it breaks down. The water quality from the sources was rated good by the surveyed households. This is consistent with the ESIA baseline quality of groundwater in the Project area (refer ESIA Annex 4) which met World Health Organisation drinking water standards. In addition, the collection of rainwater from rooftops into plastic tanks and containers was observed amongst a few households with permanent dwellings.

The majority of the communal boreholes were associated with public institutions such as mosques, primarily to provide water for washing before prayers as it is a custom by the Moslem community, although access to the water source by the wider community was acceptable.

Water was mainly fetched by children and women. The young girls and women carry the jerrycans full of water on their heads while some young boys carry the jerrycans full of water on bicycles.

Communal boreholes were the most utilised sources of water for domestic use among the surveyed households during both the wet and dry season (refer Table 107). Other water sources include protected wells used by 8.67% of the surveyed households as well as open shallow wells/unprotected open wells and rivers/streams and lakes, which are less popular. None of the surveyed respondents collected water from private or community taps – confirming that there is no piped water in the project area of influence.

**Table 107: Profile of Domestic Water Sources by Season amongst the Surveyed Households**

Water Source	% HH (Wet Season)	% HH (Dry Season)
Community Borehole	75.40%	77.42%
Private Boreholes	5.24%	5.85%
Protected Well	8.67%	8.67%
Hand Dug Well at Home	5.24%	5.65%
River/Stream/Lake	1.81%	2.22%
Vendor	0.00%	0.20%
Rain Water/Water Harvesting/Tanks	9.48%	0.60%
Open Shallow Well/Unprotected Open Well	1.41%	1.41%

#### 7.2.7.5 Sanitation

Improper disposal of human waste is a burden to public health provision. Proper disposal of human waste involves the use of a toilet facility. Access to basic sanitation facilities is high at an estimated 79% (MoH 2018). The relatively high cost of constructing latrines and poor health education were noted as factors limiting sanitation improvements (UBoS 2017a).

According to the UBOS 2017a findings, the most commonly used toilet facility was the covered pit latrine without a slab (33%), closely followed by the covered pit latrine with a slab (21%). A higher proportion of households in urban areas than rural areas used Ventilated Improved Pit (VIP) latrines (22%urban and 5% rural, respectively). Improved sanitation includes improved toilet facilities that include; flush toilets, VIP latrines, covered pit latrine with a slab and Ecosan. A total of 34% of the surveyed households used an improved toilet facility.

##### 7.2.7.5.1 Toilet System

Pit latrines of semi-permanent and temporary structures were visibly the most resorted to amenities for human convenience within the study area established at the back of the homestead, with walls made out of mud and wattle, or dry banana leaves, or live fence, or open pit and the roofs made out of grass and thatch or iron sheets. The floors were usually covered with logs and soil or a cement slab. The majority of the toilets did not have a door, or the doorway was covered by a cloth. Additionally, when the pit latrines get filled up, a new one is usually dug and built up nearby. The existing Ventilated Improved Pit (VIP) latrines were associated with public institutions such as schools and mosques.

The commonest toilet system used amongst the surveyed households was the uncovered pit latrine without a slab (37%), while 4.03% completely had no toilet and instead used bushes or dug a hole (refer Table 108). Some of the households (0.6%) reported sharing a toilet facility with other households.

Table 108: Profile of Toilet Systems among the Surveyed Households

Toilet System	% Households
Uncovered pit latrine without a slab	37.10%
Covered pit latrine without a slab	19.76%
Covered pit latrine with slab	18.55%
Uncovered pit latrine with slab	12.90%
VIP Latrine	6.25%
No facility: bush, bucket, dig a hole	4.03%
Share pit latrine with neighbours	0.60%

#### 7.2.7.6 Bathrooms

From observations when conducting the socio-economic household baseline survey, most of the households in the study area lacked bathroom facilities. For the few households that had bathrooms, the bathrooms were made up of live fences, brick and mud walls, had no roof and no door. The floors were made of stone or covered by a polyethene bag.

#### 7.2.7.7 Waste Management

According to UBOS (2014), the method through which households dispose of their solid waste can pose a risk to public health. In Uganda, the most commonly used method of solid waste disposal by households was throwing in the garden (44%) followed by burning (23%).

Municipal solid waste in Ibulanku and Igombe Sub-counties was observed to be disposed of in open pits as was the case in Nakivumbi Trading Centre in Kabugweri village (refer Figure 150). In other circumstances, waste was disposed of in gardens or by the roadside. On the other hand, liquid waste was observed to drain off in shallow soak pits, especially at Mosque ablution sites.



Figure 150: Open pit/dump site in Nakivumbi TC in Kabugweri village

Other waste management facilities observed during the socio-economic baseline survey were the biological and medical waste pits associated with health facilities, such as Makuutu Health Centre III.

Within Makuutu Sub-county, the waste generated is conveniently and unconstructively disposed of in open land spaces, gardens and pits. No waste handling facilities were observed within the proposed Project footprint of the Central Mining Pit (Mawololo, Buyayu, Makandwa Central and Nakavule villages).

The majority (68.75 %) of all households surveyed during the household survey disposed of waste at a private waste pit at the homestead, followed by 10.69% who burn the waste (refer Table 109). Communal waste dumpsites/landfills were reported to be used by 4.44% % of the households – however, none of these were observed.



Table 109: Profile of Household Waste Disposal Methods

Waste Disposal Method	% Households
Private/household waste pit	68.75%
Burn waste	10.69%
Throw in gardens	9.27%
Throw in bushes	7.66%
Communal waste/pit/landfill	4.44%
Bury waste	2.02%
Feed waste to animals	1.81%
Compost waste	1.41%

#### 7.2.7.8 Recreation and Leisure

Apart from entertainment halls and designated fields/playgrounds at the educational and religious institutions there were no modern physical recreational facilities within the study area.

#### 7.2.7.9 Access to Public Services

The most commonly accessed public facilities and services in the potential Project area were mainly concentrated near Makandwa Central village (refer Table 110).

Table 110: Commonly used Facilities by the Surveyed Households

Community Infrastructure	Location of Infrastructure Ranked by Level of Use (HH)				
	First	Second	Third	Fourth	Fifth
Primary School	Makandwa	Mawololo	Buwongo	Iganga Town Council	Mayuge
Secondary School	Makuutu	Makandwa	Bukabooli	-	-
University / College	-	-	-	-	-
Open Markets	Makandwa Central	Buyayu	Mawololo	Nakivumbi	-
Informal Shops	Makandwa Central	Mawololo	Buwongo	Nakavule	Idudi town shops
Trading Center	Makandwa Central	Buwongo	Mawololo	Nakivumbi	-
Small Government Clinic	Makuutu	Makandwa Central	-	-	-
Large Hospital	Makuutu	-	-	-	-
Community Halls / Clubs	Makandwa Central	Wairaka	-	-	-
Police Station	Makuutu	Makandwa central	-	-	-
Church / Place of Worship	Makandwa	Mawololo	Nakavule Village	-	-
Cemeteries	Makandwa	Mawololo	-	-	-
Sport / Recreational Facilities	Makandwa	-	-	-	-

#### *7.2.7.10 Cultural Heritage and Archaeology*

Cultural heritage refers to properties and sites of archaeological, historical, cultural, artistic, and religious significance. It also encompasses the unique environmental features and cultural knowledge, as well as intangible forms of culture embodying traditional lifestyles that should be preserved for current and future generations (IFC PS 8, 2012).

##### *7.2.7.10.1 Cultural Context*

The area in which the proposed Project is situated was first inhabited by the hunter-gatherers people related to the pygmy of the Congo. Stone age tools found in some locations of Uganda like Paraa and Sango Bay are evidence of the presence of these people from as early as 50,000 B.C. From around 1000 B.C, the area received new groups of people who were more advanced technologically than the hunter-gatherers. The first to arrive were the Bantu, who arrived from the west of the river Nile.

The Bantu introduced iron technology into the area and began practicing agriculture as well as animal husbandry. They The Bantu also established village communities headed by chiefs. They were later joined by Cushitic pastoralists who introduced long long-horned cattle in the area as opposed to the Zebu cows of the Bantu. The last wave of historic migrants were the Luo people, of whom the majority continued on to Kenya.

The mixing of the people resulted in the Basoga people as they are known today. Because the Bantu were the majority in the founding populations, the Lusoga language and culture of the area is Bantu while retaining Nilotic traces.

From 1000 A.D, there was a process of state formation, and the area became part of the Bunyoro-Kitara Kingdom. The first rulers of the Kingdom were the Batembuzi dynasty. There were nineteen Kings of the Batembuzi dynasty. Busoga (as it is known today) was placed under the rule of Chief Ntembe during this dynasty (Batembuzi). The next dynasty was of people called the Bachwezi. Under this dynasty, Bunyoro -Kitara kingdom was very strong and expanded rapidly. The era of the Bachwezi dynasty was also mysterious and is a subject of much folklore.

The rule of the Bachwezi collapsed at the beginning of the fifteenth century, and the ruling group migrated away from Bunyoro-Kitara Kingdom. The new rulers of the Bunyoro-Kitara Kingdom after the Bachwezi were the Babito dynasty which claimed ancestry from the Luo, a Nilotic speaking people. The Babito were secular as opposed to the previous dynasties, where the rulers were also priests to the population.

The remaining Bachwezi in Busoga were relegated to perform only religious tasks, and they still form the class of traditional priests called Baswezi. Oral tradition states that Busoga was given to Kiiza, a younger brother of the first king of the Babito dynasty. He then sent his sons to rule different areas of Busoga. By the time British colonialism was imposed on Busoga, there were fourteen chiefdoms whose rulers claimed that the founders of chiefdoms had got the authority to rule from the ruling house of Bunyoro Kingdom.

The British reorganized reorganised Busoga into eleven chiefdoms which still exist as cultural units. The Project area is a part of Bugweri Chiefdom under the Chief Menha. The population of the proposed Project area is composed of the Basoga people mainly. Other tribes present include the Jopadhola, Samia and Bagisu, among others.

According to KII with the LCI of Mawololo village, the population is equally divided between the Moslems and Christians. There is also an African religious cult referred to as Ngiri Nkabi in the area – the cult seems opposed to forms of modernisation of government programmes such as immunisation.

#### 7.2.7.10.2 Cultural Heritage Findings

There are a number of both tangible and intangible cultural resources documented in the proposed Project area including modern places of worship (refer Table 111 and Figure 151).

**Table 111: Cultural Resources Documented within the Study Area**

Waypoint	Longitude	Latitude	Elevation	Findings	Description
908	33.5871	0.52504	1152.82	Graves	Thirteen graves where four were cemented, nine are not cemented.
225	562836	57686	1159	Grave Yard	Three cemented graves; seven graves marked with soil mounds.
220	562556	57792	1152	Grave Yard	-
216	562724	57631	1157	Shrine	Family Shrine.
218	562748	57715	1155	Shrine	Family Shrine.
207	563014	57270	1162	Shrine	Family and community-owned Shrine.
217	562700	57630	1158	Graveyard	Fourteen graves, five of which were cemented and others marked with soil mounds.
950	33.5882	0.52249	1155.15	Grave	Grave.
899	33.5874	0.52535	0	Grave	One uncemented grave.
938	33.5885	0.52704	1145.3	Graveyard	Twenty-six uncemented graves.
946	33.5878	0.52741	1147.05	Grave yard	Eight cemented graves.
948	33.5874	0.52637	1146.83	Grave yard	Two cemented graves.
953	33.5884	0.52141	1154.89	Grave yard	Three graves.
982	33.579	0.52327	1163.97	Grave Yard	One grave.
001	33.5799	0.52209	1166.82	Grave Yard	One grave.
024	33.5756	0.52201	1169.97	Grave Yard	Two graves, one cemented with tiles and the other not.
025	33.5757	0.52208	1168.78	Grave Yard	One grave, tiled.
049	33.5737	0.51937	1172.62	Grave Yard	One grave
053	33.5743	0.51852	1172.74	Grave Yard	Two were cemented, and the rest are marked with soil mounds.
059	33.5763	0.51893	1175.32	Grave Yard	One grave.
068	33.5804	0.51658	1160	Grave Yard	One cemented grave.
069	33.5804	0.51667	1162.94	Grave Yard	One grave marked with stones.
070	33.5811	0.51577	1152.73	Grave Yard	One cemented, one marked with baked bricks and others invisible.

Waypoint	Longitude	Latitude	Elevation	Findings	Description
071	33.5815	0.51555	1145.8	Grave Yard	Two graves marked with stones.
074	33.5817	0.51556	1149.23	Grave Yard	One grave marked with soil mound
078	33.5817	0.51495	1145.99	Grave Yard	Two graves in the bush.
079	33.5803	0.51499	1155.48	Grave Yard	One cemented grave
080	33.5807	0.51495	1151.65	Grave Yard	Two cemented graves
103	33.571	0.51607	1170.96	Grave Yard	One cemented grave
129	33.5737	0.5128	1158.19	Grave Yard	One cemented and two uncemented graves.
134	33.5741	0.5143	1147.84	Grave Yard	Four cemented, and one marked with soil mound
139	33.5757	0.51235	1158.08	Grave Yard	Seven graves, three of which are cemented.
142	33.5749	0.51219	1157.54	Grave Yard	One cemented, one marked with stones.
143	33.5738	0.51141	1156.19	Grave Yard	One cemented, three uncemented.
144	33.5735	0.51152	1157.4	Grave Yard	Three visible graves. One cemented, and others marked with soil mound.
146	33.5724	0.51069	1137.9	Grave Yard	Five graves, one cemented and others marked with soil mounds.
147	33.5722	0.51071	1157.84	Grave Yard	Two cemented graves.
148	33.5721	0.51113	1157.74	Grave Yard	One cemented grave.
149	33.5723	0.51109	1156.37	Grave Yard	Four cemented graves.
151	33.5728	0.50916	1157.09	Grave Yard	One grave
152	33.5734	0.50862	1151.17	Grave Yard	One grave
154	33.5637	0.52354	1158.24	Grave Yard	Twelve cemented graves
182	33.5675	0.52277	1167.86	Grave Yard	Two cemented graves
201	563235	56802	1157	Grave Yard	Seven graves, three of which are cemented and others marked with soil mounds
102	33.5706	0.51615	1169.46	Shrines	Under Mutuba tree where spirits rest
156	33.5638	0.52334	1158.52	Spiritual tree	Mugayire Tree of Iseja spirit where people perform sacrifices and rituals.
208	562885	57188	1154	Grave Yard	Thirteen graves out of which two are cemented.
189	563249	56465	1177	Grave Yard	Twelve cemented graves, five are cemented and others marked with stones and soil mounds.
198	563111	56631	1149	Grave Yard	Twenty-one graves, two are marked with soil mounds, the rest are cemented



Waypoint	Longitude	Latitude	Elevation	Findings	Description
227	565670	57469	1145	Grave Yard	Two cemented graves
927	33.5884	0.52391	1156.86	Two operational mosques	Masjid Hidayah, Mawololo.
219	562697	57732	1160	Cultural/ Spiritual Tree	Has been in existence for over 100 years.
898	33.5876	0.52526	1152.35	Church	St Peter's Church of Uganda.
949	33.5878	0.52264	1153.89	Church	Mawololo Catholic Church.
032	33.5712	0.52186	1168.37	Church	St. James Church Makandwa.
058	33.5763	0.51837	1174.51	Church	Lord's Favour Church Makandwa.
081	33.5789	0.51466	1156.62	Church	New life Missionary Church Makandwa Central.
979	33.5791	0.52363	1162.76	Mosque	Filadausi Mosque, Buyayu.
035	33.5696	0.52303	1169.6	Mosque	Makandwa Mosque.
173	33.5664	0.52202	1162.77	Mosque	Nakavule Mosque.
	0563485	0062621		Historical Site	Embuga, home of the Chief of Bugweri Chieftdom
	0565258	0051628		Cultural site	Bukowe Hill
	0564056	0054063		Cultural site	Buwonge Hill
	0566074	0053245		Cultural site	Bunalweni Hill
	0566794	0052931		Cultural site	Kikalangufu Hill
	0563359	0058723		Cultural site	Kirubale Tree

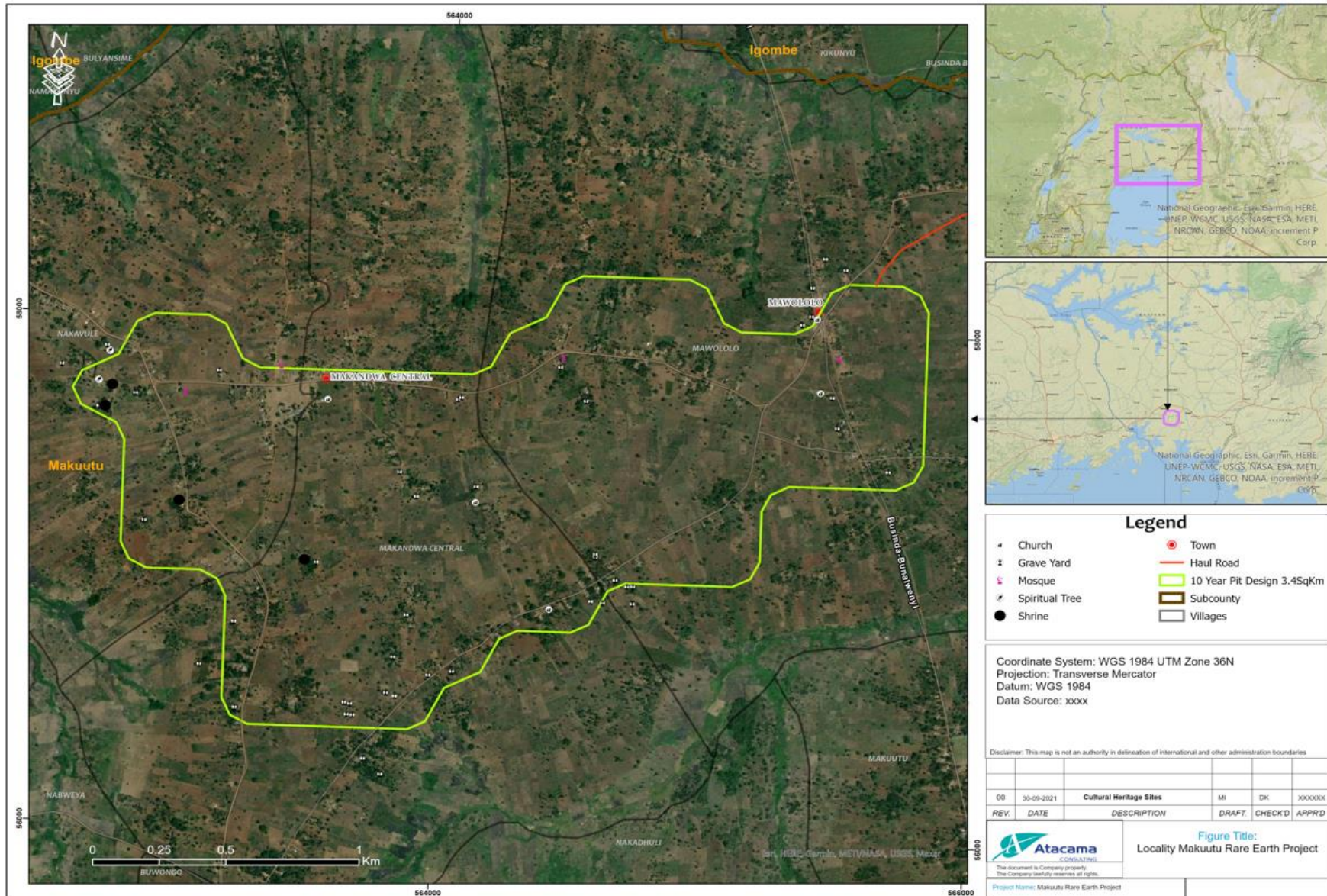


Figure 151: Location of Identified Cultural Heritage Sites within the Study Area

#### 7.2.7.10.3 Historical Sites

#### 7.2.7.10.4 Embuga

Embuga is the historic home of the Chief of Bugweri, located in Igombe village, Igombe Sub-county. It is located behind the Embuga is a royal cemetery and has housed three ruling chiefs of the Bugweri Chiefdom.

##### 7.2.7.10.4.1 Bukowe Hill Coronation Site

This hill located in Bukowe village Makuutu subcounty is recognised by Busoga Kingdom as the place where the Chiefs of Bugweri are coronated. Clan members of the Baisemenha royal clan of the chiefdom perform pilgrimage to the site every year starting 24th April for three days to get to know each other (like a get-together) as well as meet the Chief Menha, the Bugweri Chiefdom leader.

##### 7.2.7.10.4.2 Buwonge Hill Clan Site

Buwonge Hill is located in Buwonge village Makuutu subcounty and is recognised by Busoga Kingdom as the cultural site of the Baisemukose clan (under Bugweri Chiefdom). Clan members of the Baisemukose clan gather at the hill every year in December for two days meeting to meet the clan head and get to know each other. The meeting dates are given by the clan leader.

##### 7.2.7.10.4.3 Kikalangufu Hill Clan Site

Kikalangufu Hill is located in Bunalweni B village Makuutu subcounty and is recognised by the Busoga Kingdom as the seat of the Baisemunana clan. of Bugweri chiefdom. Clan members of the Baisemunana clan gather at the hill every year starting January 1 for two to three days. The Clansmen gather to know each other and to meet with the clan head.

##### 7.2.7.10.4.4 Bunalweni Hill Clan Site

Banalweni Hill (in Bunalweni A village Makuutu subcounty) is recognised by the Busoga Kingdom as the cultural site of Baisempiina clan. of Bugweri chiefdom. Clan members of the Baisempiima clan perform pilgrimage to the hill every year in December for two days to meet the clan head and get to know each other.

#### *7.2.7.11 Cultural Sites for Traditional Prayers*

##### 7.2.7.11.1 Kirubale Tree

The Kirubale tree (refer Figure 152) is located in Makandwa Central village, Makuutu Sub-county and houses the Kirubale spirit. According to the caretaker, traditional prayers are performed by the community at this site. People pray to solve personal problems like lack of jobs, sickness and to have children and marriage as well as praying for the land to produce a good harvest.





Figure 152: The Kirubale Tree

#### *7.2.7.12 Places of Modern Worship*

Places of modern worship include churches and mosques as previously presented (refer Table 50).

#### *7.2.7.13 Cultural Property at Household Level*

##### *7.2.7.13.1 Graves*

The study found both cemented and ordinary/un-cemented burial sites within the proposed Central Mining Pit area as previously presented (refer Table 112 and Figure 151).

##### *7.2.7.13.2 Household Shrines*

Household shrines are personal properties owned by individuals or families. It is in these shrines that family spirits are consulted. The owners serve as the spirit mediums and diviners on occasions when the members gather, singing traditional songs and performing rituals. The family owners are then possessed by the spirits and speak on the spirits' behalf.

### **7.2.8 Archaeological Findings**

Archaeology studies the past through examining the material remains left and used by humans in examining the proposed Project area for the Makuutu Rare Earths Project identified, pottery, lithics, faunal and metal objects. Special consideration was also given to the medicinal plants and charcoal mounds that characterise human activities and are part of the cultural heritage as presented below.

#### *7.2.8.1 Pottery*

Two hundred and seven (207) pottery sites were identified (refer Figure 153) including whole pots and 340 potsherds in the Central Makuutu Pit area (refer Figure 154). Pots were decorated with 33 decoration motifs dominated by roulette patterns which is a Late Iron Age (LIA) pottery tradition dating back to before the 11th Century. Other decoration motifs such as bevels, incisions and grooves that are attributed to the Early Iron Age (EIA) but with traces of Middle Iron Age (MIA) finger impressions as well. This, therefore, suggests that the site, in times of relative dates based on pottery, has a tradition from the Early Iron Age to the Late Iron Age (roulette) that is dominant.



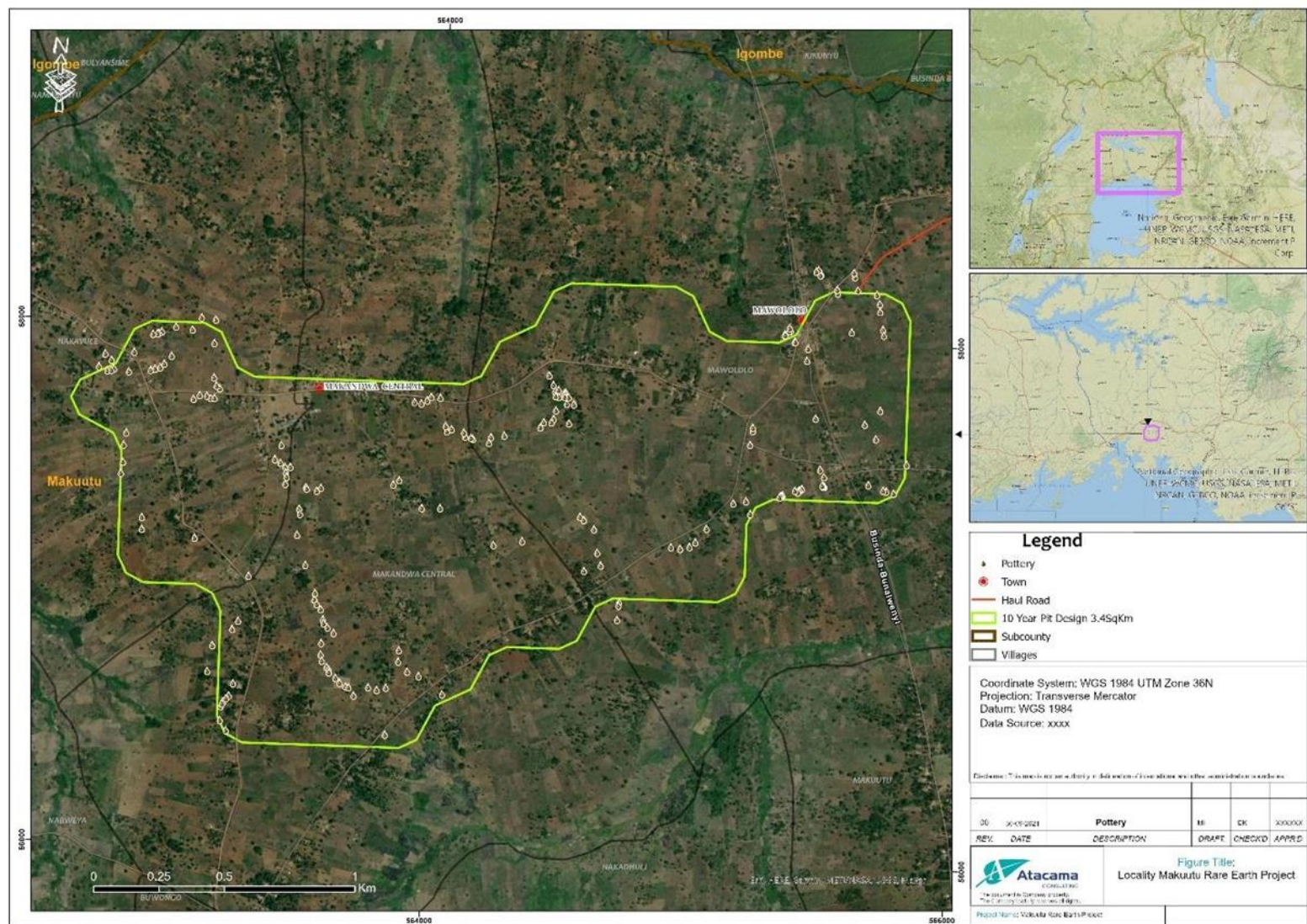


Figure 153: Pottery sites identified within the Surveyed Area of the proposed Central Mining Pit



Figure 154: Whole Pot (left) and Potsherds (right) in the Surveyed Area

### 7.2.8.2 Lithics

The Stone Age period was a prehistoric cultural period that involved the use of stone or rock for making tools especially useful for hunting and gathering. Humans also used other materials made out of wood and bones which are perishable and relatively rare compared to stone. Thus, stone material is the subject of discussion in this section of lithics.

Lithics were identified at forty-six sites within the four villages (Makandwa Central, Mawololo, Buyayu and Nakavule) of the proposed Central Mining Pit (refer Figure 155). In terms of broad lithic types based on the ninety-eight analysed lithic artefacts, the Central Mining Pit proposed Project Area contained twenty cores, nineteen shaped tools, one non-flaked stone and fifty-eight debitage (ie. by-product flakes and chips). The non-flaked stone identified from Makandwa Village was a grinding stone (refer Figure 156).

Evidence from the findings suggests that the stone tool makers used Levallois technology (the preparation of cores) which implies that the proposed Central Mining Pit location would have been used since the Middle Stone Age. This technology co-exists with the direct hammer percussion, as evidenced from the eraille scars on the bulbs of percussion. The Middle Stone Age is the period that started around 280,000 to about 50-25,000 years ago.

Analysis of the ninety-eight lithic artefacts indicated that quartz was preferred for the ninety-six lithic artefacts followed by basalt and quartzite. This is not strange since the rock types of the area are quartz-like, and the stone tool maker usually preferred to use the closest raw materials.

### 7.2.8.3 Faunal Remains

Non-hominid faunal remains are an indicator of the diet of the prehistoric people in the area under investigation. Faunal remains were identified at ten sites and were mainly animal and fish bones (refer Table 112).

Table 112: Faunal Remains Identified in the Surveyed Area of the proposed Central Mining Pit

Waypoint	Longitude	Latitude	Elevation	Description
204	563311	57011	1162	Faunal remains
911	33.5874	0.52478	1153	Animal Bone
947	33.5875	0.52668	1143	Animal bone
900	33.5873	0.52523	1151	Fish bone
901	33.5872	0.52515	1152	Animal bone
988	33.5793	0.5229	1164	Animal bone
93	33.57	0.51941	1172	Animal bone
107	33.5713	0.5149	1170	Land snail shell
163	33.5655	0.52309	1165	Animal teeth
215	562777	57608	1154	Skull



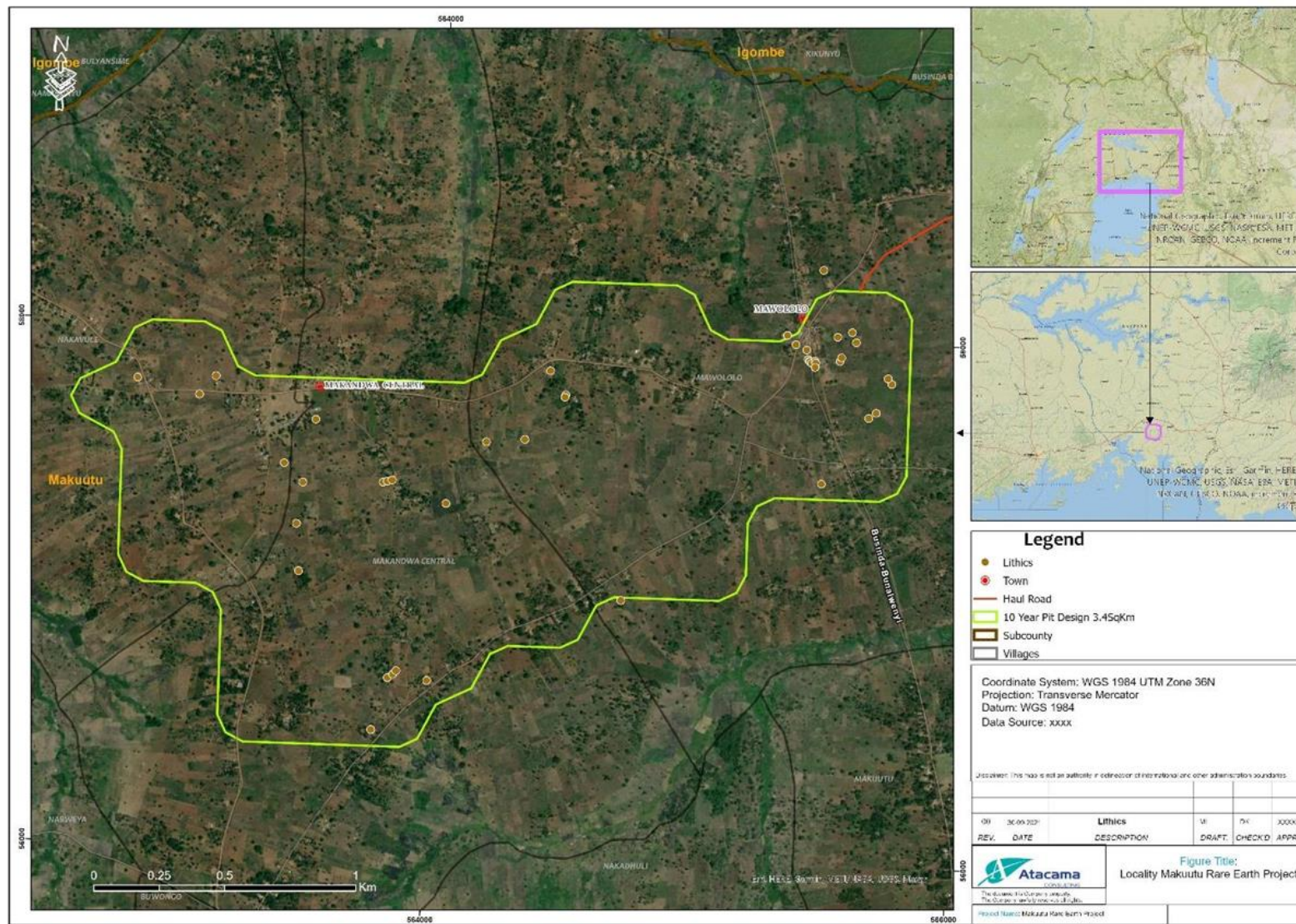


Figure 155: Location of Lithics within the Surveyed Area of the Proposed Central Mining Pit



Figure 156: Grinding Stones identified in the Surveyed Area of the proposed Central Mining Pit

#### 7.2.8.4 Iron Object

One iron object (iron ore) was also identified within the surveyed area at 33.587588, 0.52554 in Mawololo village. Iron objects are one of the archaeological materials showing the evidence of human activities that archaeologists look out for to assess the archaeological potential of the area.

#### 7.2.8.5 Charcoal Mounds

Charcoal is essential for archaeology studies because it is used for radiocarbon dating. Charcoal mounds were identified and marked during the survey (refer Table 113). Recent mounds do not qualify for dating, making their significance very low. All the charcoal mounds identified were evidence of recent human activities.

Table 113: Charcoal Mound Sites

Waypoint	Longitude	Latitude	Elevation	Village	Findings
952	33.588319	0.521478	1153	Mawololo	Charcoal mound
012	33.577919	0.520991	1169	Buyayu	Charcoal mound
044	33.572262	0.519414	1173	Makandwa Central	Charcoal mound
046	33.573483	0.519429	1172	Makandwa Central	Charcoal mound
052	33.574362	0.519135	1174	Makandwa Central	Charcoal mound
055	33.574953	0.518486	1175	Makandwa Central	Charcoal mound
076	33.581662	0.515347	1153	Makandwa Central	Charcoal mound
114	33.571314	0.5135	1164	Makandwa Central	Charcoal mound



### 7.2.8.6 Medicinal Plants

Medicinal plants are part of indigenous knowledge and constitute intangible heritage. Fifteen sites with medicinal plants were identified in the proposed Central Mining Pit area (refer Table 114). Common medicinal plants included Albizia coriaria (Musita), Aloe vera, Katosubisu, Alstonia boonei (Mubajjandalabi), Tamarindus indica, Mulama tree, Musomba madhi tree and Mususira.

Table 114: Medicinal Plants used by Communities in the Surveyed Area of the proposed Central Mining Pit

Waypoint	Longitude	Latitude	Elevation	Description
984	33.5792	0.52293	1164.82	Albizia coriaria, locally known as Musita; the bark and roots are it is used to treat headaches and syphilis.
998	33.5797	0.52242	1166.96	Aloe vera (Aloe barbadensis miller); used for several ailments such as malaria
999	33.5797	0.52239	1166.09	Albizia coriaria (Musita tree).
002	33.5797	0.52166	1167.11	Locally known as Katosubisu, its roots treat poisoning and snake bites.
004	33.5798	0.5221	1165.95	Tamarind (Tamarindus indica) tree for treating headache and stomach ache.
027	33.5751	0.52277	1162.09	Alstonia boonei, locally known as Mubajjandalabi tree. Pregnant women use it.
033	33.5711	0.52161	1171.12	Albizia coriaria, locally known as Musita tree. it is used to treat headaches and syphilis.
036	33.5698	0.52079	1173.29	Kirama tree. It treats teeth problems.
135	33.5746	0.51373	1164.02	Mulama tree. It treats ulcers, blood pressure and syphilis.
141	33.5751	0.51234	1161.12	Musomba madhi tree. Treats ulcers, syphilis, stomach ache using its stem and bark.
153	33.5645	0.52337	1160.37	Tamarind (Tamarindus indica) tree used to heal stomach ache and headache.
159	33.5647	0.52277	1160.2	Aloe vera.
931	33.5888	0.52482	1151.16	Musausilra tree heals stomach and eye problems and is used as a preservative of local brew by using the leaves and stem barks.
939	33.5885	0.52703	1145.64	Tamarind (Tamarindus indica) tree used to heal stomach aches and headache.
247	565670	58185	1142	Albizia coriaria, locally known as Musita used to treat headaches and syphilis.

## 7.2.9 Vulnerable Groups

The term “vulnerable groups” is given to individuals, households, or groups of people that may be disproportionately affected by the project development process based on their gender, ethnicity, age, physical or mental disability, economic disadvantage, or social status within their community. These groups may be more adversely affected by displacement than others, and who may be limited in their ability to claim or take advantage of resettlement assistance and related development benefits.”

### *7.2.9.1 Identifying Vulnerable People*

The socio-economic baseline survey included a set of questions aimed at identifying potentially vulnerable households and individuals within households. It should be noted that forms of vulnerability do overlap (e.g., women, in general, are vulnerable, but female heads of households have an added layer of vulnerability. Similarly, children are generally vulnerable, but orphaned children have an added layer of vulnerability).

#### *7.2.9.1.1 Elderly-headed Households*

These are defined as households in which the head is older than 65 years of age. The elderly are particularly vulnerable during project development because they often lack the physical capacity or economic opportunity to benefit from the proposed Project or otherwise may suffer grossly from the same due to their age. While elderly headed households are potentially defined as vulnerable, other factors such as support from family members or assistance/allowance from the government should be taken into account when assessing their vulnerability. For instance, elderly heads may comprise large families where the head is the elderly patriarch or matriarch, who has considerable support from the children, and grandchildren may not be vulnerable due to the presence of a strong support system. Analysis of the socio-economic baseline of the surveyed households indicates that there are 62 (12.5% of the total surveyed households) elderly-headed households that fit the aforementioned criteria.

### *7.2.9.2 Elderly-dominated Households*

These are defined as households with a high elderly dependency ratio (ratio greater than 1 per working-age household member). These may have less recourse to support by younger family members and are susceptible to the impacts of development projects in much the same way as elderly-headed households. According to the socio-economic baseline survey, 11 (2.22% of the surveyed households) had an elderly dependency ratio greater or equal to 1 and all households have only one member who is above 65+ years.

### *7.2.9.3 Female-headed Households*

Female-headed households are defined as households where the female is recognised as the sole or main income earner and decision-maker in areas concerning the welfare of the members of the household. Also, the state of a woman being a household head may derive from being unmarried, divorced, separated, or widowed. However, women, in general, are traditionally more vulnerable than men in countries like Uganda, where inequalities persist between genders. For example, customary practices in terms of land rights are biased against women making them less economically independent. Customary marriages only give women access rights to land but do not protect their land rights, leaving them vulnerable to losing access to land in case of polygamy, marriage breakdown, or widowhood.

Upon the death of the husband, the husband’s family, in many cases, deny land rights to widows, and this can render the household destitute. Where the head of a household is female, the household can be disadvantaged in that gender discrimination may limit women’s access to resources, opportunities, and public services that help women improve their standard of living. In addition, when a female is the only productive adult in the household, they must manage the household livelihood and act as a caregiver to any children, which makes them vulnerable to shocks and changes. Results from the surveyed household survey indicate that there were 93 households (18.75% of the surveyed households) claimed to be female-headed. 33 (6.65%) were female head of household with an

economically active adult man in the household and 60 (12.10%) were female head of household without an economically active man in the household.

#### *7.2.9.4 Child-headed Households and Orphans*

Child-headed households are defined as households where the head is younger than 18 years of age or a household solely comprised of children under the age of 18 who have no support from an adult family member (i.e., orphaned or abandoned). This category is considered vulnerable because often, they are dependent on others for support. In some households, orphanhood leads to child heads of households that face increasing household adversity and rising levels of responsibility for their family members during and after project implementation. Results from the surveyed household did not indicate that any of the households were headed by a child.

#### *7.2.9.5 Households with members living with a Disability or Serious Health Conditions*

These are households where one or more household members are living with a physical disability, mental disability, or long-term/chronic illness. Serious health conditions subject the households to financial burdens since disabled or sick family members are not able to work or help contribute to the household income. The presence of family members who are disabled or chronically ill puts a strain on family finances needed for their medication as well as an emotional burden to family members who are assigned to care for them. It could also imply a reduction in labour/income-producing potential of the household. Twenty-four (4.84%) and seven (1.41%) persons of the surveyed population were identified as having a physical disability and mental disability respectively. No household member was reported to be suffering from a long-term illness.

#### *7.2.9.6 Households with a majority of Dependents that are below the Legal Working Age*

These are households with the majority of their members below the age of 14 years, where the child dependency ratio per economically active member of the household is equal or greater than three (3). It is assumed that the head of household and other adult productive members of the household have a large population of unproductive individuals to fend/care for that may take their time away from focusing on improving or sustaining their livelihood (e.g., time for farming, selling/trading, etc.).

Additionally, children below the age of 14 years require additional resources for education, healthcare and feeding, yet they are not directly contributing to production or income-generation in the household. Children in homes with many dependents are likely to be involved in child labour to meet household livelihood needs. Results from the surveyed household survey indicate that 35 (7.06%) of the surveyed households had many dependents below legal working age.

Young girls in such households have an added layer of vulnerability: they face risks of defilement, child marriage, and early pregnancy. Increased expendable cash in the proposed Project area plus increased “foreign” workers attracted by the mining industry could contribute to the rates of defilement and child mothers. Early pregnancy and marriage often result in girls leaving school, which limits their capacity to meaningfully participate in decision making.

#### *7.2.9.7 Households that are considered ‘poor’ as per National Definitions*

The National Development Plan (III) defined the poor as people living on less than 1 dollar per day (the poverty line). That translates into monthly living expenses of 30 dollars, equivalent to Uganda Shillings 105,600 as of August 2021.

Households living below the poverty line are vulnerable because they do not have the income or assets that will assist them in coping with the effects of project development. Children living in poor households often do not attend school and are more likely to engage in child labour.

For instance, the poor are reliant on cash, making them vulnerable to changes in the prices of everyday commodities. They may live a hand-to-mouth existence with very little or no secondary income and have less ability to cope with shocks or changes. Thus, the loss of their main source of income (i.e.,

land) makes them more vulnerable than the rest of the community, and they may have more difficulty recovering.

However, the socio-economic data collected about household income and expenditure is deemed unreliable because there was a tendency of respondents to overstate their income and expenditures, and many respondents included periodic or seasonal income and expenditure (agricultural inputs and sales, school/educational expenses) in monthly figures.

#### 7.2.9.8 Other Groups

Other groups or individuals may also be exposed to the risk of displacement-induced vulnerability. This risk condition exists for these other vulnerable groups because they are unlikely to cope with external shocks resulting from displacement:

- Landless Households: The mining activities in the district are likely to create incentives for increased land speculation and commercialisation of land, leading to an increased transition from customary land ownership and communally held land to privatisation and individualisation of land.
- The commercialisation of land will lead to loss of customary tenure rights and increasing risk of landlessness for some individuals and groups due to the sale of land without their knowledge or consent. Land grabbing by local and non-local elites is an added risk factor. This will lead to the destitution of women, children and the next generation because mining-related inflation will make it harder for younger people to acquire land for settlement and farming.

#### 7.2.10 Developing the Vulnerable Peoples List

Based on the categories below (refer Table 115), of the 496 households surveyed, 149 households (30.6%) are considered potentially vulnerable (in the case of the female-headed households, only those without adult males in their household are considered).

Table 115: Summary of potentially Vulnerable Households among the total Surveyed Households

Vulnerability Category	Households	% Percentage of Total Households surveyed
Female head of household with an economically active adult man in the household	33	6.65%
Female head of household without an economically active man in the household	60	12.10%
Elderly Headed Household 65+ years	62	12.50%
Elderly Headed Household 65+ years with number of dependents 7+	5	1.01%
Ratio of number of HH members aged 65+ years over number of HH members of working age being greater than 01	11	2.22%
Elderly Dominated Households - HH with child dependency ratio equal or greater than 3; (Child dependency ratio equals No. of children 0-13yrs over No. of HH members of working age (14-64 yrs.))	35	7.06%
Households with members living with physical disability	24	4.84%
Households with members living with mental disability	7	1.41%
Households with members living with long-term illness	0	0.00%



From the list of potentially vulnerable households, each household that possesses specific vulnerability characteristics related with gender, marital status, age, and health status (i.e., physical or mental disability or long-term illness) was subjected to a scoring criterion (refer Table 116) and a Vulnerable Project Affected Households (VPAH) list developed for the surveyed households as of 27<sup>th</sup> August 2021.

Table 116: Scoring Criteria for developing the VPAH List

No.	Vulnerability Category	Criteria	Vulnerability Score
1	Sex and gender of Head of Household (Female Headed Household)	Female head of household with an economically active adult man in the household	5
		Female head of household without an economically active man in the household	25
2	Age of Head of Household (Elderly Headed Household)	65+ years	10
		65+ years with 7+ number of dependents	15
3	Elderly Dominated Households	Ratio of number of HH members aged 65+ years over number of HH members of working age being greater than 01	15
4	Child Headed Households	Age of head of HH less than 18 years	30
5	Households with members living with Disability	Mental disability	10
		Physical disability	10
		Long term illness	15
6	Households with many dependents below legal working age	HH with child dependency ratio equal or greater than 3 (child dependency ratio equals No. of children 0-13yrs over No. of HH members of working age (14-64 yrs.))	25
		Total Score	180*

\* A potential PAP with a score 50 and above qualifies to be listed as Vulnerable

Based on the scoring criteria in above (refer Table 116), 3.83% (19) of the surveyed households are categorized as vulnerable. The vulnerable households are spread across Makandwa Central village (68.42%), Nakavule village (15.79), Buyayu village (10.53) and Mawololo village (5.26%). The project area VPAH list should be the subject of revision and verification through stakeholder engagement with household heads as well as key stakeholders from the respective villages.

## 8 STAKEHOLDER ENGAGEMENT

The Project has developed a comprehensive Stakeholder Engagement Plan (refer ESMP Volume 2 as summarised in Section 16.2) that guided stakeholder engagements as detailed in the “Stakeholder engagement report for the Environmental and Social Impact Assessment for the proposed Makuutu Rare Earths Project”. This Report, produced by Atacama Consulting, is provided as an Addendum Report with some key aspects summarised below.

Stakeholder engagement for the ESIA was undertaken in conformance with Uganda’s national legal requirements, International Finance Corporation (IFC) Performance Standard 1 (PS1) and, Equator Principles. The main objective was to ensure that key information was clearly communicated and understood by all concerned parties and that the Project was aware of key stakeholder concerns (refer Section 8). These were taken into account in project design and operational strategies as presented in Section 3.2.

### 8.1 Objectives of the SEP

Makuutu is a long-term Project and the ultimate purpose of stakeholder engagement is to build strong long-term relationships with key stakeholders and to secure a social licence to operate. The SEP objectives included:

- Identifying and mapping the relevant Makuutu Rare Earths Project stakeholders and their associated concerns and relevance to the Project.
- Developing a management strategy for stakeholder concerns raised during engagement sessions.
- Defining a stakeholder engagement process that defines the frequency and engagement approach to be taken with each stakeholder group.
- Complying with national regulations and requirements, ESIA good practice, International Finance Corporation (IFC) guidelines and Equator Principle requirements on stakeholder consultation and disclosure.
- Establishing an effective project grievance mechanism procedure.
- Developing strategies to address the key stakeholder concerns identified during the ESIA process.
- Defining RRM’s roles and responsibilities in the implementation of the SEP.
- Defining monitoring, evaluation and reporting procedures during SEP implementation.

### 8.2 Stakeholder Identification Analysis and Mapping

Key stakeholders of the Makuutu Rare Earths Project were identified and assessed through a process of stakeholder mapping (refer Tables 117 and 120). This commenced with the identification organisations and individuals, including vulnerable groups, that may be impacted by the Project with specific consideration of:

- The proposed project area of influence.
- The expected nature of project impacts.
- The regulatory context including Ugandan law and IFC performance standards.

The quantitative household surveys undertaken on Project Affected Households within the Year 1 to Year 10 Central Makuutu deposit had a specific focus on establishing a register of “truly” vulnerable households assessed through the presence of vulnerable categories of people (refer Table 117) in combination with their available level of support.

Table 117: Ugandan Government, National and Local Community Interest in the Project

Stakeholder Categories	Stakeholder Groups	Stakeholders	Interest in the Project
National Government Authorities	<ul style="list-style-type: none"> <li>Government Ministries</li> <li>Government Agencies</li> <li>Government Authorities</li> <li>Government regulatory bodies</li> <li>Government Technical Departments</li> </ul>	<ul style="list-style-type: none"> <li>National Environmental Management Authority (NEMA)</li> <li>Directorate of Geology and Mines, MEMD</li> <li>Uganda Chamber of Mines &amp; Petroleum (UCMP)</li> <li>Ministry of Water and Environment (MWE) – e.g., Directorate of Environment Affairs, Wetlands Department and Directorate of Water Resources Management (DWRM)</li> <li>Rural Electrification Agency (REA)</li> <li>Uganda Electricity Transmission Company Limited (UETCL)</li> <li>Ministry of Lands, Housing and Urban Development (MLHUD)</li> <li>Ministry of Gender, Labour and Social Development (MoGLSD)</li> <li>Department of Museums and Monuments of the Ministry of Tourism, Wildlife and Antiquities</li> <li>Uganda National Roads Authority, under the Ministry of Works and Transport</li> <li>Ministry of Finance, Planning and Economic Development</li> <li>Uganda Human Rights Commission (UHRC)</li> <li>Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)</li> <li>Ministry of Trade, Industry and Cooperatives,</li> </ul>	<ul style="list-style-type: none"> <li>Permitting and authorisations</li> <li>Development control</li> <li>Environmental protection</li> <li>Legally mandated to handle certain critical issues</li> <li>Safeguard of protected areas</li> <li>Public health and safety</li> <li>Can offer technical advice</li> <li>Monitoring and enforcing compliance with Uganda laws through all stages of the project life cycle,</li> <li>Implementation of the project to boost Uganda’s economy</li> </ul>

Stakeholder Categories	Stakeholder Groups	Stakeholders	Interest in the Project
		<ul style="list-style-type: none"> <li>Ministry of Local Government (MoLG)</li> </ul>	
Local Government Authorities	<ul style="list-style-type: none"> <li>Districts</li> <li>Sub-counties</li> <li>Parishes</li> </ul>	<p><b>Districts:</b> Iganga, Mayuge, Bugweri and Bugiri District authorities</p> <p><b>Sub-counties:</b> Imanyiro, Buwaya, Nakigo, Mpungwe, Nakigo, Makuutu, Igombe, Ibulanku, Buwunga, Nankoma, Kapyanga. Muterere, and Bugiri Town Council.</p> <p><b>Parishes:</b> Mbaale, Magada, Isikiro, Kabaingire, Buwaiswa, Kabaingire, Kigulamo, Makandwa, Makuutu, Mawanga, Kavule, Luwooko, Bupala, and Buwunga.</p>	<ul style="list-style-type: none"> <li>Land use planning</li> <li>Community engagement and sensitisation (capacity to act as community representatives)</li> <li>Implementation of local government development plans (in line with the broader national development plan)</li> <li>Local development opportunities</li> <li>Land acquisition</li> <li>Impacts on local communities</li> <li>Provide social justice to vulnerable communities</li> <li>Facilitate bottom-up planning</li> <li>Environmental impacts,</li> <li>Management and monitoring project impacts</li> </ul>
Affected local communities	<ul style="list-style-type: none"> <li>Village local council Chairpersons</li> <li>Community members within the project area of influence</li> <li>Vulnerable Groups and their representatives</li> <li>Livelihood groups</li> </ul>	<p><b>Villages covered by the Makuutu Rare Earths Project Licenced Area:</b> Imanyiro, Igunda, Magunga, Magada, Buwolya A, Busu, Namago A, Nsango B, Nabitu, Isikiro A, Ivungunyu, Ntinda, Buwaiswa, Namadhi, Nakate, Nawanzu, Bunalwenyi A, Bunalwenyi B, Walanga, Igombe, Wairama, Nawampendo, Namakunyu, Bulyansiime, Businda A, Businda B, Mpiita, Bunkenke, Nawasenga, Matiki, Nakawa, Busoga, Kateigalwa, Bupala, Budidi, Nagoola, Imuli, Makoma A, Makoma B, Bukagolo, Nsono, Busimbi A, Namuganza, Nakavule,</p>	<ul style="list-style-type: none"> <li>Community engagement and sensitisation about the Project activities</li> <li>Impacts on community wellbeing (positive and negative)</li> <li>Environmental and social impacts</li> <li>Impacts on livelihood activities (farming, livestock)</li> <li>Prospects for employment and procurement</li> <li>Development opportunities</li> <li>They can provide input in developing</li> </ul>



Stakeholder Categories	Stakeholder Groups	Stakeholders	Interest in the Project
		<p>Kamango, Izira, Isagaza, Namayemba West, Namayemba Central, Bukonde, Kapyanga, Buyubu, Bugondhadhala, Bugubo, Kikabaala, Nangoma A, Bukiri, Kiwalanzi, Kiyinikibi, Butambula, and Nkusi.</p> <p><b>Villages in which the Makuutu Rare Earths Project Facilities will be located:</b></p> <p>Mbaale, Ibanga, Kanyambwina, Isikiro B, Buwaya A, Namatale, Ntafugirwa, Makoova A, Nawanzu, Nabweya, Nakavule, Makandwa Central, Buwongo, Mawololo, Nakadhuli, Makuutu, Buswiriri, Naitandu B, Naitandu A, Kigulamo, Kikunyu, Bunyantole, Kabugweri, Namiganda, Busambira, Kasala, Luwoko B, Luwoko central, Bupala, Kyaluya, Kitogo, Walugoma, Namatanga A&amp;B, Namalehna/Nawangeig, Budhehero, Bukerere, Kasongoire and Kyazuka/Saanika.</p>	<p>solutions for challenges they are experiencing</p> <ul style="list-style-type: none"> <li>• Acceptance by affected communities is critical to the success of the project</li> <li>• Can provide key information into the project design and local contexts</li> <li>• Social License to operate,</li> <li>• Corporate Social Responsibility (CSR) activities and/or Community Development Programme</li> </ul>
Vulnerable Persons/Groups	<ul style="list-style-type: none"> <li>• Vulnerable people within the communities of the project area of influence.</li> </ul>	<ul style="list-style-type: none"> <li>• Very poor households that rely mostly on farming for food</li> <li>• Women and female-headed households</li> <li>• Unemployed youth</li> <li>• Elderly and orphans</li> <li>• Disabled persons</li> <li>• In-migrants, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Development opportunities</li> <li>• Job opportunities</li> <li>• CSR activities</li> <li>• Livelihood improvements (farming, livestock),</li> <li>• Cumulative impacts</li> </ul>
Traditional Institutions	<ul style="list-style-type: none"> <li>• Busoga Kingdom</li> </ul>	<ul style="list-style-type: none"> <li>• Council of elders</li> <li>• Clan leaders, and</li> <li>• Kingdom representatives.</li> </ul>	<ul style="list-style-type: none"> <li>• Protection and sustenance of the local people's culture</li> <li>• Protection of cultural heritage and archaeological sites</li> <li>• Environmental and social impacts on local communities</li> </ul>

Stakeholder Categories	Stakeholder Groups	Stakeholders	Interest in the Project
			<ul style="list-style-type: none"> <li>Land acquisition plans</li> <li>Community engagement and sensitisation (capacity to act as community representatives), and</li> <li>Kept informed of project progress and plans.</li> </ul>
Business community	<ul style="list-style-type: none"> <li>Local business associations</li> </ul>	<ul style="list-style-type: none"> <li>Busoga Sugarcane Growers Association (BSGA) Uganda</li> <li>Small holder farmers</li> </ul>	<ul style="list-style-type: none"> <li>Development opportunities; and</li> <li>Complement project activities as part of CSR.</li> </ul>
Institutions	<ul style="list-style-type: none"> <li>Schools</li> </ul>	<ul style="list-style-type: none"> <li>Naitandu Primary School</li> <li>Makuutu Seed Secondary</li> <li>Makandwa Primary School</li> </ul>	<ul style="list-style-type: none"> <li>Environmental protection</li> <li>Protection of cultural heritage</li> <li>Community health and safety; and</li> <li>Access to environmental and social baseline data.</li> </ul>
	<ul style="list-style-type: none"> <li>Health centres</li> </ul>	<ul style="list-style-type: none"> <li>Buwaiswa HC III, Buwaya HC II and Isikiro HC II (Buwaya Sub-county, Mayuge District)</li> <li>Kavule HC II (Buwunga Sub-county, Bugiri District)</li> <li>Kavule Church of Uganda (COU) HC II (Buwunga Sub-county, Bugiri District)</li> <li>Namiganda HC II (Ibulanku Sub-county, Bugweri District)</li> <li>Igombe HC III (Igombe Sub-county, Bugweri District)</li> <li>Nawanzu HC II (Nakigo Sub-county, Iganga District)</li> <li>Magada HC II (Immanyiro Sub-county, Mayuge District)</li> <li>Wamulongo HC II (Mpungwe SC, Mayuge District)</li> <li>Busoga HC II (Buwunga SC, Bugiri District)</li> </ul>	<ul style="list-style-type: none"> <li>Community health and safety; and</li> <li>Access to environmental and social baseline data.</li> </ul>
Media	<ul style="list-style-type: none"> <li>Newspapers</li> </ul>	<ul style="list-style-type: none"> <li>New Vision newspaper</li> <li>Daily Monitor newspaper</li> </ul>	<ul style="list-style-type: none"> <li>Transparency and openness; and</li> </ul>

Stakeholder Categories	Stakeholder Groups	Stakeholders	Interest in the Project
	<ul style="list-style-type: none"> <li>Radio; and Social media.</li> </ul>	<ul style="list-style-type: none"> <li>Local radio stations</li> </ul>	<ul style="list-style-type: none"> <li>Information disclosure.</li> </ul>

Table 118: Other key Project stakeholders that have an intrinsic interest, influence and impact on the Project activities and their outcomes

Stakeholder	Project Expectations	Stakeholder Expectations	Strategy
Shareholders	<ul style="list-style-type: none"> <li>Shareholder confidence</li> <li>Strong demand for Ionic Rare Earths (IXR) shares strong share price.</li> </ul>	<p><b>Assurance of good prospects and high returns</b></p> <ul style="list-style-type: none"> <li>Good ore-body</li> <li>Low capital costs</li> <li>Low operating costs</li> <li>Long mine-life</li> <li>Secure funding</li> <li>High rate of return</li> <li>Strong share price</li> <li>Strong long-term market</li> </ul> <p><b>Assurance of low risk</b></p> <ul style="list-style-type: none"> <li>Low political risk</li> <li>Low levels of international outrage</li> <li>Low risk of not securing or losing funding</li> <li>Long term availability of appropriate skills and utilities (e.g. Power and water)</li> </ul> <p><b>Assurance of sustainability (Ethical investment)</b></p> <ul style="list-style-type: none"> <li>High levels of ethics including good governance</li> <li>Socially equitable</li> <li>Environmentally sustainable</li> </ul>	<ul style="list-style-type: none"> <li>Shareholder confidence in Makuutu is driven by a combination of economic viability, risk profile and reputation. Shareholders will be sensitive to media criticism about the company and from any local opposition. They will also be concerned about government stability and national security.</li> <li>Makuutu needs to celebrate its successes and in particular partnership programmes with NGOs and local communities. These aspects will feature prominently on the Makuutu Web Page and reports to shareholders. Good international press and feature articles in Mining and other journals will also be of great benefit. It is also essential that the company performs to a high standard. This includes keeping our people safe and delivering strong social and environmental outcomes.</li> </ul>

Stakeholder	Project Expectations	Stakeholder Expectations	Strategy
Financiers	<ul style="list-style-type: none"> <li>Secure Funding Arrangements to sustain Project viability over the life of the Project.</li> </ul>	<p><b>Assurance of good prospects and high returns</b></p> <ul style="list-style-type: none"> <li>Good ore body</li> <li>Low capital costs</li> <li>Low operating costs</li> <li>Long mine-life</li> <li>Secure funding</li> <li>High rate of return</li> <li>Strong share price</li> <li>Strong long-term market</li> </ul> <p><b>Assurance of low risk</b></p> <ul style="list-style-type: none"> <li>Low political risk</li> <li>Low levels of international outrage</li> <li>Low risk of not securing or losing funding</li> <li>Long term availability of appropriate skills and utilities (e.g. Power and water)</li> </ul> <p><b>Assurance of sustainability (Ethical investment)</b></p> <ul style="list-style-type: none"> <li>ESA completed to IFC Standards/Equator Principles</li> <li>High levels of ethics including good governance</li> <li>Socially equitable</li> <li>Environmentally sustainable</li> </ul>	<p>The strategy for financiers is similar to that for shareholders. They also wish to see their investment secured but ethical considerations will be important. Many financiers are signatories to Sustainability Conventions and Agreements and will become a target for criticism if they fund unethical Projects. The Makuutu ESIA has been designed to meet IFC Standards and Equator Principle Guidance and the demonstration of this will be important to Project funders and to shareholder confidence.</p>
Workforce	<ul style="list-style-type: none"> <li>High productivity</li> <li>Efficiency</li> <li>Self-reliance</li> <li>Loyalty</li> <li>High HSEC (Health, Safety, Environment, and Communities) values</li> </ul>	<ul style="list-style-type: none"> <li>Job security</li> <li>Go home safely every day</li> <li>Good wages and conditions</li> <li>A company that cares about them</li> <li>High levels of social and environmental performance</li> </ul>	<p>The workforce will be interested in economic, social and environmental sustainability in addition to their contracted salaries and conditions. They drive performance and suffer the consequences of poor performance. Many will also be deeply concerned about social and environmental performance. Good attitude and work performance will be enhanced by high levels of</p>



Stakeholder	Project Expectations	Stakeholder Expectations	Strategy
			personal commitment and ownership in combination with a capacity to make a difference. An effective intranet, HSEC committee and the provision of good information will all contribute to the development of a competent and well-informed workforce.
Non-Government Organisations (NGOs) and Civil Society Organisations (CSO)	<ul style="list-style-type: none"> <li>• Collaboration in sustainability programmes and access to NGO data</li> <li>• Frank and open dialogue</li> <li>• Good personal relationships (i.e. lack of complaints, good support)</li> </ul>	<ul style="list-style-type: none"> <li>• Commitment to sustainability</li> <li>• Project benefits to be equitable</li> <li>• Social impacts to be mitigated and positives enhanced</li> <li>• Environmental impacts to be mitigated and positives enhanced</li> <li>• Collaboration in sustainability programmes (i.e. funding and in-kind support).</li> </ul> <p>Additionally, local NGOs and CBOs would expect and be interested in the following:</p> <ul style="list-style-type: none"> <li>• Community engagement and sensitisation</li> <li>• Environmental protection</li> <li>• Impact on community wellbeing</li> <li>• Livelihood impacts</li> <li>• Detailed understanding of ongoing issues and societal dynamics in the Area of Influence (AoI)</li> <li>• Corporate Social Responsibility (CSR) activities</li> </ul>	<p>The biggest sustainability risks with the Makuutu Project are:</p> <p>Effective relocation of directly impacted households whilst maintaining their social connection, food security and livelihoods and Managing the in-migration of outsiders to prevent issues with law-and order, communicable diseases, education, poverty and food security.</p> <p>Support of the Ugandan-based and internationally connected NGOs working in these areas is important to securing local and international NGO support for Makuutu's sustainability programmes (reference will be made to the Community Development Plan). These relationships are contingent on the Makuutu Project maintaining high levels of social and environmental commitment and performance.</p>

Stakeholder	Project Expectations	Stakeholder Expectations	Strategy
		<ul style="list-style-type: none"> <li>• Development opportunities, and</li> <li>• Environmental and social impacts.</li> </ul> <p>The local NGOs and CBOs include:</p> <ul style="list-style-type: none"> <li>• Regional Health Integration to Enhance Services in Eastern Uganda (RHITES)</li> <li>• Compassion International</li> <li>• Reproductive Health Uganda (RHU)</li> <li>• Straight Talk Uganda</li> <li>• Strong Minds Uganda</li> <li>• Uganda Project Implementation and Management Centre (UPIMAC), and</li> <li>• Mothers to Mothers (M2M) Uganda.</li> </ul>	
International Community	<ul style="list-style-type: none"> <li>• Positive media</li> <li>• Good personal relationships (i.e. lack of complaints, good support)</li> </ul>	<ul style="list-style-type: none"> <li>• Commitment to sustainability</li> <li>• Project benefits to be equitable</li> <li>• Social impacts to be mitigated and positives enhanced</li> <li>• Environmental impacts to be mitigated and positives enhanced</li> </ul>	<p>International community is a broad category but the general concern is international reputation that will affect shareholder sentiment and the preparedness of financial institutions to lend money for project development. In a general sense international reputation is less influenced by positive marketing, although this doesn't hurt, and more influenced by negative press particularly about HSEC performance. The strategy should therefore be about good on-ground performance driven by good HSEC systems to avoid incidents coupled with a good web-page to ensure "good news" stories are widely disseminated.</p>

Table 119: Criteria for Assessing Stakeholder Vulnerability

Criteria	Description	Threshold Value
<b>Age-Based Vulnerability Criteria</b>		
Elderly Headed Households	Household head is older than 65 years of age and may be frail and dependant on extended family and/or government for support.	Greater than 65 years old.
Elderly Dominated Households	Households that are comprised of a majority of elderly in excess of 65 years in age will have less recourse to support by younger family members.	Where 2/3 of household members are greater than 65 years of age.
Elderly Without Financial Support	Households where elderly are not provided with a state/private pension or financial support, and will be dependent on extended family only.	Where household members greater than 65 years of age do not have access to a pension, or remittances of adult family members.
Child Headed Households	Household head is younger than 18 years of age, which limits potential for integration into local economy and sharing of project benefits.	Household head is aged less than 18 years.
Child Dominated Households	Households that are comprised of mostly children under the age of 15 years in age will have less recourse to support by older family members.	Where 2/3 of household members are less than 15 years of age.
Children Without Financial Support	Households where children do not receive social grants from the state and will be dependent on extended family only.	Where household members are less than 17 years of age, whom do not have access to state grants.
Elderly and Child Dominated Households	Households that are comprised of non-economically active people – namely the elderly and children (>65 and <18), where there is minimal support from adults.	Where household members are exclusively comprised of people above 65 or below 18 years of age.
<b>Pathology Vulnerability Criteria</b>		
Disability	Households that support disabled persons will have reduced labour/income producing potential and require additional resources and support in the care of the disabled person.	Where one or more household members are confirmed as disabled.
<b>Education Vulnerability Criteria</b>		
Household Member Education Status	Households where children do not access primary school level education, which functions as a proxy indicator of household resources availability to send members to school.	Where household members aged between 5 and 13 years of age do not/ have received no education/ below primary school.
<b>Gender Based Vulnerability Criteria</b>		
Female Headed Households	Household head is female and may be disadvantaged in terms of local cultural customs.	Where household head is female.

Criteria	Description	Threshold Value
Female Comprised Households	Households that are comprised of a majority of females, who will have less recourse to project benefits due to local cultural customs and norms.	Where 2/3 of household members are female.
<b>Homestead and Land Tenure Based Vulnerability Criteria</b>		
Tenants	Individuals who are tenants (of both residents and land) have little recourse for compensation, and are subject to the actions of asset owners.	Where the occupant (individual or family) is a tenant in, part of or wholly, the household.
Squatters	Individuals, families or groups of people that do not have legal or customary rights to occupy a building or land.	Where an individual, family or group of people occupy buildings or land without legal or customary entitlements.
Landless	Individuals or households who have a homestead, but do not claim ownership of any other land.	People without formal legal rights and those who have no recognisable legal right to land.
<b>Economic Vulnerability Criteria</b>		
Poverty	Households falling under the generally accepted indicator for poverty as defined by the World Bank.	Households living below poverty line (US\$1.90 per day).
<b>Other Criteria</b>		
Migrants	Individuals, families or groups who reside in an area temporarily and whose lifestyle is migratory.	Individuals or groups of people who are migratory and repeatedly visit an area but only settle for a short period.
Illegal Aliens	Individuals, families or groups that reside in a country without legal status. May include refugees.	Individuals, families or groups residing on-site without legal standing.
Ethnic Minorities	Individuals, families or groups of people who fall into an ethnic minority, where such status results in social and economic discrimination.	Individual or groups of people who are socially and economically discriminated.

### 8.3 Stakeholder Mapping

Stakeholder mapping is undertaken to understand a stakeholder or stakeholder group's influence and potential interest in relation to a project so that tailored consultation approaches can be developed.

Stakeholder interest is defined as, the extent to which the interests of a stakeholder are affected or impacted by the project (refer Table 120) and stakeholder influence is the power that a stakeholder has over the project's outcomes (refer Table 121). An assessment matrix of project impact and stakeholder influence facilitates an assessment of consultation approaches (refer Table 122).



Table 120: Assessing Stakeholder Interest

Interest Level	Definition
High (xxx)	The project potentially has a high positive or negative impact on the interests of the stakeholder.
Medium (xx)	The project potentially has a moderate positive or negative impact on the interests of the stakeholder.
Low (x)	The project potentially has a minor positive or negative impact on the interests of the stakeholder.

Table 121: Assessing Stakeholder Influence

Influence Level	Definition
High (xxx)	The stakeholder or stakeholder group is considered highly influential and has the capacity to stop the project or significantly impact RRM's reputation for example, powerful civil society organisations and individuals who can affect the project's 'social license' to operate.
Medium (xx)	The stakeholder or stakeholder group is considered to have moderate influence and moderate capacity to influence the project or impact RRM's reputation for example, lobby groups, NGOs and small associations.
Low (x)	The stakeholder or stakeholder group is isolated and has limited capacity to exert influence over the project or RRM's reputation for example, stakeholders who lack institutional and social legitimacy, lack awareness on the project or have weak capacity. Isolated communities that are geographically distant are considered to have low influence; however, a group of these communities connected through associations and social media can be considered to have medium influence.

Engagement activities are prioritised on the level of stakeholders' **influence** on the project and the **impact** the project has on stakeholders (refer Table 122). All stakeholders need to be identified and engagement approaches designed and implemented to:

- Effectively communicate project information
- Confirm that provided information has been understood
- Facilitate feedback from stakeholders
- Enable stakeholder input and participation in Project decisions that could affect their lives.

**High influence/Highly impacted:** This group includes local government representatives at district, sub-county and village levels along with identified Project Affected Persons (PAPs) and other vulnerable groups. RRM will appoint Community Liaison Officers (CLO) during the Project construction and operations to link the stakeholders, especially community members to RRM and to support stakeholder engagement through the provision of information and organisation of project meetings.

**High influence/Low impact:** This group includes stakeholders with great influence due to their political position and legal regulatory powers. It includes national level stakeholders, traditional institutions, media and significant NGOs'/ Civil Society Organisations (CSOs) with an interest in the social and environmental impacts of the Project.

**Low influence/Highly impacted:** This group includes indirectly affected communities, business community, local institutions and local public service providers. The stakeholder engagement team will organise community meetings in each of the affected villages to share project information and processes. All discussions between the stakeholder engagement team and community members will be documented by the team and feedback will be provided to the stakeholders.

**Low Influence/Low impact:** This group includes the general public.

Table 122: Stakeholders Influence and Project Impact Analysis Matrix

Stakeholders Categories	Project Impacts						Vulnerability			Influence over the Project						Level of Engagement
	Positive			Negative						Positive			Negative			
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	
Government Ministries; Agencies; Authorities; and Technical Departments		xx				x			x	xxx					x	Inform/Consult & Involve
Affected Districts: Iganga, Mayuge, Bugweri and Bugiri District local government leaders	xxx				xx				x	xxx				xx		Inform/Consult & Involve/Monitor
Affected sub-counties: Immanziro, Buwaaya, Makuutu and Buwunga	xxx				xx				x	xxx				xx		Involve/Collaborate/ Consult/Monitor
Affected Villages	xxx				xx					xxx						Involve/Collaborate/ Consult/Monitor
Village local council Chairpersons	xxx				xx			xx		xxx				xx		Involve/Collaborate/ Consult/Monitor
Project Affected Persons (PAPs)	xxx				xx		xxx			xxx				xx		Involve/Collaborate/ Consult/ Monitor
Women, Youth & Children, Elderly, Village Elders, Business owners, Seasonal farmers/ herdsman and Other groups		xx		xxx			xxx				xx			xx		Involve/Collaborate/ Consult/ Monitor
Council of elders, Clan leaders and Kingdom representatives		xx				x			x	xxx					x	Involve/Collaborate/ Consult/Monitor
Local business associations, National business associations, and Professional bodies		xx			xx				x			x			x	Inform/Consult & Involve
Education and Health Institutions			x			x			x			x			x	Inform
Shareholders	xxx					x			x	xxx						Inform
Financiers	xxx			xxx					x	xxx			xxx			Inform
Workforce	xxx			xxx			xxx			xxx			xxx			Inform/Consult & Involve
Non-Government Organisations and Civil Society Organisations (CSO)		xxx				xxx			x		xx		xxx			Inform/Consult & Involve

## 8.4 ESIA Stakeholder Engagement Objectives and Targets

There are three key performance objectives and strategies to achieve them presented in ESMP Volume 2 Stakeholder Engagement Plan and as summarised in Section 16.2:

- Consult stakeholders and consider their concerns in Project decisions
- Engage Stakeholders in development of Management Plans, and
- Establish strong and enduring relationships with key stakeholders.

## 8.5 Stakeholder Engagement Methods

### 8.5.1 Information Disclosure

To ensure that Makuutu Rare Earths Project information is accessible to all stakeholder groups, information was disclosed in a variety of ways. Stakeholder engagement materials were translated into the local language (Lusoga) and produced in a culturally appropriate manner (refer 123). A presentation of Project Background Information was prepared in English and Lusoga (refer Annex X) and feedback forms were also produced in English and Lusoga (refer Annex XI).

Table 123: Information Disclosure Methods

Project Information to be Disclosed	Method
Information on the project activities, process and project schedule.	<ul style="list-style-type: none"> <li>• Project Background Information Document (PBID) and information leaflets distributed at the village meeting points and made available in key public places;</li> <li>• Presentations given during meetings tailored to the audience in terms of technical detail and language;</li> <li>• Posters displayed in public places; and</li> <li>• Letters delivered by post or email.</li> </ul>
Project documents; Non-Technical Summary of Environmental and Social reports (ESIA, RAP report, etc.)	<ul style="list-style-type: none"> <li>• RRM/Project webpage; and</li> <li>• Copies of Non-Technical Summary of Environmental and Social reports (ESIA, RAP report, etc.) distributed directly to identified stakeholders by hand, post and email.</li> </ul>
Project predicted impacts and proposed mitigation measures.	<ul style="list-style-type: none"> <li>• Press releases and public announcements in local newspapers and on local radio stations;</li> <li>• Posters in public places;</li> <li>• RRM/Project webpage;</li> <li>• Public hearing to inform stakeholders about the project, predicted impacts, proposed mitigation measures and to collect feedback from the authorities and community members.</li> </ul>
Date, time, venue and purpose of upcoming meetings.	<ul style="list-style-type: none"> <li>• Meeting invitations sent at least two weeks prior to meetings;</li> <li>• Mobilisation of community members within the project affected villages with the help of LC1 Chairpersons; and</li> <li>• Meeting posters in public places such as community meeting points, trading centres, Churches and Mosques, Markets etc.</li> </ul>



## 8.6 Stakeholder Engagement Programme

Stakeholder engagement activities during the Project planning phase are structured around the following activities:

- Internal project engagement
- Drilling Activities (*already completed*)
- ESIA Scoping and ToR (*already completed*)
- ESIA Baseline Data Collection (*already completed*)
- ESIA Disclosure; and
- Resettlement Action Planning and Implementation.

### 8.6.1 ESIA Scoping and ToR Phase

Stakeholder engagement and consultations were carried out during the ESIA Scoping and ToR study for the Project in October 2020 and March 2021 (refer Section 8.10.3).

### 8.6.2 Drilling Activities

Stakeholder engagement and consultations were carried out during the Project drilling activities undertaken since March 2021 (refer section 8.10.4).

### 8.6.3 Baseline Data Collection Phase

During the ESIA and socio-economic baseline data collection activities, the socio-economic team gathered socio-economic baseline data, which involved household surveys, focus group discussions and key informant interviews with a focus on communities who would be directly impacted by mining in the first 15 years of operation.

### 8.6.4 ESIA Disclosure

After the ESIA report has been submitted to NEMA, it will be publicly disclosed for stakeholder comments. All feedback received from stakeholders on the impacts, mitigation and monitoring plans will receive a response and, where appropriate, will be incorporated into the final ESIA report or ESIA approval decision.

NEMA will lead the ESIA disclosure process with support from the lead government agencies under the Ministry of Energy and Mineral Development, as required, to align the disclosure process with national and international requirements. This may include; input into the preparation of disclosure presentation materials, advice on which stakeholders including the Government Officials, cultural and religious leaders, project affected communities, research and academic institutions and NGOs/CSOs should be consulted and, general guidance on conducting a process that is free, fair, inclusive, prior and informed.

Key objectives of consultation at this stage will be to:

- Provide stakeholders with an update on the Project and details of the final project description;
- Provide stakeholders with a summary of the Makuutu Rare Earths Project ESIA findings;

- Provide stakeholders with details of the mitigation and enhancement measures proposed to minimise negative Project impacts and maximise potential Project benefits;
- Solicit stakeholder feedback on the accuracy of the impact assessment and the appropriateness of the mitigation measures; and
- Incorporate comments from stakeholders into the final ESIA report or ESIA decision.

Activities to be undertaken as part of ESIA disclosure will be developed in consultation with the RRM and NEMA but are likely to include:

- Using national and local media (radio and newspaper) to announce publication of the ESIA Report, public comment period, and details of the public hearings if required;
- Copies of the ESIA Report distributed directly to stakeholders by hand, post and email;
- Public announcement in local newspapers;
- Publication of the ESIA Report on RRM websites;
- Comment boxes installed in centrally located community buildings in the Project affected communities where the ESIA Report is available, for review; and
- Physical meeting held with stakeholders within the locality area.

### 8.6.5 Resettlement Action Planning and Implementation for the Project

Stakeholder engagement and consultation for Resettlement Action planning will therefore be undertaken during the following RAP activities – even though it is imperative to note that the stakeholder engagement will be an ongoing process throughout the project:

- Initial disclosure of resettlement action planning activities;
- Rapid Aerial (drone) Surveys (RAS) *(if required)*;
- Cadastral Land & Asset Valuation Surveys;
- Legal Due Diligence Surveys;
- Socio-economic Survey and Household Census *(for households not surveyed during the ESIA socio-economic baseline surveys e.g. all asset holders (land users especially) will likely not have been identified at the ESIA stage – as these can only be identified during the asset valuation exercise and following detailed legal due diligence surveys surrounding true ownership)*;
- Public Cut-off Date declaration/announcement;
- Establishment of the Community Based Grievances Management Committee (CBGMC) and inauguration;
- Entitlement matrix dissemination
- Strip map and PAP list display exercise; and
- Disclosure process of RAP documentation before final documentation is produced.

Stakeholder engagement and consultation for resettlement action implementation will be done during the following activities:

- Initial disclosure of resettlement action implementation activities;
- Delivering of compensation packages (including identification of the resettlement land), and;

- Monitoring and Evaluation of Land Acquisition and Resettlement Activities.

#### 8.6.6 Handover of Stakeholder Engagement Activities to RRM's CLOs

RRM will hire and train Community Liaison Officers (CLOs) from affected communities and ensure that they are well equipped to support the contracted consultants during the transition period of RRM taking direct control of stakeholder engagement activities.

#### 8.6.7 Stakeholder Engagement during the Project Construction, Operations and Decommissioning Phases

During the project construction, operations and decommissioning phases, positive stakeholder relationships established during the Project planning phase will be maintained and enhanced (refer Table 124). Owing to the nature of the potential identified impacts of the project, stakeholder engagement activities will be either periodical (e.g., monthly or quarterly) or based on milestones (e.g., prior to the commencement of a key activity that requires stakeholder(s) input or oversight or may affect them temporarily) and be both pro-active and re-active:

- Informing relevant affected stakeholders of the timing and location of project work, including details about where and when access to certain areas will be restricted;
- Active dissemination of information and collection of feedback – regarding method mitigation measures for certain construction activities; and
- Receipt of and attending to any grievances raised via the Grievance Mechanism procedure.

Table 124: Engagement activities to be held during the Project Construction, Operations and Decommissioning Phases (in the absence of any COVID-19 restrictions and under 'normal' (no Covid-19) operating conditions)

Steps	Stakeholders involved	Activities	Responsibility	Timing
<b>Stakeholder engagement activities during the Project Construction Phase</b>				
Announcement of the start of the project construction to local communities	Affected Villages	<ul style="list-style-type: none"> <li>• Disclosure of information on workforce recruitment strategy.</li> <li>• Disclosure of Environmental and Social Management Plan (ESMP) measures and CSR/community development programmes.</li> <li>• Disclosure and explanation/reinforcement of the Grievance mechanism being implemented.</li> <li>• Announcement of restriction of access to areas needed for construction.</li> <li>• Specific meetings with vulnerable groups.</li> </ul>	Project Manager Project CLO (s) Project Health Safety, Environment and Community (HSEC) Manager	1 month before the start of construction activities
Regular Disclosure of information on important construction activities	Directly affected villages, Neighbouring Land owners, Land users (Households and / or communities that may be directly or indirectly affected by the Project.	<ul style="list-style-type: none"> <li>• Before each major activity that may have Environmental and Social (E&amp;S) impacts or create community disturbance (e.g. start of construction, earthworks, dangerous load), the local communities will be informed at least two days in advance.</li> <li>• The local council security team will also be informed two days in advance of each important construction activity that may disturb their daily activities.</li> <li>• In case of any change of the key project construction activities, community members should also be informed of the changes.</li> </ul>	Project Manager Project CLO (s) Project HSEC Manager	Throughout Construction
External engagements	Local authorities (district, municipality, division, LC1 and national level), regulating agencies	<ul style="list-style-type: none"> <li>• Each half year (or more frequently if required, given specific situations that may arise), external reporting on the project activities (progress of construction activities, ESMP, CSR/community development activities, etc.) will be done during</li> </ul>	Project CLO (s) Project Manager Project HSEC Manager	Biannually, during Construction



Steps	Stakeholders involved	Activities	Responsibility	Timing
	and supervising Ministries	<p>a community meeting in all communities already engaged and one on one with local and national authorities.</p> <ul style="list-style-type: none"> <li>Send project progress reports on a bi-yearly basis (or more frequently if required, given specific situations that may arise) to the LCI Chairpersons, the Parish, the divisions, sub-county leaders and the District CAO, the National Regulating Agencies and the supervising Ministries.</li> </ul>		
Grievance Management	Affected villages both directly and indirectly	<ul style="list-style-type: none"> <li>Grievances arising from local communities will continuously be registered, treated and answered as defined in Section 9 and a grievance log maintained.</li> </ul>	Project Manager Project CLO (s) Project HSEC Manager	Continuously during construction
<b>Stakeholder engagement activities during the Project Operations Phase</b>				
Regular disclosure of information for each important activity with potential E&S issues	Directly affected villages, neighbouring land owners, land users, households and / or communities that may be directly or indirectly affected by the proposed project.	<ul style="list-style-type: none"> <li>Before each activity that may have E&amp;S impacts or create community disturbance/nuisance, the local communities will be informed at least two days in advance.</li> </ul>	Project Manager Project CLO (s) Project HSEC Manager	Throughout Operations
External engagements	Local authorities (district, sub-county, village, LC1 and national level), regulating agencies	<ul style="list-style-type: none"> <li>Each year (or more frequently if required, given specific situations that may arise), external engagements on the project activities (progress of operation activities, Licences renewal, CSR/community development activities, etc.) will be undertaken</li> </ul>	Project Manager Project CLO (s) Project HSEC Manager	Annually, during operations

Steps	Stakeholders involved	Activities	Responsibility	Timing
	and supervising Ministries	<p>during a community meeting in all communities already engaged and one on one meetings held with local and national authorities.</p> <ul style="list-style-type: none"> <li>Project update reports will be sent yearly (or more frequently if required, given specific situations that may arise) to the LCI persons, sub county leaders, and the District CAO, the National Regulating Agencies and the supervising Ministries.</li> </ul>		
Grievance Management	Households and / or communities that may be directly or indirectly affected by the proposed project.	<ul style="list-style-type: none"> <li>Grievances arising will be continuously registered, treated and answered as defined in Section 9 below and a grievance log maintained.</li> </ul>	Project Manager Project CLO (s)	Continuously, during operations
<b>Stakeholder engagement activities during the Project Decommissioning Phase</b>				
Regular Disclosure of information for each important activity with potential E&S issues	Directly affected villages, neighbouring Land owners, Land users Households and / or communities that may be directly or indirectly affected by the proposed project.	<ul style="list-style-type: none"> <li>Prior to decommissioning, notify local communities about project decommissioning activities, about any activity that may have E&amp;S impacts or create community disturbance/nuisance, the local communities will be informed at least a month in advance.</li> <li>Sensitise communities/residents along the route for significant traffic movements, including transportation of demolition debris.</li> </ul>	Project HSEC Manager	Prior to decommissioning
External engagements	Local authorities (district, sub-county, village, LC1 and national level), regulating agencies	<ul style="list-style-type: none"> <li>Consultations and engagements related with provision of updates on the decommissioning process and to seek guidance and approvals for the decommissioning activities.</li> </ul>	Project manager Project CLO (s) Project HSEC Manager	Throughout the duration of decommissioning

Steps	Stakeholders involved	Activities	Responsibility	Timing
	and supervising Ministries			
Grievance Management	Households and / or communities that may be directly or indirectly affected by the proposed project.	<ul style="list-style-type: none"> <li>Update and continue to implement a grievance mechanism to address grievances from local stakeholders, treated and answered as defined in Section 9 and a grievance log maintained</li> </ul>	Project Manager Project CLO (s) Project HSEC Manager	Throughout the decommissioning phase

## 8.7 Resources and Responsibilities

Effective stakeholder engagement requires clear lines of communication and effective coordination within the Project, between RRM and the stakeholders. Key participants in the management of stakeholder engagement (refer Figure 44 organisation chart) will include:

- Makuutu Rare Earths Project Manager;
- Makuutu Rare Earths Project HSEC Manager
- Makuutu Rare Earths Community Liaison Officer(s).

Table 125 sets out the key roles and responsibilities required to manage the stakeholder engagement process during the Project planning, construction, operations and decommissioning phases. It is important to note however that, the allocated personnel may be subject to change (i.e., responsibilities might be allocated to different personnel) and the SEP updated accordingly to reflect changes based on the Project staffing and organogram at the time of implementation.

**Table 125: Roles and Responsibilities of the Stakeholder Engagement Team**

Role	Responsibility
Project Manager	Ensure that the staff, resources and systems are in place to enable the implementation of the SEP. Specific tasks include: <ul style="list-style-type: none"> <li>• Ensure the SEP is updated on a regular basis by the Project HSEC Manager and ensure that the grievance mechanism is implemented by the Project CLO (s).</li> </ul>
Project HSEC Manager	<ul style="list-style-type: none"> <li>• Assist the project CLO (s) with liaison and communication with key local and national government agencies, and</li> <li>• Ensure all interactions with stakeholders are agreed in advance with Rwenzori Rare Metals and follow a prescribed approach.</li> </ul>
Project HSEC Manager	Participating in stakeholder engagement activities, monitoring, and supervising any project initiatives. Tasks will include: <ul style="list-style-type: none"> <li>• Ensure that the Rwenzori Rare Metals' procedures related to local stakeholder engagement, community health and safety are respected and followed by the contractor(s) on ground especially the COVID-19 precautions.</li> </ul>
Community Liaison Officer (s) (CLO)	Participating in stakeholder engagement activities, monitoring, and supervising any community initiatives. Tasks will include: <ul style="list-style-type: none"> <li>• Ensure coordination and consistency of engagement across all stakeholders</li> <li>• Manage the coordination of stakeholder engagement activities and provide a bridging relationship between Rwenzori Rare Metals and the local stakeholders</li> <li>• Planning, implementing and conducting day-to-day ongoing management of local stakeholder engagement, including grievances</li> <li>• On-going maintenance of records of formal and informal stakeholder engagement activities</li> </ul>



Role	Responsibility
	<ul style="list-style-type: none"> <li>• Prepare and submit regular reports to the project manager regarding local engagements and grievances</li> <li>• Follow up on local grievances raised and received by the Contractor(s) to ensure that they are resolved in the stipulated time</li> <li>• Document all stakeholder consultations and update the stakeholder engagement log</li> <li>• Follow up on grievances raised and received by the Contractor(s) to ensure that they are resolved in the stipulated time</li> <li>• Register, respond and document all concerns and grievances raised by stakeholders during the project construction and operations phases, and</li> <li>• Identify new Project local stakeholders.</li> </ul>

## 8.8 Reporting, Monitoring and Evaluation

This section presents the reporting, monitoring and evaluation framework of the SEP and how the Project stakeholders will be managed throughout the project lifetime.

### 8.8.1 Record Management

Attendance records and photographs (the latter after seeking consent) of stakeholders will be maintained for all meetings/engagements and minutes will be prepared following the meeting. An Issues and Response Register will be developed to record all stakeholder comments or concerns received from meetings/engagements during the project lifetime.

Transparent documentation of engagement activities will enable the Project to track stakeholders' perceptions and concerns and facilitate the identification of additional stakeholders. To record and track engagement activities and stakeholder comments, the following forms will be used:

- Register of Attendees to record all individuals who will attend the stakeholder meetings/engagement (Annex XII).
- Meeting minutes and photos taken at all meetings to record and document all meeting discussions, and an Issues and Response Register (Annex XII).
- Grievance form (Annex XV) will allow stakeholders to lodge any grievances they may have in relation to the project.
- Grievance Log (Annex VI) will also be used to track and manage all grievances received; and

### 8.8.2 Reporting to Stakeholders

After stakeholder consultations, stakeholders will want to know which of their suggestions have been taken on board, what risk or impact mitigation measures will be put in place to address their concerns, and how project impacts are being monitored. Often the same methods used in information disclosure are applied to reporting to stakeholders. This follow-up can include; large-scale forums, brochures, targeted meetings, and consultative committees (IFC Stakeholder Engagement (2007): A Good Practice Handbook for Companies Doing Business in Emerging Markets).

Reporting to stakeholders involves providing important details on the undertakings, routines, status, and progress of the project team and the project progress. Reporting to stakeholders may also include new or corrected information since the last report. Keeping track of the many commitments made to various stakeholder groups at various times, and communicating progress made against these commitments on a regular basis requires planning and organisation. The methods and frequency of reporting to stakeholders are provided in Table 126.

**Table 126: Methods and Frequency of Reporting to Stakeholders**

<b>Reporting Party</b>	<b>Reporting Method</b>	<b>Stakeholder</b>	<b>Reporting Information</b>	<b>Frequency</b>
Rwenzori Rare Metals	Induction Tool box talks	<ul style="list-style-type: none"> <li>• New groups of workers</li> <li>• Project Contractors, subcontractors and suppliers</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental and social project requirements;</li> <li>• EHS requirements;</li> <li>• Grievance mechanism procedure; and</li> <li>• Employment and the procurement strategies.</li> </ul>	Prior to construction and during construction activities
Rwenzori Rare Metals	Formal meeting; and One on one meetings	<ul style="list-style-type: none"> <li>• National government authorities;</li> <li>• Local authorities (LC1 level to District level);</li> <li>• Local community members; and</li> <li>• Project affected persons.</li> </ul>	<ul style="list-style-type: none"> <li>• Social Investment Plan;</li> <li>• Project status/progress;</li> <li>• Plans for next period; and</li> <li>• Grievance management progress.</li> </ul>	Annually or when need arises
	Press release	<ul style="list-style-type: none"> <li>• Project affected communities;</li> <li>• National and local government authorities;</li> <li>• NGOs; and</li> <li>• General public.</li> </ul>	<ul style="list-style-type: none"> <li>• Employment opportunities;</li> <li>• Project tender information;</li> <li>• Land acquisition plans;</li> <li>• Project status/progress;</li> <li>• Plans for next period;</li> <li>• Changes and issues; and</li> <li>• Grievance mechanism procedure and progress.</li> </ul>	Annually or when need arises

Reporting Party	Reporting Method	Stakeholder	Reporting Information	Frequency
	Public meeting; and One on one meetings.	<ul style="list-style-type: none"> <li>Project Affected Persons and communities.</li> </ul>	<ul style="list-style-type: none"> <li>Project progress;</li> <li>Grievance management progress;</li> <li>Feedback on commitments; and</li> <li>Feedback on other issues affecting community members.</li> </ul>	Annually or when need arises throughout the life of the project
Rwenzori Rare Metals	Website and social media Press release	<ul style="list-style-type: none"> <li>NGOs;</li> <li>General public; and</li> <li>Other local and international stakeholders.</li> </ul>	<ul style="list-style-type: none"> <li>Project status;</li> <li>Changes and key issues; and</li> <li>Frequently Asked questions (FAQs).</li> </ul>	When changes to the project occur or annually.

### 8.8.3 Monitoring and Evaluation

In order to assess the effectiveness of this SEP and associated engagement activities, monitoring processes as part of the overall monitoring of the project implementation and performance will be done as indicated in Table 127.

Table 127: Stakeholder Engagement Monitoring and Evaluation Framework

Focus Area	Objectives	Indicators	Methodology	Frequency
<b>Stakeholder Engagement</b> <i>Have all affected persons and communities been engaged and informed of the project activities?</i>  <i>Has the project made all efforts to engage vulnerable and marginalized groups?</i>	Ongoing monitoring of engagement activities to ensure all stakeholders are identified and engagement approaches designed and implemented that: <ul style="list-style-type: none"> <li>• Drive effective communication of project information;</li> <li>• Support confirmation that information has been understood;</li> <li>• Facilitate feedback from stakeholders; and</li> <li>• Enable stakeholder input and participation in decisions affecting their lives.</li> </ul>	<ul style="list-style-type: none"> <li>• % of scheduled engagement meetings held as planned during the set period (target 70%).</li> <li>• % of Minutes of the meeting and attendance and photos available for meetings held during the set period. (target 100%).</li> <li>• % of scheduled engagement activities carried out with local vulnerable groups (target 70%).</li> </ul>	<ul style="list-style-type: none"> <li>• Check Stakeholder Engagement log</li> <li>• Check Issues and Response Register</li> <li>• Check Stakeholder Engagement log</li> </ul>	Monthly
<b>Concerns and Grievance Mechanism</b> <i>Is the concerns and grievance mechanism known in the affected community?</i>  <i>Have all concerns and grievances been captured?</i>  <i>Have grievances been resolved successfully and in a timely manner?</i>	Ongoing monitoring of the number of grievances to identify any gaps and stakeholders' satisfaction with the grievance mechanism procedure.	<ul style="list-style-type: none"> <li>• No. of grievances and complaints received / month.</li> <li>• No. of active grievances currently within each step of the Concerns and Grievance Mechanism (at a set point in each month).</li> <li>• Nature of grievances currently within each step of the Concerns and Grievance Mechanism (at a set point in each month).</li> <li>• Number of resolved grievances that grievant have appealed.</li> <li>• Nature of appealed grievances.</li> </ul>	<ul style="list-style-type: none"> <li>• Check grievance log</li> <li>• Check grievance log</li> <li>• Check grievance log</li> <li>• Check grievance log</li> <li>• Check grievance log</li> </ul>	Monthly



Focus Area	Objectives	Indicators	Methodology	Frequency
		<ul style="list-style-type: none"> <li>For active grievances - Time period since grievance receipt (target: 14 days).</li> <li>For closed out grievances - time period from grievance receipt to close out for all resolved project related grievances (target: 20 days).</li> <li>Number of times the concerns and grievance mechanism has been communicated to stakeholders (e.g., through presentation and other communication material).</li> </ul>	<ul style="list-style-type: none"> <li>Check grievance log</li> <li>Check Stakeholder Engagement log</li> </ul>	
Vulnerable Groups <i>Have all vulnerable groups been identified and supported?</i>	Ensuring that the needs of vulnerable stakeholders are addressed during project implementation to ensure they are not adversely affected by the change in circumstances brought about by the project.	<ul style="list-style-type: none"> <li>Number of households that have been identified as vulnerable.</li> <li>Type of support given to vulnerable households.</li> <li>Support extended to the identified Vulnerable people/groups</li> </ul>	<ul style="list-style-type: none"> <li>Number of vulnerable households identified.</li> <li>Analysis of % of identified vulnerable households who needs or have received assistance.</li> </ul>	Monthly

## 8.9 Stakeholder Consultation

### 8.9.1 Consultations Matrix

A stakeholder influence and project impact matrix (refer Table 122) was used to prioritise and target stakeholder consultation during the ESIA process. This was followed by an informed consultation and participation process that encompassed:

- National Level stakeholders
- District and Sub-County stakeholders
- Communities
- Technical experts and Government representatives
- Focus Group meetings with Directly Affected Persons, Local Authorities, NGOs CSOs and vulnerable groups.

### 8.9.2 Concerns Raised during the Scoping Phase of the ESIA

During the scoping study, some key stakeholders were met including the Deputy Chief Administrative Officer of Mayuge DLG (refer Figure 157), the Bugweri District Technical team (refer Figure 158), the Mayuge District Environment Officer (refer Figure 159), Bugiri District Environment Officer (refer Figure 160), Buseesa Subcounty officials in Mayuge District (refer Figure 162), village leaders at Buwaiswa Trading center (refer Figure 163) and women at Makandwa village (refer Figure 164).



Figure 157: Courtesy call to the Deputy Chief Administrative Officer of Mayuge DLG



Figure 158: Meeting with Bugweri District Technical team



Figure 159: Meeting with the Mayuge District Environment Officer





Figure 160: Meeting with the Bugiri District Environment Officer



Figure 161: Meeting





Figure 162: Meeting with Buseesa Subcounty officials in Mayuge District



Figure 163: Consulting with village leaders at Buwaiswa Trading center



Figure 164: Consulting Women at Makandwa village

### 8.9.3 Concerns raised during the ESIA Consultation Process

A large number of stakeholder concerns were raised during the Reconnaissance Visit and the formal ESIA stakeholder engagement process (refer Table 128). A consolidated summary of raised concerns and Project management strategies to address raised issues is also presented (refer Table 128).

Table 128: Stakeholder Issues and Concerns captured during the Reconnaissance Visit

Stakeholder consulted	Issues
<b>Bugweri District Local Government</b>  District Natural Resources Officer  District Community Development Officer  District Water Officer  District Land Surveyor  SAS – Igombe Subcounty	<ul style="list-style-type: none"> <li>• There is need to disclose to communities what is happening in Makuutu.</li> <li>• Project information should be shared with the district.</li> <li>• Social safeguards should be taken serious such as the following: Labour and industrial issues, workplace registration, child protection, gender issues, and information disclosure.</li> <li>• The ESIA should consider all stages/ phases of project implementation.</li> <li>• Sampling be undertaken for soil and water to track changes in the future.</li> <li>• The ESIA team should be appointed to avail itself throughout the study to guarantee continuity.</li> <li>• Land issues and wetlands should be well captured.</li> <li>• Engage the required specialists to undertake the ESIA based on the key issues captured during the scoping phase.</li> <li>• Inform the Works Dept about any planned access roads so they can provide input.</li> <li>• The people of Makuutu have welcomed the project but are worried about compensation.</li> <li>• There are a few pockets of resistance in the neighbouring villages that have not been engaged yet.</li> <li>• There is need for the project to tell the people on how they will benefit from the project.</li> <li>• There have been some community engagement activities – the Makuutu Subcounty councilors visited the project area.</li> <li>• The common land tenure is customary – people are now rushing to acquire land titles so they can earn more in terms of compensation.</li> </ul>

Stakeholder consulted	Issues
	<ul style="list-style-type: none"> <li>• The land acquisition and compensation plans by the Developer are not clear. This has potential to trigger resistance by communities – a situation commonly encountered by the District Surveying teams.</li> <li>• The Project should support people who will be displaced. They may get excited because of money but then get vulnerable. Therefore, livelihood issues should be well managed.</li> <li>• Use of drilling muds can contaminate underground water.</li> <li>• There are climate risks – during the rainy season, water sources are prone to contamination.</li> <li>• The District did not anticipate this mining project (not covered in the District Development Plan) and has no capacity to manage the associated risks and impacts.</li> <li>• Makuutu Subcounty has the poorest water potential in Bugweri Subcounty. The population may increase and put pressures on water resources. The project may disrupt settlement patterns and affect the demand for water.</li> <li>• There is a risk of planning conflicts – some towns have physical development plans which should capture the proposed mining activities and sites.</li> <li>• Some schools could be relocated e.g. Makandwa P/S which can affect performance.</li> <li>• Some roads have already been planned in the project areas but have not yet been opened.</li> <li>• Child labour is common in sugarcane plantations and the same may be encountered in the mines.</li> </ul> <p><b>Resident District Commissioner (RDC)</b></p> <ul style="list-style-type: none"> <li>• The people are not worried about the project, it is only the politics.</li> <li>• Some initial engagements done by the Minister of State, Sarah Opendi who addressed some of the local leaders (LC 3 Chairpersons). However, more sensitization of the communities is required. What has been done so far is still inadequate.</li> </ul>
Bugweri District Health Office <b>DHO and Biostatistician</b>	<ul style="list-style-type: none"> <li>• The project is completely new to me and even the DHO does not know about it</li> <li>• Mining can pose human health risks.</li> <li>• There are few health facilities compared to the population, and some have many challenges especially drug stock out, low staffing, poor physical structures, etc.</li> <li>• Water sources may be affected.</li> <li>• DHO receives updated health indicator data that tracks diseases like cancers, neurological disorders, gastronomic disorders, communicable and non-communicable diseases; Ear, Nose and Throat (ENT) conditions; epidemics like malaria.</li> <li>• The project needs to involve DHO office in assessments.</li> </ul>
<b>RRM Project Geologist</b>	<ul style="list-style-type: none"> <li>• The pilot processing plant is expected to be within the licensed exploration areas for Rwenzori Rare Metals.</li> <li>• The proposed Site 1 for the processing plant in Naitandu is good but populated. Displacement of people can hurt the project.</li> <li>• Sites 3 and 4 are outside the licensed area while the biggest part of Site 2 is within the licensed area.</li> </ul>



Stakeholder consulted	Issues
	<ul style="list-style-type: none"> <li>• Site 2 is feasible especially the part north of the swamp in Nakavule village because the area is sparsely populated.</li> <li>• The typical project activities will include excavation and transportation of the clays to the processing plant. Heap leaching is one potential processing method that involves preparing a pond lined with impermeable material. Water and acid are added that percolate through the clays and the liquid is tapped. The acid must be recycled. The typical chemicals used include <math>(\text{NH}_4)_2\text{SO}_4</math> and <math>\text{MgSO}_4</math>.</li> <li>• Some tests were undertaken in Canada 3 years ago regarding the extraction potential of the rare earth metals.</li> <li>• During this exploration phase, samples are collected and shipped to Australia for various tests. Metallurgical tests are meant to recommend the best solvent for extraction which has not been established yet while geological tests are meant to establish the mineral content of the clays.</li> <li>• Drilling is on-going to pick the samples. The typical hole depth is 6-33 meters. 6-inc diameter holes are drilled and a typical working area of 5m x 5m.</li> <li>• Two (2) types of sampling is being done. The geochemical sampling and testing provide information on the concentration of the rare earths from top to bottom of the drilled hole. Metallurgical sampling and testing determine the extraction rate and the suitable extraction processes that can be applied during the actual mining phase. These laboratory tests are used to develop the processing model which shall be scaled up to the pilot processing plant before full scale mining and processing commences.</li> <li>• During the operation phase, communities cannot live within the processing plant area and the mining sites. They would have to vacate such areas since they will be industrial areas.</li> <li>• The project will undertake progressing mining which will ensure progressive displacement of those within the areas to be mined.</li> <li>• All mined pits will be rehabilitated, and the displaced communities can return in case the land was leased to the project.</li> <li>• These are Karoo sediments – you can only encounter coal and methane and not Gold. You can only expect rare earth metals.</li> <li>• Rare earths either occur in clays or hard rocks. For hard rocks, the challenge is usually that the rare earths metals come with radioactive elements (Uranium and Thorium). As you concentrate the rare earths, also the radioactive elements get concentrated and these are dangerous if concentrated. In Uganda, the rare earths occur in the clays that contain negligible levels of radioactive elements. Concentration of the rare earths in the clays cannot lead to any dangerous levels of radioactive elements. That is the good thing about this project.</li> <li>• The project area of interest is a narrow basin about 2 km (North to South). People can therefore be relocated to areas outside the basin (South or North but not East or West).</li> <li>• The project has no interest in sites with hard rocks because the rare earths are in the clays. Therefore, areas such as Naitandu with hard rocks can be used to site the Pilot Processing Plant or to relocate people. The bottom-line is that only areas with clays shall be mined.</li> <li>• The Developer has currently secured exploration licenses. Once the mining sites have been selected, a mining license will be secured for</li> </ul>



Stakeholder consulted	Issues
	<p>specific sites. People can live around the mining areas but not within the sites.</p>
<p><b>Makuutu Subcounty</b></p> <p>S/C Chief</p> <p>Community Development Officer</p>	<ul style="list-style-type: none"> <li>• The Subcounty has benefited from the new houses constructed by the project as part of corporate social responsibility. The Developer has also promised to support the S/C to renovate the ceiling for the Council Hall.</li> <li>• The biggest fear by communities is land grabbing.</li> <li>• People are paid UGX 75,000 for each hole drilled as well as compensated for any damages to crops during the drilling exercise.</li> <li>• The information and sensitization of communities has been limited to mainly the exploration phase. They have been told that if mining starts, people will be told what will happen at that time. Therefore, there is progressive disclosure of information.</li> <li>• People are now eager to secure land titles so they can earn more compensation.</li> <li>• Makuutu S/C with an estimated population of 26,259 people is one of the most populated areas in Bugweri District. The least populated is Igombe Subcounty.</li> <li>• The Subcounty has several staff that can monitor the safeguards issues. These include the Senior Administrative Secretary, the Community Development Officer, Agricultural Officer, Veterinary Officer, the Parish Chief, the Senior Administrative Accountant, and the Health Assistant.</li> <li>• The potential site for the processing plant (Site 1) in Naitandu has some rocks and several enterprises including a few agro-processing units (mainly rice) as well as some model farmers. The area does contribute to the revenue of the Subcounty.</li> </ul>
<p><b>Mayuge District Local Government</b></p> <p>District Environment Officer</p> <p>Physical Planner</p>	<ul style="list-style-type: none"> <li>• The existing roads may be damaged by the trucks hauling the clays to the processing plant – there is need to create alternative routes outside busy areas such as towns and rural growth centres.</li> <li>• The Project should have a clear plan on maintaining the road infrastructure to be used by the project.</li> <li>• There is need for proper sensitization on land issues and how the communities will benefit.</li> <li>• Restoration of the mining pits is critical.</li> <li>• The project's land acquisition model must be clear and communicated to stakeholders.</li> <li>• Capacity building is important – the district technical teams may require training to effectively monitor project implementation.</li> <li>• Stakeholder engagement is important.</li> <li>• The people displaced by the project may end up settling within the wetlands – Mayuge DLG has commenced demarcation of wetlands.</li> <li>• The project can consider some CSR in terms of tree planting and supporting planning activities.</li> <li>• There is no physical development for the entire District. The Ministry of Lands Housing and Urban Development (MLHUD) is supporting a rapid physical development plan. The project should share the GPS coordinates for the earmarked sites so that they can be incorporated.</li> </ul>

Stakeholder consulted	Issues
<p>District Planner</p> <p><b>Resident District Commissioner (RDC)</b></p> <p>Shilok James 0772-382636</p>	<ul style="list-style-type: none"> <li>• The common land tenure is customary – there is need to carry out adequate sensitization.</li> <li>• There are potential conflicts with other planned projects in the same areas. For example, the feasibility for the Bwonda-Mayuge-Isikiro-Iganga road was completed by UNRA to upgrade the road to bituminous standards. But this road traverses some of the areas earmarked for mining which would damage this infrastructure. There is also a plan to supply water to Buwaya town which is also with the targeted mining areas.</li> <li>• For the trading centres/ towns to be affected such as Mbaale and Isikiro, there is need to plan new sites to relocate them. Lugolole is one of the centres with a physical development plan and in this FY 20/21, new roads such as Busiita-Mbaale will be opened.</li> <li>• In terms of physical planning, the mining areas will be demarcated as industrial zones.</li> <li>• Mayuge DLG does not have any previous experience in projects that trigger resettlement similar to what is expected in the proposed mining project.</li> <li>• People must be relocated together with their social services such as schools, health centres, water, etc.</li> <li>• The status of people in terms of access to social services should be maintained.</li> <li>• There are vulnerable groups within the areas targeted for mining. The different genders should be part of the compensation process.</li> <li>• There is need to provide financial literacy to the affected persons as part of the compensation process to mitigate vulnerability and livelihood restoration risks. For example, some of the people compensated for the Standard Gauge Railway (SGR) project are worse off and some have returned to the site for which they were already compensated.</li> <li>• Recommend that people are paid to go and resettle themselves but there should be conditions.</li> <li>• Potential risk of vandalism of project infrastructure – there should be provision of security for all investments and infrastructure. A security committee be established.</li> <li>• The targeted mining areas are inhabited by the Basoga people and the areas are largely peaceful. There are no major land conflicts.</li> <li>• The project must address the common valuation challenges during compensation (i.e., undervaluing or overvaluing land and assets or Government rates vs market rates).</li> <li>• The project is advised to maximize the use of the local labour.</li> </ul>
<p><b>Buwaya Subcounty</b></p> <p>S/C Chief</p>	<ul style="list-style-type: none"> <li>• The drilling team has been hosted at the Subcounty – they utilize social services such as the community borehole.</li> <li>• Unlike the previous drilling activities which was like drilling of boreholes, the new drilling method does not use any drilling muds.</li> <li>• Complaints about noise from the generator and the drilling rig and the fumes that can trigger nausea.</li> <li>• The community claims that the money paid per hole drilled (UGX 75,000) is little.</li> <li>• The communities have been concerned that the drilled holes could be an issue in future.</li> </ul>

Stakeholder consulted	Issues
	<ul style="list-style-type: none"> <li>• There is fear about loss of land.</li> <li>• Some of the people think that the exploration phase (drilling) could be an avenue to take the area's mineral wealth without any pay.</li> <li>• Sensitization is still piece-meal and inconsistent. There are hardly any information education and communication (IEC) materials used except the project maps. The communities are illiterate and cannot comprehend the project information disclosed.</li> <li>• The focus of the sensitizations has been the land issues. The project has promised to pay 3% of the mineral value to the landowners.</li> <li>• The landowners have been told to be patient – land negotiations will commence after completion of the exploration activities.</li> <li>• Sensitization is not appropriate – the project should go beyond the sites targeted for drilling. Media such as radio should be used in addition to posters and public address systems. The meetings organized by the project have been haphazardly done and very brief (20-30 minutes) which is not enough.</li> <li>• Relocation of social services in the trading centres/ town affected should be done within the same parish where they were displaced.</li> <li>• Child labour is big problem – children are involved in rice and sugarcane plantations as well as mining of gold in Bukhooli (Bugiri).</li> <li>• We envisage several benefits mainly jobs.</li> </ul>
<b>District Environment Officer – Bugiri</b>	<ul style="list-style-type: none"> <li>• Drilling has been on-going – the communities are concerned that it could affect their land.</li> <li>• When communities see project staff taking coordinates of the drilled sites, they think the project is surveying to steal their land.</li> <li>• The sites where drilling was done have been fully restored.</li> <li>• Community sensitization remains inadequate – not all stakeholders have been brought onboard. The process should be strengthened. Information disclosed so far is mainly maps. No IEC materials or radio talk shows have been conducted yet.</li> <li>• The actual mining activities have not been disclosed to the communities.</li> <li>• There are planned investments by other projects in some on the areas targeted for mining. This triggers risk of development conflicts. For example, there is planned construction of a store and an agro-processing mill in Bupala Parish under the World Bank supported Agriculture Cluster Development Project (ACDP). World Vision (NGO) has implemented some infrastructure in the targeted areas that could be lost if these are mined.</li> <li>• Some targeted areas have social infrastructure that will be affected. For example, Walugoma which is now a town board has some markets and schools.</li> <li>• Most of the targeted areas are populated and households have small pieces of land but with many children. The price of land is about UGX 3 million an acre. Land is becoming scarce due to many factors including conversion into sugarcane plantations.</li> <li>• Bugiri has no protected areas except wetlands which have been encroached upon and cultivated with rice.</li> <li>• The ESIA should include sampling and testing for water and soil samples.</li> </ul>

Stakeholder consulted	Issues
	<ul style="list-style-type: none"> <li>• Phased mining is recommended to mitigate impacts associated with land acquisition and displacement of communities.</li> <li>• Corporate social responsibility is critical.</li> </ul>
Igombe Sub County Local Government	<ul style="list-style-type: none"> <li>• People need to know the type of minerals to be mined.</li> <li>• We want to know the type of processing methods to be used.</li> <li>• Mining can cause increased cancer cases.</li> <li>• The REE project should work hand in hand with local governments.</li> <li>• Artisanal mining of REE can arise because people may think it is lucrative.</li> <li>• There is need for dialogue during land acquisition.</li> <li>• Major crimes are assault and theft as well as some few cases of rape.</li> <li>• There is need to maintain the quality of water, soil.</li> <li>• Cultural sites should not be affected.</li> <li>• Mining can negatively impact on education.</li> </ul>
Igombe LC 3 Chairperson (Munge Emmanuel – 0776352042)	<ul style="list-style-type: none"> <li>• People do not have firewood, even charcoal is scarce.</li> <li>• The woodlots are depleted.</li> <li>• Unemployment rate is high because even sugarcane growing is no longer profitable.</li> <li>• The project may affect sugarcane plantation owners both aided and unaided out growers.</li> <li>• The MAAIF project i.e. Agriculture Cluster Development Project is supporting farmers.</li> <li>• The proposed Project will revitalize industrialization in our area.</li> </ul>
Health workers at Igombe HC III – Igombe sub county, Bugweri District	<ul style="list-style-type: none"> <li>• The demand for service increases when people know that drugs are in stock.</li> <li>• There is high incidence and prevalence of malaria.</li> <li>• Mosquito nets are only given to post-natal and antenatal mothers, not to everyone in community.</li> <li>• There are non-communicable diseases that may arise from mining e.g. cancers.</li> <li>• HIV/AIDs infections need to be controlled. The new HIV infections are mainly among persons aged 16-40 years especially female aged 16-25 years). There are few STIs/STDs in area. Outreach ART sites may be affected due to relocation of communities.</li> <li>• Hazardous waste may pose a health threat.</li> <li>• Radiations need to be handled properly to avoid contamination with the environment.</li> <li>• Health reporting and disease surveillance will be scaled-up to detect any disaster, condition due to mining.</li> <li>• There are rape cases that are managed through CMR – clinical management of rape and Mental health.</li> <li>• There is an Infection prevention Committee (IPC).</li> </ul>
Makandwa village Site 2	<ul style="list-style-type: none"> <li>• We want the processing plant to be in our area (Naigaga Jane).</li> <li>• We have 5 community groups.</li> <li>• Poor transport and bad roads are a problem.</li> <li>• If they take our land, we shall lose grazing lands and crop fields.</li> <li>• We support the project but want to understand it deeply on how it will affect us.</li> <li>• We grow rice, sugarcane.</li> </ul>



Stakeholder consulted	Issues
	<ul style="list-style-type: none"> <li>The youth should be given jobs.</li> <li>Even our husbands and wives need jobs.</li> </ul>
Small holder farmers	<ul style="list-style-type: none"> <li>We are affected by drought, but we lack irrigation infrastructure.</li> <li>The seeds are of poor quality, some farmers cannot afford to buy good quality seeds.</li> <li>The land is reducing in size as well as fertility.</li> <li>Men and clans / family heads own most of the land.</li> <li>Shall they compensate us for crops lost?</li> </ul>

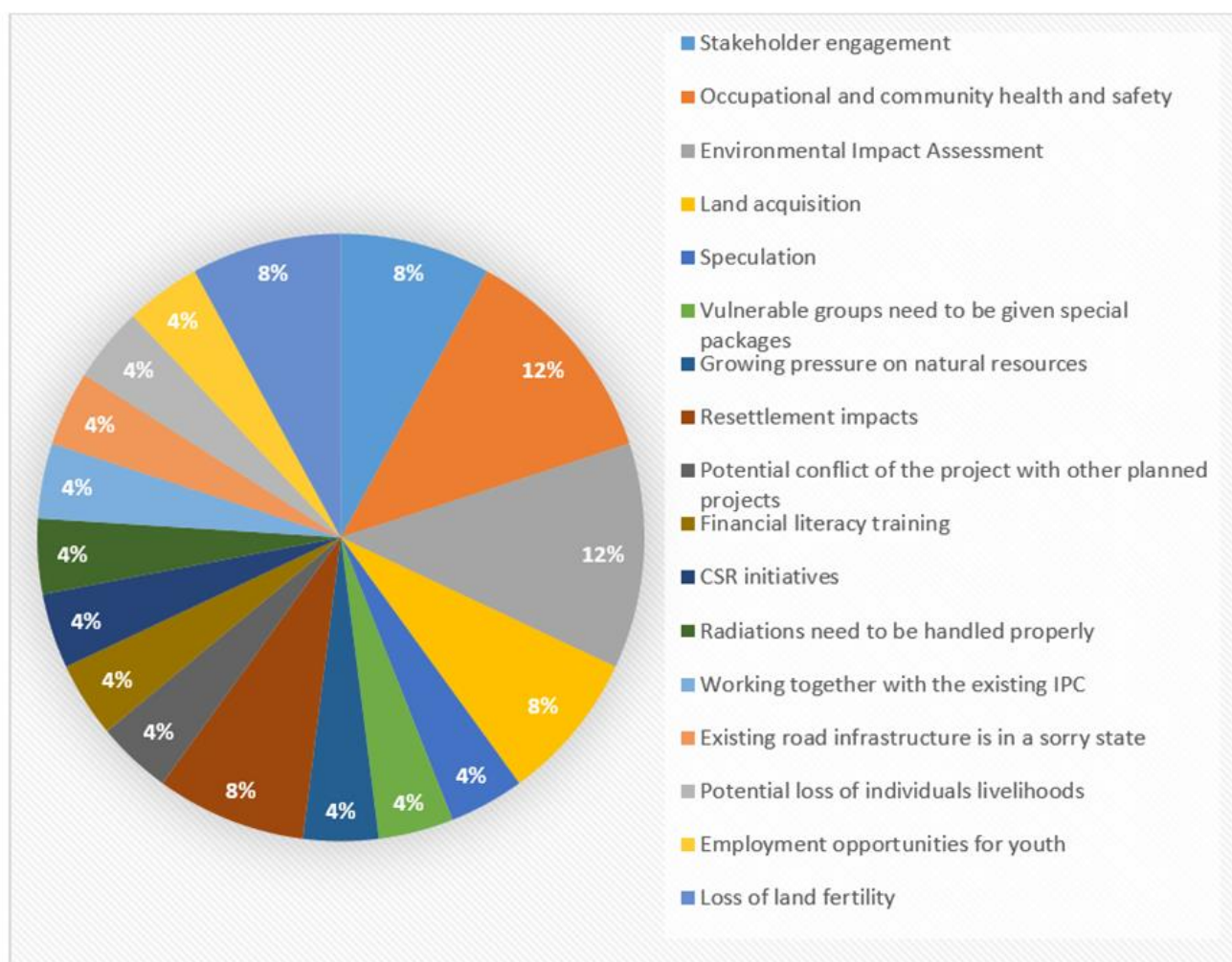


Figure 165: Distribution of key issues received during the ESIA Scoping and ToR Report Phase

#### 8.9.4 Stakeholder Engagement During the Detailed ESIA

The Stakeholder Engagement Team carried out several activities throughout the detailed ESIA process as summarised below (refer Table 129) with minutes appended (refer Annex XII).

Table 129: Summary of Stakeholder Engagement Activities during the ESIA Process

Stakeholder Category	Engagement Method	Date
<ul style="list-style-type: none"> <li><b>Government of Uganda entities:</b> Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), Ministry of Local Government, National Environment Management Authority (NEMA), Directorate of Geological Survey and Mines, Ministry of Energy and Mineral Development (MEMD), Ministry of Gender, Labour and Social Development (MoGLSD).</li> </ul>	Webinar	4 <sup>th</sup> June 2021
<ul style="list-style-type: none"> <li><b>National Non-Government Organisations (NGOs)/Civil Society Organisation (CSOs):</b> Extractive Industries Transparency Initiative (EITI) – Uganda National Secretariat, Advocates Coalition for Development and Environment (ACODE), Uganda Chamber of Mines &amp; Petroleum, Global Rights Alert, National Association of Professional Environmentalists (NAPE), LANDnet Uganda.</li> </ul>	Webinar	4 <sup>th</sup> June 2021
<ul style="list-style-type: none"> <li>Meeting with the Ministry of Water and Environment (MWE)/Directorate of Water Resources Management (DWRM)</li> </ul>	Webinar	13 <sup>th</sup> July 2021
<ul style="list-style-type: none"> <li>Meeting with the National Environment Management Authority (NEMA)</li> </ul>	Webinar	29 <sup>th</sup> July 2021
<ul style="list-style-type: none"> <li>Meeting with Bugweri District Local Government</li> </ul>	Bugweri District Local Government Offices	17 <sup>th</sup> August 2021
<ul style="list-style-type: none"> <li>Meeting with Makuutu Sub-county</li> </ul>	Makuutu Sub-county Offices	17 <sup>th</sup> August 2021
<ul style="list-style-type: none"> <li>Meeting with Igombe Sub-county</li> </ul>	Igombe Sub-county Headquarters	18 <sup>th</sup> August 2021
<ul style="list-style-type: none"> <li>Meeting with Ibulanku Sub-county</li> </ul>	Ibulanku Sub-county Headquarters	18 <sup>th</sup> August 2021
<ul style="list-style-type: none"> <li>Meeting with the Local NGOs (Group I)</li> </ul>	Bugweri District Local Government	19 <sup>th</sup> August 2021
<ul style="list-style-type: none"> <li>Meeting with the Local NGOs (Group II)</li> </ul>	Bugweri District Local Government	20 <sup>th</sup> August 2021
<ul style="list-style-type: none"> <li>Meeting with the Bugweri Chiefdom</li> </ul>	Nile Courts Hotel, Jinja	19 <sup>th</sup> August 2021
<ul style="list-style-type: none"> <li>Meeting with Bugiri District Local Government</li> </ul>	Bugiri District Local Government Headquarters	11 <sup>th</sup> November 2021
<ul style="list-style-type: none"> <li>Meeting with Mayuge District Local Government</li> </ul>	Mayuge District Local Government Headquarters	16 <sup>th</sup> November 2021
<ul style="list-style-type: none"> <li>Meeting with Busoga Kingdom Officials</li> </ul>	Speke Courts Hotel, Jinja	11 <sup>th</sup> November 2021

#### 8.9.4.1 Issues Raised during the detailed ESIA Stakeholder Engagements and Consultations

During the engagement and consultation meetings, a number of issues/concerns were raised as well as suggestions and recommendations by the different stakeholders as summarised below (refer Table 130 and Figure 166). Detailed meeting minutes are appended (refer Annex XII) along with written feedback from community level stakeholders.

Table 130: Issues raised by Stakeholders during the detailed ESIA Engagement and Consultation Activities

Stakeholder	Key Emerging Issues
<b>Level: National Government Ministries and Agencies</b>	
Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), NEMA, Directorate of Geological Survey and Mines, Ministry of Energy and Mineral Development (MEMD), Ministry of Gender, Labour and Social Development (MGLSD)	<ul style="list-style-type: none"> <li>• The project description should be detailed enough to fully inform any person reading about the proposed Project.</li> <li>• In relation to the restoration of the mining pit areas, mining comes with some negative impacts on soil fertility considering the volumes of materials to be extracted. It should be clarified if the overburden going to be removed will be enough to fill the mining pit areas.</li> <li>• What is the net present value of the proposed Project and expected income to the government, for example, in terms of royalties and corporate income tax?</li> </ul>
Ministry of Water and Environment and Directorate of Water Resources Management	<ul style="list-style-type: none"> <li>• Expressed interest in the environmental and socio-economic baseline data because it may be useful in catchment management activities which have been spearheaded by DWRM's water management zones.</li> <li>• Interested in getting some data that will assist MWE/DWRM look at how to protect water sources that have been developed by different stakeholders in the water and environment sector.</li> <li>• In the event that some boreholes are to be affected by the project, MWE/DWRM should be notified about the borehole numbers and the administrative areas so that they can advise on how the Project can handle those water permits.</li> <li>• Need for more elaborate plans to address the contamination risks to water resources.</li> <li>• The ESIA approach should be modified to look at a regional scope, to focus on large scale impacts other than local (project-area specific) impacts only.</li> <li>• Conduct a comprehensive water resource assessment in the area to know the water balance model – such an assessment will prove to be very informative for monitoring purposes.</li> <li>• The 17 rare earth elements to be extracted must be analysed for benchmarking and monitoring of water quality.</li> <li>• What are the environmental impacts that are already experienced in countries like China, South Africa and in the USA where REE are mined?</li> <li>• The effect of the proposed Project activities on agricultural land and settlements should be well elaborated.</li> </ul>
National Environment Management Authority (NEMA)	<ul style="list-style-type: none"> <li>• Elaborate how impacts and impact significance is ranked since this is of interest to a number of stakeholders.</li> <li>• The assessment methodology presented in the report should be precise to simplify the review process.</li> </ul>

Stakeholder	Key Emerging Issues
	<ul style="list-style-type: none"> <li>• Conduct a risk assessment for personnel and environmental resources such as water resources and agricultural land.</li> <li>• The ESMP should be comprehensive, practical and clearly state the roles and interventions that the developer will undertake during the proposed Project implementation.</li> <li>• Liaise with the Directorate of Geological Survey and Mines to come up with a proper mining plan taking into consideration the restoration activities with a preference for successive restoration.</li> <li>• A regulation on chemicals is under preparation and as such, the proposed Project may have more legal requirements to comply with.</li> <li>• Present a detailed waste management plan in the ESIA report. The plan should document all different waste streams and describe how the project developer intends to handle the waste streams.</li> <li>• Ensure that the activities at the processing plant are described in detail and elaborated in the ESIA, especially matters to do with waste and chemical management.</li> <li>• Put in place measures to avoid siltation of the water courses.</li> <li>• The recruitment approach for project workers must be elaborate because this could cause in-migration that will call for an infrastructure management plan to manage social problems that could be associated with the proposed Project.</li> </ul>
<b>Level: National level (NGOs and CSOs)</b>	
Extractive Industries Transparency Initiative (EITI) - Uganda National Secretariat, Advocates Coalition for Development and Environment (ACODE), Uganda Chamber of Mines & Petroleum, Global Rights Alert, National Association of Professional Environmentalists (NAPE), LANDnet Uganda.	<ul style="list-style-type: none"> <li>• Drainage and hydrology are issues that will be sensitive because of the high propensity of the proposed Project to cause pollution in terms of chemicals used when leaching and disposing of the tailings after removing the rare earth materials.</li> <li>• How is the Project prepared to develop the skills of those currently employed in sugarcane plantations, seeing that some of the plantations may be affected by the proposed project activities?</li> <li>• What does the project developer plan to do if they find that there are important cultural sites within the Project area?</li> <li>• How is the Project going to make sure that both men and women are involved and that women are supported in the land acquisition process?</li> </ul>
<b>Level: Local Government Authorities</b>	



Stakeholder	Key Emerging Issues
Bugweri District Local Government	<ul style="list-style-type: none"> <li>• Are there plans to replicate such consultation meetings within the project host communities?</li> <li>• There is need to engage with the cultural leaders because they wish to be part of the process.</li> <li>• What mitigation plans are in place to manage impacts such as workers' compensation, sexual harassment, and health and safety?</li> <li>• What partnerships can be formed between the district and the project developer for matters of road infrastructure development?</li> <li>• Provide details regarding land management processes related to the proposed Project.</li> <li>• Is there a plan to engage the with the district council? This is because the district council is the political leadership of the district.</li> <li>• Elaborate the impacts of the proposed Project such as impacts on agricultural activities, food security and establishment of emergency services.</li> <li>• The Environmental and Social Management Plan should be implemented rather than being left on paper.</li> </ul>
Bugiri District Local Government	<ul style="list-style-type: none"> <li>• As Community Development Officers, how are we going to be facilitated to sensitise people about the Makuutu Rare Earth Project?</li> <li>• Engagement meetings should be taken down at the sub-county and village level so that people can get more project-specific information.</li> <li>• As Bugiri Municipality, this is the first time to hear about this Project.</li> <li>• What kind of minerals will be mined?</li> <li>• Will the Project affect the entire village or part of the village?</li> <li>• Previously, I received people from RRM who marked nine (9) potentially affected villages, but the invitation letter to this meeting indicated additional villages. Why is this so?</li> <li>• People were not happy with the money given to them during the test pit exercise. One of the land owners refused the money in as much as he allowed the project team to go on with their exercise on his land.</li> <li>• Will RRM compensate people in the event that their houses are affected by the Project?</li> <li>• RRM/the stakeholder engagement team needs to engage the community so that people can get information about the Project.</li> <li>• The PowerPoint presentation was elaborate, and there seems to be a good plan for addressing potential issues. However, project commitments at inception may sometimes not materialise during project implementation. What is the assurance that RRM will remain committed to the current plan?</li> <li>• For future engagements, plan to make use of visual presentations such as videos that can be better understood.</li> <li>• Apart from resettlement, what are the other foreseeable negative impacts of the Project?</li> </ul>
Mayuge District Local Government	<ul style="list-style-type: none"> <li>• The project cost-benefit analysis should be clarified.</li> <li>• What are the direct benefits for the peasants, especially those to be displaced by the Project?</li> </ul>

Stakeholder	Key Emerging Issues
	<ul style="list-style-type: none"> <li>• What happens in between project time and restoration time and time for taking people back to their land?</li> <li>• When shall we hear from Atacama after this engagement?</li> <li>• Are we going to discuss the Resettlement Action Plan (RAP)</li> <li>• RRM and the consultant should plan for more engagements so as to provide more detailed project information to the stakeholders</li> <li>• What should we expect out of Rare Earth Elements (REE)?</li> <li>• What criteria will be used to identify households eligible to receive cash and in-kind compensation?</li> <li>• Previously, mining in Mayuge District has been restricted to sand and stones. This project is, therefore, one of a kind.</li> <li>• The economic aspect of the Project and benefits to the people should be clarified to indicate whether the 1% of annual project revenue is part of RRM's CSR activities or part of the royalty plan.</li> <li>• The royalty plan for the various sub-counties should be clarified.</li> <li>• The economic aspect of the Project to the people of Mayuge District should be clarified.</li> <li>• It is likely that the whole of Mbaale Trading Centre will be affected by displacement. Following compensation, will the people be allowed to resettle wherever they wish, or is there a plan for establishing a resettlement village nearby?</li> <li>• Regarding the waste management of the Project, it is better for RRM to consider modern techniques of waste management since the proposed constructed wetland will not perform the real treatment just like a natural wetland within Makuutu Sub-county would.</li> <li>• The Project has taken a number of years at the exploration stage, and the potential areas for minerals have been marked out. Because of that, no activity has been undertaken on the land since then, and thus the Consultant should clarify whether the lost productivity will be considered at the time of compensation.</li> <li>• The ponds left after mining will be a source of stagnant water and breeding grounds for mosquitoes. As such, malaria and other water-borne diseases are expected. A plan for the health system which addresses such concerns should be provided.</li> <li>• The Ministry of Works and Transport plans to upgrade Iganga-Busikiro-Mbaale road, and the project plans to excavate in such areas. RRM is advised to engage with the Ministry of Works and Transport before mining activities start.</li> <li>• The main purpose of the ESIA is to come up with proposals or mitigation measures so that the Project does not become a curse. It is therefore advisable that a Resettlement Action Plan is prepared in consultation with the district so that affected people can be resettled smoothly.</li> <li>• The proposed shallow open pit mining presents a challenge of management of overburdened soils as these may also contain radioactive elements such as Uranium which was identified in Mayuge District by a series of studies. A mechanism to handle the possibility should be provided.</li> </ul>

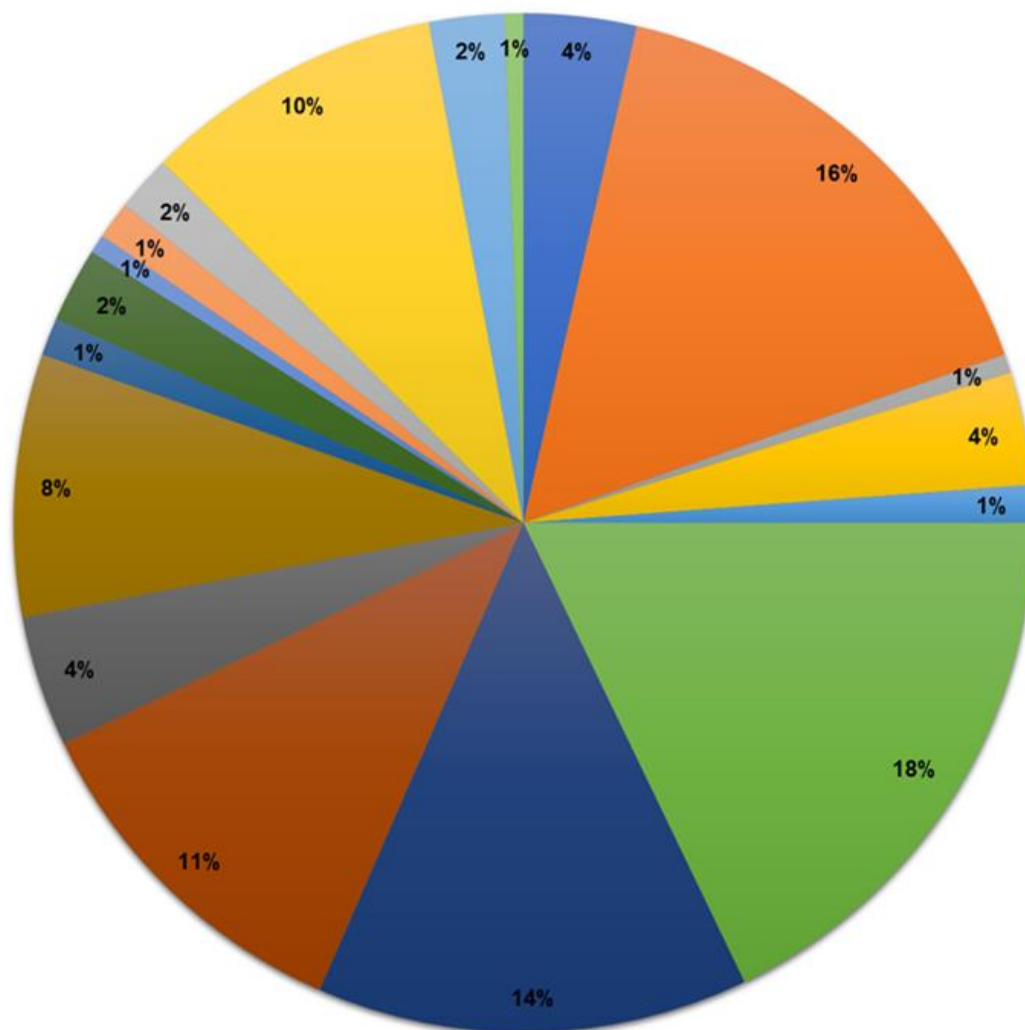
Stakeholder	Key Emerging Issues
	<ul style="list-style-type: none"> <li>• There is a need to carry out ecological analysis to identify the species to be affected so that during restoration, the affected species are replanted other than introducing new ones that may not save the purpose of environmental conservation.</li> <li>• During mining, the air quality will be altered, and thus RRM should consider equipping hospitals with staff skills and facilities to manage such life-threatening situations as part CSR.</li> <li>• The road network is going to be destroyed as a result of the Project and therefore RRM, should provide a plan for improving the existing roads as well as rehabilitating roads destroyed due to project activities.</li> <li>• RRM intends to extract rare earth metals, but there are also other raw materials that shall be extracted from the environment in the process. RRM should therefore seek approval for the use of every raw material, especially the natural resource materials like stones, sand and forest resources, among others in line with the Mayuge District Natural Resource Management Ordinance.</li> <li>• There shall be a change in the surface and underground hydrological cycle. Excavation of ditches which will potentially affect borehole yields especially during the dry season as well as siltation of springs during the wet season. RRM should consider providing alternative water sources to the affected communities.</li> <li>• Immigration due to the movement of people seeking job opportunities may lead to moral degeneration and promiscuity. To mitigate against such impacts, RRM should consider, as a priority, employing the local people from Mayuge.</li> <li>• In the ESIA report, I expect the Consultant to disclosure information about the project turnover so that we determine the 1% for the local development, but also it will be the basis to determine different royalties and taxes that the district is supposed to benefit.</li> <li>• RRM should furnish Mayuge District Local Government and the respective sub-counties with the exploration licenses before the ESIA report is approved.</li> <li>• RRM should provide Mayuge District Local Government and the respective sub-counties with a site layout plan for the entire project before the final approval is given by NEMA.</li> </ul>
Igombe Sub County, Kikuyus Parish, Businda B village officials	<ul style="list-style-type: none"> <li>• Clarify the types of minerals present and in which villages they are located in this sub-county.</li> <li>• How will it be ensured that the right claimants are the ones that receive compensation?</li> <li>• Provide clarification on aspects of the proposed Project such as relocating potential Project Affected Persons, building houses for relocated persons and leases on the land as attained by the project developer. When the lease on the land expires, will the land automatically revert to the previous owners who may have been relocated?</li> <li>• We have heard from a neighbouring sub-county that land surveys are being undertaken in a process that is not transparent/fair. Should there be hope that such will not be the case here in Igombe Sub-county?</li> <li>• How will you handle cases where potential PAPs receive partial compensation for land that will not immediately be utilised by the project developer?</li> </ul>

Stakeholder	Key Emerging Issues
	<ul style="list-style-type: none"> <li>• Clarify whether the local service tax will be collected by the district or the sub-county?</li> <li>• How will local communities' benefit from the project?</li> <li>• What criteria will be followed to enlist workers on the project activities?</li> </ul>
Ibulanku Sub-county, Buniantole Parish, Namiganda Parish, Buniantole village, Kabugweri village and Namiganda village officials	<ul style="list-style-type: none"> <li>• Highlight the negative consequences of the proposed Project for understanding purposes.</li> <li>• What kind of rare minerals is the proposed Project going to extract from the area?</li> <li>• When is the proposed Project expected to commence?</li> <li>• Is it possible for the proposed Project to set up a health centre within the area to boost service delivery?</li> <li>• Will the proposed Project allow people in this area to tap on the proposed electricity generation facilities at a free cost without having to pay electricity bills?</li> <li>• At the end of the proposed Project lifespan, will the electricity be left for the existing local communities or will it be decommissioned?</li> <li>• Will potential Project Affected Persons be compensated?</li> <li>• As a sub-county how do we benefit in terms of taxes?</li> <li>• Is the compensation rate developed by the project developer or the district?</li> <li>• Will the projected 2000 workers come from the local communities?</li> <li>• Upon project decommissioning, when will the project developer return the land to the land owners?</li> </ul>
Makuutu Sub-county, Makandwa Parish, Mawololo, Makandwa Central and Nakavule village officials	<ul style="list-style-type: none"> <li>• Significant concern about resettlement, compensation and maintenance of livelihoods. Particularly concerned about timing for resettlement and clarity on where they will be resettled.</li> <li>• Worried about Project impact on water and agricultural production.</li> <li>• Would like to see the project deliver employment and improved social services and particularly with respect to roads and community health.</li> <li>• Will community members be consulted about the Project?</li> <li>• Is there going to be a process of counting members in the community that will be potentially affected by the proposed Project such that all can be compensated accordingly?</li> <li>• At what time and dates will the project consultation radio programmes be aired?</li> </ul>
<b>Level: Cultural Leaders</b>	
Busoga Kingdom Officials	<ul style="list-style-type: none"> <li>• How will the local people, especially the youth, benefit from the Project?</li> <li>• The project lifetime is currently estimated at 27 years; by then, it will be difficult for people to go back to their land. If you work with the Kingdom, it may ease the process of tracing the former settlers and bringing them back to their land.</li> <li>• With the Project taking 15 years in Bugweri District, what mechanism of checks and balances is in place to make sure that the three (3) districts share the project benefits when the Project starts?</li> <li>• Did you go through the local authorities and the Kingdom to sign the Sales Purchase Agreement, the Non-Circumvention, Non-Disclosure &amp; Working Agreement (NCNDA) and the Irrevocable Master Fee Protection Agreement (IMFPA)?</li> <li>• Will you sign a Memorandum of Understanding with the chiefdoms?</li> <li>• Will the land be returned to the former owners at the end of the project lifetime?</li> </ul>



Stakeholder	Key Emerging Issues
	<ul style="list-style-type: none"> <li>• Before recruitment in Bugweri District, potential employees should be sent to the office of the Prime Minister, Bukooli Chiefdom for verification.</li> <li>• How will Bukooli Chiefdom benefit from the Project?</li> <li>• Many times, we (leaders) receive Projects like this one with the hope that they will benefit our communities but they end up affecting our communities. For example in Busia District, children are involved in the mining activities and they might not be able to go back to school. What mechanisms are in place to protect the children within the communities affected by this mining project?</li> <li>• RRM needs to indicate the percentage share of benefits to Bukooli Chiefdom.</li> <li>• One of the people from Bukooli Chiefdom should be a partner on this Project.</li> <li>• At the time of project implementation, you never consult with the chiefdoms but instead work with the district and the CAO. This is not acceptable.</li> <li>• Children from Bukooli must get jobs. The chiefdom is not begging but instructing RRM not to source for employees from elsewhere.</li> <li>• Bukooli Chiefdom is interested in signing a Memorandum of Understanding with RRM regarding the sharing of project profits/proceeds. It will be good for RRM to indicate within the Memorandum of Understanding the profit percentage share to Busoga Kingdom.</li> <li>• We need to know the starting wage for workers.</li> <li>• Going forward, the Kingdom should be represented in all district meetings.</li> <li>• Without a signed agreement, Bukooli Chiefdom has not accepted the Project.</li> <li>• Will the Project provide insurance to workers in case of injuries?</li> <li>• In the event that cultural heritage and archaeological sites are affected by the Project, will RRM pay for their relocation?</li> <li>• Before signing a Memorandum of Understanding with the districts, RRM needs to sign an MoU with Busoga Kingdom.</li> </ul>
Bugweri Chiefdom	<ul style="list-style-type: none"> <li>• How will compensation be affected in cases where people will have to be moved along with graves on their land?</li> <li>• How will you ensure that the quality of the top soil is maintained when it is kept for 27 years?</li> <li>• What are the mechanisms in place local people getting only the lowest paying jobs?</li> <li>• Are there mechanisms to build capacity of the locals in managing infrastructure left behind by the proposed Project such as schools and health centres?</li> <li>• Disclose the skills required on the proposed Project disclosed to enable the community leadership to do deliberate pre-skilling to provide more specialised services to the proposed Project.</li> <li>• To have a lasting impact on the community, we propose for the proposed Project to construct permanent roads.</li> <li>• Ensure that our views are very explicitly expressed in writing.</li> <li>• There is a need for a Liaison Officer to be employed by the proposed Project to ensure that the Chiefdom's interests are well represented.</li> <li>• Will Project Affected Persons (PAPs) be compensated for only areas where minerals will be found or for their entire land taking into consideration that after minerals are extracted, the surrounding land may not be usable at all?</li> </ul>

Stakeholder	Key Emerging Issues
	<ul style="list-style-type: none"> <li>Memorandum of Understanding between Bugweri Chiefdom and Makuutu Rare Earths Project should be signed.</li> <li>Cultural sites that might be affected by the project should be handled carefully.</li> </ul>
<b>Level: Local Level (NGOs and CSOs)</b>	
<p>NGO Group I Engagement</p> <p>Participants included USAID/CARE/MUCOBAD, Bugweri Farmers' Association and the Multipurpose CSO.</p>	<ul style="list-style-type: none"> <li>Will the land revert to its original owners who might be displaced by the proposed Project activities?</li> <li>How do you intend to handle case where some land owners refuse to lease land to the project developers?</li> <li>Clarify whether the chemical that will be used to leach the minerals from the clay will not harm people or the environment.</li> <li>How will the proposed Project support communities during unfortunate incidents?</li> <li>How will the proposed Project handle communities that are negatively impacted?</li> <li>How will cases of child labour be avoided?</li> <li>Will the project have Corporate Social Responsibility activities aimed at helping persons living with HIV?</li> <li>Ensure that the proposed Project fully compensates all potential Project Affected Persons.</li> <li>What kind of jobs will be available for members of the local community?</li> </ul>
<p>NGO Group II Engagement</p> <p>Participants included Women in Leadership and New Life Organisation.</p>	<ul style="list-style-type: none"> <li>During land acquisition, provide specific details on how land will be acquired and handed back to the respective land owners following completion of the proposed Project given that land is of importance in Busoga region.</li> <li>Will the proposed Project construct roads/maintain the existing roads?</li> <li>There is need for the proposed Project team to execute exactly what is promised to avoid cases of community retaliation.</li> <li>Will the extraction of minerals from underground disrupt water supply and the water table?</li> <li>How are the NGOs going to be involved in the upcoming proposed Project activities?</li> </ul>
<p>Summary of issues raised to RRM during the community consultations undertaken by RRM's drilling team in March, 2021.</p>	<ul style="list-style-type: none"> <li>Concerns about the drilling mission to be a cover up for a much bigger scheme of confiscating the land.</li> <li>Crop damage payment: Is the payment going to be done before or after drilling? Clarification on the resettlement and location matters.</li> <li>In case the planned drill hole position falls inside someone's house, would RRM demolish the house in order to execute the work?</li> <li>Are there going to be employment opportunities for locals during the mission?</li> <li>What is the value of the minerals contained in the samples that were to be taken?</li> </ul>



- Benefits for local people and the government
- Increased traffic volumes
- Share project information
- Displacement and compensation
- Land Use/Land Management/Food security
- Management of grievance
- In-migration (influx of workers)
- Gender issues and sexual harassment
- Health and safety (PPE, HIV/AIDS awareness)
- Project description and the negative and positive impacts
- Pollution (Soil, air, waste, noise)
- Engage relevant national and local stakeholders
- Water resources (quality, quantity, and drainage)
- Employment
- Restoration
- Cultural Heritage Management
- Infrastructure development
- Implementation of the recommendations

Figure 166: Percentage Distribution of the key concerns raised during the detailed ESIA stakeholder engagements and consultations

#### 8.9.4.2 Key Issues Raised by Stakeholders and Project Response

The following is a consolidated summary of the key issues raised by stakeholders during the ESIA process and the Project Response (refer Table 131).

**Table 131: Consolidated List of Stakeholder Concerns and Project Response**

Key Concern	ESIA Section	Response Summary
<b>General Concerns</b>		
In the event that cultural heritage and archaeological sites are affected by the Project, will RRM pay for their relocation?	10.7.2.8	The study team has undertaken transect-based foot walk surveys within the Project area in Year 1- Year 10 Makuutu Central Mining Pit, marking all important archaeological and cultural heritage spots as well as examining the identified artefacts in the field. A Cultural Heritage Management Plan (CHMP) and a Chance Finds Procedure (CFP) have been prepared as additional management tools to guide how archaeological finds will be managed during project implementation. Refer to Section 10.7.2.8 for a detailed discussion on cultural heritage
Will the Project provide insurance to workers in case of injuries?	11.9	The Project commits to the safety of its employees, contractors and subcontractors at worksites and other places of work, and it will operate in collaboration with and to the requirements of the local health authorities.  All project employees will be equipped with and use, appropriate personal protective equipment (PPE) to adequately protect them from hazards associated with their specific occupation in accordance with Section 19 of the Uganda Occupational Safety and Health Act, 2006.  The Project will also comply with the Government of Uganda's Workers' Compensation Act, 2000, which outlines the compensation to workers for injuries suffered and scheduled diseases incurred during the course of employment.
Without a signed agreement, Bukooli Chiefdom has not accepted the Project.	4.9	Rwenzori Rare Metals has not yet signed any MoUs with any authority at the national and local government level because the Project is still at the exploration level. RRM will continue working closely with all relevant authorities and engaging them at all project development phases for harmony and the social licence to operate as well as signing MOUs with Chiefdoms.
Going forward, the Kingdom should be represented in all district meetings.	11.2	RRM will continue working closely with all relevant authorities/stakeholders and engaging them at all project development phases. According to the Project Stakeholder Engagement Plan (Refer section 11.2 of the ESIA), stakeholders will be consulted and engaged based on the specific engagement and consultation objectives.
We need to know the starting wage for workers.	5.2	At the time of preparation of the ESIA report, the wages for workers had not yet been determined. However, they will largely be determined based on good labour and working conditions and acceptable wage rates within the country, the district and the sector.
Children from Bukooli must get jobs. The chiefdom is not begging but instructing RRM not to source for employees from elsewhere.	4.9	The Project will need workers of various skills that will range from skilled and semi-skilled labour as well as casual labour and will. look to employ locals in the first instance. Community members will be enlisted according to their skills. Where personnel with required skills are not available and are sourced from outside Uganda, the personnel will be required to train Ugandans who will then be capable of undertaking these roles after seven (7) years.
At the time of project implementation, you never consult with the chiefdoms but instead work with the district and the CAO. This is not acceptable.	8	RRM will continue working closely with all relevant authorities/stakeholders and engaging them at all project development phases.
One of the people from Bukooli Chiefdom should be a partner on this Project.	11.3	The Project will work closely with all relevant stakeholders in streamlining and implementing community development programmes – refer to Section 11.3 of the ESIA report.



Key Concern	ESIA Section	Response Summary
Many times, we (leaders) receive Projects like this one with the hope that they will benefit our communities but they end up affecting our communities. For example, in Busia District, children are involved in the mining activities and they might not be able to go back to school. What mechanisms are in place to protect the children within the communities affected by this mining project?	9.2.9.17	<p>The Makuutu Project will abide by Ugandan Law, International Conventions to which Uganda is a signatory and Company Policy to protect vulnerable people, including children and will not be employing any children. The impact associated with child labour has been identified and assessed in Section 9.2.9.17 of the ESIA report.</p> <p>Project employment will follow the Ugandan Employment Act (2006), Section 32, which forbids the employment of anyone under the age of 18.</p> <p>In accordance with the Ugandan Employment Act (2006), Section 32, the employment of anyone under the age of 18 will be forbidden in regards to the proposed Project activities.</p>
Before recruitment in Bugweri District, potential employees should be sent to the office of the Prime Minister, Bukooli Chieftdom for verification.	4.9	This has been noted. RRM would look to employ people local to the area provided they have the necessary qualifications, skills and experience. The company is committed to employ from the region, and will sign an MOU with Kingdom to agree on possible employment effort. It must be however noted that it won't always be possible to get qualified people from the area. However, the company commits to providing opportunities for training for the youth within the region.
Did you go through the local authorities and the Kingdom to sign the Sales Purchase Agreement, the Non-Circumvention, Non-Disclosure & Working Agreement (NCNDA) and the Irrevocable Master Fee Protection Agreement (IMFPA)?	11.1.2	RRM will take all steps necessary to ensure that the Project is compliant with all Ugandan legal and regulatory frameworks. RRM has not yet signed such documents with any authority at the national and local government level because the Project is still at the exploration stage.
With the Project taking 15 years in Bugweri District, what mechanism of checks and balances is in place to make sure that the three (3) districts share the project benefits when the Project starts?	4.7	While mining and processing will commence in Bugweri there will be ongoing exploration and test-work across the project footprint and all Districts will benefit from social programmes funded directly by the Project and from Project Royalties as well as employment and infrastructure development. The project will have a Community Development Plan (CDP) that will indicate how it (project) will contribute to various causes in the project area to benefit local communities. Some of these contributions might be in the areas of improving the road network, schools, medical facilities, farming practices and skilling of youth. Communities will be invited to contribute/make input into the development of the CDP – refer to Section 11.3 that provides further insights into community development.
The project lifetime is currently estimated at 27 years; by then, it will be difficult for people to go back to their land. If you work with the Kingdom, it may ease the process of tracing the former settlers and	11.4	The staged nature of mining and resettlement will greatly mitigate social impact. People will be resettled to a new house with replacement land or sustained livelihoods in addition to compensation for loss of assets when their land is needed. The land will then be restored to productive use before being handed back to the community.

Key Concern	ESIA Section	Response Summary
bringing them back to their land.		
RRM should provide Mayuge District Local Government and the respective sub-counties with a site layout plan for the entire project before the final approval is given by NEMA.	6.3.3.4	Section 3.3.4 of the ESIA report includes a detailed site layout for the Project.
RRM should furnish Mayuge District Local Government and the respective sub-counties with the exploration licenses before the ESIA report is approved.	9.2.8.12	The exploration and retention licenses will be sent to the district, through the CAO. At the time of submission of the ESIA report, RRM had not yet received mining licenses from the Ministry of Energy and Mineral Development because the project was still in the exploration phase, which will determine the next project development phase, i.e., mining. The mining licenses, upon receipt, will be shared with the relevant authorities.
RRM intends to extract rare earth metals, but there are also other raw materials that shall be extracted from the environment in the process. RRM should therefore seek approval for the use of every raw material, especially the natural resource materials like stones, sand and forest resources, among others in line with the Mayuge District Natural Resource Management Ordinance.	9.2.8.12	The project may need rock to sheet haul roads which would be obtained from properly licensed quarries. RRM shall seek approvals from the relevant authorities before using any natural resource material.
During mining, the air quality will be altered, and thus RRM should consider equipping hospitals with staff skills and facilities to manage such life-threatening situations as part CSR.	6.1.4	The Project is not expected to impact community health. Dust will be well controlled and there will no other emissions that could impact community health. Mining roads and haul roads will be completely separated from public roads but the need for strategic support to generally upgrade local roads will be undertaken in consultation with District Planners. Support will also be provided to upgrading hospitals and other social infrastructure in consultation with District Planners.
There is a need to carry out ecological analysis to identify the species to be affected so that during restoration, the affected species are replanted other than introducing new ones that may not save the purpose of environmental conservation.	9.2.6.2	Most of the Project area is currently degraded farmland that will be returned to high quality farmland. Rare species such a Mvule ( <i>Milicia excelsa</i> ) will be included in the rehabilitation area and opportunities will also be taken to create wildlife habitat as well as to work with stakeholders to restore degraded wetlands downstream of mining areas. Section 6.7.2.2 of the ESIA lists the plants identified during the flora surveys. Special attention will be given to IUCN listed species, and during restoration, native trees will be replanted.
The proposed shallow open pit mining presents a challenge of management of overburdened soils as these may also contain	3.3.1	The Makuutu Project, typical of Ionic Adsorption Clay REE deposits, has very levels of Thorium and Uranium and no challenges with radionuclides. The baseline surface and groundwater also indicate very low levels of Uranium below the 0.01 mg/L detection level and of Thorium which was also very low and mainly below the 0.5 mg/L detection limit.

Key Concern	ESIA Section	Response Summary
radioactive elements such as Uranium which was identified in Mayuge District by a series of studies. A mechanism to handle the possibility should be provided.		For water monitoring purposes, the project will routinely monitor the mining areas around the process plant and all the downstream water bodies and points of discharge to confirm that there is no contamination.
The Ministry of Works and Transport plans to upgrade Iganga-Busikiro-Mbaale road, and the project plans to excavate in such areas. RRM is advised to engage with the Ministry of Works and Transport before mining activities start.	11.5	The Project will collaborate with District Planners to upgrade some shared public roads as described in the Emergency Management Plan as summarized in Section 16.5 in particular. Internal roads will not be shared with the public but some internal mining roads within established rehabilitated areas might be left as permanent access roads
The Project has taken a number of years at the exploration stage, and the potential areas for minerals have been marked out. Because of that, no activity has been undertaken on the land since then, and thus the Consultant should clarify whether the lost productivity will be considered at the time of compensation.	11.4	The important point is that any resettlement will be staged in line with the mining plan. Landowners will continue to use their land as they always have until it is needed. They will then be resettled to a new house with replacement land and restored livelihoods. Mined land will then be restored to productive agricultural land to support livelihoods. As the proposed project advances, Resettlement Action Plan (RAP) studies will be undertaken to establish physical and economic displacement as a result of the Project. RAP related engagements and consultations will, among other objectives, aim to address land acquisition, land and asset valuation and compensation thereof. Therefore, all the aspects and questions related to land acquisition will be addressed then.
The economic aspect of the Project and benefits to the people should be clarified to indicate whether the 1% of annual project revenue is part of RRM's CSR activities or part of the royalty plan.	2	<p>The Project will independently allocate an initial 1% of revenue, expected to be about US\$1million a year to Social programmes. This contribution will be capped at US \$2million a year by about Year 7.</p> <p>The allocation of Project Royalties is a Ugandan Government responsibility, but Ugandan law requires that 17% of Royalties return to directly impacted Districts and 3% to landowners. It is against the above requirement that project developer will pay its royalties to the District Local Government, including sub-counties.</p>
Will NGOs be involved in Project activities?	8	Stakeholder engagement strategy including stakeholder mapping and engagement methods and frequency is presented in Section 12 and summarised in Table 122. NGOs will be engaged via focus group meetings. NGOs will be important with the Community Development Plan in particular.
Delivery on promises.	11.1	The Project will have a robust Social and Environmental Management System underpinned by good information management systems, public reporting of performance against objectives and a Grievance Mechanism. Key commitments to stakeholders will be included in a routinely audited Legal and other requirements Register.
Will facilitation payments be made to Local Government to help sensitive people about the Project?	8	For the detailed ESIA studies, Atacama Consulting was contracted by RRM to lead and conduct the stakeholder engagement activities for the Project. In this activity, Atacama has worked closely with local leaders within the project affected areas. Additionally, RRM has a community liaison team that is responsible for the day-to-day engagement and liaison with communities to ensure further engagement and grievance management.
Clarify whether the chemical that will be used to leach the	3	Ammonium sulfate ((NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> ) is a product manufactured on a large scale and used mainly as a nitrogen fertilizer in agriculture. In addition, there are numerous other niche applications, e.g. as a food additive and in drinking

Key Concern	ESIA Section	Response Summary
minerals from the clay will not harm people or the environment.		water treatment. It is a safe chemical but will in any case be washed from the “spent ore” before this is used to backfill the mining pits. This material will then be capped with 1 m of stored topsoil and fully encapsulated. The community will not be exposed to this chemical.
How do you intend to handle cases where land owners refuse to lease their land?	11.4	The Project intends to voluntarily purchase project land in sparsely inhabited areas of the Central Makuutu Mining Pit and is flexible about where mining commences. As the mining pit expands and currently degraded agricultural land largely used for shifting agriculture is rehabilitated to high quality land via a process of liming, full fertilization and irrigation it will be in very high demand and landowners who may have initially been reluctant to sell, lease or land-swap their land should clearly see the economic benefit of doing so.
Will the land revert to its original owners who might be displaced by the proposed Project activities?	11.4	The Compensation and Resettlement Action Plan as summarised in Section 11.4 covers land negotiation processes but the arrangements will be flexible. Some private land will be voluntarily purchased by the Project at a fair price, some might be leased and, some might be swapped for other suitable land. The intention, however, is to resettle Project Affected persons to a new house in a resettlement village and to secure their livelihoods either independently on equivalent privately or communally held land or, on livelihood projects established by the Project.
Memorandum of Understanding between Chiefdoms and Makuutu Rare Earths Project should be signed.	8	Makuutu will engage openly and transparently with all stakeholders and will assess the merit of formal memorandums of understanding with particular interest groups once the Project is approved if there are specific gaps in the National level approvals including environmental and social requirements that need to be addressed. Duplicated requirements will be unhelpful to all parties but MOUs with the Chiefdoms will be supported.
Will Project Affected Persons (PAPs) be compensated for only areas where minerals will be found or for their entire land taking into consideration that after minerals are extracted, the surrounding land may not be usable at all?	11.4	The Compensation and Resettlement Action Plan as summarised in Section 16.4 presents the mechanisms for fair compensation but rehabilitated land with liming and full fertilization is expected to be highly productive and will blend seamlessly with unmined adjacent land.
Community Liaison Officers	8	The Project will appoint Community Liaison Officers to facilitate communication with the Project and to ensure that the Grievance Mechanism work effectively. Four have already been appointed in the Pre-construction Phase of the Project.
To have a lasting impact on the community, we propose for the proposed Project to construct permanent roads.	11.5	The Project will collaborate with District Planners to upgrade some shared public roads as described in the Emergency Management Plan as summarized in Section 11.5 in particular. Internal roads will not be shared with the public but some internal mining roads within established rehabilitated areas might be left as permanent access roads
Disclose the skills required on the proposed Project disclosed to enable the community leadership to do deliberate pre-skilling to provide more specialised services to the proposed Project.	11.3	The Project will work closely with community leaders to establish programmes to develop the required skills needed for the Project.
Are there mechanisms to build capacity of the locals in managing infrastructure left behind by the proposed	11.3	Yes, but not in the sense of Project infrastructure left behind after the Project closes. The Community Development Plan as summarized in Section 11.3 presents a strategy of developing fully independent communities that will be responsible for managing their established social infrastructure over the life of the Project and who will continue to operate it after the Project closes.



Key Concern	ESIA Section	Response Summary
Project such as schools and health centres?		
What are the mechanisms in place to prevent local people getting only the lowest paying jobs?	11.3	The Project will support training and education, commencing with Primary School and including of women and girls to facilitate an ever-increasing proportion of local people into technical, professional and managerial roles with the Project as presented in the Community Development Plan as summarized in Section 11.3. Project Affected Households and other Project Affected Persons will additionally be provided with employment or shares in livelihood projects established on rehabilitated project land with high potential to be highly successful from a financial viewpoint and transitioning to independent ownership.
How will you ensure that the quality of the top soil is maintained when it is kept for 27 years?	11.8	Mining pits will be progressively backfilled and rehabilitated with an expected lag of about 6 months so topsoil will be relatively fresh. This lixiv-ferralsol soil will then be limed, fully fertilised and potentially irrigated to transform what is currently low-productivity land used for shifting agriculture into high quality farmland.
Will Project Land be passed back to landowners at mine closure	11.4	The Compensation and Resettlement Action Plan as summarised in Section 11.4 presents the compensation strategy but the intention is that the project purchases land by voluntary means. Land will be acquired progressively and progressively rehabilitated back to productive agricultural land after mining. This land will be used for livelihood projects and potentially for land swapping and handed back to the community or other third parties once it is fully rehabilitated.
Will the projected 2000 workers come from the local communities?	Figure 44	The Organisation Chart presented in Figure 44 explains that it is the intention that all 1,200 full time employees anticipated at full production by Year 10 be Ugandan. Targeted training will, however, be provided to local people to facilitate employment with the project and many people will additionally be employed in contract work and on livelihood projects developed for Project Affected Households (PAHs) and Project Affected People (PAP). These include agriculture, fish farming and agroforestry.
When does the Project expect to commence?	3	The Project expects to secure a Mining Permit is late 2022 which will be following by construction in 2023 and operations in 2024 (refer Section 3).
Lack of information about the Project	3	Stakeholder engagement process (refer Table 123) as well as the detailed Project Description presented in Section 3.
Protecting the rights and safety of workers.	Section 11.9	The Project has developed a comprehensive Occupational Health and Safety Plan as summarised in Section 11.9. The Project will comply with Ugandan Labour laws and Uganda's obligations under a range of International Treaties and Conventions (refer Section 5.3.3) as well as embedding a Rights based approach to the fair treatment of all workers.
Will the overburden be sufficient to fully fit the mining pit.	3	Yes. The overburden in combination with "spent-ore" will fully fill the mining pit. The volume of REE removed is very small in comparison to the volume of material excavated.
Artisanal mining might be a problem	3	The ionic adsorption REE clay at Makuutu has ppm grades of REE and requires very large volumes of ore and complex processing technology to extract. There is no financial incentive for anyone to commence artisanal mining.
Exploration drilling survey teams are being confused with general land surveyors and creating anxiety about "land stealing"	9.2.6.1	Clear communication in combination with an effective Compensation and Resettlement Action Plan that leaves no-one disadvantaged.
Project has promised 3% of mineral value to landowners	9.2.1	Uganda tax law requires 3% of Project Royalties to be paid to directly impacted landowners. This is a Ugandan Government responsibility outside of the control of the Project that has been misinterpreted.
Access to Project Environmental and Socio-economic Baseline Data	Sections 6 and 7	Summarized in Sections 6 and 7 and in detail in the Annexes.

Key Concern	ESIA Section	Response Summary
MWE and DWRM would like access to detailed water quality data.	6.2 (hydrology) 6.7 (biodiversity)	Hydrology is covered in 6.2 and biodiversity in Section 6.7. Baseline surface water and groundwater quality is appended (refer Annex IV). Water quality data was additionally provided to DWRM prior to the completion of the ESIA.
What are the environmental impacts of REE Mining in other places?	3.3.1	Ionic-adsorption clay REE mining, unlike prevailing hard rock REE mining, does not have challenges with Uranium and Thorium and consequent radioactivity. Makuutu is one of very few significant ionic-adsorption clay deposits outside of southern China where the issues are land disturbance and surface water contamination with ammonium sulphate lixiviant. With complete backfill of pits and strong containment of process chemicals Makuutu is not expected to have either of these issues.
Clarify the types of minerals present and in which villages they are located in this sub-county.	Section 3	An overview of the REE is presented in Section 3. These REE are not carcinogenic and do not bioaccumulate. They are essentially benign with the exception of dust which could be irritating to workers in the bagging plant and which would require them to wear dust-masks and safety glasses. This dust will, however, be confined to some operating areas and community impact will be negligible
Elaborate how impacts and impact significance is ranked since this is of interest to a number of stakeholders.	Section 9	The risk assessment process and treatment plans to address issues are presented in Section 9. The Project will deliver net positive economic, environmental and social benefit with resettlement and livelihood restorations being the greatest challenges.
The ESMP should be comprehensive, practical and clearly state the roles and interventions that the developer will undertake during the proposed Project implementation.	Section 11	The ESIA is supported by a comprehensive 9 volume ESMP that details the strategies that will be taken to secure environmental and social performance objectives. These are summarized in Section 16. Specific controls to key concerns of stakeholders are presented in section 11.3.
Description of Process Plant	Section 3	A detailed description of the Process Plant is included in Section 3.
The Environmental and Social Management Plan should be implemented rather than being left on paper.	Section 11	The Environmental and Social Management Plan designed to secure the Environmental and Social Objectives of the ESIA is underpinned by a comprehensive monitoring programme (refer Table 140), public reporting and a Plan Do Check Act Environmental Management System (refer Section 11.1).
Will local service tax be collected by the sub-county or the District?	3	Note: Question for Warren and Patience. The most significant financial contribution from the project to the local area will be the 20% of Project Royalties which under Ugandan Finance Law must return to the Project area. This equates to US\$76 million over the expected life of the Project.
Potential Positive Benefits		
What is the net present value of the proposed Project and expected income to the government, for example, in terms of royalties and corporate income tax?	9.2.1	The Project has an EBITA of US\$3.9 billion, and after-tax free cash flow of US\$2.4 billion. The project will deliver estimated gross royalty payments to Uganda of US\$380 million plus corporate tax contributions of US\$965 million over the life of the project
Collaboration and information sharing and particularly with respect to data on health, education, livelihoods and law and order.	9.2.6.1	Openly and transparently share information with key stakeholders to maximize the effectiveness of support programmes.
Tree planting to increase amenity	9.2.6.2	Valuable trees will be planted in rehabilitated areas, buffer zones and in local communities in addition to in agroforestry projects.

Key Concern	ESIA Section	Response Summary
Maximise the use of local labour	9.2.6.3	Preferentially employ local people with the appropriate skills and training and provide training and support to facilitate this.
Enhancing agricultural production	9.2.6.4	Transform currently degraded agricultural land to high productivity land capable of sedentary agriculture via a process of liming, full fertilization and irrigation of rehabilitated mining land. Operate intensive agricultural ventures and other established livelihood projects collaboratively with local communities.
Wetland Protection	9.2.6.5	Support farmers in sustainable agricultural practice and establish a Catchment Management Group for local catchments to promote sustainable practices.
Establishment of woodlots with scarcity of wood.	11.3.8	Woodlots and other livelihood projects will be established on rehabilitated Project land.
Safety and status of women	Table 140	The status of women will be enhanced through measures including: <ul style="list-style-type: none"> <li>• Support for education and training for girls and women.</li> <li>• Funding of women's shelters</li> <li>• Livelihood Projects for women</li> <li>• Support of Law enforcement capacity</li> <li>• Education for Makuutu workforce on acceptable personal behaviour standards of employees.</li> </ul>
Improve community health	11.3.4	The Community Development Plan proposes an initial US\$200,000 a year rising to US\$400,000 by Year 7 be allocated to community health programmes including malaria, schistosomiasis, HIV and TB.
Is it possible for the proposed Project to set up a health centre within the area to boost service delivery?	9.3.4	Community health is a priority for the Project and investment will be guided by the advice of a specialist Advisory Committee and the District Planner.
Upgrade roads and community infrastructure such as council halls.	9.2.7.6	Makuutu will collaborate with District Planners to upgrade roads and other infrastructure as appropriate to securing mutually beneficial outcomes in the understanding that roads and infrastructure are primarily a role for Government. A large portion of the 20% of Project Royalties returned to the local regions is additionally expected to be allocated to infrastructure upgrade.
Will the proposed Project allow people in this area to tap on the proposed electricity generation facilities at a free cost without having to pay electricity bills?		Makuutu is focused on facilitating the development of a strong independent community with good social services which endure past the tenure of the Project. A key focus on the Project is to support livelihoods and employment so that people can afford to pay for key social services provided independently of the Project.
At the end of the proposed Project lifespan, will the electricity be left for the existing local communities or will it be decommissioned?	11.8	Life of Mine Rehabilitation and Closure Plan as summarised in Section 16.8 commits the Project to establishing a multi-stakeholder Mine Closure Committee to assist in the development of a Final Closure Plan within 5 years of ultimate closure. This will include decommissioning of facilities but the Project intends for communities to have independent high capacity with respect to community services throughout the life of the Project. This would continue unchanged after the Project closes.
Increase Employment	11.3	The Community Development Plan presents the strategy of training and capacity building that will assist people to secure direct employment, contract employment and, work on livelihood projects established on Project land
Support for farming livelihoods <ul style="list-style-type: none"> <li>• Irrigation</li> <li>• Good quality seeds</li> <li>• Land Fertility</li> <li>• Compensation for loss of crops</li> </ul>	3.5.11	The agricultural productivity of poor productivity pre-mining lixiv ferral soil will be greatly enhanced in rehabilitated areas via liming and full fertilization in combination with irrigation. This land will be available for land swapping during land acquisition and for livelihood projects. Agricultural outreach programmes will also be provided in addition to agricultural support to enhance general agricultural productivity in the Project area to enhance livelihoods and food security. Any loss of farmland will be fairly compensated.
Potential Negative Impacts Pre-Construction		

Key Concern	ESIA Section	Response Summary
Addressing concerns during the Exploration Drilling Programme	9.2.7.2	Most community concern about the exploration drilling programme related to a lack of understanding about the small magnitude and low risk associated with the drilling programme which was addressed via discussion at public meetings. The appointment of Community Liaison Officers additionally mitigated this risk. Clear communication, compensation payments to landowners and managing activities for minimal impact further mitigated this risk.
Land Acquisition and Resettlement including: <ul style="list-style-type: none"> <li>• Clarity on the land acquisition process.</li> <li>• Fair compensation and no disadvantage.</li> <li>• Maintain social connections and livelihoods</li> <li>• Financial literacy training for compensation recipients.</li> <li>• Establishment of a resettlement village.</li> <li>• Displaced people resettling in ecologically sensitive areas.</li> <li>• Loss of Sub-county revenue from closure of displaced businesses.</li> <li>• Land speculation and profiteering (making sure that the right people are compensated).</li> </ul>	9.2.7.1	<p>Compensation and Resettlement Action Plan</p> <ul style="list-style-type: none"> <li>• Avoid involuntary resettlement</li> <li>• No social or financial disadvantage</li> <li>• Comprehensive RAP that encompasses asset valuation, compensation to limit disadvantage, protection of vulnerable people and, sustainable livelihoods.</li> </ul>
<b>Potential Negative Impacts During Construction</b>		
Land Use Conflict	9.2.8.1	<p>Land ownership clarity</p> <p>Land Use Agreements and Compensation</p> <p>Negotiation with planners and planned development entities on alternate sites.</p>
Clarify recruitment processes to prevent in-migration.	9.2.8.1	In addition to the measures described in Section 9.2.8.1 to secure land tenure and to control in-migration livelihoods projects will be targeted at genuine PAPs and PAHs as determined by formal pre-project census. Candidates for professional roles will be secured through robust HR processes aimed at selecting the best quality candidates. Targeted training and development will be provided to local communities to facilitate employment with the project.
Impact on community water resources	9.2.8.2	No project use of groundwater resources.



Key Concern	ESIA Section	Response Summary
Soil erosion and sedimentation	9.2.8.3	Effective rehabilitation, erosion control and treatment (e.g. storage dams) of discharge water.
Chemical pollution of surface water	9.2.8.4	Effective containment of chemicals and good emergency response.
Sanitation	9.2.8.5	Modern sewage treatment plant and male and female ablution blocks.
Impact of socio-economic infrastructure and social services	9.2.8.6	Staged resettlement and replacement of all impacted infrastructure.
Impact on public roads	9.2.8.7	Separation of Project roads from public roads.
Project water supply	9.2.8.8	Independent water supply from harvested stormwater and Reverse Osmosis Plant so as not to impact community water supply.
Impact on Education Facilities	9.2.8.9	Staged resettlement and replacement of all impacted private and public infrastructure.
Impact on Religious Facilities	9.2.8.10	Staged resettlement and replacement of all impacted private and public infrastructure.
Impact on Trading Centres	9.2.8.11	Staged resettlement and replacement of all impacted private and public infrastructure.
Planning Conflicts	9.2.8.12	Effective engagement with District Planners to secure alignment with NDP III as reflected in District plans.
Impact on heritage sites	9.2.8.13	ESIA heritage assessment and detailed pre-clearing survey.
<b>Potential Negative Impacts during Operations</b>		
The recruitment approach for project workers must be elaborate because this could cause in-migration that will call for an infrastructure management plan to manage social problems that could be associated with the proposed Project.	11.1	Clarity of land ownership as determined by a pre-mining assessment is important to secure the land of existing land-owners and close collaboration will be undertaken with the District Planners to ensure that in-migration is properly managed.
Waste Management Plan	11.6	A detailed Waste Management Plan has been developed as summarised in Section 11.6 that quantifies waste streams. Logistics and the Reduce, Reuse, Recycle processes that will be put in place to minimize the generation of waste and to maximise recycling are presented.
Progressively rehabilitate mining voids.	11.8	A detailed Life of Mine Rehabilitation and Closure Plan has been developed as summarised in Section 11.8. Mining pits will be completely filled and progressively returned to productive agriculture land limiting the disturbance footprint to about 6 months of mining anticipated to be about 20 hectares.
The effect of the proposed Project activities on agricultural land and settlements should be well elaborated.	11.3 and 11.4	This is detailed in the Compensation and Resettlement Action Plan as summarised in Section 11.4. The development of livelihood projects including fish, farming, tree farming and intensive agriculture on rehabilitated land is presented in the Community Development Plan (Refer Section 11.3).
Impact on community water resources	9.2.9.1	No project use of community groundwater resources. Water balance presented in Figure 39.
MWE/DWRM should be notified about the borehole numbers	9.2.9.2 Figure 76	Map of boreholes and water sources presented in Figure 76. Any boreholes or water sources impacted by mining or project infrastructure would be replaced in consultation with MWE/DWRM.
Concentration of REE in surface water	Section 3	An overview of REE and their properties is presented in the Project Description and baseline concentrations in surface and groundwater are appended (Refer Annex IV).
Soil erosion	9.2.9.2	Effective rehabilitation, erosion control and treatment (e.g. storage dams) of discharge water.

Key Concern	ESIA Section	Response Summary
Impact on fauna	9.2.9.3	Prohibition of hunting; Inclusion of rare trees (e.g. Mvule) and habitat flora in revegetation areas; creation of forest and; restoration of downstream wetlands.
Chemical pollution	9.2.9.4	Effective containment of chemicals and good emergency response.
Transport and site access	9.2.9.5	Fully separated Project roads and strategic upgrade of shared access roads.
Project water supply	9.2.9.6	Independent water supply from harvested stormwater and Reverse Osmosis Plant.
Rehabilitated area land stability	9.2.9.7	Geotechnical stability assessment and appropriate engineering.
Geotechnical stability	9.2.9.8	Design of mining pits to secure stability.
REE impact on human health and concerns about radioactivity.	9.2.9.9	REE is essentially benign and radionuclides typically associated with hard rock REE projects at very low levels. The REE are not radioactive.
Increase in communicable diseases	9.2.9.10	Workforce training and direct support of community healthy projects.
Local capacity to manage emergencies	9.2.9.11	Independent capacity to manage onsite incidents in combination with collaborative support to increase local capacity.
Security risks	9.2.9.12	Security fencing and employment of security staff.
Collision with power lines	9.2.9.13	Appropriate risk assessment and controls to avoid impact with powerlines.
Tailings management and restoration of mining pits	9.2.9.14	In-pit tailings and progressive rehabilitation so that there are no waste dumps or tailings dam at the end of Project life.
Deterioration in Law and Order	9.2.9.15	Manage in-migration. Implement an effective Compensation and Resettlement Action Plan that leaves nobody financially or socially disadvantaged. Support employment, livelihoods and food security. Contribute to increase in policing capacity in close collaboration with District Planners.
Protect vulnerable groups including women	9.2.9.16	Provide training and education for girls and women to facilitate employment in addition to support such as child-care and food security. Support establishment of shelters to enable escape from domestic violence. Provide incentives for children to attend school for as long as possible.
Prevent use of child labour	9.2.9.17	Improving livelihoods and providing incentives for education including education of girls should reduce the prevalence of child labour.
Institutional capacity building	9.2.9.18	Convene Workshops involving Local, District and National level stakeholders to collaboratively develop a Project Vision and Road-Map to success. Involve government officials in the Annual Business Planning Workshops for the Makuutu Project. Appropriate support to developing social infrastructure and institutional capacity in the areas of education, community health, emergency management and law and order in particular.
Local Government control and oversight of Project activities to ensure they meet HSEC requirements and minimize community impacts.	9.2.9.19	Legal due diligence to ensure that all local government requirements are met. Regularly Inform/Consult & Involve local government officials as per the stakeholder engagement plan (refer Table 123). Provide targeted skills training as appropriate.

## 9 IMPACTS/ RISKS AND MITIGATIONS

### 9.1 Environmental and Social Risk Assessment

#### 9.1.1 Introduction

This section presents an overarching risk assessment which will be followed by an overview of each significant environmental and social risk and specific issues of concern raised by stakeholders.

The Environmental and Social Risks of the Makuutu Rare Earths Project were assessed using Australian Standard (AS 4360) risk assessment protocols. This risk assessment was based on the potential impact of planned Project activities on known Environmental and Social Values, considering stakeholder feedback, environmental and social baseline information, and the regulatory context.

#### 9.1.2 Risk Assessment Method

The risk assessment process commenced with an overview of the environmental (refer Table 132) and social (refer Table 133) values that need protecting. The potential impact of project-related activities on these values was then presented in an Issues and Impact Table (refer Table 134). The Australian Risk Assessment Tables for consequence (refer Table 135) and likelihood (refer Table 136) were then used to determine the level of risk from a 5x5 Risk Assessment Matrix (refer Table 137). The inherent risks (i.e., Risk level without controls), the planned controls and, the residual risks (i.e., assuming that the planned controls are effective) were then tabulated into a consolidated risk table (refer to refer Table 138). Ratings were reviewed and agreed by technical specialists from Ionic Rare Earths, Rwenzori Rare Metals and the ESIA team (JBN and Atacama).

#### 9.1.3 Project Environmental and Social Risk

In addition to the overall assessment of environmental and social risks of the project over its life in this section, there are issue specific risk assessment tables in each volume of the supporting Environmental and Social Management Plans including:

- o Volume 1: Environmental and Social Management and Monitoring Plan
- o Volume 2: Stakeholder Engagement Plan
- o Volume 3: Community Development Plan
- o Volume 4: Preliminary Compensation and Resettlement Action Plan
- o Volume 5: Emergency Management Plan
- o Volume 6: Waste Management Plan
- o Volume 7: Greenhouse Gas Abatement and Climate Change Adaptation Plan
- o Volume 8: Life of Mine Rehabilitation and Closure Plan

These assessed risks form the basis of performance objectives and targets and associated monitoring and reporting programme (refer ESMP Volume 1, Environmental and Social Management and Monitoring Plan as summarised in Section 11.1). Performance against all objectives will be reported in a publicly available Annual Environmental Report (AER). In addition to that, the relevance of the performance objectives will be reviewed in consideration of an evolving risk context that takes account of changes to:

- Makuutu Project Environmental and Social Policy;
- Changes to Ugandan legal context including relevant Acts, Regulations, Obligations under International Conventions and National and District Development Plans (e.g., NDP III);
- Changes to Project parameters including mining and processing methods and scale of production;
- Community expectations and in particular stakeholder feedback from formal meetings and complaints received via the Grievance Mechanism;
- Advice from the proposed Makuutu Environmental and Social Advisory Committee.

Table 132: Environmental Values at Makuutu Rare Earths Project Site

VALUE	CHARACTERISTICS
Soils	<p>The predominant soils are Lixic Ferralsols, Petric Plinthosols (Acric) and Gleysols which despite low fertility have good permeability, stable structure with low erodibility. They currently support shifting agriculture but with liming and appropriate fertilization, they should be capable of supporting sedentary agriculture. On available information, restoration of mined areas to productive agricultural land is feasible and will be implemented.</p> <p>The topsoil is on average 1m thick, and this will be removed and temporarily stored in stockpiles prior to replacement on land-formed mining pits. The cycle of topsoil stripping, mining of overburden and ore, filling the mining void with overburden and “spent ore” from the process plant and, replacing the topsoil should take 6 months.</p>
Land Capability	The soils are relatively suitable for agriculture, but poor farming practices have depleted this productivity. There is opportunity to secure enhanced agricultural productivity on land returned to agriculture after mining through a combination of liming, the addition of agricultural fertilisers and, optimising topography and drainage to minimize waterlogging issues.
Drainage	The proposed mining areas in the 3 districts of Bugweri, Bugiri and Mayuge are on elevated land at the head of river catchments. These areas drain through wetlands used for the farming of rice and sugarcane. Effective emission control at the Project site is necessary to prevent contamination of this farmland and to comply with the water quality discharge permits that will be required from DWRM to dispose of excess stormwater. The Project area has a positive water balance with annual rainfall of about 1,400 mm and an evaporation rate of 125 mm.
Hydrogeology	Local communities rely on boreholes and shallow wells for their water supply. The Project will utilize harvested stormwater and large volumes of high-quality Reverse Osmosis (RO) water from the process plant for project water and will be self-sufficient for water supply. The Project will not be consuming community groundwater resources. The low permeability of the ionic adsorption clay ore-body additionally creates a lack of aquifers in the mining areas. Infiltration of groundwater into mining pits is therefore not expected to be significant and this will be further mitigated by progressive rehabilitation that will limit the open pit size to about 20 hectares. The spent ore that will be used to backfill the mining pits has a high proportion of low-permeability swelling smectite clay which will exclude productive aquifers from the land-formed mining areas.
Water Quality	The water quality of streams draining the central, eastern and western project areas is of neutral pH, low in salts and low in metals. Uranium and ammonia are both undetectable. Contamination with coliform bacteria is, however, widespread and streams are subject to increased turbidity following storm events. The quality of groundwater within the orebody is similar to that of the surface water but with greater clarity and slightly acidic (i.e., pH 6.2).
Air Quality	The project area is currently characterized by activities that do not significantly affect local air quality. The baseline air quality monitoring results indicate low levels for gases as well as particulate matter which is largely attributed to vehicular traffic on unpaved roads. The average particulate matter values for both PM <sub>10</sub> and PM <sub>2.5</sub> were all within the national and international limits of 0.025g/m <sup>3</sup> and 0.050 mg/m <sup>3</sup> . The use of unpaved roads by heavy mining trucks is expected to increase the dust levels and ambient levels for gases within the vicinities/ transport corridors. Dust suppression will be undertaken as required to reduce dust nuisance.
Noise and vibration	The noise levels at trading centres where economic activities occur is less than 70 dBA. The equivalent continuous sound pressure level with A-weighting (LAeq) was 69.1dBA at Buniantole primary school, 62.3 dBA at Namaganda trading center, 60.1 dBA at Mawanga Primary School/ HC III/ Church and 67.4 dBA at Namavundu trading center were slightly higher than the acceptable limits for daytime. Ground vibrations are not an issue due to the low traffic volumes and size of vehicles. The trucks carrying sugarcane do not currently pose any structural risks.

VALUE	CHARACTERISTICS
Flora	There are no national parks or conservation zones within the Project area. Out of the five hundred twenty-eight (528) plant species encountered in all study sites, only seven (7) species have been listed on the IUCN Redlist of Uganda of 2016. The most common species of conservation importance is <i>Milicia excelsa</i> (Mvule) in Moraceae. A conservation program will be implemented to replant the species elsewhere within the project area vicinities. It is important to note that these species also exist outside the areas to be disturbed.
Fauna	All the butterfly species, reptiles and amphibians recorded during the survey are categorized as Least Concern (LC) by IUCN 2019 Red List of Threatened Species Checklist. Overall, sixty-five (65) species of birds were identified in the general project area. Twenty-five (25) bird's species were recorded in habitats with trees or woodlots on community land in the project area. Thirteen (13) bird species were recorded in wetlands / seasonal wetlands and streams areas. These were either wetland specialists or wetland visitors. Twenty-four (24) species were recorded in grasslands or open habitats areas. Also recorded were three (3) Palearctic migrants and two Afrotropical migrants. All the bird species recorded during the survey are categorized as Least Concern (LC). Trees with bird nests were recorded in the project area. By the time the survey was conducted it was the beginning of the breeding season for some birds and they were busy nesting. A Biodiversity Specialist will be recruited to provide technical support in relocating the nests as necessary. Only seven (7) mammal species were recorded in the project area. The general scarcity of mammals in the project area is due to habitat degradation.

Table 133: Major Social Values in Project area

VALUE	CHARACTERISTICS
Poverty	Uganda is one of the poorest countries in the world with 21.4% of the national population considered poor (UBOS, 2017). The Project is within Busoga Region which, with 37.5% of the population considered poor, is the second poorest region in Uganda behind Karamoja Region. The Project has the potential to alleviate poverty in one of the poorest regions of the world.
Lifestyle	Communities within the Project area are largely supported by subsistence agriculture. An increasing population in combination with a lack of adequate land and falling agricultural production, exacerbated by climate change, is contributing to extreme poverty and limited access to food, medical care, shelter, clothing and social services such as education, roads, electricity and security. Farmers are increasingly turning to intensive and monotonous smallholder sugarcane growing.  There is a significant risk that the prosperity that the project will bring to the region will stimulate in-migration and put pressure on already inadequate government services. Collaborative strategies that limit dependency and build institutional capacity are likely the best approach to alleviating poverty and delivering long-term social benefits. A strategy to prevent uncontrolled in-migration of opportunistic settlers is a priority and needs to be developed collaboratively with local authorities.
Employment	Most people in the area are currently self-employed agriculturalists and merchants and those working in sugar plantations. The envisaged project employment opportunities will increase the amount of disposable income in the community and this in turn will support small shops and taverns. Community support services will likewise need to increase.
Public Safety	The greatest public safety risk is likely to be road safety exacerbated by poor standard roads and increased frequency of delivery trucks. This will, however, be confined to the 9 km stretch of public road from the Busesa intersection to the Process Plant entry 2km north of Nakivumbi which will be upgraded as appropriate in consultation with the Bugweri District Engineer and UNRA. The proposed entry at the NW corner of the Process Plant will additionally limit Project



VALUE	CHARACTERISTICS
	<p>traffic impacts on the Nakivumbi Trading Centre. The public will be excluded from all operational areas including the Process Plant, active mining areas and the haul road delivering ore to the Process Plant from the mine. These areas will be security fenced and patrolled. Any crossing of the haul road with public road crossings will be controlled (refer crossing 176) and if necessary equipped with overpasses to fully separate the public from haul roads.</p>
Community Health	<p>Significant communicable diseases within the Project area include HIV, hepatitis A, B and C, measles, salmonella and blood-borne illnesses. The four main types of non-communicable diseases are cardiovascular diseases (like heart attacks and stroke), cancer, chronic respiratory diseases (such as chronic obstructed pulmonary disease and asthma) and diabetes. Rates of schistosomiasis and malaria, in Uganda are additionally among the highest in the world.</p> <p>It is generally preferable for Projects to contribute to improved social outcomes in adjacent communities through investing in programmes that strengthen institutional capacity rather than by directly investing in support programmes and creating dependency. One exception to this is the control of malaria and other debilitating mosquito borne diseases. This needs to be a priority focus for the Project because good health is critical to both workforce productivity and to the functional capacity of the community. The level of absenteeism, malaise and poor productivity associated with high prevalence of malaria will be very high. Mosquitoes can be controlled via methods such as provision of bed-netting impregnated with insect repellent and indoor residual spraying (IRS) supported by the USAID President's Malaria Initiative (PMI) Vectorlink project.</p> <p>The risk of increased prevalence of communicable diseases can be mitigated through strategies that prevent uncontrolled in-migration, improve institutional medical capacity, and enhance community health education. This will also benefit the control of non-communicable diseases. Effective control of malaria and other mosquito borne diseases will have profound community health benefit.</p>
Indigenous Heritage	<p>There are no known indigenous people within the Project area and hence no need for an indigenous people's plan.</p>

### 9.1.4 Issues and Impacts

The potential impacts of the Project in key environmental and social values are presented below.

Table 134: Potential Project impacts on environmental and social values

Activity	Issue (Aspect)	Potential Impact
Construction	Land clearing	<ul style="list-style-type: none"> <li>• Loss of timber resources</li> <li>• Loss of non-timber forest products</li> <li>• Loss of wildlife habitat</li> <li>• Loss of rare species</li> <li>• Acceleration of land erosion</li> <li>• Damage to archaeological site</li> <li>• Displacement of wildlife</li> <li>• Introduction of weeds</li> </ul>
Construction	Road Construction	<ul style="list-style-type: none"> <li>• Interference with stream flows</li> <li>• Increased sedimentation and turbidity of stream water</li> <li>• Barrier to wildlife migration</li> <li>• Facilitating access of poachers</li> <li>• Facilitating in-migration of settlers</li> </ul>
Construction	Drilling Activity	<ul style="list-style-type: none"> <li>• Generation of litter</li> <li>• Spillage of fuels and oils</li> <li>• Aesthetic impacts of drill mud</li> <li>• Noise and vibration displacing wildlife</li> <li>• Contamination of aquifers</li> <li>• Contamination of surface streams</li> <li>• Wildlife hunting by workforce</li> </ul>
Mining	Extraction of Clay	<ul style="list-style-type: none"> <li>• Land clearing impacts (see above)</li> <li>• Contamination of pit discharge water with fuel or oil</li> <li>• Contamination of pit discharge water with metals and sediment</li> <li>• Contamination of groundwater with fuel or oil</li> <li>• Noise and vibration displacing wildlife</li> <li>• Noise and vibration disturbing nearby residents</li> <li>• Depletion of natural springs used by local people or wildlife</li> <li>• Generation of excess volumes of greenhouse gas</li> <li>• Generation of exhaust fumes impacting air quality</li> <li>• Generation of dust smothering vegetation and impacting workforce health</li> <li>• Generation of wastes including tyres, waste oil and batteries</li> </ul>
Processing	Chemical storage	<ul style="list-style-type: none"> <li>• Major spill of process chemicals during road transport.</li> <li>• Major spill of process chemicals during handling.</li> <li>• Major spill of process chemicals from bulk storage.</li> </ul>
Processing	Heap Leaching	<ul style="list-style-type: none"> <li>• Contamination of land from process chemical spill from heap leach pad.</li> <li>• Contamination of surface water from a process chemical spill at the heap leach pad.</li> <li>• Contamination of groundwater with process chemicals at the heap leach pad.</li> <li>• Noise and vibration displacing wildlife</li> <li>• Noise and vibration disturbing nearby residents</li> <li>• High use of energy and emissions of greenhouse gasses.</li> </ul>
Land-forming/	Backfill of mine pits	<ul style="list-style-type: none"> <li>• Contamination of ground and surface waters from residual process chemicals in clay residues.</li> </ul>

Activity	Issue (Aspect)	Potential Impact
Rehabilitation		<ul style="list-style-type: none"> <li>• Poor final surface design and survey control resulting in suboptimal surface contouring and consequent ponding and erosion.</li> </ul>
Land-forming/ Rehabilitation	Topsoiling	<ul style="list-style-type: none"> <li>• Inadequate volumes of topsoil</li> <li>• Poor agricultural productivity on reclaimed mining land</li> <li>• High levels of erosion and surface water turbidity</li> </ul>
Transport	Transport of process chemicals and diesel from Mombasa to site	<ul style="list-style-type: none"> <li>• Contamination of land with process chemicals or hydrocarbons from spills or road accident</li> <li>• Contamination of surface waters process chemicals or hydrocarbons from spills or accident</li> <li>• Disturbance of communities by noise or dust from delivery trucks</li> <li>• Increased accident risk for general road users</li> <li>• Difficulty of general traffic overtaking on narrow roads</li> <li>• Increased road maintenance costs for community</li> </ul>
Engineering	Equipment Maintenance	<ul style="list-style-type: none"> <li>• Direct land contamination from fuel and oil spills</li> <li>• Contamination of stormwater with oil</li> <li>• Oil contamination of underflow water from wash-pad</li> <li>• Contamination of rubbish dump with oily waste</li> <li>• Contamination of dump with tyres, batteries, and other regulated wastes.</li> <li>• Generation of green-house gasses from fuel and electricity use.</li> </ul>
Administration	Residency	<ul style="list-style-type: none"> <li>• Introduction of exotic plants and animals</li> <li>• Hunting and bush-meat consumption by workforce</li> <li>• Direct disturbance of community by mine employees</li> <li>• Disturbance of native fauna from noise</li> <li>• Excessive use of electricity</li> </ul>
Administration	Waste Management	<ul style="list-style-type: none"> <li>• Contamination of land and surface waters with sewage</li> <li>• Contamination of land with litter</li> <li>• Proliferation of vermin feeding on food scraps at rubbish dump.</li> </ul>
Local Community	In-migration	<ul style="list-style-type: none"> <li>• Loss of capacity in key community services such as food security, health, education and law and order.</li> <li>• Loss of income from unavailable agricultural land</li> <li>• Increase in rates of communicable diseases such as HIV due to proliferation of bars and vice.</li> <li>• Depletion of wildlife due to increased hunting pressure.</li> </ul>

Table 135: Consequence Table for Risk Assessment

Level	Consequence				
	Safety	Environment	Community Reputation /	Quality	Economic
5 – Catastrophic	Potential fatality	Catastrophic/unrecoverable environmental damage/Off-site release impacting on external parties	National Media Coverage/Ongoing State Media coverage or interest/ Major impact on reputation/ Court Action	Loss of major customer or market	>\$10 million or production loss of > 10 days
4 – Major	Major Injury resulting in permanent disability	Major/long-term environmental damage/Off-site release (e.g., Level 3)	Regional or State Media Coverage/ Significant stakeholder interest/ Moderate impact on reputation/Fine or Notice issued	Quality issue affecting multiple customers	\$1 - \$10 million – or production loss of 1 – 10 days
3 – Moderate	Injury resulting in LTI / MTI Restricted Work	Moderate/medium term environmental damage/On-site release not immediately contained (e.g., Level 2)	Local Media Coverage/Repeated External complaint/ Complainant irate/ Minor loss of reputation	Customer Complaint	\$100,000 – \$1 million or production loss of 10 – 72-line hours
2 – Minor	Minor injury resulting in First Aid Treatment	Minor/short-term environmental damage/On-site release immediately contained	Local Issue/External complaint over minor issue	Quality excursion affecting multiple lots	\$20,000 – \$100,000 or production loss of 1 – 10-line hours
1 – Insignificant	No injury	No or negligible environmental damage	Unsubstantiated External Inquiry/No stakeholder interest	Quality Issue	<\$20,000

Table 136: Likelihood Table for Risk Assessment

Likelihood		Description
A	Almost Certain	The event is expected to occur in most circumstances
B	Likely	The event will probably occur in some circumstances
C	Moderate	The event might occur at some time
D	Unlikely	The event could occur at some time, but is not expected
E	Rare	The event may occur in exceptional circumstances

Table 137: 5x5 Risk Assessment Matrix as per AS 4360

Likelihood	Consequence				
	1- insignificant	2-minor	3-moderate	4-major	5-catastrophic
A-almost certain	M-medium	H-high	H	VH-very high	VH
B-likely	M	M	H	H	VH
C-moderate	L-low	M	H	H	H
D-unlikely	L	L	M	M	H
E-rare	L	L	M	M	M



Table 138: Inherent and Residual Environmental and Social Risks for Makuutu Rare Earths Project

Aspect	Intrinsic			Controls	Residual		
	C	L	R		C	L	R
Inability to acquire Project land	5	B	V H	Effective engagement Effective Compensation and Resettlement Action Plan. Staged mining process.	4	C	H
Increase in HIV and other diseases in the community as a result of uncontrolled development	4	B	H	Manage in-migration. HIV Awareness programme. Appropriate community capacity with respect to health and law and order (refer Community Development Plan section 11.3).	4	C	H
Loss of capacity in key community services such as food security, health, education and law and order in communities near the project site.	4	B	H	Collaborative programmes with government to appropriately service growing centres and build capacity as per Community Development Plan.	3	C	H
Shortage of land for agriculture in expanding communities near the project site.	4	B	H	Compensation and Resettlement Action Plan. And Clarification/security of land tenure. Integrated land use planning with key stakeholders including planned agriculture. Community Development Plan.	3	C	H
Break down of law and order in rapidly expanding communities near the project site.	4	B	H	Control in-migration. Appropriate government support to enforce law and order. Planned development and sustainable livelihoods. Community Development Plan	3	C	H
Lack of food security in rapidly expanding local communities in the project area.	4	B	H	Control in-migration. Appropriate government support for agricultural development. Planned development and sustainable livelihoods. Community Development Plan.	3	C	H
Land use changes and displacement of communities	4	B	H	Compensation and Resettlement Action Plan	4	C	H
Effective engagement with administrative hierarchies	4	B	H	Effective ongoing engagement.	4	C	H
Adverse social impacts associated with changes to population size and demographics driven by mechanisms such as in-migration and increased household wealth.	4	B	H	Demographic assessment including potential positive and negative impacts and development of associated controls to manage adverse outcomes.	4	C	H

Aspect	Intrinsic			Controls	Residual		
	C	L	R		C	L	R
Adverse impact on a range of aspects including education, water security, community health driven by loss of infrastructure and demographic change.	4	B	H	Part of Relocation Action Plan, Livelihood Restoration Plan and; Community Development Plan	3	C	H
Adverse media reports cause drop in shareholder confidence and a fall in share price	4	B	H	Good performance, good relationships, effective dissemination of accurate information	3	C	H
International NGOs launch media campaign against the Project.	4	B	H	Good performance and effective engagement of NGOs	3	C	H
Generation of excessive greenhouse gas during mining operations.	3	C	H	Optimise machinery and operations to be as emissions efficient as possible as detailed in the Greenhouse gas abatement plan.	3	D	M
Contamination of land and water with oil/diesel during mining operations.	3	C	H	Bunded fuel storage facilities. Regular inspections of facilities.	3	D	M
				Good procedures for handling fuels and oils. No mine pit discharge water to streams. Effective oil spill response procedures and well-trained workforce. No disposal of oily waste to landfill.			
Contamination of land and water with process chemicals during Processing.	3	C	H	Good integrity of heap-leach liners Bunded storage facilities. Regular inspections of facilities. Good procedures for handling chemicals. No discharge water to streams. Effective spill response procedures and well-trained workforce.	3	D	M
Noise and vibration displacing wildlife and livestock during mining operations.	3	B	H	Mining activities largely in cleared farmland Wildlife and stock become habituated to noise and vibration.	2	C	M
Excessive use of energy and emissions of greenhouse gasses during processing.	3	C	H	Plant and truck fleet designed to be as energy and emissions efficient as possible. Third party hydropower.	3	D	M
Contamination of land/surface water from leach chemicals following failure of the liner.	3	C	H	Well-designed pad to best practice geotechnical standards. Good leach pad management procedures. Trained operators and high level of surveillance.	3	D	M
	3	C	H	Restricted access to local villages.	3	D	M

Aspect	Intrinsic			Controls	Residual		
	C	L	R		C	L	R
Makutu worker infecting local community member with HIV.				Security Gate. HIV risk awareness programmes.			
Spread of infectious diseases such as hepatitis in the camp during operations.	3	C	H	Pre-employment medicals and inoculations. High personal hygiene standards enforced.	3	E	M
Optimal siting of process plant	4	A	H	Selection of Site 5 (sugar cane farm). Demonstration of effective mitigation. Relocation Action Plan.	3	D	M
Chemical contamination of water and food crops	4	C	H	Good operational control of chemicals/spills. Effective spill response.	4	D	M
Hydrological impacts on streams and marshes	4	C	H	Effective operational control.	3	D	M
Poor capacity of external emergency responders	3	B	H	Relocation Action Plan. Site Security. Collaborative Emergency/Crisis Response exercises and plans.	2	C	M
Biodiversity impact from habitat loss	4	C	H	Mainly farmland. Baseline assessment and avoidance.	4	D	M
Inadequate environmental monitoring and reporting in breach of environmental licence and regulatory requirements	4	B	H	Site monitoring/reporting and public disclosure processes.	3	D	M
Inadequate protection from poverty and other adverse outcomes for vulnerable groups	3	B	H	Vulnerability assessment in combination with a rights-based approach (eg. Right to property, fair compensation, education, employment, health services etc.).	2	C	M
Inadequate community engagement/information sharing with poorly educated communities.	3	B	H	Community Management Plan and ongoing engagement over the life of the Project.	2	C	M
Dissatisfied stakeholders lodge appeals with government delaying project	4	B	H	Good performance, good relationships, good government engagement.	3	D	M
Project financiers dissatisfied with quality of consultation and delay funding	4	B	H	Good reputation achieved through good performance and relationships.	3	D	M
Inadequate consultation results in impractical management plans	4	C	H	Good consultation and liaison with right people.	3	D	M
Dissatisfied local community take hostile action to prevent Project progress	4	C	H	Good community support delivered through effective engagement and demonstrated commitment	4	D	M
Ugandan government dissatisfied with quality of the ESIA and do not approve it	4	C	H	Good quality ESIA	4	D	M
International NGOs lobby Ugandan Government to not approve the Project causing delays	3	A	H	Good performance and effective engagement of NGOs	2	C	M

Aspect	Intrinsic			Controls	Residual		
	C	L	R		C	L	R
Ongoing legal and other disputes result in significant ongoing operational, reputational and financial cost	3	B	H	Good disputes resolution process, good relationships, good performance.	2	C	M
Poor reputation increases sovereign risk and jeopardises long term contracts	3	C	H	Good performance, relationships and dissemination of accurate information.	3	D	M
Noise and vibration disturbing nearby residents	3	C	H	Adherence to Regulatory Noise limits for nearest noise sensitive premise.	2	D	L
Contamination of land and surface waters with sewage at Makuutu camps at project site.	4	C	H	High standard toilets and Sewage Treatment System.	3	E	L
Community/security impact of upgrade of roads within Project area	4	C	H	Relocation Action Plan	3	D	L
Inadequate site chemical/hydrocarbon management leading to spills.	3	C	H	Site operation/chemical control.	2	D	L
Inadequate disposal of tailings/spent clay residues leading to pollution.	3	C	H	Site Operational Control. Low concentrations of residual process chemicals. Progressive rehabilitation of strip mining.	3	D	L
Noise and vibration of processing plant displacing wildlife.	3	C	H	Processing facilities located to the south in wildlife poor area. Plant and equipment designed for minimal noise and vibration. Wildlife will become habituated.	2	D	L
Depletion of natural springs used by local people or wildlife during mining operations.	3	D	M	No draw-down of local aquifers.	3	E	M
Contamination of discharge water with metals and sediment during mining operations.	2	B	M	No discharge water from mine pits. Truck wash facilities equipped with sediment traps and Oil Water Separators.	2	D	L
Contamination of groundwater with oils during mining operations.	2	B	M	Good spill control and maintenance. Shallow mine pits. No dewatering to rivers and streams. No beneficial use of groundwater.	2	D	L
Excess Generation of wastes including tyres, waste oil and batteries.	2	B	M	Good waste disposal facilities. Good waste management procedures. Well trained workforce aware of waste reduction and disposal strategies. Waste reduction targets (refer Waste Management Plan Section 11.6).	2	D	L
Contamination of land from direct product spillage during processing and transport operations.	2	C	M	Benign product with negligible impact. Spillage recovered as saleable product.	2	D	L
				Well designed and maintained slurry transfer systems.			

Aspect	Intrinsic			Controls	Residual		
	C	L	R		C	L	R
Contamination of run-off stormwater from processing area.	2	B	M	Processing area designed with sumps and stormwater catch drains.	2	D	L
Makuutu worker or community member injured in a fight in the community.	2	C	M	Fitness for work protocols (e.g., blood alcohol testing and zero blood alcohol allowed at work). Security Gate. Makuutu personal expected behaviour standards.	2	D	L
Industrial accident to community member illegally entering operational areas at mine site	4	D	M	Buffer zone around operations. Control of access through security gates. Employment of trained security guards.	4	E	L
Proliferation of vermin feeding on food scraps at rubbish dump at the project site.	2	B	M	Rubbish dump control system including separate composting of food scraps and removal from waste stream (refer Waste Management Plan Section 11.6).	2	D	L
Community concern about Project capacity to mitigate the environmental impacts of exploration drilling.	2	C	M	Community engagement (sensitisation)	2	D	L
Excessive mine use of shared water resources leading to loss of water security for local community.	4	D	M	No expected project impact on aquifer-based water supply	2	D	L
Poor reputation makes it difficult to source good employees for the Project	3	D	M	Good reputation achieved through good performance and relationships.	2	D	L
Ugandan government imposes onerous operating conditions to satisfy unhappy appellants.	3	D	M	Good ESIA and effective engagement with regulators	2	D	L
Excessive generation of exhaust fumes impacting air quality during mining operations.	1	C	L	High standard equipment.	1	D	L
				Well maintained machinery and equipment. Well planned and managed operations (refer Greenhouse Gas Abatement and Climate Change Adaptation Plan Section 11.7)			
Generation of dust from mining operations smothering vegetation and impacting workforce health.	1	C	L	High rainfall and humidity limit dust. Use of dust suppression (i.e., water sprays) if needed in dry season. Most machinery movement within pit and to process plant remote from vegetation and accommodation.	1	D	L



### 9.1.5 Discussion of Project Risks

Inability to acquire Project Land was the only Very High risk. This will be mitigated to High through effective stakeholder engagement, effective Compensation and Resettlement Action Plan and the staged Mining Process which enables land acquisition to also be staged. Progressive rehabilitation of mined land back to productive agricultural land additionally minimizes the social impact of the Project and provides opportunity for livelihood Projects. While this risk is specific, reversible, and readily addressed through mitigation measures, it remains High because the consequence of not being able to secure Project land would be catastrophic for the Project.

There were a number of High social risks associated with community health and conflict in particular that could also be significantly mitigated through effective stakeholder engagement, effective Compensation and Resettlement Action Plan and the staged Mining Process as well as the Community Development Plan. Managing in-migration is particularly important in the mitigation of these risks. These risks are also specific, reversible, and readily addressed through mitigation measures but they remain High because of their high consequences for the Project and the lack of direct control by the Project over areas of Government responsibility. Government support and partnerships with Ugandan Institutions and NGOs will be important in mitigating these risks. While the residual risk of these social challenges remains High, despite controls, these risks should be considered within the context of the significant benefits that the Project is expected to deliver to local communities (refer Section 4.7). The project has the potential to improve standards of education, community infrastructure, the extreme poverty and, the significant community health challenges to positively transform the lives of local people.

Makuutu is committed to ensuring that Project Affected People are not socially or economically disadvantaged and a key part of this is securing their livelihoods and food security. The selected location for the 200 ha Processing Plant is in a largely uninhabited area that is currently utilised as a sugar cane farm largely eliminates resettlement issues at that location. The commencement of mining in sparsely populated areas will additionally allow time to properly plan staged resettlement. Progressive rehabilitation of mined land back to productive agricultural land additionally provides opportunity to lease the land as well as creating livelihood projects such as fish farms and agroforestry.

The management of in-migration and its consequent impacts on community health and community services will also be challenging. These issues will be managed in close collaboration with Ugandan authorities. These potentially negative social impacts will, however, be balanced by the presence of a significant long-term project in one of the poorest regions of the world. This will bring much needed economic development to the benefit of both the local region and the nation of Uganda.

In the picture; adverse media reports causing a drop in shareholder confidence and a fall in share price and; international NGOs launching negative media campaign against the Project are also outside of the direct control of the Project. These two risks remain High because strategies such as delivering good environmental and social performance, effectively communicating and, developing strong personal relationships with key stakeholders may not be sufficient to satisfy everyone that the Project is delivering positive outcomes to the local districts and to Uganda more widely. This particularly applies to those with personal agendas that benefit from creating conflict and the consequent attention and donations.

Makuutu is a long-term project and a strategy of securing excellent performance, operating transparently and, securing social equity should convince the vast majority of stakeholders that the

Project is adding value and secure a social licence to operate. The Project will therefore focus on the following key controls that mitigate multiple assessed risks;

- Demonstrated good environmental and social performance which will be publicly reported.
- Good relationships with key stakeholders including local communities and the government.
- Dissemination of accurate and timely information.
- Good government engagement.
- Effective community engagement.
- Effective engagement of NGOs.
- Good collaboratively developed issue management plans (such as grievance management).
- Good dispute resolution processes.
- Transparent, fair and inclusive negotiation.
- High quality ESIA and associated Public Disclosure.

### 9.1.6 Cumulative Impacts

There are no known major planned development projects that will be operating concurrently with the Makuutu Project to create major cumulative impacts. There are, however a number of major agricultural support projects being undertaken in the Project area which will impact livelihoods.

- The first of these is the US \$248 million Agriculture Cluster Development Project. This is a project implemented by the Ministry of Agriculture, Animal Industry and Fisheries, financed by the International Development Assistance (IDA) of the World Bank. Bugweri and Bugiri are in Cluster 2 with a focus on Maize, Rice, Cassava and Robusta Coffee. Assistance to farmers is being provided and some choke points on the Iganga Road have been addressed. The Project appears to be gaining momentum and is a key government initiative closely aligned with the objectives of Makuutu. [https://www.agriculture.go.ug/wp-content/uploads/2021/07/ACDP\\_Status\\_Report\\_300621\\_lowres.pdf](https://www.agriculture.go.ug/wp-content/uploads/2021/07/ACDP_Status_Report_300621_lowres.pdf). Livelihood projects proposed for rehabilitated land are particularly relevant to this initiative.
- The second initiative is the IFAD Country Strategic Opportunities Programme for the Republic of Uganda which is particularly relevant to Mayuge. This has three strategic objectives aimed at ensuring the inclusion of women, youth, nutrition and climate change adaptation measures, and at contributing directly to the SDGs. <https://webapps.ifad.org/members/eb/132/docs/EB-2021-132-R-20.pdf>
  - SO1: Support increased production, productivity, value addition, competitiveness and inclusion of smallholders within selected value chains (vegetable oil, livestock and aquaculture) that have all been identified as key and listed as priority commodities in the Third National Development Plan.
  - SO2: Strengthen environmental sustainability and climate change resilience of poor rural people's livelihoods and economic activities.
  - SO3: Enhance sustainable livelihood development for marginalized and poor households, especially women and youth.

The Project area is within IFAD's vegetable oil development project area and Mayuge, which is encompassed by the Western Section of the Project. This area is specifically designated as a hub for the development of Oil Palm. This is part of a US\$210.4 million project designed to sustain the lives of 300,800 vulnerable rural households. The total Project cost is US\$1,838.6 million with US\$4,559.7 contributed by IFAD to the benefit 5,147,987 households.

- The third significant initiative affecting Bugweri and Bugiri is the Igogero and Naigombwa Irrigation Scheme Project. This is being delivered under the “Enhancing National Food security through Increased Rice Production” strategy under the direction of the Ministry of Agriculture, Animal and Fisheries. This is a 5,500 hectares scheme with 2,500 ha in Igogero in Bugiri and 3,000 hectares in Naigombwa in Bugweri that will extend up the Naigombwa River downstream of the Project area. It will be mainly used for a large rice irrigation scheme set to benefit 5,000 farmers in Bugiri and 4,000 in Bugweri District. This Project has some important implications for the Project:
  - It will be particularly important that the Project has high compliance with the water quality discharge Standards established by DWRM because any contaminants will enter the downstream irrigation scheme area. Nutrient contribution to the downstream river system from 5,500 hectares of intensively farmed rice will likely be significant and the Makuutu Project may be blamed for contributing to high nutrient levels in the downstream river system.
  - The conservation of protected wetlands in the upper reaches of the Naigombwa River between the Project area and the proposed irrigation area becomes even more important with respect to potential encroachment of rice farming into these areas.
  - The Makuutu Project will require a dam for managing stormwater and has plans to use excess water to irrigate livelihood support projects. This creates potential opportunity for collaboration with the downstream irrigation Project.
  - The combination of a large irrigation scheme and a large mining project amplifies environmental and social risks and opportunities and particularly with respect to resettlement and livelihoods. Concurrent resettlement from the irrigation project and the Makuutu Project in combination with an influx of outsiders seeking opportunity will need to be carefully managed in close consultation with District Planners and government representatives.

Third party hydropower from the Jinja (Nalubaale) hydro-power scheme is already in place with transmission lines over the Project site but the Project will nevertheless complete a power options assessment, including the potential use of solar power which, if successful, could serve as an example to others and result in greater use of solar power in Uganda. The Project will, additionally contribute to upgrades in local transport infrastructure and potentially the main arterial road to Mombasa in Kenya. This in turn would increase the attractiveness of Uganda to other large businesses relying on international shipping for import or export purposes.

On a local and regional level, the improvement in the relative prosperity of the local area will attract entrepreneurs and people seeking work. The potential for uncontrolled in-migration and consequent impact on local services and infrastructure is a major risk that the Project will manage collaboratively with local officials and town planners. It is likely, however, that with a current mine-life of 30 years, the population of local centres will increase significantly and transform the area. Addressing issues of community health and food security will be a priority (refer Section 11.3). It is important that local communities do not become dependent on the mine but creating independent and self-sufficient communities will inevitably ensure their longevity. The commercial value of property in the area is likely to increase which in turn will impact on the nature of farming.

The success of the Makuutu Project will build the reputation of Uganda as a good place to establish a business and encourage other large mining projects to establish. It will also provide the Ugandan government with a good benchmark on planning, development and management of mining operations for good sustainability outcomes. It will also provide a pool of experienced Ugandan regulators and specialists benefiting from the Makuutu experience.

Cumulative impact risks are mainly associated with people influx and are summarized in Table below.

Table 139: Risk Assessment for cumulative Impacts

Aspect	Intrinsic			Planned Control	Residual		
	C	L	R		C	L	R
Expanding population in Project area due to multiplier effect creates a permanent large population centre with consequent adverse impact on law and order, food security and community health	3	B	H	Integrated land-use planning with key stakeholders including the Ugandan Government, local community and NGO's.  Community Development Plan (Refer Section 11.3).	3	C	H
Increased road traffic as a result of population expansion causing roads to deteriorate and accidents to increase in port area.	3	C	H	Collaborate with and support Ugandan Government with improving roads in Project area	3	D	M
Loss of capacity and social issues developing due to multiplier effect expanding the population of area near the Project.	4	C	H	Collaborate with and support Ugandan institutions and NGO's in improving capacity in the Project area in Health, Education, Law and Order and Food Security.	3	D	M
Development of additional large mining operations in Uganda driven by the success of the Makuutu Project multiplying the social and environmental impacts assessed for the Project.	3	C	H	Provide Ugandan government with a good benchmark on planning, development and management of mining operations for good sustainability outcomes. Provide pool of experienced Ugandan regulators and specialists benefiting from the Makuutu experience.	3	D	M

C :Consequences (1-insignificant, 2-minor, 3-moderate, 4-major, 5-catastrophic); P : Probability (A-almost certain, B-likely, C-moderate, D-unlikely, F-rare) ; R : Risk (L-low, M-medium, H-high, VH-very high).

## 9.2 Minimising Environmental and Social Risks and Enhancing Benefits

This section provides an overview of approaches that Makuutu will take to minimize environmental and social risk and maximise project benefits. It is founded on the risk context presented in Section 9.1) as well as addressing the concerns and recommendations received from stakeholders.

The Project will deliver net positive economic, environmental and social benefit to Uganda and the communities near the Project (refer Table 15). Some key aspects are as follows:

### 9.2.1 Financial benefit

The economic highlights of the Makuutu Project were presented in the Project Preliminary Economic Assessment Report that was publicly announced in April 2021 (refer Table 5). Makuutu will mine approximately 500 million tonnes of ore and waste material over its 27-year life to produce 79,213 tonnes of mixed Rare Earth Oxide (REO) with a value of US\$8.2 billion (including Scandium) which would be extracted from 281.5 million dry tonnes of ionic clay ore over the 27-year life of the Project. The Project has an EBITA of US\$3.9 billion, and after-tax free cash flow of US\$2.4 billion. The project will deliver estimated gross royalty payments to Uganda of US\$380 million plus corporate tax contributions of US\$965 million over the life of the project based upon the existing Mineral Resource Estimate (MRE). In addition to this, it is projected that direct employment will also contribute directly to the local districts that host the Makuutu deposit, with in excess of US\$100million expected to be spent on local employment, local business and services.

### 9.2.2 Social Benefit

While the social challenges associated with resettlement and the compensation of Project Affected Persons is the greatest risk area for the Project this will be managed to ensure that no Project Affected Persons are financially or socially disadvantaged (refer Section 11.4). In addition to this the opportunity for Makuutu to transform the lives of the poorest people in Uganda is enormous. The Project will additionally be a catalyst for the development of other major mining projects in Uganda consistent with Uganda's National Development Three Plan (NDP III) of unlocking the mineral wealth of Uganda to secure the Vision 2040 of Uganda to become a prosperous middle-income country by 2040.

The direct benefit on local communities will include upgrades to road and infrastructure in combination with aspiring to 100% of the 1,200 Makuutu employees being Ugandan by Year 7 (Refer Section 11.1). Makuutu has also made a decision to not have on-site camps or a FIFO workforce during the establishment of the Project. The workforce will reside in the local Districts and visitors will utilise nearby hotels and restaurants for accommodation and food.

The Makuutu Rare Earths Project will be a significant financial contributor to Uganda, with estimated gross royalty payments of US \$380M plus corporate tax contributions of US \$965M over the life of the project. Under Ugandan Tax Law 17% of Project Royalty payments are required to return to the area through mandated local government (17%) and land owner (3%) share of Project Royalties. This amounts to US \$76 million over the life of the Project which would be dedicated the areas adjacent to the Project.

The Project is currently contributing \$486,000 a year to community programmes. Makuutu will increase this financial contribution by allocating a portion of revenue to enable the community to directly benefit from Project success. It is proposed that this initially be set at 1% which by the 2-module phase of the Project in Year 3 would be about US \$1 million a year. This proportion would be slowly reduced as the Project expands and reach a maximum contribution of \$2 million per year by Year 7. It would then be capped and remain at this level until Year-26 prior to dropping to US \$1 million in the final year of the Project. The total contribution to community programmes over the life of the Project would be US \$47 million.



A total of US \$123 million would therefore be allocated to community support and infrastructure over the life of the Project. With this level of support the opportunity for local communities to benefit from the World Class Makuutu Project is enormous. Makuutu will establish a stakeholder advisory group to advise on how this funding can be best spent with a specific focus on the key areas of sustainable livelihoods and community health. These programmes will be undertaken in partnership with Ugandan Institutions and NGOs. Makuutu is a long-term project but it will put in place initiatives that deliver even longer-term health and prosperity to the local community and Uganda more broadly that will endure well past the end of the Project life. The proposed Agricultural Research Institute in combination with large scale agro-forestry and fish farming projects (refer Section 11.3) will be particularly significant in establishing long-term food security and sustainable livelihoods for people living in the Project area.

### 9.2.3 Environmental Benefit

The Makuutu Project will be largely sited on established farmland and will not have a significant direct impact on biodiversity values. The progressive rehabilitation of mining pits will additionally return mined land back to productive agricultural land (refer Section 11.8). The moving mining footprint will be equivalent to about 6 months of mining which will initially be about 20 hectares. At the end of mining there will be no legacy mining pits, tailings dams or waste dumps. In addition to this, millions of dollars of embedded capital and a focus on controls on Project activities (refer Section 11.1) should ensure high standards of emission control during operations and no adverse impacts on the quality of the downstream river systems (refer Figure 59). The direct impact of the Project on environmental values can therefore be considered neutral.

The Project will, however, look for opportunities to collaborate with specialist NGOs and Ugandan institutions to restore degraded wetlands downstream of the Project area to enhance biodiversity outcomes. The creation of woodlots (refer section 11.3) in combination with donating 20,000 untreated wooden pine pallets to the community for use as firewood (refer ESMP Volume 6, Waste Management Plan as summarised in Section 11.6) will also help slow the current Ugandan forest clearing rate of 200,000 hectares a year (refer Figure 53) that is largely occurring as a consequence of firewood harvesting.

### 9.2.4 Greenhouse Gas Emissions

While the Project will emit 1.5 million tonnes of CO<sub>2</sub> over its life (refer Section 11.7) it will produce sufficient heavy REE to construct 90 GW of renewable wind energy and contribute to a globally significant reduction in green-house gas emissions of 300 million tonnes of CO<sub>2</sub> per year. Wind turbines rely on neo-magnets that depend on neodymium, dysprosium and terbium REE in particular. These heavy REE comprise about a third of the REE that will be produced by Makuutu (refer Figure 17). The lack of global supply of these heavy REE is a bottleneck in the production of neo-magnets. In the absence of the heavy REE from Makuutu the 90 GW of wind power generation that would be enabled by the Project might not be enabled by heavy REE from other sources due to a shortage of supply. The 300 million tonnes a year of CO<sub>2</sub> emissions from coal-fired power that would have been displaced by the wind turbines would therefore continue. This is six times Uganda's National Greenhouse Gas emissions of 49 million tonnes.

### 9.2.5 Alignment with NDP III

The Project is highly consistent with Uganda's National Development Plan three (NDPIII) of unlocking Uganda's mineral potential and enabling Uganda to become a wealthy middle-income country by 2040 as per the Vision 40. Makuutu will generate significant wealth for Uganda and serve as a catalyst for other major mining projects as well as contributing to positive social and environmental outcomes.

### 9.2.6 Positive Impacts

In addition to the net positive social, environmental and economic benefits of the Project already discussed (refer Section 4) a number of specific positive benefits were raised by stakeholders during formal meetings to discuss the ESIA including the following that have not been directly addressed in other sections of the ESIA (refer Table 131):

#### *9.2.6.1 Collaboration and information sharing and particularly with respect to data on health, education, livelihoods and law and order.*

The Project will maintain open and transparent dialogue and share Project information with District Planners and Local, District and National level Government entities (refer Table 123). The Project will additionally benefit from information relevant to the success of community support programmes including information on infrastructure, education, community health and, livelihood programmes to facilitate the deployment of resources to best effect.

#### *9.2.6.2 Tree planting to increase amenity*

A number of rare and useful tree species including Mvule or African Teak (*Milicia excelsa*) will be lost during the establishment of Project infrastructure and the expansion of the mining pit. Large numbers of these species will, however, be included in the rehabilitation programme including in established agro-forestry areas. In addition to this an embankment of topsoil is planned for the Process Plant (refer Figure 41) will be heavily vegetated with Mvule and other useful trees to provide an effective buffer between the project and nearby communities. The Project will establish a tree nursery and trees will also be available to local communities for beautification and particularly for communities outside the Project footprint and those established on rehabilitated areas.

#### *9.2.6.3 Maximise the use of local labour*

Makuutu will preferentially employ local people with the appropriate skills and experience and will facilitate this through the provision of support for education and skills training, including that of women and girls. The Project will employ 1,200 people at peak production by year 10 and with the intention that 100% of these people be Ugandan by Year 7. In addition to this:

- Makuutu will not have a FIFO workforce and all employees will be resident in nearby communities which will increase income for local businesses and in particular hospitality.
- Makuutu will provide business training and capacity building to enable people to establish businesses that will be supported by the Project and potentially include: training; office cleaning; earthmoving; waste management; catering and other hospitality; IT; plant nursery and tree planting in rehabilitated areas; security; mechanical and electrical trades and many other areas.
- The direct investment of an initial US\$1m a year rising to US\$2m by year 7 on social programmes in combination with a return of 20% of Project Royalties to the local area will increase

employment in the areas of education, community health, roads and infrastructure in particular.

- Livelihood projects established on rehabilitated land including intensive agriculture, agroforestry and fish farming and associated downstream industry will employ many people.
- Agricultural outreach programmes and the potential extension of the soil liming and full fertilisation techniques that Makuutu will be using in rehabilitated areas to areas outside of the future mining footprint. Irrigation could also be extended outside of the mining footprint. This would generally enhance agricultural production to the benefit of livelihoods and food security in the project area.

#### *9.2.6.4 Agricultural enhancement*

The agricultural productivity of land in the mining area is poor and decreasing. The lixic ferralsol soils additionally require long periods of fallow to maintain their productivity. Small land-holdings are therefore becoming increasingly unviable and are being increasingly subsumed into large commercial enterprises such as sugar-cane farming which is creating hardship for small farmers.

The Makuutu Project will provide significant opportunity for economic diversification and the employment of many people in non-agricultural areas (refer Section 4.7). At the same time, it will transform the poor-quality pre-mining land to high quality productive agricultural land in rehabilitated areas via a process of liming, full fertilization and irrigation. Rehabilitated land can additionally be used to establish fish farms and agro-forestry projects that can employ a lot of people and transition to community ownership with appropriate ongoing support such as in place in other parts of Uganda (<http://www.ugandafarm.org/>).

#### *9.2.6.5 Wetland Protection*

Protected wetlands are being increasingly used for the cultivation of rice with consequent biodiversity impact. Agricultural support could be provided to farmers outside of the Project footprint to enhance their profitability on the condition that they adopt sustainable farming methods which protect protected wetlands in particular. The establishment of a multi-stakeholder Catchment Management Group as in place across Australia could see these catchments managed sustainably for the benefit of all with enhanced social, environmental and economic outcomes.

### **9.2.7 Negative Impacts – Pre-Construction Phase**

#### *9.2.7.1 Land Acquisition and Resettlement*

Any disturbance of surface rights of the landowner must be adequately and fairly compensated. Land acquisition for the processing plant and acquisition of surface rights for the mining activities present one of the biggest risks to the project in terms of project timelines and project costs. The management of the land acquisition and resettlement process is also critical in gaining acceptance and project support by the host communities. Mismanagement of this process can significantly jeopardize the project by triggering community rejection including long legal battles that can hurt project implementation timelines. Therefore, the land acquisition model (lease or outright purchase) must be clearly defined, and a transparent process undertaken to ensure land acquisition and resettlement is done in a smooth manner. What is critical is for the project to undertake progressive land acquisition so that the number of people to be resettled is manageable at any given time. The ESIA findings

indicate that most land is owned under customary, freehold and leasehold land tenure systems. During consultations, the local communities enquired about the project's land acquisition approach. The most preferred approach was compensation. At the same time, some local government officials in Bugweri and Mayuge DLG hinted at possibilities of leasing.

The NDPIII observes that .... *the existent land tenure systems warrant adequate and amicable compensation of the land owners before mining or establishing any developments on the land. License holders have to buy surface rights from either the landlords or tenants, and in some instances both parties, which makes the investment costs very high. Furthermore, the land prices are often inflated once owners or tenants get to know certain minerals exist below the ground. There is need to harmonise the existing laws and regulations* (NDPIII). The observation above in the NDPIII is critical and the risks associated with speculation needs to be managed by the Developer. There is a reported rush by the land owners to secure land titles so they can fetch more compensation.

The Mining Regulations 2019 equally capture land acquisition and compensation under Regulation 28.

#### 9.2.7.1.1 Regulation 28. Application for mining lease.

(1) An application for a mining lease shall—

(e) be accompanied by—

- (i) the dimensions of the area applied for;
- (ii) a statement of the number of land owners or lawful occupants of land in the area applied for, including a resettlement action plan (RAP), if applicable;
- (iii) written proof that the applicant has reached an agreement with the land owner or lawful occupier of the area he or she intends to mine as required by section 42 (3) of the Act;
- (iv) written proof that the applicant has secured the surface rights of the land subject of his or her application as required by section 43 (3) (h) of the Act;

(v) a certificate of approval of environmental and social impact assessment from National Environment Management Authority in; and

(f) contain proof that the land has been surveyed and submission of a deed plan of the land in question.

#### 9.2.7.1.2 Regulation 29. Notice to land owners and lawful occupiers of land on grant of mining lease.

(1) The Commissioner shall notify an applicant for a mining lease and the Chief Administrative Officer of the relevant district of his or her decision.

(2) Where the decision is to grant a mining lease, the Chief Administrative Officer shall cause a notice in Form 45 set out in Schedule 2 to these Regulations to be served to all land owners or lawful occupiers of land within the area of the proposed mining lease.

(3) Notwithstanding subregulation (2), a general notice having the same effect posted at the district and sub-county headquarters and such other place as the Commissioner may specify shall be sufficient notice to those land owners or lawful occupants of land.

(4) Where the Commissioner's decision under subregulation (1) is to grant a mining lease, he or she shall furnish the Chief Administrative Officer of the district concerned with a map showing the boundaries of the approved mining area.

#### 9.2.7.1.3 Significance of Land Acquisition and Resettlement

Land Acquisition and the associated compensation and resettlement action plan has major significance and is the focus of the Preliminary Compensation and Resettlement Action Plan which is summarized in the ESIA (Refer Section 11.4).

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.7.1.4 Mitigations

- The Developer shall sensitize communities on the boundaries of the project components (processing plant and mining pits);
- The Developer shall prepare and implement a Compensation and Resettlement Action Plan (RAP).
- The Compensation and Resettlement Action Plan presents the following themes:
  - Avoidance of involuntary resettlement where-ever possible.
  - No Project Affected Persons to be financially or socially disadvantaged.
    - Replacement housing
    - Replacement public infrastructure
    - Replacement social services
    - Livelihood restoration possibly including:
      - Replacement land
      - Paid work with the Project or on Project supported livelihood projects
      - Food Security

#### 9.2.7.1.5 Performance Objectives

- Achieve voluntary negotiated agreements with impacted stakeholders to minimise the need for involuntary resettlement.
- Ensure that the economic impact of displacement is mitigated.
- Target development opportunities for displaced people.
- Seek Government support to secure compensated land.

#### 9.2.7.2 Managing Conflict during the Exploration Drilling Programme

Most community concern about the exploration drilling programme related to a lack of understanding about the small magnitude and low risk associated with the drilling programme which was addressed



via discussion at public meetings. The appointment of Community Liaison Officers additionally mitigated this risk. Clear communication, compensation payments to landowners and managing activities for minimal impact further mitigated this risk. Key concerns included:

- Concerns about the drilling mission to be a cover up for a much bigger scheme of confiscating the land.
- Crop damage payment: Is the payment going to be done before or after drilling? Clarification on the resettlement and location matters.
- In case the planned drill hole position falls inside someone's house, would RRM demolish the house in order to execute the work?
- Are there going to be employment opportunities for locals during the mission?
- What is the value of the minerals contained in the samples that were to be taken?

#### 9.2.7.2.1 Significance of community conflict during the exploration drilling programme

The sensitivity of the receptor is low as is the magnitude of the impact making this an aspect of Minor significance. Good relationships with stakeholders, are, however, very important and particularly as the impacted communities will be the same communities that will be engaged in the much more significant compensation and resettlement action plan.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.7.2.2 Mitigations

Key mitigations include:

- Meetings with impacted land-owners to discuss concerns and explain the Project.
- Appointment of Community Liaison Officers
- Minimising the scale of impact including no litter and rehabilitation of the holes.
- Payment of fair compensation to landowners.

#### 9.2.7.2.3 Performance Objectives

- Comply with Legal and other Requirements
- Minimise Impacts on Water Quality of Rivers and Streams During Construction and Operation.
- Minimise Noise and Vibration Impacts During Construction and Operation.
- Consult Stakeholders and consider their concerns in Project Decisions
- Engage Stakeholders in the development of Management Plans
- Establish Strong and Enduring Relationships with key Stakeholders

- Ensure high standards of road safety on access roads within Project areas.

## 9.2.8 Negative Impacts – Construction Phase

### 9.2.8.1 Land Use Conflicts

There are diverse land uses across the 3 Districts. Agricultural land is the major land use and most wetlands have been cultivated. Directly impacted land will be acquired and compensated as per the strategy presented in the Compensation and Resettlement Action Plan (refer Section 11.4) and direct impacts outside of the Project footprint are expected to be minimal. This includes impacts on cultivated wetlands downstream of the Project. The quality of stormwater discharged from the Project area is expected to be good and this will be regulated via a DWRM water discharge permit.

The Project is expected to provide significant economic stimulus to local communities which in turn will stimulate in-migration. If this is not managed properly, it could lead to significant land use conflict, pressure on social services and pressure on public infrastructure. If on the other hand local residents have secure land tenure and in-migration is properly planned and controlled by District Planners and Local Government Institutions, then rural growth centres and small towns such as Mbaale in Mayuge could reap the benefits of the Project without the corresponding social risks.

#### 9.2.8.1.1 Significance of Land Use Conflicts

With the planned controls the significance of land use conflict in the Project areas is considered Moderate.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.8.1.2 Mitigations

- Clarity on land ownership and titles to limit the risk of existing landowners being displaced by outsiders.
- Close collaboration between the Project and District Planners so that in-migration and consequent population growth can be properly planned and managed.
- Direct impact on wetland cultivation is not expected and there will be good controls on emissions to prevent indirect impacts.
- If it proves necessary to resettle people, they will be fairly compensated and their livelihoods and food security will be secured.

### 9.2.8.1.3 Performance Objectives

- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Support the principle of land tenure for local people to prevent loss of land and resources to outsiders in-migrating into Project areas.
- Facilitate community training and education to enable local communities to take advantage of Project opportunities and facilitate employment and business development opportunities in local communities.
- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities directly impacted by the Project.

### 9.2.8.2 Increased Exploitation of Water Resources in the Area

This was a concern raised by stakeholders but it is considered a Minor Risk by the Project. The Project will be self-sufficient with water and will not be utilising existing community water supplies. It will take advantage of the positive water-balance in the area (i.e., 1,500 mm of rainfall and 125 mm of evaporation) to harvest rainwater for Project use. In addition to rainwater, there will be large volumes of high-quality Reverse Osmosis water generated by the Process Plant. This will be sufficient to supply the relatively low volumes of water that will be required for mixing concrete, masonry works and maintaining sanitation among other requirements during construction. A permit from NEMA/DWRM to dispose of excess water will be required during operations to dispose of surplus water.

The Project is aware, however, of the reliance of local communities on groundwater resources and of the concerns expressed by stakeholders at multiple stakeholder engagement meetings that the project could adversely impact on local water supply.

### 9.2.8.2.1 Significance of Project Impact on Water Resources

Overall, the magnitude of impact of water use is considered Minor due to the envisaged magnitude of Project impact on community groundwater resources being negligible whilst understanding that the sensitivity of the receptor is High.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.8.2.2 Mitigation Measures

- Makuutu has a net positive water-balance with an annual rainfall of 1,500 mm and evaporation of about 125mm. The Project will direct harvested storm-water into a constructed storm-water pond at the process plant to ensure that discharge water quality is good. This pond will serve as process-water supply and for dust suppression during periods of extended dry weather.
- A key requirement of the Process plant is to concentrate the REE in the lixiviant that desorbs the REE from the ionic-adsorption clay. This process involves membrane exchange and will generate large volumes of high-quality Reverse Osmosis (RO) water that will be available for Project water uses. It is essentially distilled water.

#### 9.2.8.2.3 Performance Objectives

- No impact on groundwater height or quality as confirmed by routine (i.e. Quarterly) monitoring in Project areas.
- Minimise Impacts on Water Quality of Rivers and Streams During Construction and Operation.
- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities impacted by the Project.

#### 9.2.8.3 Soil Erosion and Sedimentation

The construction phase will involve use of heavy machinery to initially clear topsoil from the Process Plant area and to construct foundations which will include levelling and contouring. Topsoil will be strategically stored as grassed earthen barriers between the project site and roadside settlements in Nakivumbi in particular. The area will then be land-formed and contoured prior to the construction of workshops, offices, the Process Plant and the HDPE lined heap leach pads. Stormwater will be directed to a stormwater pond which in combination with high quality RO water produced by the Process Plant will serve as a process water supply with excess water discharged to the river system under Permit from DWRM. Discharge water quality is expected to be good with low levels of suspended sediment but this will be closely monitored prior to discharge.

Construction of the haul road (about 4 km) will be limited to the right of way. The soils of the proposed sites are generally sandy loams and loams on laterite which are reasonably stable prone to some erosion upon disturbance. This will be mitigated by sheeting the haul road with hard-cap and rock which should protect streams S2 & S4 at the haul road crossing.

##### 9.2.8.3.1 Significance of Impact on soil erosion and sedimentation

Overall, the magnitude of soil erosion is assessed as Medium due to the moderate size of the disturbance footprint during construction while the sensitivity is considered High because the sites (processing plant and haul road) are adjacent to streams, rivers, and wetlands. The overall significance is ranked as **Major**.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.8.3.2 Mitigation Measures

- The progressive rehabilitation of the mine will limit the mining footprint to about 6 months which will be equivalent to about 20 hectares which minimizes the scope of erosion.
- Stormwater will be diverted away from the mining pit to minimize stormwater inflow into the mining pit and consequent risk of slurry formation when haul trucks traffic through ponded water.
- Stormwater from the Mining Pit will be pumped to the settlement pond at the Process Plant which will also receive run-off from all disturbed areas at the Process plant.
- Where possible, site clearance and road construction will be undertaken during the dry season, with watering down of surfaces to avoid dust nuisance;
- Vegetation clearance will occur at the processing facility footprint, approved road alignment and the mine where ore will be initially stockpiled;
- Excavated materials will be stockpiled in bunded areas away from the streams and stabilized with hydro-mulch or similar to prevent erosion until grass is established to avoid possible losses into the water courses;
- Drainage channels will be constructed to convey storm water, thereby preventing erosion from excavated sections and material stock piles. The drainage system will incorporate silt traps, and as appropriate, culverts and bridges at road sections crossing waterways, to prevent flooding;
- All fill operations (e.g., site leveling) and backfill operations (e.g., for used borrow pits) during construction will involve moisture conditioning, uniform compaction and the surface revegetation for bare surfaces to promote soil stability.

#### 9.2.8.3.3 Performance Objectives

- Comply with DWRM water quality conditions for Project discharge water.
- Minimise Impacts on Water Quality of Rivers and Streams During Construction and Operation as verified from quarterly water quality monitoring.
- Progressively rehabilitate and stabilize disturbed areas.



#### 9.2.8.4 Pollution from Construction Materials, Chemicals and Waste

Construction activities will utilize materials and chemicals (e.g., concrete, fuel, machinery oil, hydraulic fluid, and paint) while also generating waste with the potential to pollute the aquatic environment in the project area if not responsibly managed. In addition, the flow of wastewater and stormwater from construction sites into waterways could create a nuisance for surrounding communities.

Construction of the Process Plant will additionally be undertaken concurrently with early mining and the consequent use of large volumes of diesel fuel. In the latter part of the construction, process chemicals including sulfuric acid, ammonium sulphate and ammonium bicarbonate will be received on site and staged commissioning of the heap leach process will commence.

##### 9.2.8.4.1 Significance of pollution impacts during Construction

The initial magnitude of the impact of construction materials, chemicals and waste during construction will be Medium but it will increase to High with the arrival of Process Chemicals. The sensitivity of the receptors is also High because the sites (processing plant and haul road) are adjacent to streams, rivers, and wetlands. The overall significance is ranked as **Major**.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

##### 9.2.8.4.2 Mitigation Measures

###### General controls

- A Waste Management Plan has been prepared (Refer Section 11.6) that addresses aspects such as sources and volumes of waste; waste minimisation, reuse, and recycling opportunities; and waste collection, storage, and disposal procedures.
- The contractor will ensure that all workers receive training on proper disposal of all waste prior to working at the project site;
- Good construction practices and site/waste management measures will be observed to ensure that all solid waste, fuels and solvents do not enter the nearby lands and open water sources;
- Waste hydrocarbon storage areas will be sheltered, paved and bunded for oil containment;
- Excavated materials or other construction materials will not be stockpiled or deposited near or on-stream banks, lake shorelines, or other watercourse perimeters where they can be

washed away by high water or storm runoff or can in any way encroach upon the watercourse itself;

- Traffic management should be ensured during transport of the waste. Any vehicles transporting excavated materials or waste off-site should be cleaned before leaving the construction site to ensure no earth, mud, debris and the like is deposited by them on public roads.
- Vehicle and equipment washing, servicing and fuelling, etc. should be restricted to a designated area with properly designed fuel tanks and bunds and proper operating procedures. Containment measures such as drains, oil trap, sump and bins will be provided at the designated, to receive all wastes (liquid and solid) generated; and
- Sedimentation tanks or pits should be constructed for collecting and retaining all the concrete washout water. After the tank has been used to wash down the chutes of ready mixed trucks and the wash water has evaporated or has been vacuumed off, the remaining hardened solids can be broken up and removed from the pit and disposed as fill material. Concrete wash water is highly alkaline (pH of 10-13). Therefore, pH correction is required.

#### Specific Controls at the Process Plant

- Impermeable HDPE leach-pad liners to prevent loss of lixiviant to groundwater.
- Major storage tanks for Sulfuric Acid and Diesel housed within impermeable bunds.
- Emergency Management Plan to quickly and effectively clean up all spills which includes removal and treatment of any contaminated soil.
- Provision of tap water to Nakivumbi community to reduce or eliminate reliance on groundwater sources.
- Establish water quality monitoring programme using permanent water monitoring bores.

#### Specific controls in the Mining Area

- Ammonium Sulphate will be rinsed from the “spent ore” prior to it being replaced in the mining pits to remove residual contamination.
- The mixed montmorillonite/kaolinite clay ore will have extremely low permeability and will function as an aquitard with minimal transmission of groundwater.
- Alternate water sources for local communities including resettled Project Affected Persons will be provided.
- A Hydrogeological Model will be developed to confirm the lack of significant aquifers in the mining pit.
- Water quality monitoring will be in place in active mining areas using permanent monitoring bores.
- Progressive rehabilitation (refer ESMP Volume 8: Life of Mine and Closure Plan as summarised in Section 11.8) will limit open mining pits to about 6 months life limiting both the size of the pits and their potential to accumulate groundwater seepage. Once rehabilitated, vertical infiltration of stormwater into the replaced “spent-clay” fill material will be negligible.

#### 9.2.8.4.3 Performance Objectives

- Implement an Effective ESMS to Drive Continual Improvement in Social and Environmental Performance over the Life of the Project.

- Comply with Legal and other Requirements.
- Minimise Impacts on Water Quality of Rivers and Streams During Construction and Operation.
- Proactively manage Project activities to minimise the risk of emergencies.
- Respond quickly and effectively to emergency situations to mitigate consequences.
- Fully investigate all emergencies and provide effective post-emergency support to mitigate consequences and reduce the risk of a recurrence.
- Implement an Integrated Recycling System.
- No unauthorised disposal of hydrocarbon and chemical waste to landfill.
- Management of the site landfill to ensure legal compliance and environmental protection
- Appropriate disposal of medical waste to eliminate risk of infection to workforce or the community.
- Ensure workforce compliance with waste procedures.

#### 9.2.8.5 Sanitation at the Construction Site

The site will be equipped with sanitation facilities and appropriate sewage treatment during both construction and operation to ensure that there is no pollution of downstream water-courses. The high rainfall and high water-tables in some areas create challenges that will be addressed in the design with options such as constructed wetlands being considered. This is discussed in detail in the ESMP Volume 6 (Waste Management Plan) that is summarized in Section 11.6.

##### 9.2.8.5.1 Significance of Sanitation Issues

The baseline surface water quality of streams downstream of the Project areas indicates widespread contamination with coliform bacteria. With the installation of modern ablution facilities, the Project is not expected to contribute additional untreated sewage to waterways. The magnitude of the impact has been assessed as Medium to ensure that this sensitive issue receives high attention but it could arguably have been assessed as Low. With High sensitivity because of the close proximity of waterways and wetlands in the project area the significance is ranked as **Major**.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.8.5.2 Mitigation Measures

- The contractor will put in place good quality ablution blocks with appropriate sewage treatment for the workforce. This will secure high standards of on-site hygiene and protection of downstream water-courses.
- Provision of water and soap at the sanitary facilities at all time;
- Provide separate sanitary facilities for the different gender and clearly label them.

#### 9.2.8.5.3 Performance Objectives

- Implement an Effective ESMS to Drive Continual Improvement in Social and Environmental Performance over the Life of the Project.
- Comply with Legal and other Requirements.
- Minimise Impacts on Water Quality of Rivers and Streams During Construction and Operation.

#### 9.2.8.6 Impact on Socio-Economic Infrastructure and social services

The project will be self-sufficient with respect to all services and will not be utilizing existing socio-economic infrastructure with the exception of workforce and delivery truck use of public roads when accessing the site. These will, however, be upgraded as appropriate in consultation with Government. The Project will additionally contribute to the upgrade of emergency response infrastructure including public hospitals as presented in the Emergency Response Plan (refer Section 11.5).

The Project may, however, eventually impact on some social infrastructure within the future footprint of the mining pit that will necessitate relocation of facilities (refer ESMP Volume 4, Preliminary Compensation and Resettlement Action Plan as summarized in Section 11.4). The mining pit will expand at about 35 hectares a year and will initially not impact on public infrastructure allowing time to plan and negotiate good outcomes for the community.

#### 9.2.8.6.1 Significance of Project Impact on Infrastructure

There will be no need to relocate facilities or to resettle people at the Nakivumbi Trading Centre adjacent to the Process Plant or on any of the roadside dwellings in this area due to its location in a largely unoccupied sugar-cane farm. The sensitivity of receptor and the magnitude of impact are both, however, High so the significance is **Major**.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.8.6.2 Mitigations

- Significant upgrade to public access roads to the Process Plant will likely be necessary prior to construction and definitely prior to production to accommodate large volumes of process chemicals.
- Community water supply will not be impacted.
- Emergency Management Plan (Refer Section 11.5) and Preliminary Compensation and Resettlement Action Plan (Refer Section 11.4) include strategies to upgrade and relocate any public infrastructure impacted by the Project footprint.
- Makuutu direct contribution to Community Development in combination with 20% of Project Royalties allocated to local areas will see investment >US\$100 million over the Project life which will deliver very high standard facilities to the Project area.

#### 9.2.8.6.3 Performance Objectives

- Consult Stakeholders and consider their concerns in Project Decisions.
- Engage Stakeholders in the development of Management Plans.
- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Ensure high standards of road safety on access roads within Project areas.
- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities directly impacted by the Project.
- Proactively manage Project activities to minimise the risk of emergencies.
- Fully investigate all emergencies and provide effective post-emergency support to mitigate consequences and reduce the risk of a recurrence.

#### 9.2.8.7 Roads (Feeder and Community Access roads)

The Project will operate internal private roads but there will be significantly increased traffic on access roads to the Process Plant as a consequence of process chemical delivery trucks and worker access to the Project. This will require these roads to be upgraded in close consultation with Government.

Operational areas including the process plant, haul road and mining areas will be completely separated from the community with security fencing. As the mining footprint expands at a rate of about 35 hectares a year it will ultimately encompass some existing public roads which will need to be relocated. This will, however, be a staged process over the 27-year life of the Project. The mining pits will also be progressively rehabilitated allowing new permanent roads to be constructed in previously mined areas.

#### 9.2.8.7.1 Significance of impact on public roads

Delivery trucks and workforce traffic will mainly be confined to a 10 km stretch of road from the Busesa junction to the Process Plant entry 2 kilometres north of the Nakivumbi Trading section. There are no towns or river crossings in this section of road and the road will additionally be upgraded as appropriate in consultation with UNRA and Bugweri District Local Government. This will limit the magnitude of the impact to Medium. The sensitivity of the Receptor in this section will also be Medium. The overall significance will therefore be Moderate.



			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.8.7.2 Mitigations

1. The main public access road to the Process Plant will have increased delivery truck traffic and it will be upgraded to accommodate this.
2. All mining and processing activities will be completely separated from the communities. This includes the haul road from the mine to the process plant which will be fully fenced. Any intersections with public roads will be controlled or equipped with overpasses.
3. Public roads consumed by the expanding mining pit will need to be relocated in a staged fashion in close collaboration with the District Planners and local communities over the life of the Project.
4. Existing public roads will be upgraded in collaboration with District Planners as part of the Emergency Management Plan.

#### 9.2.8.7.3 Performance Objectives

- Consult Stakeholders and consider their concerns in Project Decisions.
- Engage Stakeholders in the development of Management Plans.
- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Ensure high standards of road safety on access roads within Project areas.
- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities directly impacted by the Project.
- Proactively manage Project activities to minimise the risk of emergencies.
- Fully investigate all emergencies and provide effective post-emergency support to mitigate consequences and reduce the risk of a recurrence.

#### 9.2.8.8 Water Sources (Boreholes, Piped water supply / PSPs)

The project will not utilize local water sources and will secure the Project water supply from harvested stormwater and Reverse Osmosis Water from the Process Plant (refer Water Balance, Figure 39). There are, however, some existing water-sources on the periphery of the planned mining pit that may ultimately be consumed by the expanding mining footprint. In this situation new water supplies will be established for impacted communities. The annual average rainfall at nearby Iganga from 1990 to 2015 was 1,436 mm ( <https://dataafrica.io/profile/iganga-uga> ) and the average annual evaporation rate is 125 mm. [https://unece.org/fileadmin/DAM/env/documents/2017/WAT/05May\\_16\\_Workshop\\_Kisumu/3.1\\_Muli\\_SMM\\_Basin\\_characteristics.pdf](https://unece.org/fileadmin/DAM/env/documents/2017/WAT/05May_16_Workshop_Kisumu/3.1_Muli_SMM_Basin_characteristics.pdf) . The Project site will therefore have an excess of rainfall over

evaporation of 1,311 mm a year. Project water will be sourced from rainwater harvested from the extensive roof area of Project sheds, offices and workshops at the Process Plant and process water will be largely sourced from high quality Reverse Osmosis water produced by the Process Plant as a consequence of concentrating the REE in the pregnant lixiviant. Drinking water will be ultrafiltered and UV sterilized to ensure that it is free of pathogens.

The mine will not be a large user of water. The clay ore contains about 20% moisture and even in extended dry periods the requirement for water for dust suppression will be low. Excess stormwater harvested by the mining pit will, however, need to be discharged. This will be pumped to the Process Plant stormwater pond for clarification and released to discharge once conformed as meeting the requirements of a discharge Permit issued by DWRM. This stormwater might, alternatively be treated through a Reverse Osmosis (RO) system prior to discharge should this be necessary. The RO process would remove all dissolved and suspended solids from this water. The preliminary Project water balance (refer Figure 39) indicates that the Project will be discharging an average 300,000 kL of excess water per year.

#### 9.2.8.8.1 Significance of Project Water Supply

For reasons previously explained the Project will have an abundance of water, even in extended dry periods/ The magnitude of impact is considered Low as is the sensitivity of the receptor for an overall Minor significance rating.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.8.8.2 Mitigations

- The Project will not utilize existing public water supplies.
- Any impacted existing water supplies from constructed infrastructure or mining footprint will be replaced.
- The water quality of all discharges will be checked prior to discharge and any waste streams with residual ammonium sulphate will be treated by Reverse Osmosis treatment to remove any residual ammonium salt.

#### 9.2.8.8.3 Performance Objectives

- No impact on groundwater height or quality as confirmed by routine (i.e., Quarterly) monitoring in Project areas.
- Minimise Impacts on Water Quality of Rivers and Streams During Construction and Operation.

- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities impacted by the Project.

#### 9.2.8.9 Education facilities such as Schools

The expanding mine pit may ultimately encompass education infrastructures especially school buildings, classrooms, teacher houses, school water source, playgrounds, etc. In these situations, the communities utilizing these schools would also be displaced requiring both the school and community with all essential infrastructure to be relocated. The slow rate of expansion of the mining pit (i.e., 35 hectares a year) in combination with flexibility in the mine plan, would, however, allow time for this relocation to be properly planned and executed as described in the ESMP Volume 4, Preliminary Compensation and Resettlement Action Plan (refer Section 11.4). Improved education for local communities is additionally a key priority of the Community Development Plan (refer Section 11.3).

##### 9.2.8.9.1 Significance of impact on local schools

While schools are very important the magnitude of impact by the Project is Low as there will be no immediate impact on any school and once the mining pit has expanded to a point where a school might be affected a new school would certainly be in place. The Project is aware of the presence of one school in the future mining footprint that would need to be relocated or replaced after perhaps 9 years of mining. The sensitivity of the receptor is considered Medium on the basis that schools are readily replaced. The potential for in-migration of people seeking opportunity may, however, increase the demand for school services.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

##### 9.2.8.9.2 Mitigations

- This will be encompassed in the Compensation and Resettlement Action Plan (refer ESMP Volume 4 as summarized in Section 11.4).
- Project Investment in Education is a key platform of the Community Development Plan with specific targets on increasing the number of children graduating from primary school and high school as well as providing adult education, apprenticeships and University scholarships. This is essential to not only securing good educational outcomes for local people but for the Project to source skilled workers over its 27-year life.

#### 9.2.8.9.3 Performance Objectives

- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Facilitate community training and education to enable local communities to take advantage of Project opportunities and facilitate employment and business development opportunities in local communities.
- Manage the in-migration of outsiders into the compensation zone during the negotiation process.

#### 9.2.8.10 Impact on Religious Facilities

While there will be no immediate impact on religious facilities, some religious structures such as mosques and churches may ultimately be encompassed by the expanding mining pit and require relocating. This, however, is not likely to occur until perhaps Year 8 or 9 of the Project and by this stage suitable replacement structures will have been put in place as negotiated with key stakeholders. The in-migration of outsiders may, however, increase the demand for these facilities. The impact of the Project on these structures during Construction will be Low but the sensitivity will be High for a significance score of Moderate.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.8.10.1 Mitigations

- Any church or mosque impacted by Project infrastructure will be replaced in close collaboration with the community. This is covered by the Preliminary Compensation and Resettlement Action Plan (refer ESMP Volume 4 as summarized in Section 11.4).

#### 9.2.8.10.2 Performance Objectives

- Consult Stakeholders and consider their concerns in Project Decisions.
- Engage Stakeholders in the development of Management Plans.
- Ensure that any religious building to be impacted by the expanding mining footprint is replaced with an equivalent structure to the satisfaction of key stakeholders well in advance of the mining plan.

#### 9.2.8.11 Impact on Trading Centers / RGCs

The Project will not immediately impact on any Trading Centres but in the longer term could directly affect some urban agglomerations such as trading centers especially those located within mining targets e.g., Mbaale, Isikiro, Buwaiswa, Namwanvubu, Buswiriri, Kavule, Buwunga, Bukalaikoti,

Walugoma and Luwoko central. The negative impacts will include displacement / relocation and loss of social infrastructures e.g., water sources, roads, electricity, etc. This impact will, however, be staged over the 27-year life of the Project allowing time to properly plan and execute a suitable relocation plan. This is addressed in the ESMP Volume 4 (Preliminary Compensation and Resettlement Action Plan as summarized in Section 16.4). These communities will additionally benefit from significant investment in Community Development (refer ESMP Volume 3, Community Development Plan as summarized in Section 11.3).

#### 9.2.8.11.1 Significance of Impact on Trading Centres

Any physical displacement of Trading Centres would be fairly compensated as presented in the Preliminary Compensation and Resettlement Action Plan (refer section 11.4) but indirect impacts with respect to expanding populations and increased wealth in the community will likely be positive with respect to trade and profit. The most significant risk would be existing traders being pushed out by immigrants. The Project impact is considered Medium and the sensitivity of the Receptor also considered Medium for a Moderate significance.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.8.11.2 Mitigations

- Most trading centres will not be directly affected, including the Nakivumbi Trading Centre adjacent to the proposed Process Plant. There will, however, be road upgrades, increased numbers of visitors and a significant injection of wealth into local community from direct employment and contract work. The main risk to traders will be in-migration of outside opportunists which will need to be managed by the District Planners and Local Government Authorities. Of particular importance will be clarity of Land Tenure so that existing residents are not displaced.

#### 9.2.8.11.3 Performance Objectives

- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Support the principle of land tenure for local people to prevent loss of land and resources to outsiders in-migrating into Project areas.
- Facilitate community training and education to enable local communities to take advantage of Project opportunities and facilitate employment and business development opportunities in local communities.



- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities directly impacted by the Project.
- Achieve voluntary negotiated agreements with impacted stakeholders to minimise the need for involuntary resettlement.
- Manage the in-migration of outsiders into the compensation zone during the negotiation process.
- Ensure adversely impacted people are compensated in a transparent and consistent manner.
- Ensure that the economic impact of displacement is mitigated.

#### 9.2.8.12 Potential planning conflicts

**Development priorities:** Development Plans are a legal requirement for all higher and lower Local Governments in Uganda. Section 35 of the Local government Act (Cap 243) requires District Councils to prepare comprehensive and integrated Development plans incorporating plans of lower Local Governments. The same section also obliges lower Local Governments to prepare Development plans incorporating plans of lower Local Councils in their respective areas of jurisdiction. Development plans therefore form a basic tool for implementation of decentralized development programs and service by Government and non-government actors in Local Governments. In addition, Local Government plans are key instruments that support the national development management processes in Uganda.

There are potential conflicts with other development interventions by both state and non-state actors. The major interventions include development projects in education, health, HIV/AIDs, agriculture by state actors such as ministries, department, and agencies (MDAs), local governments and Presidential initiatives. The non-state actors such as NGOs and FBOs have also equally made investment such as constructing water sources, health centers, schools, community support especially Village Saving and Loan Association (VSLAs), farmer support, entrepreneurship development. The potential areas of conflict would arise from relocation / demolition / displacement of social investments.

##### 9.2.8.12.1 Significance of impacts on Development Planning processes

Close collaboration on planning will be necessary between the Project and key stakeholders including District Planners, local communities and local government officials. The magnitude of impact is High as is the Sensitivity of the receptor making this of Major significance.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major

	High	4	4 Minor	8 Moderate	12 Major	16 Major
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#### 9.2.8.12.2 Mitigations

Makuutu's Vision for the Community is:

"To work together to build a future where everyone has a pathway to health and opportunity."

Makuutu will achieve this through two key mechanisms:

1. Ensure that Project Affected Persons are fairly compensated so that they are not disadvantaged and that their livelihoods, food security and social connections are protected (i.e., ESMP Volume 4 Preliminary Compensation and Resettlement Action Plan as summarized in Section 16.4).
2. Work collaboratively with key stakeholders (including local communities, District Planners, Government Institutions and NGOs) to deliver improvements to community health, education and livelihoods in particular (i.e., ESMP Volume 3 Community Development Plan as summarized in Section 16.3). >US\$100 million will be invested in these programmes over the life of the Project.

#### 9.2.8.12.3 Performance Objectives

- Implement an Effective ESMS to Drive Continual Improvement in Social and Environmental Performance over the Life of the Project.
- Comply with Legal and other Requirements.
- Consult Stakeholders and consider their concerns in Project Decisions
- Engage Stakeholders in the development of Management Plans
- Establish Strong and Enduring Relationships with key Stakeholders
- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Support the principle of land tenure for local people to prevent loss of land and resources to outsiders in-migrating into Project areas.
- Improve food security for expanding local communities
- Combat the spread of HIV and other diseases in expanding local communities
- Facilitate community training and education to enable local communities to take advantage of Project opportunities and facilitate employment and business development opportunities in local communities.
- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities directly impacted by the Project.
- Establish woodlots, aquaculture and intensive agriculture Projects on revegetated project Land
- Achieve voluntary negotiated agreements with impacted stakeholders to minimise the need for involuntary resettlement.
- Manage the in-migration of outsiders into the compensation zone during the negotiation process.
- Ensure adversely impacted people are compensated in a transparent and consistent manner.
- Ensure that the economic impact of displacement is mitigated.
- Target development opportunities for displaced people
- Seek Government support to secure compensated land

- Proactively manage Project activities to minimise the risk of emergencies.
- Develop Physical completion criteria and rehabilitation techniques to the satisfaction of key stakeholders.

#### 9.2.8.13 Impact on heritage sites

Heritage sites identified in the ESIA baseline study programme that fall outside of the direct Project footprint will be avoided. Heritage sites that will be unavoidably encompassed by the expanding mining pit will be treated on their merit in close consultation with key stakeholders including local communities and appropriate Government Institutions. High significance sites might be avoided and, physical relics and structures including graves might be salvaged and relocated to an appropriate location in combination with appropriate compensation. In addition to the broad ESIA baseline heritage survey the Project will implement a pre-clearing survey process using trained and qualified people to identify any heritage sites within areas proposed for clearing.

##### 9.2.8.13.1 Significance of Damage to Heritage Sites

The sensitivity is high and the magnitude of the impact with controls in place is likely to be low making this an aspect of Moderate Significance.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

##### 9.2.8.13.2 Mitigations

- Base-line heritage survey across Project area by specialist experts.
- Pre-clearing survey process by trained assessors prior to commencement of clearing to identify any heritage sites.

##### 9.2.8.13.3 Performance Objectives

- Implement an Effective Environmental and Social Management System (ESMS) to Drive Continual Improvement in Social and Environmental Performance over the Life of the Project.
- Objective 2: Comply with Legal and other Requirements.
- Consult Stakeholders and consider their concerns in Project Decisions
- Engage Stakeholders in the development of Management Plans
- Establish Strong and Enduring Relationships with key Stakeholders

## 9.2.9 Negative Impacts – Operation Phase

Many of the issues, controls and performance objectives presented for the Construction Phase (refer Section 11.5) also apply to the operational phase but of increasingly greater magnitude as the Project transitions from Construction to a single Module Operation processing 2.5 million tonnes a year and ultimately by Year 10 to a five-module operation processing 12.5 million tonnes of ore a year. The controls and performance objectives will nevertheless be similar.

### 9.2.9.1 Increased Exploitation of Water Resources in the Area

Issues and controls around increased exploitation of local water resources has been discussed for the construction phase (refer Section 11.5.2). This was assessed as being of minor significance during construction and that remains the case for operations. The overall water balance with an estimated annual discharge of 300,000 kL a year is expected to be largely unchanged (refer Figure 39). With progressive rehabilitation the mining footprint will remain at about 20 hectares and while there will be additional heap leach piles there will also be additional membrane filtration resulting in efficient recycling of process water in the form of large volumes of Reverse Osmosis (RO) water.

The Project will remain self-sufficient for water supply and will not be consuming community groundwater supplies. Increased population growth in nearby centres, however, may increase local water consumption but there will additionally be potential for the Project to supply high quality tap water to communities near the Process Plant and in particular the Nakivumbi Trading Centre.

#### 9.2.9.1.1 Significance of water exploitation during operations

Overall, the magnitude of impact of water use on water supply is low due to positive water balance of the Project area and the Projects water supply independence. The overall significance is ranked as **Minor**.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.9.1.2 Mitigation Measures

1. The Project will have abundant water-supply for all project requirements even during extended periods of dry weather as a consequence of a positive water-balance, large stormwater storage dam and production of large volumes of Reverse Osmosis (RO) water from the Process Plant.
2. A Discharge Permit from NEMA will be required to discharge excess polished stormwater from the stormwater storage dams into local water-courses.

3. The Project will routinely (i.e. monthly) be monitoring water table height and groundwater quality and will know quickly if there are any emerging issues that could threaten the community water supply.

#### 9.2.9.1.3 Performance Objectives

- No impact on groundwater height or quality as confirmed by routine (i.e. Quarterly) monitoring in Project areas.
- No adverse impact on the Water Quality of Rivers and Streams During Construction and Operation.
- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities impacted by the Project.

#### 9.2.9.2 Soil Erosion and Sedimentation

The issues assessed for soil erosion and sedimentation in the construction phase (refer Section 9.2.8.3.1) will be similar in the operational phase and particularly with early mining happening concurrently with the construction of the Process Plant. There will be an increased disturbance footprint at the mine but this is expected to be countered by stabilisation of the disturbance footprint at the Process Plant. The effectiveness of rehabilitation and other stabilisation techniques is also likely to become increasingly effectiveness as a consequence of targeted trials and experience.

The diversion of stormwater away from disturbed areas and the pumping of potentially turbid water from the mining pit to the Process Plant stormwater pond will help the control of sedimentation and the securing of clear discharge water in compliance with the DWRM water quality requirements in the discharge water but it is difficult to clarify water made turbid with suspended clay.

The operation phase will involve use of heavy machinery and excavations for clay ore in the designated mining pits. The dispersiveness of the clay under conditions of heavy machinery trafficking will be closely assessed. The floor of the mining pits will be kept dry by contouring to direct stormwater to pumping sumps. From here, it will be pumped into the mine stormwater pond for polishing prior to discharge under NEMA licence into local watercourses. The haul roads will be sheeted with hard-cap or other rock to ensure that they are trafficable under wet conditions and do not erode.

#### 9.2.9.2.1 Significance of soil erosion and sedimentation during operations

Overall, there is a medium chance of turbid water being discharged from the mining pits into High sensitivity streams, rivers, and wetlands. The overall significance is ranked as **Major**.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate



	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.9.2.2 Mitigation Measures

- Progressive rehabilitation to minimise the size of the mining footprint and volumes of harvested stormwater.
- Vegetation clearance should be limited to the mining footprint of the project which should be about 20 hectares.
- Stormwater in the mine will be harvested and directed to a Stormwater Pond at the Process Plant for polishing.
- The quality of water in the stormwater pond will be assessed to ensure that it meets DWRM water permit discharge standards prior to release.
- Excavated materials should be stockpiled in bunded areas away from the streams and stabilised, to avoid possible erosion into the water course;
- Maintain drainage channels installed during construction to direct stormwater runoff from potentially contaminated areas;
- Rumble grids should be installed at the entrance/ exit points at the mining pits and processing plant to minimise the dirt and caked-on mud from tyres and underside of hauling trucks.

#### 9.2.9.2.3 Performance Objectives

- Comply with DWRM water quality conditions for Project discharge water.
- Minimise Impacts on Water Quality of Rivers and Streams During Construction and Operation as verified from quarterly water quality monitoring.
- Progressively rehabilitate and stabilize disturbed areas.

#### 9.2.9.3 Potential Impact on Fauna

The construction activities of the proposed project will have inevitable negative effects to the biological environment of the area of implementation. Mining activities will involve among others clearance, excavations, landscaping, etc. The negative effects on fauna will mainly stem from activities associated with clearance, excavation, and landscaping. Clearing of vegetation along the new haul road will lead to loss of foraging habitat, basking, roosting breeding and hiding habitat for fauna. Nesting trees may be felled and lost within the mining pits and sections of the processing plant.

##### 9.2.9.3.1 Significance of fauna impact during operations

The impact is expected to be Medium while the sensitivity is Medium. The overall impact significance is **Moderate**.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.9.3.2 Mitigations

- Progressive rehabilitation limiting the size of the disturbance footprint and creating fauna habitat.
- No hunting or bush-meat on Project land Policy.
- Machine operators be sensitized to carry out vegetation clearance, excavations and landscaping in sections and limit vegetation clearance to portions of the land to be affected. This is to allow fauna to migrate to adjoining bushes.
- Relocate animals that cannot flee on their own and this should be done by qualified / trained person
- During vegetation clearance, spare mature indigenous trees whenever possible and particularly in areas outside the mining pit.
- Spare nesting trees if possible and if inevitable that a nesting tree has to be felled, let it be so during non-breeding season.
- Set and observe speed limits in the project area
- Attempts to scare fauna before undertaking vegetation clearance should be undertaken
- Areas identified for clearance should be searched for fauna and if found, the fauna should be translocated to safety.
- Only qualified personnel should handle wildlife or fauna in case translocation is necessary.
- Plant trees and other useful habitat in revegetated areas.

#### 9.2.9.3.3 Performance Objectives

- No breaches of “No hunting or bush-meat on Project land Policy.
- Comply with Legal and other Requirements.
- Minimise Impacts on Water Quality of Rivers and Streams During Construction and Operation.
- Minimise Noise and Vibration Impacts During Construction and Operation.
- Consult Stakeholders and consider their concerns in Project Decisions.
- Engage Stakeholders in the development of Management Plans.
- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Support the principle of land tenure for local people to prevent loss of land and resources to outsiders in-migrating into Project areas.
- Improve food security for expanding local communities.

- Establish woodlots, aquaculture and intensive agriculture Projects on revegetated project Land.
- Develop Physical completion criteria and rehabilitation techniques to the satisfaction of key stakeholders.
- Develop a conceptual life of mine and closure plan.

#### 9.2.9.4 Use and storage of chemicals

The operation phase of the project will involve use of materials and chemicals (e.g., clay ore, concentrated sulfuric acid, ammonium sulfate, fuel, machinery oil and hydraulic fluid) while also generating waste with potential to pollute the aquatic environment in the project area if not responsibly managed. Preliminary information from the Developer indicates that the annualised reagent consumption for the peak annual throughput scenario of 12.5 million tonnes per annum has been estimated to be as follows:

- 98%wt Concentrated sulfuric acid ( $\text{H}_2\text{SO}_4$ ), up to (peak) 110,000 tonnes per annum
- Ammonium sulfate ( $(\text{NH}_4)_2\text{SO}_4$ ), up to (peak) 20,000 tonnes per annum
- Ammonium bicarbonate ( $\text{NH}_4\text{HCO}_3$ ), up to (peak) 20,000 tonnes per annum

The above will pose occupational safety and health risk which are regulated by the Mining Regulations 2019. The magnitude of the impact of process materials, chemicals and waste is high while sensitivity of the receptors is high because the sites (mining pit, processing plant and haul road) are adjacent to streams, rivers, and wetlands.

##### 9.2.9.4.1 Significance of chemical use at peak operation

With the potential High magnitude of impact and High sensitivity of adjacent watercourses the overall significance is ranked as **Major**. With modern storage facilities including fully bunded tanks, good procedures including spill clean-up procedures and a trained competent workforce the risk of a major spill is, however, low.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

##### 9.2.9.4.2 Mitigations

- The project will comply with the requirements of Regulation 64. Service of notice relating to safety, health and welfare. A holder of a mineral right shall comply with the requirements of the

Act, Occupational Safety and Health Act, 2006, the Employment Act, 2006, and any other applicable law relating to health and safety of operations and human health.

- The mitigations including Standards for handling, storing and disposing of waste hydrocarbons and chemicals are presented in ESMP Volume 1 (Environmental and Social Management and Monitoring Plan and summarized in Section 16.1), ESMP Volume 5 (Emergency Management Plan which includes spill response as summarized in Section 16.5) and ESMP Volume 6 (Waste Management Plan as summarized in Section 16.6).

#### 9.2.9.4.3 Performance Objectives

- Implement an Effective ESMS to Drive Continual Improvement in Social and Environmental Performance over the Life of the Project.
- Comply with Legal and other Requirements.
- Minimise Impacts on Water Quality of Rivers and Streams During Construction and Operation.
- Ensure high standards of road safety on access roads within Project areas.
- Proactively manage Project activities to minimise the risk of emergencies.
- Respond quickly and effectively to emergency situations to mitigate consequences.
- No unauthorised disposal of hydrocarbon and chemical waste to landfill.
- Management of the site landfill to ensure legal compliance and environmental protection.
- Ensure workforce compliance with waste procedures.

#### 9.2.9.5 Transport and Access

Internal project roads will not be available to the general public and operational areas will be security fenced. Mining and haulage activities will therefore have no direct impact on public roads. All haul road crossings of public roads will additionally be controlled (refer Figure 167).

There will, however, be increased traffic on local public roads and particularly on the main access roads to the Process Plant, from process chemical delivery trucks and from the locally based workforce. The existing public roads in the project area are in moderate to poor condition. The critical aspects are the bridges that cannot tolerate heavy loads. Therefore, the project working with Government will require significant improvements of the existing roads and opening new ones as well.

The sensitivity of the receptors is high, because the roads support only small cars, motorcycles, and bicycles. The motorcyclists and bicycle riders, practice what we call 'dangerous loading', implying that they carry very heavy and wide loads, and they do not give way to motorists. This behaviour is most likely to increase on road traffic accidents.

The Uganda Vision 2040 indicates that Government will provide specific infrastructure including roads, railway, electricity, and water to facilitate exploitation of minerals. To enable bulk transportation of heavy minerals and/or their products, the railway will be extended to areas where enormous deposits have been found. The electricity grid will be connected to support the mining and processing of these minerals (Uganda Vision 2040). Therefore, the project can expect Government support in line with the Vision 2040 commitments to improve the existing road network in the project areas to facilitate transportation of the ore from the mines to the processing plant. Figure 168 shows the proposed infrastructure for the mining sector. It includes a railway line through Iganga which is near the proposed project which could be utilized for the delivery of process chemicals.

#### 9.2.9.5.1 Significance of road traffic accessing the site

The magnitude of impact is assessed as High as is the sensitivity of the receptor making this an issue of Major significance.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.9.5.2 Mitigations

- ESMP Volume 5 (Emergency Management Plan) as summarized in Section 16.5.
- Project activities including mining and processing will be completely separated from public facilities. The haul road will be security fenced and have controlled crossings where the haul road crosses public roads (refer Figure 167). The mine will also have controlled security fencing.
- RMM to upgrade or construct additional public access roads as required with support from Government of Uganda.
- Sensitize the local communities on road safety.
- Deploy traffic guides.
- Potential renovation of bridges on public access roads to ensure they are strong enough to handle heavy vehicles.
- Some upgrade of public access roads may be necessary to facilitate safe delivery of process chemicals by truck from the Osukuru Complex and from the port of Mombasa in Kenya.
- General upgrade of community roads will be financially supported as part of the Community Development Plan (ESMP Volume 3 as summarized in Section 16.3) and the Emergency Management Plan (ESMP Volume 5 as summarized in Section 16.5) in close collaboration with District Planners.





Figure 167: Controlled bauxite haul road crossing in Australia similar to what is planned for Makuutu.

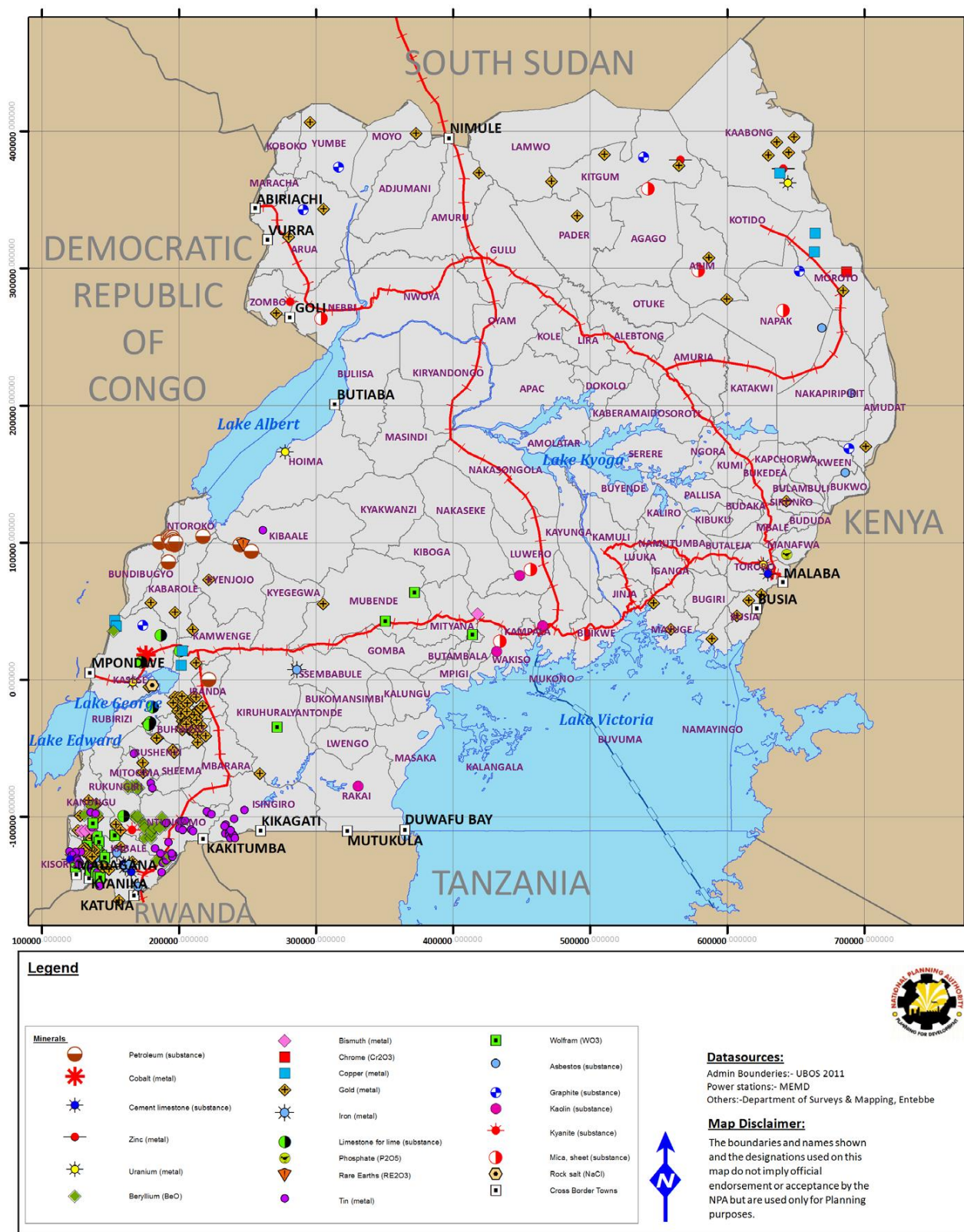


Figure 168: Proposed Infrastructure for Mineral Development (Source: Uganda Vision 2040)

#### 9.2.9.5.3 Performance Objectives

- Implement an Effective ESMS to Drive Continual Improvement in Social and Environmental Performance over the Life of the Project.
- Comply with Legal and other Requirements.

- Consult Stakeholders and consider their concerns in Project Decisions.
- Engage Stakeholders in the development of Management Plans.
- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Ensure high standards of road safety on access roads within Project areas.
- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities directly impacted by the Project.
- Proactively manage Project activities to minimise the risk of emergencies.
- Respond quickly and effectively to emergency situations to mitigate consequences.
- Fully investigate all emergencies and provide effective post-emergency support to mitigate consequences and reduce the risk of a recurrence.

#### 9.2.9.6 Mining footprint removes existing community water supply sources from aquifers within the orebody.

The potential impact of the Project on community water supply in construction has previously been presented (Refer Section 9.2.8.2). This was assessed as being of Minor significance as a result of the Project being completely self-sufficient with respect to water supply and having no direct impact on existing community ground-water supply. This will remain the case over the life of Project. The low permeability of the ionic adsorption clay ore-body precludes it functioning as a water aquifer but there are some existing water-bores near the periphery of the orebodies that may ultimately be encompassed by the expanding mining pit. This includes three bores in the Year 1 to year 10 Central Mining Pit. These will not, however, be impacted until the late stages of the Year 1 to 10 Central Mining Pit and by this stage, current inhabitants will have been resettled and their existing water supply will have been replaced.

##### 9.2.9.6.1 Significance of impact on community water supply

The magnitude of impact is considered Negligible while the sensitivity of the receptor is considered High making this an issue of Minor significance.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

##### 9.2.9.6.2 Mitigation Measures

- Community water supply to be included as a component of the Compensation and Resettlement Action Plan.

- Any existing water supply point within the mining footprint will be replaced with an alternative water source in a suitable nearby location as negotiated with the Project Affected Persons and the District Planners.

#### 9.2.9.6.3 Performance Objectives

- No impact on groundwater height or quality as confirmed by routine (i.e., Quarterly) monitoring in Project areas.
- Minimise Impacts on Water Quality of Rivers and Streams During Construction and Operation.
- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities impacted by the Project.

*9.2.9.7 Mining Pit infill materials of overburden and spent clay will be subject to swelling and may slump over time following replacement thereby creating instability.*

This is low risk from a general landform perspective, but it would become more significant if land-formed areas were used as resettlement sites too quickly before the risk of ground movement on building foundations was fully understood.

#### 9.2.9.7.1 Significance of ground movement in rehabilitated areas

The expected magnitude of the impact is Low and the sensitivity of the receptor would also be Low if the land was used for agriculture but this would increase to Medium if the land was to be used for resettlement housing. The worst-case significance is therefore Moderate.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.9.7.2 Mitigation measures

- Progressive rehabilitation will create long-term landforms that can be monitored over the life of the mine and enable the magnitude of slumping to be assessed.
- Initial assessment of at least 5 years prior to rehabilitated areas being used as resettlement sites.
- Initial focus on using rehabilitation areas for livelihood projects such as intensive agriculture, fish ponds and agroforestry (refer ESMP Volume 3: Community Development Plan as summarised in Section 11.3) that will not be affected by minor slumping.

#### 9.2.9.7.3 Performance Objectives

- Implement an Effective ESMS to Drive Continual Improvement in Social and Environmental Performance over the Life of the Project.
- Comply with Legal and other Requirements.
- Consult Stakeholders and consider their concerns in Project Decisions.
- Engage Stakeholders in the development of Management Plans.

- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Support the principle of land tenure for local people to prevent loss of land and resources to outsiders in-migrating into Project areas.
- Establish woodlots, aquaculture and intensive agriculture Projects on revegetated project Land
- Develop Physical completion criteria and rehabilitation techniques to the satisfaction of key stakeholders.
- Formally determine the project Asset Retirement Obligation (ARO) annually and ensure sufficient funds are in place.
- Develop a conceptual life of mine and closure plan.

**9.2.9.8 Groundwater and Surface water inflow into mining pits creates geotechnical instability leading to slumping of pit walls.**

Securing geotechnical stability is fundamental to the mining plan and a big part of this is water management. Surface water will be diverted away from the mining pits to reduce volumes of inflow water and consequent operational issues caused by ponding. Groundwater inflows within a low permeability clay orebody on the other hand are expected to be very low. The progressive rehabilitation process will additionally keep the size of the mining pits to under 20 hectares keeping stormwater volumes to a manageable level. This stormwater will be routinely pumped out of the mining pit to the at the stormwater pond at the Process Plant.

**9.2.9.8.1 Significance of geotechnical risk associated with water inflow into mining pits.**

The intrinsic significance with poor controls is Major with both High magnitude and High sensitivity (ie. engulfment of workers).

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

**9.2.9.8.2 Mitigations**

- Geotechnical assessment by qualified geotechnical engineers to assure stability.
- Appropriate side-wall slopes and benches to prevent slumping. Slopes are normally 3 horizontal to 1 vertical (3H:1V) (refer Figure 28).
- Construction of safety berms around the edge of the pit for public and workforce safety.
- Routine geotechnical monitoring (eg. for cracks).
- Depth of Pits <20m.



- Divert stormwater away from pits to limit inflow volumes.
- Prevent ponding at the base of the pit wall via effective stormwater dewatering in the mine pit.

#### 9.2.9.8.3 Performance Objectives

- Implement an Effective ESMS to Drive Continual Improvement in Social and Environmental Performance over the Life of the Project.
- Comply with Legal and other Requirements.
- Minimise Impacts on Water Quality of Rivers and Streams During Construction and Operation.
- Proactively manage Project activities to minimise the risk of emergencies.
- Develop Physical completion criteria and rehabilitation techniques to the satisfaction of key stakeholders.
- Develop a conceptual life of mine and closure plan.

#### 9.2.9.9 Potential Impacts of REE on Human Health

An overview of the properties of REE and their potential impacts on human health and the environment has previously been presented (refer Section 3.2). This overview concluded that REE are essentially benign from a human health impact perspective in that they are not carcinogenic and they do not bioaccumulate. The dust from the REE carbonate product that Makuutu plans to produce will, however, be generally irritating to eyes, skin and the respiratory tract. Dust will need to be controlled and workers protected via the use of safety glasses, gloves, protective clothing and face masks. REE are additionally largely insoluble in water under neutral conditions which limits their potential to impact aquatic life.

Stakeholders in Uganda including local communities and regulatory bodies are not highly familiar with REE mining which is a new product for Uganda. They are therefore concerned about potential impacts on community health. The Project has responded to these concerns by explaining that it is Uranium and Thorium radionuclides associated with hard-rock REE mining that is the greatest health concern generally associated with REE mining but this does not apply to the Makuutu ionic-adsorption clays which have very low levels of radionuclides.

There will additionally be minimal community exposure to emissions of REE from the Makuutu Rare Earths Project. There will be low levels of dust in the moist clay and mining and processing operations will be remote from community dwellings. Occupational exposure by the workforce will additionally be monitored and managed through the use of effective emission control systems and the use of Person Protection Equipment (PPE) such as protective clothing, gloves and dust-masks.

#### 9.2.9.9.1 Significance of human health impacts from REE mining at Makuutu

The magnitude of impact is considered low and the sensitivity of the receptor is also low with the community well separated from operational activities and exposure. The significance of this issue is therefore Minor.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.9.9.2 Mitigations

The occupational health and safety of the Makuutu workforce will be the responsibility of the Project and it will be managed through an effective Safety, Health and Hygiene Management System. The effective control of emissions to land, air and surface waters will in addition limit any community exposure and consequent exposure-related community health issues.

#### 9.2.9.9.3 Performance Targets

- Implement an Effective ESMS to Drive Continual Improvement in Social and Environmental Performance over the Life of the Project.
- Comply with Legal and other Requirements.
- Consult Stakeholders and consider their concerns in Project Decisions.
- Engage Stakeholders in the development of Management Plans.
- Establish Strong and Enduring Relationships with key Stakeholders.

#### 9.2.9.10 Project contributes to increase in communicable diseases

The control of communicable diseases including HIV/AIDS that could be spread between the workforce and the community is a high priority for the Project both from a perspective of improving the lives of local people and from the perspective of enabling a healthy and productive workforce.

The Community Development Plan (refer Section 11.3) includes an objective to: “Combat the spread of HIV and other diseases in expanding local communities.” An expanding community will need greater medical capacity and pro-active health programmes. Improving the capacity of medical services in the community is an important part of the CDP. In addition to capacity building, site medical expertise and facilities, including medical evacuation capacity, will be made available to the local community in emergency situations and direct assistance will be provided to the control of debilitating diseases such as malaria and schistosomiasis which affect 25% of local people. The effectiveness of these measures will be formally assessed each year from a review of medical statistics and performance targets and work programmes reviewed and set for the next year. In addition to this, managing in-migration into the Project area and educating the Makuutu workforce will be important in preventing the spread of communicable diseases such as HIV/AIDs, TB and in the short term COVID 19. The Project will assess strategies to effectively control serious endemic illnesses for the benefit of both community and workforce health during the ESIA process with the assistance of an appointed Community Health specialist.

#### 9.2.9.10.1 Significance of Project contribution to the spread of communicable diseases.

The magnitude of impact is High and so is the sensitivity of the receptor. Communicable disease is therefore of Major significance to the Project.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.9.10.2 Mitigation

- Support for community health programmes as detailed in the ESMP Volume 3 Community Development Plan (refer Section 11.3).
- Effective community planning including management of in-migration.
- Workforce education about communicable diseases and appropriate support through measures such as condom vending machines.

#### 9.2.9.10.3 Performance Objectives

- Comply with Legal and other Requirements.
- Minimise Impacts on Water Quality of Rivers and Streams During Construction and Operation.
- Consult Stakeholders and consider their concerns in Project Decisions.
- Engage Stakeholders in the development of Management Plans.
- Establish Strong and Enduring Relationships with key Stakeholders.
- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Support the principle of land tenure for local people to prevent loss of land and resources to outsiders in-migrating into Project areas.
- Improve food security for expanding local communities.
- Combat the spread of HIV and other diseases in expanding local communities.

#### 9.2.9.11 Local capacity to manage emergencies

Makuutu will develop internal capacity to manage accidents and incidents within the operational boundaries including the operation of a medical centre. Close collaboration will, however, be maintained with local institutions and particularly with respect to accidents on the public roads. Strategies to increase this local capacity in close collaboration with District Planners are included in the Emergency Management Plan (refer ESMP Volume 5 as summarised in Section 11.5) and the Community Development Plan (refer ESMP Volume 3 as summarised in Section 11.3).

The available medical facilities close to the mining site do not have casualty wards, except for Iganga hospital. Although Iganga Hospital has a casualty unit, it is not well equipped to handle accident cases that may arise from the operation of the mine. The sensitivity of the receptors is high, since according to the present Iganga Hospital statistics, an average of 10 riders are received at the casualty unit which is under equipped.

There is only one truck and water tank servicing the whole of Busoga East and yet there are a number of fires that occur, especially sugar cane plantation fires. The Fire Office is also understaffed with only 14 firefighters. They also lack state of the art equipment for protecting themselves while on duty. The sensitivity of the receptor is high since, there are sugar cane plantations all around the mining area and processing plant, which can be a source of fire to the mining facilities.

#### 9.2.9.11.1 Significance of community emergency management capacity

The magnitude of the aspect is High as is the sensitivity making this an aspect of Major significance.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.9.11.2 Mitigations

Makuutu proposes the following measures to increase local capacity for dealing with emergency situations.

- Equip the nearby hospitals with required equipment and facilities to handle traffic accident emergencies.
- Construct its own medical facility and equip it to handle traffic accident and other emergencies.
- Purchase its own ambulance.
- Build a site first aid centre.
- Establish a very strong emergency and rescue department.
- Sensitize the community about fire safety.
- Purchase its own firefighting equipment; and
- Equip the fire brigade with state-of-the-art firefighting equipment.

### 9.2.9.11.3 Performance Objectives

- Implement an Effective ESMS to Drive Continual Improvement in Social and Environmental Performance over the Life of the Project.
- Comply with Legal and other Requirements.
- Consult Stakeholders and consider their concerns in Project Decisions
- Engage Stakeholders in the development of Management Plans
- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Support the principle of land tenure for local people to prevent loss of land and resources to outsiders in-migrating into Project areas.
- Ensure high standards of road safety on access roads within Project areas.
- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities directly impacted by the Project.
- Manage the in-migration of outsiders into the compensation zone during the negotiation process.
- Proactively manage Project activities to minimise the risk of emergencies.
- Respond quickly and effectively to emergency situations to mitigate consequences.
- Fully investigate all emergencies and provide effective post-emergency support to mitigate consequences and reduce the risk of a recurrence.

### 9.2.9.12 Security Risks

All operational areas will be security fenced and all access to site will be controlled via a manned security gate. The Project will additionally employ a large internal security team to manage security issues on Project land and to patrol the security fences. The security team will additionally liaise with local government officials and police to secure good collaboration.

#### 9.2.9.12.1 Significance of Security Risks

The magnitude of security issues is High and so is the sensitivity. That makes this aspect one of Major significance.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.9.12.2 Mitigation Measures

- Establish an onsite security department.



- Install security fencing to completely separate the project from the local community including a separate haul road.
- Increase the capacity of the local police to respond to incidents.
- Deploy checkpoints along all access roads.
- Sensitize communities on security matters.

#### *9.2.9.12.3 Performance Objectives*

- Implement an Effective ESMS to Drive Continual Improvement in Social and Environmental Performance over the Life of the Project.
- Comply with Legal and other Requirements.
- Consult Stakeholders and consider their concerns in Project Decisions
- Engage Stakeholders in the development of Management Plans
- Establish Strong and Enduring Relationships with key Stakeholders
- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Support the principle of land tenure for local people to prevent loss of land and resources to outsiders in-migrating into Project areas.
- Improve food security for expanding local communities.
- Ensure high standards of road safety on access roads within Project areas.
- Facilitate community training and education to enable local communities to take advantage of Project opportunities and facilitate employment and business development opportunities in local communities.
- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities directly impacted by the Project.
- Achieve voluntary negotiated agreements with impacted stakeholders to minimise the need for involuntary resettlement.
- Manage the in-migration of outsiders into the compensation zone during the negotiation process.
- Ensure adversely impacted people are compensated in a transparent and consistent manner.
- Ensure that the economic impact of displacement is mitigated.
- Target development opportunities for displaced people.
- Seek Government support to secure compensated land.
- Proactively manage Project activities to minimise the risk of emergencies.

#### *9.2.9.13 Risk of Collision with Power Lines*

The powerlines cross all the mining pits and the processing plant and since these lines surge, they present overhead hazards for cranes and other tall mining vehicles. While levelling the ground along the processing plant, the powerlines may need to be shifted, because they are on uneven ground. The sensitivity of the receptors is high since the electrocution hazards may lead to fatalities.

##### *9.2.9.13.1 Significance of collision risk with power lines*

Both the magnitude and sensitivity associated with an impact with high voltage power lines are High making this an aspect of Major significance.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.9.13.2 Mitigation Measures

- Create awareness of electrocution risks that may occur from working close to powerlines.
- Perform a thorough risk assessment of the situation and liaise with authorities to address significant issues which might include:
  - Increasing the height of the lines
  - Increasing the stability of the lines
  - Liaising with UETCL to shift the powerlines.
- Do not undertake work with large machinery under powerlines.

#### 9.2.9.13.3 Performance Objectives

- No incidents or near misses associated with power lines.

#### 9.2.9.14 Management of Tailings and Restoration of Mining Pits

An overview of the mine pit rehabilitation process is presented in the Project Description section (refer Section 3.5.11). A high-level overview is repeated here because of the high significance of mining pit rehabilitation to the Community Development Plan (refer Section 11.3), Compensation and Resettlement Action Plan (refer Section 11.4) and, Life of Mine and Closure Plan (refer Section 11.8) in particular. The progressive and complete filling of the mining void with overburden and “spent ore following leaching” followed by the return of the topsoil will create highly productive agricultural land on former mining pits. At the end of mining there will be no mining voids, waste dumps or contaminates sites legacies.

The Mining Regulations equally capture the requirement to restore mining areas as detailed below.

##### 9.2.9.14.1 Regulation 55. Environmental restoration plan.

The holder of an exploration licence or a mining lease shall submit to the Commissioner a costed environmental restoration plan in accordance with section 110 of the Act and the National Environment Act, 2019 together with a graphical representation of the land to be affected, which shall address restoration of worked out areas.

#### 9.2.9.14.2 Regulation 58. Disposal of tailings.

(1) The holder of a location licence or mining lease who has access to a watercourse may, subject to the Water Act, and the National Environment Act, 2019, and any other applicable law, dispose of tailings from his or her mining operations or mineral processing operations in that water course.

(2) Disposal of tailings on land is subject to the National Environment Act, 2019 and regulations made under that Act.

#### 9.2.9.14.3 Significance of in-pit tailings disposal and progressive rehabilitation

The magnitude and sensitivity of this issue are both High making this an aspect of major significance for the Project.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.9.14.4 Mitigations

This is described in both the ESIA Project Description Section (refer Section 3.5.11) and in detail in the ESMP Volume 8 (Life of Mine Rehabilitation and Closure Plan as summarised in Section 11.8).

#### 9.2.9.14.5 Performance Objectives

- Establish woodlots, aquaculture and intensive agriculture Projects on revegetated project Land
- Develop Physical completion criteria and rehabilitation techniques to the satisfaction of key stakeholders.
- Formally determine the project Asset Retirement Obligation (ARO) annually and ensure sufficient funds are in place.
- Develop a conceptual life of mine and closure plan.

#### 9.2.9.15 Deterioration in Law and Order

The Project will provide significant economic stimulus to near Project areas with the potential for a mixture of positive and negative consequences including a deterioration in law and order. Managing the in-migration of people seeking opportunity, displacing local people and creating conflict will be particularly important (refer Section 9.2.7.1) as will ensuring that Project benefits are socially equitable. A situation where a small number of people receive high wages and benefits while the majority continue to struggle with extreme poverty will inevitably lead to conflict. Those who have not benefited equitably might resent those who have received benefits and, those that have become relatively prosperous might exploit the poorer people. A proliferation of bars, nightclubs and vice in

the cashed up local area could contribute to fighting and the spread of communicable diseases such as HIV AIDS. A deterioration in law and order will create problems for the community and to the Project in the form of stealing and damage to Project assets.

#### 9.2.9.15.1 Significance of deterioration in law and order

The magnitude and sensitivity of law-and-order issues are both high making this an aspect of major significance.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

#### 9.2.9.15.2 Mitigations

- Engage District Planners and other Ugandan Authorities to ensure that in-migration is well managed. A key part of this will be security of land tenure for current community members.
- Effective Compensation and Resettlement Action Plan that leaves nobody financially or socially disadvantaged and with the livelihood of all Project affected persons secured.
- Broad range and employment and livelihood options benefiting a large number of people in combination with Project support for education and training to increase employability.
- Financial training for those receiving cash compensation.
- Tight knit community (Busoga people) with extensive social networks who will share benefits within their social networks.
- Fitness for work protocols including drug and alcohol testing that will limit alcohol and drug consumption within the Makuutu workforce.
- Contribute to increase in policing capacity in close collaboration with District Planners.

#### 9.2.9.15.3 Performance Objectives

- Consult Stakeholders and consider their concerns in Project Decisions
- Engage Stakeholders in the development of Management Plans
- Establish Strong and Enduring Relationships with key Stakeholders
- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Support the principle of land tenure for local people to prevent loss of land and resources to outsiders in-migrating into Project areas.
- Improve food security for expanding local communities.
- Ensure high standards of road safety on access roads within Project areas.

- Facilitate community training and education to enable local communities to take advantage of Project opportunities and facilitate employment and business development opportunities in local communities.
- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities directly impacted by the Project.
- Establish woodlots, aquaculture and intensive agriculture Projects on revegetated project Land
- Achieve voluntary negotiated agreements with impacted stakeholders to minimise the need for involuntary resettlement.
- Manage the in-migration of outsiders into the compensation zone during the negotiation process.
- Ensure adversely impacted people are compensated in a transparent and consistent manner.
- Ensure that the economic impact of displacement is mitigated.
- Target development opportunities for displaced people
- Seek Government support to secure compensated land
- Proactively manage Project activities to minimise the risk of emergencies.
- Respond quickly and effectively to emergency situations to mitigate consequences.
- Fully investigate all emergencies and provide effective post-emergency support to mitigate consequences and reduce the risk of a recurrence.

#### 9.2.9.16 Protect vulnerable groups including women

There is potential for vulnerable groups and particularly women to be increasingly marginalised if they do not receive an equitable share of project benefits. The current role of women as carers and primary providers of household food crops in combination with a lack of experience in the cash economy limits their opportunity for direct and contract employment with the Project.

##### 9.2.9.16.1 Significance of not protecting vulnerable groups

The magnitude and sensitivity of vulnerable group protection are both high making this an aspect of major significance.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major



#### 9.2.9.16.2 Mitigations

- Support the education of girls and women to facilitate future employment with the Project.
- Combination of cash and in-kind wages payment that might include food or food vouchers to enhance the food security of families and limit the risk of all the cash paid to the husband being consumed on alcohol and gambling.
- Provide support for child-care to enable mothers to enter the paid workforce.
- Support the establishment of women's shelters to facilitate escape from family violence.
- Provide contract opportunities suited to the current skill set of women in particular and including aspects such as nursing and health support; catering; office cleaning; secretarial work; embroidery of Project work clothes; operation of plant nursery; tree planting; work on established livelihood projects. Suitable work would also be found for other vulnerable groups such as disabled people.
- Provide incentives for children to attend school with the consequence of freeing up time for mothers.

#### 9.2.9.16.3 Performance Objectives

- Consult Stakeholders and consider their concerns in Project Decisions
- Engage Stakeholders in the development of Management Plans
- Establish Strong and Enduring Relationships with key Stakeholders
- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Support the principle of land tenure for local people to prevent loss of land and resources to outsiders in-migrating into Project areas.
- Improve food security for expanding local communities.
- Facilitate community training and education to enable local communities to take advantage of Project opportunities and facilitate employment and business development opportunities in local communities.
- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities directly impacted by the Project.
- Establish woodlots, aquaculture and intensive agriculture Projects on revegetated project Land
- Achieve voluntary negotiated agreements with impacted stakeholders to minimise the need for involuntary resettlement.
- Manage the in-migration of outsiders into the compensation zone during the negotiation process.
- Ensure adversely impacted people are compensated in a transparent and consistent manner.
- Ensure that the economic impact of displacement is mitigated.
- Target development opportunities for displaced people
- Seek Government support to secure compensated land.

#### 9.2.9.17 Prevent use of child labour

The use of child labour is prevalent in the Project area and particularly in agricultural production. Much of this is due to a lack of food security and it additionally contributes to the current very low rate of 1 in 3 children graduating from primary school which locks in a long-term cycle of disadvantage.

### 9.2.9.17.1 Significance of child labour

The magnitude and sensitivity of vulnerable group protection are both high making this an aspect of major significance.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

### 9.2.9.17.2 Mitigations

- Enhancing food security in the project area.
- Makuutu Policy of not utilising child labour or purchasing goods and services created with the use of child labour.
- Providing incentives to keep children at school for as long as possible including financial incentives such as scholarships, school buses, the provision of day-care, providing free books and writing utensils and, providing free meals for children who attend school.
- Enhancing food security in the Project area.

### 9.2.9.17.3 Performance Objectives

- Consult Stakeholders and consider their concerns in Project Decisions
- Engage Stakeholders in the development of Management Plans
- Establish Strong and Enduring Relationships with key Stakeholders
- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Support the principle of land tenure for local people to prevent loss of land and resources to outsiders in-migrating into Project areas.
- Improve food security for expanding local communities.
- Facilitate community training and education to enable local communities to take advantage of Project opportunities and facilitate employment and business development opportunities in local communities.
- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities directly impacted by the Project.
- Establish woodlots, aquaculture and intensive agriculture Projects on revegetated project Land

#### 9.2.9.18 Institutional capacity building

Local, District and to a point, National institutions will have no or limited experience with a Project of the size and complexity of Makuutu. While the Project will be self-sufficient with respect to social services it will need to comply with a range of Local, District and National Level Government requirements and to collaborate on joint initiatives and particularly with respect to infrastructure development and the implementation of the Resettlement Action Plan.

##### 9.2.9.18.1 Significance of institutional capacity building

The magnitude and sensitivity of institutional capacity building are both medium making this an aspect of moderate significance.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

##### 9.2.9.18.2 Mitigations

- Regularly Inform/Consult & Involve government officials as per the stakeholder engagement plan (refer Table 123).
- Provide targeted skills training as appropriate.
- Convene Workshops involving Local, District and National level stakeholders to collaboratively develop a Project Vision and Road-Map to success.
- Involve government officials in the Annual Business Planning Workshops for the Makuutu Project.
- Appropriate support to developing social infrastructure and institutional capacity in the areas of education, community health, emergency management and law and order in particular.

##### 9.2.9.18.3 Performance Objectives

- Consult Stakeholders and consider their concerns in Project Decisions
- Engage Stakeholders in the development of Management Plans
- Establish Strong and Enduring Relationships with key Stakeholders
- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Support the principle of land tenure for local people to prevent loss of land and resources to outsiders in-migrating into Project areas.
- Improve food security for expanding local communities.

- Facilitate community training and education to enable local communities to take advantage of Project opportunities and facilitate employment and business development opportunities in local communities.
- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities directly impacted by the Project.
- Establish woodlots, aquaculture and intensive agriculture Projects on revegetated project Land.

*9.2.9.19 Local Government control and oversight of Project activities to ensure they meet HSEC requirements and minimize community impacts.*

This was an issue raised by stakeholders at the ESIA engagement meeting held with the Bugweri District Local Government representatives. The Project will be completely independent with respect to social services but it will need to comply with local government requirements and local government will be a key collaborator with the Project as previously discussed (refer Section 9.2.9.18). The Project will have a range of Permits and associated monitoring and reporting requirements including a Water Quality discharge Permit for excess stormwater that will be issued by the Directorate of Water Resource Management (DWRM). The Project will also have a Grievance Mechanism (refer Section 10.1) to address stakeholder concerns including those received from Local Government.

The issue of capacity building was previously discussed (refer Section 9.2.9.19) but the Project will ensure that Local Government requirements relevant to the Project are met. This will include a process of legal due diligence to fully understand the scope of these requirements in combination with the deployment of resources to make sure they are met. Collaborative planning and the development of long-term relationships with Local Government officials will be particularly important.

*9.2.9.19.1 Significance of local government capacity to administer Project requirements*

The magnitude and sensitivity of local government capacity to administer Project requirements are both medium making this an aspect of moderate significance.

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude of impact	Negligible	1	1 Insignificant	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

*9.2.9.19.2 Mitigations*

- Complete legal due diligence to understand local government administrative requirements.

- Regularly Inform/Consult & Involve Local Government officials as per the stakeholder engagement plan (refer Table 123).
- Provide targeted skills training as appropriate.
- Convene Workshops involving local government administrators to collaboratively develop a Project Vision and Road-Map to success.
- Involve local government officials in the Annual Business Planning Workshops for the Makuutu Project.

#### 9.2.9.19.3 Performance Objectives relevant to local government administration

- Consult Stakeholders and consider their concerns in Project Decisions
- Engage Stakeholders in the development of Management Plans
- Establish Strong and Enduring Relationships with key Stakeholders
- Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
- Support the principle of land tenure for local people to prevent loss of land and resources to outsiders in-migrating into Project areas.
- Improve food security for expanding local communities.
- Facilitate community training and education to enable local communities to take advantage of Project opportunities and facilitate employment and business development opportunities in local communities.
- Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities directly impacted by the Project.
- Establish woodlots, aquaculture and intensive agriculture Projects on revegetated project Land.

#### 9.2.10 Managing Other Risks

Performance objectives and strategies for managing a wide range of environmental and social issues are presented in a 9 volume Environmental and Social Management Plan that is summarised in Section 16. This includes the significant risks presented in Section 14.1 as well as the aspects of particular interest to local communities and other stakeholders presented in Section 14.2. The 8 ESMP Volumes are:

- Volume 1: Environmental and Social Management and Monitoring Plan that includes an overview of resources, performance standards and the Environmental and Social Management System that ensures that the Project continues to meet the performance expectations of stakeholders under continually evolving legal, stakeholder and project risk contexts.
- Volume 2: Stakeholder Management Plan which presents stakeholder mapping, engagement strategies and, the grievance mechanism to ensure that the expectations and concerns of stakeholders are well understood and that long term relationships founded on trust can be developed.
- Volume 3: Community Development Plan which presents the strategies to improve the lives of people in local communities with a particular focus on community health, education and sustainable livelihoods.



- Volume 4: Preliminary Compensation and Resettlement Action Plan that presents the strategy for the acquisition of Project land by voluntary processes with no social or economic disadvantage to Project Affected Persons.
- Volume 5: Emergency Management Plan that presents the strategies that will be employed to avoid emergency situations while building internal and external capacity to respond effectively to any emergency situation that does arise.
- Volume 6: Waste Management Plan that presents the strategies that will be employed within a Reduce, Reuse, Recycle framework to avoid waste, maximise recycling and appropriately dispose of any wastes produced by the Project.
- Volume 7: Greenhouse Gas Mitigation and Climate Change Adaptation Plan that presents the Project greenhouse gas footprint calculated at 1.5 million tonnes of CO<sub>2</sub> over the life of the Project in addition to producing sufficient heavy REE to produce 90 GW of offshore wind-power that would displace 300 million tonnes a year of coal fired CO<sub>2</sub> emissions. This volume also explains how the Project will adapt to projected higher intensity wet seasons and longer periods of drought as well as providing outreach assistance to local farmers to adapt to a changing climate.
- Volume 8: Life of Mine Rehabilitation and Closure Plan that presents the progressive rehabilitation strategy and a Conceptual Closure Plan.
- Volume 9: Occupational Health and Safety Management Plan that presents the strategy for securing an injury free workplace.

## 10 Environmental and Social Management and Monitoring

A matrix summary of the Environmental and Social Management and Monitoring Plan (refer Table 141 and Table 143) presents a high-level overview of the detailed Environmental and Social Management and Monitoring Plan presented in Volume 1 of the ESMP as summarised in Section 11.1. The monitoring plan enables the tracking of performance objectives developed to mitigate significant environmental and social risks (refer Section 9.1) and issues of concern to stakeholders (refer Section 8) as well as the 8 volume ESMP (refer Section 11.2).

An estimated US\$6 million of environmental and socially relevant capital will be embodied in the capital works programme including aspects such as high standard bunding for major chemical and fuel storage; controlled haul road crossings and security fencing to protect public safety and, stormwater diversion structures (refer ESMP Volume 1 as summarised in Section 11.1). In addition to this there will be US\$3.4 million invested in environmentally relevant equipment including waste management equipment, water trucks for dust suppression and a high-quality sewage treatment plant.

The environmental and social monitoring programme will be implemented by an environment and social team which at full production will number 35 technical experts reporting to a Health, Safety, Environment and Community (HSEC) Manager. These will comprise 8 HSE Officers, 5 Environmental Officers, 15 Security Officers, 6 medical officers and 2 trainers. It is the intention of Makuutu that all 1,200 directly employed staff including the HSEC team be Ugandan by Year 7. The cost of this HSEC workforce and their monitoring and management activities is expected to be about US\$500,000 per year in addition to operational environmental expenses including operation of waste management, wash-pad maintenance, sewage treatment plants, dust suppression and, other emission control activities amounting to another US\$1million a year. In addition to this the Project is proposing an initial investment of 1% of Project revenue be invested in community development projects with a specific focus on community health, education and sustainable livelihoods. This contribution is expected to reach US\$2million a year by Year 7 and will be maintained at this level over the life of the Project. This equates to US\$9.4 million of environmental capital in addition to US\$3.5 million a year on environmental and social programmes once the project reaches full production by Year 10.

Monitoring data will be included in monthly and annual reports provided to NEMA and the Annual Environmental Report, which will include all monitoring data and analysis, will be publicly available.

Details of the monitoring programme referred to Table 140 is discussed in detail in the separate Environmental and Social Management and Monitoring Plan (refer ESMP Volume 1 as summarised in Section 11.1) is presented in Table 140. This monitoring will track the effectiveness of the planned controls (refer Table 141) to achieve the key environmental and social performance objectives.

Table 140: Social and Environmental Management and Monitoring Plan

Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
Exploration Drilling					
Land Access	Un-authorised or illegal activity by the Project	<ul style="list-style-type: none"> <li>• Exploration Lease (EL)</li> </ul>	<ul style="list-style-type: none"> <li>• Lease in place</li> </ul>	<ul style="list-style-type: none"> <li>• Prior to EL renewal date</li> </ul>	Developer with support from: <ul style="list-style-type: none"> <li>• Directorate of Geological Survey and Mines (DGSM)</li> </ul>
	Landowner conflict	<ul style="list-style-type: none"> <li>• Land Access Agreement with landowners</li> </ul>	<ul style="list-style-type: none"> <li>• Land Access Agreements in place</li> </ul>	<ul style="list-style-type: none"> <li>• As required</li> </ul>	Project with support from: <ul style="list-style-type: none"> <li>• District Local Governments (District Land Officers, CDOs, Surveyors, etc.)</li> <li>• Ministry of Lands, Housing and Urban Development (MLHUD)</li> </ul>
Drilling Activity	Generation of litter	<ul style="list-style-type: none"> <li>• Bins provided and all rubbish removed</li> </ul>	<ul style="list-style-type: none"> <li>• No litter visible at end of programme inspection</li> </ul>	<ul style="list-style-type: none"> <li>• At the end of drilling programme.</li> </ul>	Project with support from DLGs
	Damage to vegetation	<ul style="list-style-type: none"> <li>• Minimal clearing footprint for safe drilling</li> <li>• Avoid trees where possible</li> <li>• Rehabilitate as necessary (i.e., rake over and replace any removed vegetation on pad)</li> </ul>	<ul style="list-style-type: none"> <li>• Visual disturbance acceptable to landowner in post drilling joint inspection.</li> </ul>	<ul style="list-style-type: none"> <li>• At end of drilling</li> </ul>	Project with support from DLGs
	Contamination of surface streams	<ul style="list-style-type: none"> <li>• No drilling within 25m of watercourse</li> </ul>	<ul style="list-style-type: none"> <li>• No visual evidence of surface water contamination.</li> </ul>	<ul style="list-style-type: none"> <li>• At end of drilling</li> </ul>	Project with support from DLGs and Directorate of Water Resources Management (DWRM)

Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
	Impact on public safety	<ul style="list-style-type: none"> <li>No drilling within 125 m of major road or dwelling</li> </ul>	<ul style="list-style-type: none"> <li>Number of public safety incidents</li> </ul>	<ul style="list-style-type: none"> <li>As received</li> </ul>	Project with support from DLGs and Uganda Police
	Spillage of fuels and oils	<ul style="list-style-type: none"> <li>All fuels and oils to be stored in a bunded area</li> </ul>	<ul style="list-style-type: none"> <li>Number of visible spills.</li> <li>All spills completely cleaned up.</li> </ul>	<ul style="list-style-type: none"> <li>End of drilling</li> </ul>	Project with support from DLGs and drilling contractors.
	Noise and vibration impacting amenity	<ul style="list-style-type: none"> <li>Avoid drilling near any residences.</li> </ul>	<ul style="list-style-type: none"> <li>Number of community complaints</li> </ul>	<ul style="list-style-type: none"> <li>As received</li> </ul>	Project
	Wildlife hunting by workforce	<ul style="list-style-type: none"> <li>No bush-meat or hunting Policy</li> <li>Operator supervision</li> </ul>	<ul style="list-style-type: none"> <li>Number of reports of hunting or bushmeat.</li> </ul>	<ul style="list-style-type: none"> <li>As received</li> </ul>	Project
Designing the Project to minimize impacts on the community	The scale of necessary compensation and resettlement can be minimized by siting facilities for minimal community impact.	<ul style="list-style-type: none"> <li>Optimal siting of process plant through selection of Site 5 (sugar cane farm).</li> <li>Staged resettlement in line with mining plan incorporating progressive rehabilitation and return to productive agricultural land.</li> <li>Involuntary resettlement avoided by fair payment to landowners.</li> <li>Compensation paid and livelihoods and food security secured for other Project Affected Persons (PAPs) in line with Compensation and Resettlement Action Plan.</li> </ul>	<ul style="list-style-type: none"> <li>Alternatives assessment document encompassing design and layout in ESIA.</li> <li>Number of community complaints</li> </ul>	<ul style="list-style-type: none"> <li>For all land acquisition staged over the life of the Project.</li> </ul>	Project NEMA (via ESIA Approval process)
	Acceleration of land erosion	<ul style="list-style-type: none"> <li>Avoid unnecessary land clearing.</li> <li>Properly construct bridges and river crossings for high flow events.</li> </ul>	<ul style="list-style-type: none"> <li>Downstream water quality assessment for turbidity in particular</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly</li> </ul>	Project working with the District Local Governments (DLGs), Uganda National Roads

Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
		<ul style="list-style-type: none"> <li>Actively grass/ revegetate disturbed areas and topsoil stockpiles</li> </ul>	<ul style="list-style-type: none"> <li>Visual examination of stockpiles for signs of erosion with remedial works undertaken as required.</li> </ul>		(UNRA) Authority and DWRM
	Damage to archaeological site	<ul style="list-style-type: none"> <li>Avoid unnecessary clearing.</li> <li>Archaeological baseline assessment completed to identify sites of significance as part of ESIA.</li> <li>Workforce awareness and observation about archaeological sites.</li> <li>Pre-clearing inspection by trained inspector.</li> </ul>	<ul style="list-style-type: none"> <li>Clearing approval in place for all clearing.</li> <li>No sites of significance in area to be cleared.</li> <li>No incident reports on damage to a heritage site.</li> </ul>	<ul style="list-style-type: none"> <li>As needed as part of clearing permit process.</li> </ul>	Project working closely with Department of Museums and Monuments
	Displacement of wildlife	<ul style="list-style-type: none"> <li>Protect wildlife from hunting (i.e., Security and no bush-meat Policy)</li> <li>Supervision</li> </ul>	<ul style="list-style-type: none"> <li>No incident reports on workforce hunting.</li> </ul>	<ul style="list-style-type: none"> <li>As received</li> </ul>	Project
	Introduction of weeds	<ul style="list-style-type: none"> <li>Inspection of machinery on arrival to ensure machinery is clean and free of mud and seeds.</li> </ul>	<ul style="list-style-type: none"> <li>Inspection sheets and sign off for new equipment by HSEC staff.</li> </ul>	<ul style="list-style-type: none"> <li>On all newly arrived machinery</li> </ul>	Project
Occupational Health and safety	Injuries and occupational health impacts on employees and contractors	<ul style="list-style-type: none"> <li>OHS Management System <ul style="list-style-type: none"> <li>Fit for Purpose facilities and equipment</li> <li>Good Procedures (including mandatory risk assessment prior to tasks being undertaken)</li> <li>Competent People (appropriately trained, licensed and fit for work with good supervision)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Number and types of Incidents, Injuries and Near Misses.</li> <li>Conformance to Facility Standards.</li> <li>Procedural breaches</li> <li>Training records</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing (daily)</li> </ul>	Project and The Department of Occupational Health and Safety under the Ministry of Gender Labour and Social Development (MGLSD)



Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
		<ul style="list-style-type: none"> <li>○ Governance (monitoring and audits)</li> <li>○ Critical Safety Rules</li> </ul>			
Construction Phase					
Construction activities.	Interference with stream flows	<ul style="list-style-type: none"> <li>• Installation of appropriate bridges and culverts at river crossings.</li> </ul>	<ul style="list-style-type: none"> <li>• Downstream water quality assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	Project working with UNRA and DLGs.
	Increased sedimentation and turbidity in streams	<ul style="list-style-type: none"> <li>• Sheet piling of roads with laterite/cap-rock limits muddiness.</li> <li>• Diversion of stormwater and stabilization of topsoil stockpiles to limit erosion.</li> </ul>	<ul style="list-style-type: none"> <li>• Downstream water quality assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	Project working with UNRA and DLGs.
	in-migration of settlers onto Project land	<ul style="list-style-type: none"> <li>• Security fencing, security inspections and, security presence on all access roads.</li> </ul>	<ul style="list-style-type: none"> <li>• Presence of immigrants.</li> <li>• Instances/reports of trespassers.</li> </ul>	<ul style="list-style-type: none"> <li>• As needed</li> </ul>	Project working with Uganda Police and the Ministry of Gender Labour and Social Development (MGLSD).
General workforce impacts	Generation of litter	<ul style="list-style-type: none"> <li>• Good waste management facilities</li> <li>• Good waste management procedures</li> <li>• Enforcement of site waste management procedures</li> </ul>	<ul style="list-style-type: none"> <li>• Waste tracking volumes.</li> <li>• Compliance with waste procedures (facility inspections including contents of recycling bins).</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly and annual reports to NEMA.</li> </ul>	Project with support from DLGs and NEMA
	Wildlife hunting by workforce	<ul style="list-style-type: none"> <li>• Enforcement of no hunting or bush-meat Policy on site.</li> </ul>	<ul style="list-style-type: none"> <li>• No evidence or reports of hunting</li> </ul>	<ul style="list-style-type: none"> <li>• As received</li> </ul>	Project working with Uganda Wildlife Authority (UWA).
	Fuel Spill in the Mining area contaminating	<ul style="list-style-type: none"> <li>• Fit for purpose fuel storage and handling facilities including bunded bulk storage.</li> <li>• Spill prevention and clean-up procedures.</li> </ul>	<ul style="list-style-type: none"> <li>• Formal site HSE compliance inspections</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly</li> </ul>	Project working with Department of Petroleum Supply and Distribution

Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
	land and surface water	<ul style="list-style-type: none"> <li>Well trained and competent workforce.</li> </ul>			under the Ministry of Energy, NEMA and DWRM.
	Chemical spill in processing plant area contaminating land and surface water.	<ul style="list-style-type: none"> <li>Fit for purpose fuel storage and handling facilities including bunded area for bulk storage.</li> <li>Spill prevention and clean-up procedures.</li> <li>Well trained and competent workforce.</li> </ul>	<ul style="list-style-type: none"> <li>Incident Reports</li> </ul>	<ul style="list-style-type: none"> <li>As received</li> </ul>	Project working with Department of Petroleum Supply and Distribution under the Ministry of Energy, NEMA and DWRM.
	Excessive dust in dry season	<ul style="list-style-type: none"> <li>Enforce speed limits on haul roads</li> <li>Dust suppression (e.g., water trucks and sprinklers) as necessary to prevent dust.</li> </ul>	<ul style="list-style-type: none"> <li>&gt;4g/m<sup>2</sup>/month dust deposition as measured by Deposition Gauges or 24-hr limits of 25 µg/m<sup>3</sup> for PM<sub>2.5</sub> and 50 µg/m<sup>3</sup> for PM<sub>10</sub>.</li> </ul>	<ul style="list-style-type: none"> <li>Monthly</li> </ul>	Project
Communicable diseases	Project contractors contribute to the spread of HIV and other communicable diseases in the local community.	<ul style="list-style-type: none"> <li>Workforce education on HIV safety and expected standards of workforce behaviour.</li> <li>Condom vending machines.</li> </ul>	<ul style="list-style-type: none"> <li>Prevalence of HIV in local community and workforce from public health records and in-house medical checks,</li> </ul>	<ul style="list-style-type: none"> <li>Annual</li> </ul>	Project with support from the DLGs and Ministry of Health (MOH)
Un-controlled in-migration to	Creation of social conflict	<ul style="list-style-type: none"> <li>Security of tenure for local landowners.</li> <li>Support of local authorities.</li> </ul>	<ul style="list-style-type: none"> <li>Incident reports</li> <li>Formal surveys</li> </ul>	<ul style="list-style-type: none"> <li>Annual assessment</li> </ul>	Project working with MGLSD and MLHUD.

Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
general project area		<ul style="list-style-type: none"> <li>Sustainable livelihood focus.</li> <li>Community education.</li> <li>Good security on Project access roads.</li> </ul>	<ul style="list-style-type: none"> <li>Crime statistics</li> </ul>		
	Inadequate Community Services	<ul style="list-style-type: none"> <li>Build capacity in the community in partnership with key stakeholders including District Planners.</li> </ul>	<ul style="list-style-type: none"> <li>Formal surveys</li> <li>Feedback from local government/town planners</li> </ul>	<ul style="list-style-type: none"> <li>Annual assessment</li> </ul>	DLGs (District Planners and District Community Development Officers)
	Increase in communicable diseases such as HIV/AIDS	<ul style="list-style-type: none"> <li>Influx management to limit presence of outsiders.</li> <li>Community Health Support Programmes (ie. As per Community Development Plan)</li> <li>HIV Awareness programme for workforce.</li> </ul>	<ul style="list-style-type: none"> <li>Public health data on prevalence of HIV and other diseases and tracking of trends.</li> </ul>	<ul style="list-style-type: none"> <li>Annual assessment</li> </ul>	Project working with MOH
	Covid 19 spread in Makuutu workforce and contractors	<ul style="list-style-type: none"> <li>Proof of Covid 19 vaccinations for expatriate visitors plus quarantine as required by Ugandan authorities.</li> <li>No one with cold/flu symptoms allowed to attend work.</li> <li>Temperature check on arrival at work.</li> <li>Masks and social distancing to be in place at workforce in combination with hand washing/sanitation.</li> </ul>	<ul style="list-style-type: none"> <li>Number of Covid 19 cases in workforce/contractors and in local area.</li> </ul>	<ul style="list-style-type: none"> <li>Daily during pandemic</li> </ul>	Project and MOH
	Loss of capacity in key community services such as food security, health, education and law and order in communities near the project site.	<ul style="list-style-type: none"> <li>Collaborative programmes with government to appropriately service growing centres and build capacity as per Community Development Plan.</li> </ul>	<ul style="list-style-type: none"> <li>Local council report card and feedback from District Planners.</li> <li>Spatial mapping including aerial photographs to support assessment.</li> </ul>	<ul style="list-style-type: none"> <li>At least annual</li> </ul>	DLGs (District Planners and District Community Development Officers)

Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
	Child abuse /Child Labour	<ul style="list-style-type: none"> <li>• Livelihood and food security support projects (refer Community Development Plan Section 11.3).</li> <li>• Scholarships and other support to children</li> <li>• Makuutu Employment Policies</li> <li>• Control of in-migration</li> </ul>	<ul style="list-style-type: none"> <li>• Percent of children completing Primary School</li> <li>• Average GDP/person in local counties and Districts</li> <li>• Community health metrics including degree of stunting in children,</li> </ul>	<ul style="list-style-type: none"> <li>• Annual</li> </ul>	DLGs (District Planners and District Community Development Officers)
	Status of Women (Gender Equality)	<ul style="list-style-type: none"> <li>• Training and education of women and girls</li> <li>• Equitable employment of women at the Project</li> <li>• Livelihood and food security support to PAPs including women who are not landowners.</li> <li>• Business contracts for women (eg. Cleaning, waste management, nursery/rehabilitation, fish farming etc.)</li> <li>• Control of in-migration</li> <li>• Support of Law enforcement capacity.</li> </ul>	<ul style="list-style-type: none"> <li>• Girl's education completion</li> <li>• Percent employment of women</li> <li>• Women GDP in Project areas</li> </ul>	<ul style="list-style-type: none"> <li>• Annual</li> </ul>	DLGs (District Planners and District Community Development Officers)
	Gender Based Violence	<ul style="list-style-type: none"> <li>• Funding of women's shelters</li> <li>• Livelihood Projects for women</li> <li>• Support of Law enforcement capacity</li> <li>• Education for Makuutu workforce on acceptable personal behaviour standards of employees.</li> </ul>	<ul style="list-style-type: none"> <li>• Incidents of domestic violence</li> </ul>	<ul style="list-style-type: none"> <li>• Annual</li> </ul>	DLGs (District Planners and District Community Development Officers)
Occupational Health and Safety	Injuries and occupational health impacts on	<ul style="list-style-type: none"> <li>• OHS Management System <ul style="list-style-type: none"> <li>○ Fit for Purpose facilities and equipment</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Number and types of Incidents, Injuries and Near Misses.</li> </ul>	<ul style="list-style-type: none"> <li>• Ongoing (daily)</li> </ul>	Project and The Department of Occupational Health and

Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
	employees and contractors	<ul style="list-style-type: none"> <li>○ Good Procedures (including mandatory risk assessment prior to tasks being undertaken)</li> <li>○ Competent People (appropriately trained, licensed and fit for work with good supervision)</li> <li>○ Governance (monitoring and audits)</li> <li>● Critical Safety Rules</li> </ul>	<ul style="list-style-type: none"> <li>● Conformance to Facility Standards (Planned maintenance, structural integrity, heavy and light vehicle standards, condition of roads, condition of bunds, alarm systems).</li> <li>● Procedural breaches (Working at height, electrical safety, lock-out tag out, Vehicle interaction, confined spaces, machine guarding, chemical management (PPE))</li> <li>● Training records</li> </ul>		Safety under the Ministry of Gender Labour and Social Development (MGLSD)
Operational/Mining Phase					
Land Clearing	Loss of timber resources.	<ul style="list-style-type: none"> <li>● Avoid trees outside of mining envelope where possible.</li> <li>● Salvage all valuable timber.</li> </ul>	<ul style="list-style-type: none"> <li>● All felled trees salvaged</li> </ul>	<ul style="list-style-type: none"> <li>● Quarterly</li> </ul>	Project working with landowners.
	Loss of rare species	<ul style="list-style-type: none"> <li>● Baseline assessment to confirm lack of rare or endemic species in clearing envelope completed as part of the ESIA.</li> <li>● Protection/restoration of downstream wetlands over the life of the Project.</li> </ul>	<ul style="list-style-type: none"> <li>● No rare species present.</li> <li>● Avoid or replace (compensate) any rare flora.</li> </ul>	<ul style="list-style-type: none"> <li>● Quarterly</li> </ul>	Project working with the Wetlands Management Department (WMD), DLGs and NEMA.



Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
			<ul style="list-style-type: none"> <li>Downstream water quality assessment.</li> </ul>		
	Loss of topsoil	<ul style="list-style-type: none"> <li>Topsoil conserved for future rehabilitation in grassed (non-erosive) stockpiles.</li> </ul>	Topsoil inventory	Monthly in areas of active disturbance.	Project
	Acceleration of land erosion and consequent surface water turbidity.	<ul style="list-style-type: none"> <li>Avoid unnecessary clearing.</li> <li>Properly construct bridges and river crossings for foreseeable flood events,</li> <li>Active grassing/ revegetation of disturbed areas and topsoil stockpiles</li> </ul>	Downstream water quality assessment.	<ul style="list-style-type: none"> <li>Quarterly</li> </ul>	Project with support from UNRA and DLGs. Liaison with DWRM for WQM
	Damage to archaeological site	<ul style="list-style-type: none"> <li>Avoid unnecessary clearing.</li> <li>Archaeological baseline assessment to identify sites of significance.</li> <li>Workforce awareness and observation about archaeological sites.</li> <li>Pre-clearing inspection by trained inspector.</li> </ul>	<ul style="list-style-type: none"> <li>No sites of significance in area to be cleared.</li> <li>No incident reports on damage to a heritage site.</li> </ul>	<ul style="list-style-type: none"> <li>As needed as part of clearing permit process.</li> </ul>	Project working closely with Department of Museums and Monuments.
	Displacement of wildlife	<ul style="list-style-type: none"> <li>Protect from hunting (i.e., Security and no bush-meat Policy)</li> <li>Supervision</li> </ul>	<ul style="list-style-type: none"> <li>No incident reports on workforce hunting.</li> </ul>	<ul style="list-style-type: none"> <li>As received</li> </ul>	Project working with UWA.
	Introduction of weeds	<ul style="list-style-type: none"> <li>Inspection of machinery on arrival to ensure clean and free of mud and seeds.</li> </ul>	<ul style="list-style-type: none"> <li>Inspection sheets</li> </ul>	<ul style="list-style-type: none"> <li>On all newly arrived machinery</li> </ul>	Project Ministry of Agriculture Animal Industry and Fisheries (MAAIF)
Mining activities	Interference with stream flows	<ul style="list-style-type: none"> <li>Installation of appropriate storm-water diversion structures.</li> </ul>	<ul style="list-style-type: none"> <li>Downstream water quality assessment</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly</li> </ul>	Project DLGs (District Engineers) DWRM
	Increased sedimentation and turbidity in streams	<ul style="list-style-type: none"> <li>Diversion to sumps of stormwater in pits to minimize sediment in stormwater discharge.</li> </ul>	<ul style="list-style-type: none"> <li>Water quality testing of water prior to discharge.</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly</li> </ul>	Project working with the DLGs (District Environment Officers,

Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
		<ul style="list-style-type: none"> <li>Stabilization and greasing of topsoil stockpiles to reduce erosion</li> <li>Installation of Stormwater Pond to capture stormwater for clarification and other treatment as necessary prior to discharge</li> <li>Sheeting of roads with laterite/cap-rock limits muddiness.</li> <li>Installation of appropriate bridges and culverts at river crossings</li> </ul>	<ul style="list-style-type: none"> <li>Downstream water quality assessment</li> </ul>		District Water Officers, etc.), NEMA and DWRM.
	in-migration of settlers onto Project land	<ul style="list-style-type: none"> <li>Security fencing, security inspections and, security presence on all access roads.</li> </ul>	<ul style="list-style-type: none"> <li>Presence of immigrants.</li> <li>Instances/reports of trespassers.</li> </ul>	<ul style="list-style-type: none"> <li>As needed</li> </ul>	Project with support from DLGs (District Community Officers) and MGLSD.
	Diesel and oil spill contamination of land and surface water	<ul style="list-style-type: none"> <li>Double skinned self-bunded diesel tank.</li> <li>Good spill response and clean-up processes.</li> <li>Oil traps at truck wash facilities.</li> <li>Good maintenance practices including regular change of hydraulic hoses to prevent rupturing.</li> </ul>	<ul style="list-style-type: none"> <li>Volumes of fuels and oils spilled from incident reports.</li> <li>Water quality checks on hydrocarbons in stormwater pond and in downstream water bodies and wetlands</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly water quality assessment</li> </ul>	Project with support from: NEMA DWRM
	Generation of high volumes of greenhouse gas	<ul style="list-style-type: none"> <li>Selection of energy efficient machinery.</li> <li>Efficient design of operational layout.</li> <li>Good monitoring and focus on energy efficiency.</li> </ul>	<ul style="list-style-type: none"> <li>Emissions of CO<sub>2</sub> based on diesel fuel combustion</li> </ul>	<ul style="list-style-type: none"> <li>Annual report</li> </ul>	Project
	Generation of exhaust emissions impacting air	<ul style="list-style-type: none"> <li>Well maintained and efficient machinery.</li> <li>Good maintenance and operational practices.</li> <li>Competent workforce.</li> </ul>	<ul style="list-style-type: none"> <li>Air quality data</li> </ul>	<ul style="list-style-type: none"> <li>Monthly for dust.</li> <li>Annual for NOx/SOx</li> </ul>	Project

Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
	quality for community	<ul style="list-style-type: none"> <li>• Buffer distance between operations and residences.</li> </ul>			
	Noise and vibration impact on nearby communities	<ul style="list-style-type: none"> <li>• Good noise and vibration control.</li> <li>• Maximise buffer distance from noise sensitive premises.</li> </ul>	<ul style="list-style-type: none"> <li>• Ambient noise survey</li> <li>• Noise complaints</li> </ul>	<ul style="list-style-type: none"> <li>• Annual noise survey and complaints as received.</li> </ul>	Project with support from DLGs and NEMA
	Inappropriate disposal of tyres, batteries and hydrocarbons and other regulated waste.	<ul style="list-style-type: none"> <li>• Good waste facilities.</li> <li>• Good waste management procedures including appropriate disposal strategies.</li> <li>• Well trained workforce.</li> </ul>	<ul style="list-style-type: none"> <li>• Waste Tracking data.</li> <li>• Formal site inspection data.</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly</li> </ul>	Project with support from NEMA
Process Plant activities	Contamination of surface and groundwater with process chemicals including potential to contaminate food crops in downstream wetlands.	<ul style="list-style-type: none"> <li>• Fully contained (bunded) storage facilities.</li> <li>• Lined heap leach pads and ponds.</li> <li>• Reverse Osmosis treatment of process liquors to remove all ammonium salts.</li> <li>• Storm-water Pond to contain water prior to release to surface waters</li> </ul>	<ul style="list-style-type: none"> <li>• Water quality testing of stormwater pond and downstream river systems including for ammonia and hydrocarbons.</li> <li>• Inspections (monthly of facilities).</li> <li>• Incident reports for all spills.</li> <li>• Groundwater quality testing for ammonia, pH and process chemicals beneath storage</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	Project with support from NEMA DWRM

Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
			facilities and heap leach pads		
	Trespassers onto property from adjacent communities	<ul style="list-style-type: none"> <li>• Buffer zone around operational areas.</li> <li>• Security fencing, security inspections and, security presence on all access roads.</li> </ul>	<ul style="list-style-type: none"> <li>• Instances/reports of trespassers.</li> </ul>	<ul style="list-style-type: none"> <li>• As needed</li> </ul>	Project Bugweri District Local Government Bugweri Police Station Iganga Central Police Station
	Generation of exhaust emissions impacting air quality	<ul style="list-style-type: none"> <li>• Well maintained and efficient machinery.</li> <li>• Good maintenance and operational practices.</li> <li>• Competent workforce.</li> </ul>	<ul style="list-style-type: none"> <li>• Air quality data (TSP or PM<sub>2.5</sub>/PM<sub>10</sub>, NO<sub>x</sub>, SO<sub>x</sub>, and CO)</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly for dust.</li> <li>• Annual for NO<sub>x</sub>/SO<sub>x</sub></li> </ul>	Project NEMA
	Noise and vibration impact on nearby communities	<ul style="list-style-type: none"> <li>• Good noise and vibration control.</li> <li>• Maximise buffer distance from noise sensitive premises.</li> </ul>	<ul style="list-style-type: none"> <li>• Ambient noise survey (LAeq)</li> <li>• Noise complaints</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly noise survey and complaints as received.</li> </ul>	Project NEMA
	Inappropriate disposal of tyres, batteries and hydrocarbons and other regulated waste.	<ul style="list-style-type: none"> <li>• Good waste facilities.</li> <li>• Good waste management procedures including appropriate disposal strategies.</li> <li>• Well trained workforce.</li> </ul>	<ul style="list-style-type: none"> <li>• Waste Tracking data.</li> <li>• Formal site inspection data.</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly</li> </ul>	Project NEMA
Un-controlled in-migration into project areas	Social conflict	<ul style="list-style-type: none"> <li>• Security of tenure for local landowners.</li> <li>• Support of local authorities.</li> <li>• Sustainable livelihood focus.</li> <li>• Community education.</li> <li>• Good security on Project access roads.</li> </ul>	<ul style="list-style-type: none"> <li>• Incident reports</li> <li>• Formal surveys</li> </ul>	<ul style="list-style-type: none"> <li>• Annual assessment</li> </ul>	Project DLGs (District Planners and Community Development Officers) in liaison with MGLSD Uganda Police

Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
	Inadequate Community Services	<ul style="list-style-type: none"> <li>Build capacity in the community in partnership with key stakeholders.</li> </ul>	<ul style="list-style-type: none"> <li>Formal surveys</li> <li>Feedback from local government/town planners</li> </ul>	<ul style="list-style-type: none"> <li>Annual assessment</li> </ul>	DLGs (District Planners and CDOs) Local NGOs
	Increase in communicable diseases such as HIV/AIDS	<ul style="list-style-type: none"> <li>Preliminary Compensation and Resettlement Action Plan</li> <li>Influx management</li> <li>Community Health Support Programmes (Community Development Plan)</li> </ul>	<ul style="list-style-type: none"> <li>Public health data</li> </ul>	<ul style="list-style-type: none"> <li>Annual assessment</li> </ul>	MOH/ District Health Officers
Communicable diseases	Project workforce contributes to the spread of HIV and other communicable diseases in the local community.	<ul style="list-style-type: none"> <li>Management of in-migration with District Planners and through clarity of land ownership.</li> <li>Policy to reside long-term workforce in the community.</li> <li>Workforce education on HIV safety and expected standards of workforce behaviour.</li> <li>Condom vending machines.</li> </ul>	<ul style="list-style-type: none"> <li>Prevalence of HIV in local community and workforce from public health records and in-house medical checks,</li> </ul>	<ul style="list-style-type: none"> <li>Annual</li> </ul>	Project with support from Health Centres in the vicinity and TASO. District Health Officers
	Covid 19 spread in Makuutu workforce and contractors during pandemic (if unresolved)	<ul style="list-style-type: none"> <li>Proof of Covid vaccinations for expatriate visitors plus quarantine as required by Ugandan authorities.</li> <li>No one with cold/flu symptoms allowed to attend work.</li> <li>Temperature check on arrival at work.</li> <li>Masks and social distancing to be in place at workforce in combination with hand washing/sanitation.</li> </ul>	<ul style="list-style-type: none"> <li>Number of covid cases in workforce/contractors and in local area.</li> </ul>	<ul style="list-style-type: none"> <li>Daily during pandemic</li> </ul>	Project and MOH
Community Development	Social Licence to Operate	<ul style="list-style-type: none"> <li>Community health support</li> </ul>	<ul style="list-style-type: none"> <li>Incidence of malaria/HIV AIDS and TB from Public health data (Health Management</li> </ul>	<ul style="list-style-type: none"> <li>Annual</li> </ul>	Project MOH



Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
			Information System, HMIS)		
		<ul style="list-style-type: none"> <li>Education support</li> </ul>	<ul style="list-style-type: none"> <li>% children graduating from Primary School from Department of Education data.</li> <li>Completion rates for adult skills training courses.</li> </ul>	<ul style="list-style-type: none"> <li>Annual</li> </ul>	Ministry of Education and Sports (MoES)
		<ul style="list-style-type: none"> <li>Livelihoods</li> </ul>	<ul style="list-style-type: none"> <li>Average GDP in local communities from survey data.</li> <li>Employment data with Project</li> </ul>	<ul style="list-style-type: none"> <li>Annual</li> </ul>	Uganda Bureau of Statistics (UBOS)
Loss of public infrastructure	Public roads and facilities consumed by expanding mining pit	<ul style="list-style-type: none"> <li>Compensation and Resettlement Action Plan.</li> <li>Staged resettlement</li> <li>Engagement with communities and district planners</li> </ul>	<ul style="list-style-type: none"> <li>Spatial mapping of public infrastructure.</li> <li>Long term public infrastructure plan agreed with the relevant Ministries, Departments and Agencies (MDAs) and the District Local Governments.</li> </ul>	<ul style="list-style-type: none"> <li>Annual</li> </ul>	Project with support from MDAs (Chief Government Valuer (CGV), MLHUD, MGLSD, etc.) and DLGs and NGOs.
Food Security	Shortage of land for agriculture in expanding	<ul style="list-style-type: none"> <li>Livelihood Restoration Plan.</li> <li>Clarification/security of land tenure.</li> </ul>	<ul style="list-style-type: none"> <li>Stunting and other malnourishment indicators in</li> </ul>	<ul style="list-style-type: none"> <li>Annual</li> </ul>	Project with support from: <ul style="list-style-type: none"> <li>MLHUD</li> </ul>

Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
	communities near the project site.	<ul style="list-style-type: none"> <li>Integrated land use planning with key stakeholders including planned agriculture.</li> <li>Community Development Plan.</li> </ul>	<ul style="list-style-type: none"> <li>children from public health data.</li> <li>Community health indicators in public health data.</li> <li>Spatial land use mapping including cropping data and yields from Ministry of Agriculture</li> </ul>		<ul style="list-style-type: none"> <li>MAAIF</li> <li>MGLSD</li> </ul>
Public Safety and Security	Increased road accidents due to increased traffic on public access roads	<ul style="list-style-type: none"> <li>Security fencing and security staff to separate general public from mining and processing activities.</li> <li>Upgrade roads in consultation with District planners.</li> <li>Construct and fully separate haul road with security fencing and controlled crossing</li> </ul>	<ul style="list-style-type: none"> <li>Number of incidents involving company and contract vehicles including delivery trucks.</li> <li>Number of trespassers</li> </ul>	<ul style="list-style-type: none"> <li>Monthly</li> </ul>	Project with support from: <ul style="list-style-type: none"> <li>District Planners</li> <li>UNRA</li> <li>Uganda Police</li> </ul>
Road Accidents	Poor capacity of external emergency responders	<ul style="list-style-type: none"> <li>Increased public emergency response capacity including hospital emergency capacity.</li> <li>In-house project emergency response capacity and on-site medical facility.</li> <li>Collaborative Emergency/Crisis Response exercises and plans</li> </ul>	<ul style="list-style-type: none"> <li>Public road accident statistics and outcomes and trends</li> </ul>	<ul style="list-style-type: none"> <li>Annual</li> </ul>	Project with support from: <ul style="list-style-type: none"> <li>District Planners</li> <li>Uganda Police</li> <li>MOH/ Health Centres</li> </ul>
Law and Order	Break down of law and order in rapidly expanding communities near the project site due to lack of	<ul style="list-style-type: none"> <li>Control in-migration.</li> <li>Appropriate government support to enforce law and order.</li> <li>Planned development and sustainable livelihoods.</li> </ul>	<ul style="list-style-type: none"> <li>Crime statistics in local communities.</li> <li>Security incidents at Project</li> </ul>	<ul style="list-style-type: none"> <li>Monthly and in publicly available Annual Environmental Report</li> </ul>	Project with support from: <ul style="list-style-type: none"> <li>Uganda Police</li> <li>MGLSD</li> <li>District Planners</li> <li>Ministry of Justice</li> </ul>

Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
	public law and order capacity.				
Community Services	Adverse impact on a range of aspects including education, water security, community health driven by loss of infrastructure and demographic change	<ul style="list-style-type: none"> <li>Part of Compensation and Resettlement Action Plan and; Community Development Plan</li> </ul>	<ul style="list-style-type: none"> <li>District Planners Reports.</li> </ul>	<ul style="list-style-type: none"> <li>Annual</li> </ul>	Project with support from: <ul style="list-style-type: none"> <li>District Planners</li> <li>MDAs (MWE, MEMD, etc.)</li> </ul>
Biodiversity impact	<ul style="list-style-type: none"> <li>Biodiversity impact from habitat loss.</li> <li>Biodiversity impact on downstream habitats due to pollution from the Project</li> </ul>	<ul style="list-style-type: none"> <li>Mainly farmland.</li> <li>Baseline assessment and strategic avoidance.</li> <li>Good containment of all chemicals on-site and maintenance of good quality stormwater discharge.</li> </ul>	<ul style="list-style-type: none"> <li>Downstream water quality</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly</li> </ul>	Project with support from: <ul style="list-style-type: none"> <li>NEMA</li> <li>Makerere University</li> </ul>
Legal compliance with environmental laws	Activities without securing the requisite permits and approvals Inadequate environmental monitoring and reporting in breach of	<ul style="list-style-type: none"> <li>Secure all necessary licenses, approvals and permits as applicable and meet conditions therein.</li> <li>Site monitoring/reporting and public disclosure processes.</li> </ul> Conditions of Permits including: <ul style="list-style-type: none"> <li>water abstraction - DWRM, (Not anticipated but possible)</li> <li>Waste-Water Discharge- DWRM</li> </ul>	Number of regulatory breaches		Project with support from: <ul style="list-style-type: none"> <li>NEMA</li> <li>DWRM</li> <li>DoOHS/MGLSD</li> <li>District Local Governments (Environment Officers, etc.)</li> </ul>

Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
	environmental licence and regulatory requirements	<ul style="list-style-type: none"> <li>Waste Management (NEMA)</li> <li>Class 2B Landfill (NEMA)</li> <li>Storage of fuel - MEMD,</li> <li>Workplace Registration - DoOHS/MGLSD</li> </ul>			
Poverty	Inadequate protection from poverty and other adverse outcomes for vulnerable groups	<ul style="list-style-type: none"> <li>Vulnerability assessment in combination with a rights-based approach (e.g., Right to property, fair compensation, education, employment, health services etc.).</li> </ul>	<ul style="list-style-type: none"> <li>Trends in average GDP.</li> <li>Prevalence of stunting and malnutrition from public health records.</li> </ul>	Annual	Project with support from: <ul style="list-style-type: none"> <li>UBOS</li> <li>MGLSD</li> <li>Other MDAs (MAAIF, MLHUD, etc.)</li> </ul>
Community engagement	Inadequate community engagement/information sharing with poorly educated communities.	<ul style="list-style-type: none"> <li>Community Management Plan and ongoing engagement over the life of the Project.</li> <li>Effective grievance mechanism</li> </ul>	<ul style="list-style-type: none"> <li>Community perception survey</li> <li>Number of community complaints</li> </ul>	Triennial Monthly report	Project with support from: <ul style="list-style-type: none"> <li>District Local Governments</li> <li>Relevant MDAs</li> </ul>
Community health	Contamination of land and surface waters with sewage at Makuutu camps at project site.	<ul style="list-style-type: none"> <li>High standard toilets and Sewage Treatment System.</li> <li>Effluent/water quality monitoring to ensure functionality of system.</li> <li>Hygiene education of workforce.</li> </ul>	<ul style="list-style-type: none"> <li>Sewage effluent monitoring.</li> <li>Surface and groundwater quality monitoring.</li> </ul>	Monthly Quarterly	Project with support from: <ul style="list-style-type: none"> <li>District Water Officers and Environment Officers</li> <li>DWRM</li> </ul>
Community development/su	Leverage positive benefits though alignment and	<ul style="list-style-type: none"> <li>Stakeholder Advisory Committee providing advice.</li> </ul>	<ul style="list-style-type: none"> <li>Community Health, Education and Livelihood metrics</li> </ul>	Annual	Project with support from Ugandan Institutions and NGOs

Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
pport Partnerships	shared investment with strategic partners.	<ul style="list-style-type: none"> <li>Joint investment in significant initiatives for the benefit of local communities.</li> </ul>	aligned with scale of investment		
Tailings/spent ore disposal	Inadequate disposal of tailings/spent clay residues leading to pollution.	<ul style="list-style-type: none"> <li>In-pit disposal and progressive rehabilitation.</li> <li>Site Operational Control.</li> <li>Low concentrations of residual process chemicals in spent clay after washing.</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>Stormwater discharge, Surface water and groundwater monitoring</li> </ul>	Quarterly	Project with support from: <ul style="list-style-type: none"> <li>NEMA</li> <li>DGSM</li> </ul>
Community Water supply	Depletion of natural springs used by local people or wildlife during mining operations.	<ul style="list-style-type: none"> <li>No impact on local aquifers.</li> <li>Complete independence for water supply based on harvested stormwater.</li> <li>Mapping of local springs and water sources in ESIA.</li> <li>Replacement of any springs or water sources impacted by site footprint.</li> </ul>	<ul style="list-style-type: none"> <li>Number of community complaints about water supply.</li> </ul>	Monthly	Project with support from: <ul style="list-style-type: none"> <li>District Water Officers</li> <li>DWRM</li> <li>Kyoga Water Management Zone</li> </ul>
Land and water contamination from mined ore.	Contamination of land from direct product spillage during processing and transport operations.	<ul style="list-style-type: none"> <li>Benign product with negligible impact.</li> <li>Spillage recovered as saleable product.</li> <li>Well designed and maintained slurry transfer systems.</li> </ul>	<ul style="list-style-type: none"> <li>Surface water quality testing</li> </ul>	Quarterly	Project with support from: <ul style="list-style-type: none"> <li>DGSM</li> <li>NEMA</li> <li>DWRM</li> <li>MEMD</li> <li>MoWT</li> <li>Uganda Police</li> </ul>
Putrescible waste management	Proliferation of vermin feeding on food scraps at solid waste management	<ul style="list-style-type: none"> <li>Rubbish dump control system including separate composting of food scraps and removal from waste stream (refer Waste Management Plan Section 11.6).</li> </ul>	<ul style="list-style-type: none"> <li>Landfill inspection to confirm absence of putrescible waste and vermin.</li> </ul>		Project with support from: <ul style="list-style-type: none"> <li>District Environment Officers</li> </ul>



Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
	facilities at the project site.				<ul style="list-style-type: none"> <li>District Health Inspectors</li> <li>NEMA</li> </ul>
Occupational Health and safety	Injuries and occupational health impacts on employees and contractors	<ul style="list-style-type: none"> <li>OHS Management System <ul style="list-style-type: none"> <li>Fit for Purpose facilities and equipment</li> <li>Good Procedures (including mandatory risk assessment prior to tasks being undertaken)</li> <li>Competent People (appropriately trained, licensed and fit for work with good supervision)</li> <li>Governance (monitoring and audits)</li> </ul> </li> <li>Critical Safety Rules</li> </ul>	<ul style="list-style-type: none"> <li>Number and types of Incidents, Injuries and Near Misses.</li> <li>Conformance to Facility Standards (Planned maintenance, structural integrity, heavy and light vehicle standards, condition of roads, condition of bunds, alarm systems).</li> <li>Procedural breaches (Working at height, electrical safety, lock-out tag out, Vehicle interaction, confined spaces, machine guarding, chemical management (PPE))</li> <li>Training records</li> </ul>	Ongoing (daily)	Project and the Department of Occupational Health and Safety under the Ministry of Gender Labour and Social Development (MGLSD)
Closure and Decommissioning					
Physical completion criteria for	Rehabilitated mining areas prove unsuitable	<ul style="list-style-type: none"> <li>Develop physical completion criteria and rehabilitation techniques in collaboration with and to the satisfaction of key</li> </ul>	<ul style="list-style-type: none"> <li>Physical completion criteria in place within Final Closure</li> </ul>	At mine closure.	Project with support from: <ul style="list-style-type: none"> <li>DGSM</li> </ul>

Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
decommissioning in place.	for agreed final land-use at the end of mining.	stakeholders including post-closure monitoring. <ul style="list-style-type: none"> <li>Undertake revegetation/research trials over the life of the Project on rehabilitated land to validate/optimize techniques and demonstrate long-term effectiveness.</li> </ul>	Plant developed within 5 years of ultimate closure/decommissioning. <ul style="list-style-type: none"> <li>Long-term high standard revegetation in place at end of mining to demonstrate effectiveness</li> </ul>		<ul style="list-style-type: none"> <li>NEMA</li> <li>MGLSD</li> <li>MLHUD</li> <li>DGSM</li> <li>DLGs</li> </ul>
Social completion criteria for decommissioning in place.	Closure of project causes severe social dislocation and adverse social impacts.	<ul style="list-style-type: none"> <li>Develop social completion criteria in close collaboration with key stakeholders including post-closure monitoring.</li> <li>Long-term livelihood projects such as fish farming, intensive agriculture, agroforestry and other businesses in place to sustain livelihoods after mine closure and decommissioning.</li> <li>High capacity developed in essential social services to sustain high standards of community health, education, personal security and food security over the long term.</li> </ul>	<ul style="list-style-type: none"> <li>Local Government and District status reports.</li> <li>Project monitoring to continue for 5 years following closure.</li> </ul>	Annual following closure for 5 years.	Project with support from: <ul style="list-style-type: none"> <li>DGSM</li> <li>MGLSD</li> <li>MLHUD</li> <li>MWE</li> <li>NEMA</li> <li>DGSM</li> </ul>
Sufficient funds in place to achieve physico-chemical and social closure objectives.	State of Uganda left with legacy issues	<ul style="list-style-type: none"> <li>Formally determine the Project Asset Retirement Obligation (ARO) annually and ensure sufficient funds are in place should an unplanned closure occur.</li> </ul>	<ul style="list-style-type: none"> <li>ARO process in place with sufficient funds to deliver closure objectives.</li> <li>Progressive rehabilitation and</li> </ul>	Annual review of ARO.	Project with support from: <ul style="list-style-type: none"> <li>NEMA</li> <li>DGSM</li> <li>Relevant MDAs</li> </ul>

Issue	Potential Impact	Key Controls	Monitoring Indicators	Frequency	Responsibility
			<ul style="list-style-type: none"> <li>social transition/capacity building projects implemented over the life of the project limit the magnitude of closure liability and social dislocation.</li> </ul>		
Final Closure Plan in place within 5 years of closure.	Lack of a fully integrated Final Closure Plan prepared to the satisfaction of NEMA in place to ensure that the Project leaves no adverse physico-chemical or social legacies,	<ul style="list-style-type: none"> <li>Develop a final Project Closure Plan in collaboration with key stakeholders including the Ugandan Government (National, District and Local), key institutions, NGOs and other partners.</li> </ul>	<ul style="list-style-type: none"> <li>Signed off Final Closure Plan in place within 5 years of ultimate closure and decommissioning</li> </ul>	Within 5 years of end of mining and processing.	Project with support from: <ul style="list-style-type: none"> <li>NEMA</li> <li>DGSM</li> </ul>

Table 141: Proposed Monitoring Programme

Aspect	Parameter	Equipment /Method	Monitoring Sites	Frequency	Objective
NEMA Compliance Audit	<ul style="list-style-type: none"> <li>Emission control and compliance with limits</li> <li>Permit currency and completeness</li> <li>Stakeholder concerns</li> <li>Community support</li> </ul>	NEMA Regulatory Assessment for Permit and other compliance.	Operational and other Project affected areas	Annual	NEMA Regulatory Compliance Audit
ESMS Audit Report	<ul style="list-style-type: none"> <li>Internal and external systems audits</li> </ul>	Validated Audit Report	NA	Annual	Implement an effective ESMS to drive continual improvement in social and environmental performance over the life of the Project.
Compliance with legal and Other Requirements	<ul style="list-style-type: none"> <li>Environmental Obligations Register</li> <li>Work area inspections</li> <li>Incident reporting and investigation</li> <li>NEMA inspections</li> </ul>	Annual Environmental Report (AER)	NA	Annual	Comply with all applicable legal and other requirements.
Water quality monitoring (Waste Water Discharge Licence required from DWRM)	pH, EC, Dissolved Oxygen (DO), Water Temperature, Biochemical Oxygen Demand (BOD), Coliform (Faecal), Oil, Turbidity, Suspended Solids (SS), Colour, and	<ul style="list-style-type: none"> <li>Multiparameter water quality meter.</li> <li>Sample bottles</li> <li>Cooler Box</li> <li>Trained staff</li> <li>External (or internal) Laboratory Analysis</li> </ul>	Point of discharge and upstream and downstream sample points in operational areas	Quarterly	Minimise impacts on water quality of rivers and streams during construction and operation.

Aspect	Parameter	Equipment /Method	Monitoring Sites	Frequency	Objective
	Odour, Cations, Total dissolved solids Total & Dissolved Metals (As, Cd, Cr, Cu, Pb, Ni, Ag, Zn, Fe), Sulphate) Uranium and Thorium.				
General Groundwater Quality	pH, EC, Dissolved Oxygen (DO), Water Temperature, Biochemical Oxygen Demand (BOD), Coliform (Faecal), Oil, Turbidity, Suspended Solids (SS), Colour, and Odour, Cations, Total dissolved solids Total & Dissolved Metals (As, Cd, Cr, Cu, Pb, Ni, Ag, Zn, Fe), Sulphate) Uranium and Thorium.	<ul style="list-style-type: none"> <li>• Multiparameter water quality meter.</li> <li>• Groundwater pump to purge the well prior to sampling</li> <li>• Sample bottles</li> <li>• Cooler Box</li> <li>• Trained staff</li> </ul> External (or internal) Laboratory Analysis	In established monitoring wells within the Central, Eastern and Western orebodies in addition to the Process Plant, adjacent to the mining pit and within rehabilitated areas of the mining pit.	Quarterly for operational areas and annual within the broader mining lease.	To assess operational impacts on groundwater quality in both active mining areas and in the vicinity of the Process Plant and to confirm no changes in groundwater quality in future mining areas not currently impacted by mining activities.
Groundwater contamination monitoring	pH in groundwater beneath storage areas for Sulfuric Acid and Acidic Liquors. Hydrocarbons in groundwater beneath Diesel storage tanks	<ul style="list-style-type: none"> <li>• Groundwater pump to purge the well prior to sampling</li> <li>• Sample bottles</li> <li>• Cooler Box</li> <li>• Trained staff</li> </ul> External (or internal) Laboratory Analysis	Upgradient and downgradient of the Pregnant Liquor Pond; Major Diesel Storage and Major Sulfuric Acid Tank Storage	Monthly	To confirm integrity of pond and bund liners through assessing the presence of contaminants in groundwater.



Aspect	Parameter	Equipment /Method	Monitoring Sites	Frequency	Objective
Groundwater level at Process Plant (Possible Water Abstraction Licence from DWRM)	Distance to water-table	Within established groundwater wells used for groundwater quality monitoring.	Permanent groundwater bores in Process Plant area.	Monthly	To assess groundwater height which is critical to community groundwater supply. The Project is not planning to extract any groundwater at The Process Plant.
Groundwater level and groundwater abstraction (Possible Water Abstraction Licence from DWRM)	Distance to water-table	Within established groundwater wells used for groundwater quality monitoring.	In active mining area	Quarterly for active mining area and annual within the broader mining lease.	To assess impact of mining activity and mine dewatering on groundwater height. The heavy clay ore is a poor aquifer with low transmissibility and volume of groundwater draining into the mining pit from adjacent areas will be low.
Land-use Changes	Active Mining Pit Topsoil/waste stockpiles Rehabilitation Agroforestry (onsite) Fish Farms (onsite) Intensive Agriculture (onsite) Natural habitat (onsite) Mining infrastructure Process Plant infrastructure Public infrastructure including number of dwellings Agriculture (offsite) Natural habitat (offsite) including wetlands.	Aerial Photography GIS Mapping On-ground truthing	Process Plant Active Mining Areas Eastern Central and Western lease areas.	At least annual	To track the land-use uses changes over the life of the Project both within and adjacent to operating areas.

Aspect	Parameter	Equipment /Method	Monitoring Sites	Frequency	Objective
Noise survey	Site boundary noise levels for the equivalent continuous sound pressure level with A-weighting (LAeq)	Quarterly noise survey by External Contracted specialist using a calibrated Sound Pressure meter.	In vicinity of process plant and active mining areas (up to 500m).	Quarterly	Minimise noise impact during construction and operation.
Vibration monitoring	Transport/haul corridors for vibrations (m/s)	Quarterly survey by External Contracted specialist using a calibrated Vibration meter	In vicinity of active mining and haul areas (up to 100m).	Quarterly	Minimise noise impact during construction and operation.
Dust monitoring and other gaseous pollution	Boundary survey of PM <sub>2.5</sub> and PM <sub>10</sub> , NO <sub>2</sub> , SO <sub>2</sub> and CO in active mining areas and along the haul road. Continuous Dust Deposition Gauge Monitoring at Process Plant, Haul Road and Active Mining areas and in nearby communities.	Portable air quality monitoring meters for SO <sub>2</sub> , NO <sub>2</sub> and CO Deposition gauges (15cm funnel on 5L brown Winchester bottle at 2 m height) Copper sulphate (to prevent algae) Vacuum filter Drying ovens 4 decimal place balance	Mining areas and along the haul road (up to 1-2 Km radius for dust) Deposition gauge monitoring for g dust/m <sup>2</sup> fallout	Monthly	Manage dust from stockpiles and materials handling
Stakeholder Engagement for Project Design Decisions	Categories and number engaged during the ESIA consultation process Period for disclosure and Public Review of ESIA	NEMA ESIA approval process SEP activities	Directly impacted communities and other stakeholders	During ESIA Process	Consult stakeholders in a meaningful manner and consider their concerns in Project decisions.

Aspect	Parameter	Equipment /Method	Monitoring Sites	Frequency	Objective
Stakeholder Engagement for development of Management Plans Decisions	Minutes of stakeholder meetings	Electronic Minutes	Key stakeholders including NEMA, District Planners and Local Government.	Annual during planning/budget cycle)	Engage Stakeholders in development of Management Plans.
Social Licence to Operate	Number of resolved grievances Effective use of Grievance mechanism Community Development Projects (including employment with Project)	Complaints Register Incident Reports to NEMA	Local community District Planners Government Departments	As per Schedule in Stakeholder Engagement Plan.	Establish strong and enduring relationships with key stakeholders.
Management of in-migration	Biannual Census Conflict indicators Conformance with integrated land management plan	AER District Planner input	Key stakeholders and in particular District Planners and local government.	Annual	Plan and manage in-migration of outsiders into local communities directly impacted by the Project.
Secure Land tenure and Displacement Impacts	Land Tenure Maps Household Survey Compensation and Resettlement Action Plan	AER District Planner input	Landowners Project Affected Persons Local and National Government including District Planners and Department of Land and Housing.	Annual	Support the principle of land tenure for local people to prevent loss of land and resources to outsiders in-migrating into Project areas.
Food Security	Household survey	External specialist Survey Reports	Project affected Persons	Annual	Improve food security for expanding local communities.

Aspect	Parameter	Equipment /Method	Monitoring Sites	Frequency	Objective
Community Health	Health data	External specialist Survey Reports	Local Community and workforce.	Annual	Combat the spread of HIV and other diseases in expanding local communities
Road Safety	Road safety data (traffic, accidents, etc.) and stakeholder engagement	External specialist Survey Reports	Road condition report. Road upgrade project status Capacity Building project for emergency services.	Bi-Annual	Ensure high standards of road safety on access roads within Project areas.
Community training and education	Makuutu training programmes Employment statistics Numeracy/literacy standards Household survey livelihood data	Training materials Training records External specialist Survey Reports	Literacy/numeracy programmes. Skills programmes. Primary and secondary education support.	Annual	Facilitate community training and education to enable local communities to take advantage of Project opportunities and facilitate employment and business development opportunities in local communities.
Community services and infrastructure development	Infrastructure scorecard Aerial Photos	AER Input from District Planners	Focus on communities near active mining areas, haul roads Process Plant and project access roads.	Annual	Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities directly impacted by the Project.
Sustainable Livelihoods	Makuutu Project monitoring programme	AER External specialist Survey Reports	Rehabilitated mining areas.	Annual	Establish woodlots, aquaculture and intensive agriculture Projects on revegetated project Land.
Voluntary Resettlement	Effective resettlement process as per Compensation and	External specialist survey reports	Proportion of achieved voluntary and	Annual	Achieve voluntary negotiated agreements with impacted stakeholders to minimise the need for involuntary resettlement.

Aspect	Parameter	Equipment /Method	Monitoring Sites	Frequency	Objective
	Resettlement Action Plan.		involuntary resettlement.		
In-migration into compensation zones during resettlement process	Local census before and after resettlement	External specialist survey reports	Compensation areas identified for resettlement as per the Compensation and Resettlement Action Plan	Annual	Manage the in-migration of outsiders into the compensation zone during the negotiation process.
Fair compensation for Project Affected Persons	Number of disputes during compensation and resettlement process.	External specialist survey reports	Compensation areas identified for resettlement as per the Compensation and Resettlement Action Plan	Annual	Ensure adversely impacted project affected persons (PAPs) are compensated in a transparent and consistent manner.
Economic impact of displacement	Effective negotiation process. Perception survey.	External specialist survey reports	Compensation areas identified for resettlement as per the Compensation and Resettlement Action Plan	Annual	Ensure that the economic impact of displacement is mitigated.
Sustainable livelihoods for Project Affected Persons (PAPs)	Effective negotiation process. Perception survey. Follow up review continuing post relocation	External specialist survey reports	Compensation areas identified for resettlement as per the Compensation and Resettlement Action Plan	Annual	Target development opportunities for displaced people.



Aspect	Parameter	Equipment /Method	Monitoring Sites	Frequency	Objective
Securing compensated/purchased land	Follow up review. Number of disputes post relocation.	External specialist survey reports	Compensation areas identified for resettlement as per the Compensation and Resettlement Action Plan	Annual	Seek Government support to secure compensated land by preventing resettlement following compensation
Preventing accidents	Number of incidents/emergencies	Incident Reports in AER Input from DOH	Within and adjacent to project areas	Annual	Proactively manage Project activities to minimise the risk of emergencies.
Responding quickly to emergency situations	Incident investigation report.	Incident Reports in AER	Within and adjacent to all project areas	As required	Respond quickly and effectively to emergency situations to mitigate consequences.
Incident investigation	Incident investigation report.	Incident report in AER	For all onsite emergency related incidents and any offsite incidents involving Project vehicles.	As required	Fully investigate all emergencies and provide effective post-emergency support to mitigate consequences and reduce the risk of a recurrence.
Waste recycling (Waste Permit from NEMA)	Value and/ or quantity of waste recovered for recycling Monthly waste management data	Inspection of waste management facilities & Waste database in monthly and AER	All Project waste streams will be tracked and reconciled with warehouse inventory goods receipts (e.g. tyres, batteries, oil and grease)	Monthly	Implement an Integrated Recycling System.
Waste disposal (Permit from NEMA)	Monthly waste management data	Inspection of waste management facilities &	On-site landfill and reconciled	Monthly	No unauthorised disposal of hydrocarbon and chemical waste to landfill.

Aspect	Parameter	Equipment /Method	Monitoring Sites	Frequency	Objective
		Waste database in monthly and AER	Certificates of destruction from offsite receivers (e.g. waste oil)		
Landfill management (Permit from NEMA for Class 2b inert landfill)	Monthly inspection data	Waste database in monthly and AER	Site landfill inspected for presence of regulated waste and compliance with licence conditions.	Monthly	Management of the site landfill to ensure legal compliance and environmental protection.
Medical waste disposal	Certificates of destruction for medical waste disposed off site or sign off sheets if approved to be incinerated onsite.	Waste database in monthly and AER	Medical waste from onsite health centre will be formally tracked and reconciled with disposal certificates.	Monthly	Appropriate disposal of medical and other regulated waste to eliminate risk of infection to workforce or the community.
Waste management compliance	Number of incidents	All waste incidents and related investigation reports to be reported in monthly and AER	On-site compliance with Waste Management Plan and recycling/disposal.	Monthly	Ensure workforce compliance with waste procedures.
Designing for minimal Minimising Greenhouse Gas emissions	Annual GHG Report	Largely based on diesel consumption as determined from metered use per machine, reconciled fuel receipts and end of	Project footprint and activities	Annual	Optimise greenhouse gas emissions in design, construction and operations.

Aspect	Parameter	Equipment /Method	Monitoring Sites	Frequency	Objective
		month tank volume reconciliation.			
Greenhouse Gas abatement programmes	Annual GHG Report	Largely based on diesel consumption as determined from metered use per machine, reconciled fuel receipts and end of month tank volume reconciliation.	Project footprint and activities	Annual	Publicly report progress on greenhouse gas abatement planning in all areas of operation.
Greenhouse gas emission reporting	Annual GHG Report	Largely based on diesel consumption as determined from metered use per machine, reconciled fuel receipts and end of month storage tank volume reconciliation.	Project footprint and activities	Annual	Integrate green-house gas efficiency into operational decisions.
Physical completion criteria for decommissioning	Life of Mine and Closure Plan Working Closure Plan	Establish bio-physical closure committee of key stakeholders encompassing: <ul style="list-style-type: none"> <li>• Landform stability and erosion measures.</li> <li>• Agricultural productivity measures</li> <li>• Downstream water quality measures.</li> </ul>	All operational areas and offsite impacted areas.	Annual (Working closure plan) and; within 5 years of closure (Final closure plan).	Develop physical completion criteria and rehabilitation techniques in consultation with key stakeholders to enable validation that the rehabilitated project land is acceptable for relinquishment. The progressive rehabilitation of disturbed areas over a wide geographical range over the life of the Project should have already validated much of this.

Aspect	Parameter	Equipment /Method	Monitoring Sites	Frequency	Objective
Social completion criteria for decommissioning	Life of Mine and Closure Plan Working Closure Plan	Establish social closure committee of key stakeholder including aspects such as full independence from the Project with respect to: <ul style="list-style-type: none"> <li>• Sustainable livelihoods and food security.</li> <li>• Essential social services.</li> <li>• No legacy social issues.</li> </ul>	For all project impacted stakeholders.	Annual (Working closure plan) and; within 5 years of closure (Final closure plan).	Develop social completion criteria in close collaboration with key stakeholders to enable validation that full relinquishment of the Project will have acceptable social consequences The development of independent, self-sustaining communities with good social services over the life of the Project will limit the social impact of ultimate closure and relinquishment.
Asset Retirement Obligation	ARO spreadsheet of costs	External specialist assessment of the cost of physical works and social programmes necessary to achieve the determined biophysical and social closure objectives.	For all Project liabilities	Annually developed assurance programme to ensure that Uganda does not need to fund necessary work to address any environmental and social legacies that would result from an unplanned closure of the Project.	Formally determine the Project Asset Retirement Obligation (ARO) annually and ensure sufficient funds are in place to address social and environmental legacies in the event of an unplanned closure. .
Conceptual Life of Mine closure plan	Life of Mine and Closure Plan	External specialist assessment	For life of mine project	As part of ESIA	Develop a Conceptual Life of Mine and Closure Plan.
Weather	Precipitation Evaporation Temperature	Located at the Process Plant and operated with in-house resources for	Process Plant or nearby	Continuous logging	Accurate meteorological data is important for both Project design (ie. stormwater discharge and flood

Aspect	Parameter	Equipment /Method	Monitoring Sites	Frequency	Objective
	Humidity Wind velocity Wind direction Wind run UV (Sunshine hours)	the life of the Project or alternatively Project access to real time meteorological data from a government weather station in place at a nearby centre such as Iganga.	Government Weather Station		management) and ongoing operation with rainfall and evaporation particularly important.
Water Balance	Water consumption and Discharge	Analysis of rainfall, evaporation and catchment areas in combination with metered water use and stormwater discharge volumes.	Mine and Process Plant	Monthly	An accurate water-balance will enable water efficiency to be determined along with calculation of stormwater discharge volumes from both the mining area and process plant.
Flora	Flora diversity	Annual survey of rehabilitated areas and undisturbed adjacent areas and in particular downstream wetlands would be completed by external flora specialists. Aerial photographs of Project areas by Project.	Mine and Process Plant	Baseline and thereafter annual	Allows the impact of mining and processing operations on the flora of Project land and downstream wetlands to be tracked over the life of the Project to enable any necessary remedial work to be undertaken and to assess the success of biodiversity enhancement Projects.
Fauna	Faunal Diversity	Annual survey of rehabilitated areas and undisturbed adjacent areas and in particular downstream wetlands	Mine	Baseline and thereafter annual	Allows the impact of mining and processing operations on the fauna of Project land, adjacent land and, downstream wetlands to be tracked over the life of the Project to enable any necessary remedial work to be



		would be completed by external flora specialists.  Aerial photographs will be taken annually by Project.			undertaken and to assess the success of biodiversity enhancement Projects.
Fish and Aquatic biodiversity including dragonflies.	Abundance  Diversity	Annual survey by external specialists	Downstream of areas receiving discharge stormwater from the Project areas including the Process Plant and active mining areas.	Baseline sampling and then at intervals to be determined but probably annual	Due Diligence. To ensure that the biodiversity of the downstream river system is maintained.
Health and livelihoods	Population  Dietary habits  Rates of infection (e.g., HIV, malaria, schistosomiasis, and other diseases)  Infant mortality  Life expectancy  Literacy/education rates  Livelihoods  Housing	Bi-annual survey by external social specialists including perception surveys, health, education and livelihood metrics.	Project area and adjacent communities	Baseline survey (ESIA) plus once every two years	To monitor if the Project is impacting community health or livelihoods.



## 10.1 Grievance Redress Mechanism

The purpose of the grievance redress mechanism (GRM) is to create a systematic process for recording, processing, and resolving grievances raised by PAPs, PACs, and other stakeholders. The GRM will be communicated to all stakeholders from the early stages of Project planning. It will be the responsibility of the developer to establish it and maintain it functional and effective throughout the lifetime of the Project. This will minimise the risk that affected communities might use other means to vent their frustrations with consequent risk to the Project.

The grievance mechanism is based on the following principles from the IFC Performance Standards (2012) and Principle 6 (Grievance Mechanism) of the Equator Principles (refer Table 142).

**Table 142: Grievance Mechanism Principles**

Responsibility	Task
<b>IFC</b>	
Accessibility	Ensure that the grievance mechanism is accessible to those who may wish to submit a grievance or complaint. Factors that affect accessibility to the mechanism include location, access to technology, language barriers, literacy, etc.
Regular communication	Outline the grievance mechanism in writing, publicise, and explain the mechanism to stakeholders. Information will be provided in a format and language (Lusoga) readily understandable to the local population.
Transparency	The process will be transparent, readily understandable, accessible and appropriate for all affected stakeholders, in particular vulnerable populations. Clarify at the outset who is expected to use this procedure, and assure potential users that there will be neither costs nor retribution associated with lodging a grievance.
Efficiency	Publicly communicate and adhere to a timeframe in which all recorded complaints will receive a response. Complainants will be aware of when they can expect to be contacted and/or receive a response to their complaint(s).
Fairness	Put measures in place to ensure fairness of process for affected parties and to enhance equality. If a resolution cannot be reached, an independent third party will mediate between the Project and the complainant.
Written records	Keep a written record of all complaints in the grievance log. This is critical for effective grievance management. In addition to informing the complainant of the outcome, the Project will also report back periodically to communities and other stakeholder groups on how they have responded to the grievances received.
<b>Equator Principles</b>	
Legitimate	Enabling trust from the stakeholder groups for whose use they are intended, and being accountable for the fair conduct of grievance processes.
Accessible	Being known to all stakeholder groups for whose use they are intended, and providing adequate assistance for those who may face particular barriers to access.

Responsibility	Task
Predictable	Providing a clear and known procedure with an indicative time frame for each stage, and clarity on the types of process and outcome available and means of monitoring implementation.
Equitable	Seeking to ensure that aggrieved parties have reasonable access to sources of information, advice and expertise necessary to engage in a grievance process on fair, informed and respectful terms.
Transparent	Keeping parties to a grievance informed about its progress, and providing sufficient information about the mechanism's performance to build confidence in its effectiveness and meet any public interest at stake.
Rights-compatible	Ensuring that outcomes and remedies accord with internationally recognized human rights.
A source of continuous learning	Drawing on relevant measures to identify lessons for improving the mechanism and preventing future grievances and harms.
Based on engagement and dialogue	Consulting the stakeholder groups for whose use they are intended on their design and performance, and focusing on dialogue as the means to address and resolve grievances.

### 10.1.1 Roles and Responsibilities for Management of the Grievance Mechanism

All grievances that will be raised by stakeholders during the Project will be received and recorded in a grievance log and the resolution of grievances will be the ultimate responsibility of Rwenzori Rare Metals. Rwenzori Rare Metals will be supported by dedicated staff who will be responsible for receiving, coordinating, classifying and processing grievances.

Rwenzori Rare Metals will be responsible for overall functioning of the grievance mechanism and distribution of resolution actions to relevant departments and stakeholders.

#### 10.1.1.1 Project HSEC Manager

Makuutu Rare Earths will employ a Health Safety Environment and Community (HSEC) Manager who with the support of a large team (refer Figure 44) will be responsible for the effective use of the grievance mechanism by:

- Coordinating the work of Grievance Management Committees and Community Liaison Officers towards the successful resolution of grievances;
- Ensuring grievances are logged and addressed following established grievance procedures;
- Responding to complex grievances and developing adequate solutions for issues that can be resolved;
- Reporting to the aggrieved parties about developments regarding their grievances and decisions taken;
- Monitoring and evaluating progress of ongoing grievances;
- Ensuring project and local government staff engaged in grievance management are adequately trained in the grievance procedures; and
- Reporting on informal disputes and grievances to Rwenzori Rare Metals on a regular basis.

#### *10.1.1.2 Project Community Liaison Officers*

- The Community Liaison Officers (CLOs) will report through the Project HSEC Manager and be responsible for addressing simple grievances from receipt of grievance to resolution. The CLO(s) will also be responsible for monitoring and reporting of the resolution process and disseminating results to the affected persons and Project Grievance Management Committee(s).
- Day-to-day activities may include; receiving, evaluating, resolving simple grievances, and assigning complex grievances.
- In instances of complex grievances, the CLO(s) will assign grievance resolution to the technical personnel or report to Makuutu Rare Earths Project HSEC Manager.
- CLOs will be employed by RRM to ensure adequate representation and accessibility to the grievance mechanism.

#### *10.1.1.3 Community Based Grievance Management Committee*

The purpose of the Community Based Grievance Management Committee (CBGMC) is to serve as a channel for grievances between affected communities and the Project at a local level by working jointly with the CLO(s). The CBGMC should be set-up before commencement of the project construction activities. The role of the CBGMCs will be to mediate the resolution of site-specific grievances relating to project activities and inform on the progress and status of outstanding grievances that are being handled by the project team. The Project will work closely with this committee to resolve any project-related grievances.

The roles and responsibilities of the CBGMC will be to:

- Represent the interests of PAPs and obtain their input in the discussions on the project and obtain consensus;
- Provide regular feedback to the PAPs on the progress of the project;
- Seek support and approval in decision-making processes during project planning and implementation, and
- Assist in mediating and reconciliation of/about grievances that cannot be resolved at the second level of the grievance mechanism.

The CBGMC will be operational at the village level, comprising of the CLO, local leaders and representatives of affected persons. This may include:

- Two (2) people from the affected persons;
- One (1) Community representative;
- Vulnerable people representative;
  - One (1) Women representative;
  - One (1) Youth representative;
  - One (1) Elderly representative; and
  - One (1) Disabled representative.
- One (1) Opinion leader/elder;
- LC1 chairpersons from all affected villages; and



- One (1) Makuutu Rare Earths Project representative (CLO).

### 10.1.2 Grievance Communication Channels for the Project

A number of tools will be used in the ongoing management, coordination, and implementation of the Project concern and grievance mechanism and stakeholders will have many avenues to report a grievance including:

- Grievance Form
- Project Community Liaison Officer (CLO)
- Community Based Grievances Management Committee (CBGMC)
- Local Council representative (LCI, LCII, LCIV (where active) LCV)
- Stakeholders will be able to submit their concerns and grievances during community meetings and resolutions may be presented at the meeting
- Project telephone number: +contact for the designated Stakeholder Engagement Team Leader and RRM representative contact (Ugandan National Project Manager) shall also be provided.
- Email address; email address for the designated Stakeholder Engagement Team Leader and RRM representative (Ugandan National Project Manager) shall also be provided.
- WhatsApp
- Writing a Letter with address to be provided.

### 10.1.3 Grievance Mechanism

The grievance mechanism will involve seven (7) stages (refer Figure 169).

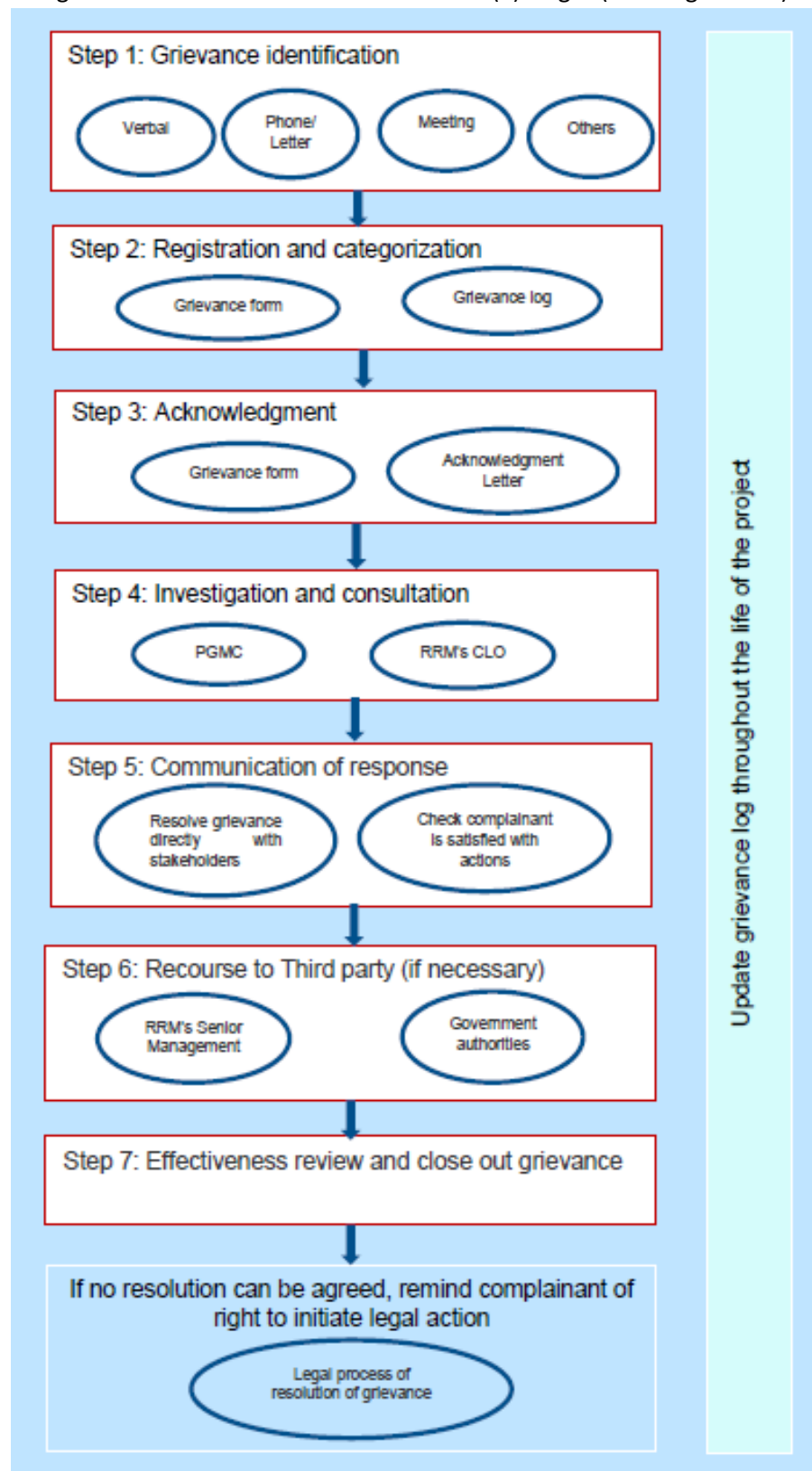


Figure 169: Grievance Flow Chart

## Step 1: Grievance Identification

Stakeholders will be able to lodge grievances in writing using the grievance form (Annex VI). If a stakeholder is unable to submit a written grievance, they can submit a grievance verbally and the grievance will be recorded on their behalf by Makuutu Rare Earths Project CLO or via a local community leader or grievance management committee members.

## Step 2: Registration and Categorisation

All Makuutu Rare Earths Project grievances received will be recorded in the grievance log. The grievance log will be used for logging, tracking and managing the grievances. The grievance log is presented in Annex VI.

The significance of the grievance will be assessed and the grievance will be categorised as:

- Low priority grievance: A local, isolated or one-off complaint;
- Medium priority grievance: Widespread and/ or ongoing complaint, e.g., noise, vibration and dust during construction and/or operations phases;
- Critical priority grievance: Potential for significant breach of Project policies (including national permits and international conventions that the Project is committed to complying with) and/ or negative media attention.

This categorisation will be updated and refined over the life of the project as required.

Table 145 outlines the process for responding to different categories of grievances. The response timeframe refers to the time period for responding to a stakeholder's grievance and starting the process of resolving the grievance. The Project will aim to close the grievance as far as possible within the response timeframes indicated in Table 143, otherwise it is anticipated that the Project will close out grievances within 20 days of receiving a grievance, in as much as possible.

Table 143: Grievance Categorisation and Response

Grievance Priority	Description	Response Timeframe	Type of Response
Low Priority Complaint	Local, isolated or one-off complaint.	Grievance response within 14 days.	Makuutu Rare Earths Project CLO to coordinate internal response to grievance.
Medium Priority Complaint	Widespread and/ or ongoing complaint, i.e., noise, vibration and dust during construction.	Grievance response within 7 days.	Makuutu Rare Earths Project Manager investigates the grievance/complaint.
Critical Priority Complaint	Potential for significant breach of the Project policies and/ or negative media attention.	Grievance response within 5 days.	Makuutu Rare Earths Project Manager arranges priority team to investigate the grievance/complaint as a matter of urgency. Project activities may be halted for the investigation and to

Grievance Priority	Description	Response Timeframe	Type of Response
			allow mitigation measures to be determined.

### **Step 3: Acknowledgement**

Upon submission of a grievance, regardless of the method used, stakeholders will receive a Letter of Acknowledgement informing them that their grievance has been received and logged. Information will be provided on the next course of action and an indicative timeframe for resolution. Verbal acknowledgement will be provided where appropriate.

### **Step 4: Investigation and Consultation**

Following assignment of a grievance by Makuutu Rare Earths Project CLO, an investigation will be conducted into the issue raised, including consultation with the concerned person. Makuutu Rare Earths Project Environment and Community Advisor and Makuutu Rare Earths Project Manager will work in collaboration with the CLO to identify measures to resolve the grievance as appropriate.

### **Step 5: Communication of Resolution**

The outcome of the investigation will be communicated to the complainant and feedback will be requested on the resolution. All grievances will be responded to within the timeframes indicated in Table 143 above. The initial response will include a summary of what is planned and when it is likely to be implemented, or an explanatory note clarifying why action is not required. The response will be in writing, although a verbal response will also be provided where appropriate.

Stakeholders submitting the grievance will be asked to give their feedback on the proposed course of action. If the feedback is negative, negotiation meetings will be organised with the project stakeholders in order to reach agreement. All actions will be logged in the grievance form and the grievance log (Annex VI).

### **Step 6: Recourse to a Third Party**

If resolution of the grievance cannot be achieved, Rwenzori Rare Metals will consider establishing an amicable resolution mechanism through the setting up of a conflict resolution committee. This will be made up of Rwenzori Rare Metals representatives and local authority representatives to settle disputes amicably and for management of complex grievance issues. The emphasis is on an amicable settlement between the Project and the complainant regarding a grievance and an amicable settlement is encouraged throughout the process. If still unresolved, the dispute will ultimately be sent to the relevant government bodies.

### **Step 7: Effectiveness Review**

When corrective actions are agreed upon between the Project and the complainant, the Project will be responsible for ensuring that corrective actions are implemented. Stakeholders will be informed on the progress of the implemented corrective actions. If no further attention is required, then the Makuutu Rare Earths Project CLO can close the grievance and record this in the grievance Log. Final decisions and details of closed grievances will be approved and signed off by Makuutu Rare Metals Project Manager.

## 10.2 Managing Information and Monitoring Data

### 10.2.1 Environmental and Social Obligations Register

The Makuutu Project will maintain an Environmental Obligations Register that will be reviewed quarterly as a prelude to the quarterly update of the Environmental and Social Aspects Register that will include controls and treatment plans to mitigate environmental and social risks. It will be updated to account for legislative changes, changes in conditions of Permits, changes to Project operations, commitments to stakeholders, outcomes of incident investigations and stakeholder complaints received through the Grievance Mechanism Process.

The Environmental and Social Obligations Register will include:

- Control measures
- Jurisdiction (i.e., local, District or National and which Ministry)
- The Environmental or Social Aspect
- The Work area of the organisation
- A summary of the requirement/limit
- Applicability to the Project
- Relevance to specific hazards and assets (e.g., stormwater pond, sewage treatment plant, landfill, major storage for diesel or Sulfuric Acid etc.)
- Date of update (normally annual)

### 10.2.2 HSEC Data System

Makuutu will maintain a centralised HSEC Data Management System with the following capability.

- Obligations Register
- Aspects/Risk Register including key controls and responsibilities.
- Hazards and Incidents
- Community Complaints Register
- Incident Investigation
- Action Assignment (Who What When) that sends out email alerts and escalates overdue actions up the chain of command.
- Sustainability data including:
  - Diesel and Process Chemical use (Including Sulfuric Acid, Ammonium Sulphate and Ammonium Bicarbonate)
  - Waste tracking data (waste volumes)
  - Production data
  - Water use (including a water balance)
  - Energy use

Some aspects of this System will only be accessible to specialist staff, but all employees will use this system to record:

- All HSEC incidents including accidents and injuries along with all hazards and near miss incidents.
- Assignment of actions (Who What When) and tracking of completion to address root causes of incidents and hazards.



### 10.2.3 Assurance Programme

An assurance programme will be in place to annually:

- Verify the accuracy of sustainability data used in External Sustainability Reports.
- Assess Corporate Liability including Closure Liability as part of the Asset Retirement Obligation (ARO) process.

### 10.2.4 Managing Emission Data

Consolidated data bases will be maintained of all emissions monitoring data to enable trending and analysis. This will facilitate prompt action to avoid breaches of emission limits and the magnitude of environmental and social impact.

The databases will be aligned with the format of data received from laboratories to eliminate the need for manual entry and consequent risk of transcription errors. The use of conditional formatting will additionally immediately flag any data that is out of the expected range or threatening a compliance limit. These data will then be double checked to confirm accuracy which could involve reanalysis and confirmatory sampling. In this way, there will be high confidence that all reported data is accurate.

In addition to managing data on emissions to air, land, surface water and groundwater aspects such as ground-water height and river gauging (flow rate and depth), and waste and recycling volumes will also be tracked.

### 10.2.5 Managing spacial data

Aerial photography will be used to track the land disturbance footprint including the extent of the mining pit, rehabilitation area and infrastructure footprint. Infrastructure changes in adjacent communities will also be tracked.

This information will be managed in a GIS database with facility to turn layers on and off to easily track changes over time. Potentially contaminated sites including the landfill, diesel fuel storage facilities and chemical storage facilities including the Sulfuric Acid bulk storage area will be included.

### 10.2.6 Trigger Action Response Plans (TARPs)

Trigger Action Response Plans (TARPs) will be put in place for continuously monitored emission data to limit the magnitude of any emission event considered to be of high significance. These would include:

- Low pH in discharge water from the Process Plant stormwater pond which would indicate a spill of Sulfuric Acid from the adjacent major storage facility for Sulfuric Acid into the stormwater pond. This would trigger an immediate spill response as explained in the Volume 5 ESMP Emergency Management Plan.
- High turbidity in the discharge water from the Stormwater Pond.

## 10.3 Aquifer Assessment

An initial assessment program will be undertaken to identify any groundwater aquifers in the project area and to develop a hydrogeology model, followed by ongoing routine measurement of monitoring

bores. The initial study is being conducted by Ugandan hydrogeology experts Optimum Earth based in Kampala and will include:

- Study of available water bore data, geology and previous hydrogeology studies leading to identification of any major aquifers in the Project area.
- Geophysical survey using ground electrical resistivity and conductivity methods to focus targeting on main aquifers and provide data for hydrogeology model.
- Design of hydrogeology monitoring drill program and installation of hydrogeology bores targeted at main aquifers and around proposed mining areas and infrastructure locations
- Bores will be measured for groundwater water levels, water recharge rates and water quality sampling.

There is no water extraction planned from these water bores. They are for monitoring purposes only.

## 10.4 Groundwater Monitoring

Groundwater quality and groundwater height will be monitored quarterly at the 10 groundwater monitoring points across the Project used in the baseline water quality assessment (refer Figure 109). This will enable a regional overview of changes to groundwater quality and volume over the life of the mine. In addition to this, up and down-gradient localised groundwater impact will be assessed at the following locations:

- Groundwater quality up and down-gradient of diesel storage, sulfuric acid storage and heap leach pads at the Process Plant from permanent monitoring wells. These would be assessed quarterly.
- Measure flow rates of Protected Springs in the vicinity of both the Process Plant and the Makuutu Central Zone Mining Pit that will be mined in Year 1 to Year 10 (refer Figure 75).
- A number of locations in the Active Mining Pit subject to annual review and possible relocation in line with expanding operations in consultation with DWRM and NEMA. This would include:
  - Upgradient unmined area
  - Rehabilitated area
  - Downgradient unmined area

## 11 Environmental and Social Management Plans

A nine volume Environmental and Social Action Plan (ESMP) has been developed to achieve 37 key performance objectives. This includes an overview of the carbon footprint of the Project and the strategy for climate adaptation (refer ESMP Volume 7 as summarised in Section 11.7). Many of these objectives are relevant to addressing the key concerns of stakeholders (refer Section 9.2).

- The Environmental and Social Management and Monitoring Plan (refer ESMP Volume 1)
- The Stakeholder Engagement Plan (refer ESMP Volume 2).
- Community Development Plan (Refer ESMP Volume 3)
- Preliminary Compensation and Resettlement Action Plan (refer ESMP Volume 4)
- Emergency Management Plan (refer ESMP Volume 5)
- Waste Management Plan (refer ESMP Volume 6)
- Greenhouse Gas Abatement and Climate Change Adaptation Plan (ESMP Volume 7)
- Life of Mine Rehabilitation and Closure Plan (refer ESMP Volume 8)
- Occupational Health and Safety Plan (ESMP Volume 9)

The following presents a high-level overview of these eight and the key performance objectives within each volume.

### 11.1 Volume 1: The Environmental and Social Management and Monitoring Plan

An overview of the environmental and social monitoring programme has been presented in the ESIA (refer Section 10). The ESMP provides detailed information on the staffing and resources needed to complete this monitoring along with an overview of the Plan Do Check Act continual improvement processes of the proposed Environmental Management System. This system will be underpinned by a routinely reviewed and updated Environmental and Social Aspects Register and, Legal and other Obligations Register. In this way, unanticipated impacts and any new risks arising from changing stakeholder expectations, new legal requirements and project parameters will be quickly identified and mitigated. This volume also includes an overview of the Environmental and Social Performance Standards that will be adopted by the Project in alignment with Equator Principle requirements.

This Volume presents the strategies to achieve the first five of the 37 identified environmental and social performance objectives.

#### 11.1.1 Objective 1: Implement an Effective Environmental and Social Management System (ESMS) to Drive Continual Improvement in Social and Environmental Performance over the Life of the Project.

##### 11.1.1.1 Overview of ESMS

The Makuutu ESMS is aligned with guidance provided for Equator Principle 4. It will be internally audited and reviewed each year to ensure its ongoing adequacy and it will be externally audited at least once every three years. Non-conformances with Standards will be addressed in a scoped improvement programme. The Makuutu Project will implement a 9 element ESMS (refer Figure 170) that will drive continual performance improvement within a Plan Do check Act continual improvement framework. The foundation of this ESMS is the Makuutu Rare Earths Project Social

and Environmental Policy (refer section 2.4) and the Management Programmes (refer Section 11) are underpinned by assessment of Risks and Impacts (refer Section 9).

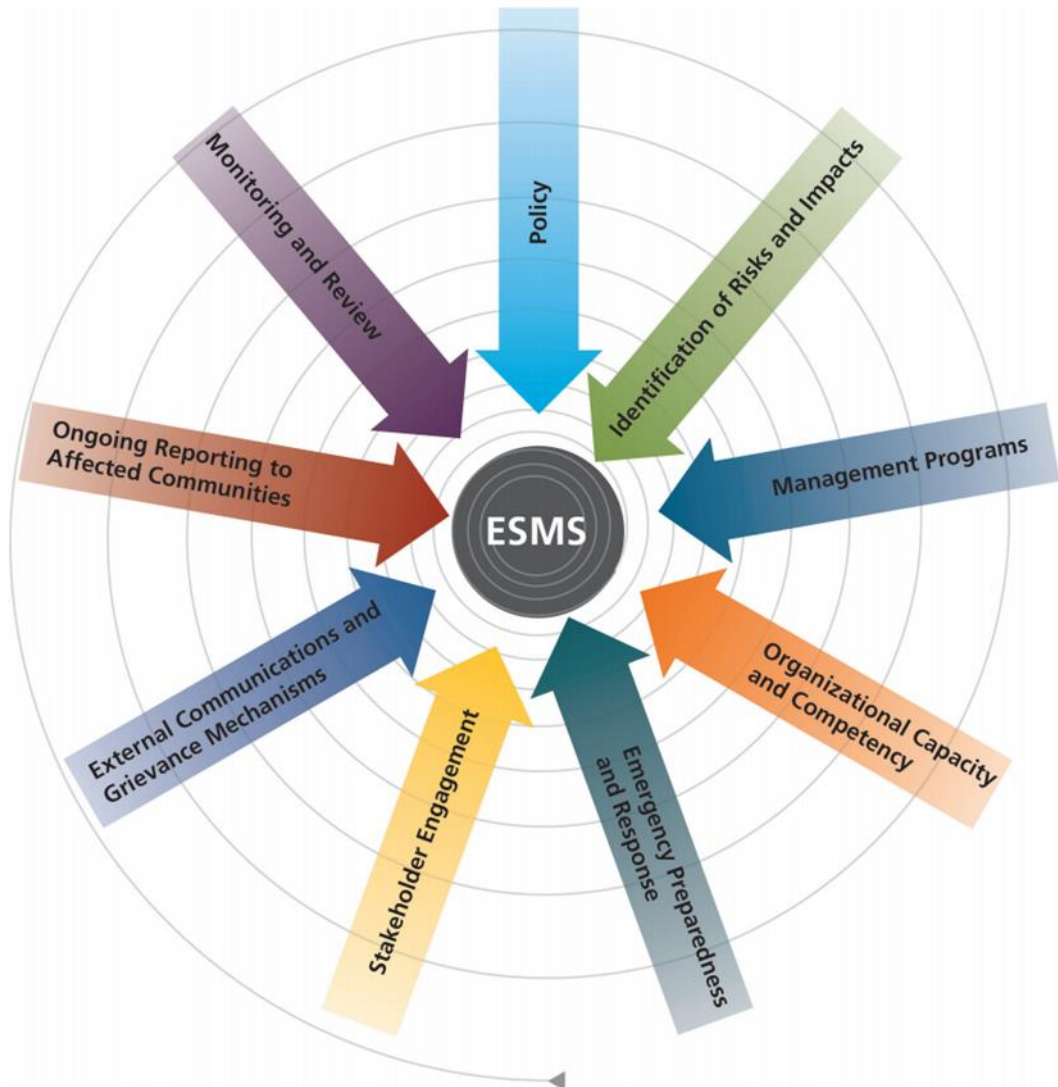


Figure 170: Elements of the Makuutu ESMS as per Equator Principle Guidance

Organisational capacity and competence are encompassed in the Organisational Chart (refer Figure 45) in combination with the requirement for all Makuutu employees and contractors to have defined environmental accountabilities which will be routinely performance assessed.

Emergency Preparedness is presented in ESMP Volume 5 (refer Section 11.5) and Stakeholder Engagement, including external communication and Grievance Mechanism is presented in the Stakeholder Engagement Plan ESMP Volume 2 (refer Section 8.2). Of particular note will be the production of a publicly available Annual Environmental Report (AER) and ongoing formal meetings with Regulators, NGOs and local communities.

The Makuutu environmental monitoring programme will be continually reassessed in line with changing environmental objectives and targets and the development of new technologies. This will be undertaken formally at least annually when the Environmental Objectives and Targets are reassessed after the compilation of the Annual Environmental Monitoring Report.

#### *11.1.1.2 Performance Standards*

The Makuutu integrated Environmental and Social Management System is supported by Performance Standards consistent with the requirements of Equator Principle 3. These Standards are presented in detail in the Environmental and Social Management and Monitoring Plan (refer ESMP Volume 1) and have been developed to help ensure compliance with the requirements of the Makuutu Health and Safety and, Social and Environment Policies and, the “duty of care” obligations to manage the operations in a safe, environmentally and socially appropriate manner. These Standards define minimum requirements for both “behaviours” and “processes” across the Project. These include:

##### *11.1.1.2.1 Environmental Standards*

- Water Management and Water Quality
- Waste Management
- Land Use and Biodiversity Protection
- Protecting Air Quality
- Noise and Vibration
- Optimising Energy Use
- Visual Impact

##### *11.1.1.2.2 Occupational Health and Safety Standards*

- General Workplace Health and Safety
- Hazardous Substance Management
- Use of Explosives
- Electrical Safety and Isolation
- Physical hazards
- Geotechnical Safety
- Machine and Equipment Safety
- Ionizing Radiation
- Fitness for work
- Travel and remote site health
- Thermal stress
- Noise and Vibration

##### *11.1.1.2.3 Community Health and Safety Standards*

- Water Storage Dams
- Land Subsidence
- Emergency Preparedness and Response
- Communicable Diseases
- Mine Closure and Post-Closure
- Physical Integrity
- Chemical Integrity
- Ecological Habitat Integrity



#### 11.1.2 Objective 2: Comply with Legal and other Requirements.

The Makuutu Environmental and Social Policy (refer Section 2.4) commits the company to complying with all applicable legal requirements. The establishment of a Legal Obligations Register detailing specific legal obligations, individual responsibilities in achieving these obligations and mechanisms for monitoring and reporting will be an important first step in ensuring and verifying compliance. This will build on the overview of legal and other requirements presented in the ESIA (refer Section 5). Legal compliance is a key focus of the Environment and Social Management and Monitoring Programme (refer section 11).

An internal assessment of the compliance position will be reported in the Annual Environmental Report and a formal legal compliance audit utilising the services of a specialist environmental lawyer will be undertaken every 3 years. This is additional to ongoing compliance monitoring by Ugandan Regulatory Institutions including NEMA and DWRM.

#### 11.1.3 Objective 3: Minimise Impacts on Water Quality of Rivers and Streams During Construction and Operation.

Rivers and streams downstream of the mine-site and the Processing Plant pass through cultivated wetlands. This water is low in salts and dissolved metals including REE and radionuclides but contamination by coliform bacteria is widespread making it unsafe to drink without treatment. Community water supply is sourced from shallow wells rather than watercourses which mitigates this human health risk. With strong planned controls, Makuutu is additionally not expected to have a significant impact on the quality of water in rivers and streams apart from short term and localised increases in stream turbidity following earthworks as previously discussed (refer Section 9.2.8.3).

#### 11.1.4 Objective 4: Minimise Noise and Vibration Impacts During Construction and Operation.

The ore-body at Makutu is hosted in regolith overlying the basement rock. This allows “free-digging” mining methods comprising scrapers, truck and shovel and dozer pushing. Vibration is not expected to be an issue in the absence of blasting but heavy mining machinery will generate some noise, including noise from reversing alarms. The operation will be continuous with loaders and scrapers likely to be emitting > 100 decibels (db (A)) and trucks >90 db (A) at source. There will, however, be a buffer zone between the Project and communities which will mitigate noise impacts. Makuutu will monitor noise and vibration levels quarterly (refer Table 141) to ensure that noise impacts on nearby communities and noise sensitive premises are acceptable as guided by the Ugandan noise regulations. The Makuutu Grievance Mechanism which has been well communicated to stakeholders including local communities provides an avenue for any residents impacted by noise or vibration to quickly bring this to the attention of the Project.

#### 11.1.5 Objective 5: Manage Dust from Stockpiles and Materials Handling.

The high annual rainfall at Makuutu which varies between approximately 1480 mm and 1540 mm (Figure 55) in combination with a moisture content of >20% in the clay orebody will mitigate the risk of dust. There may, however, be periods of dry weather when some haulage dust might be generated. This will be suppressed using water trucks in combination with dust suppressing

chemicals as appropriate. Road dust might be an issue during dry periods, but this will be mitigated by measures such as keeping speed low, particularly when passing through villages.

A dust monitoring programme including the use of deposition gauges and aerosol monitors will be put in place to routinely monitor levels of airborne dust and allow the effectiveness of dust suppression measures to be assessed (refer Table 141). Annual dust targets will be set with performance reported in the Annual Environmental Report.

## 11.2 Volume 2: Stakeholder Engagement Plan

The Stakeholder Engagement Plan (SEP) encompasses stakeholder mapping, external communication processes, including communication methods and schedules and, the Grievance Mechanism. Effective stakeholder engagement and consequent development of strong relationships founded on trust is critical to maintaining the Project's social licence to operate. It enables the Project to quickly become aware of any stakeholder concerns and take appropriate action to address emerging issues. It additionally ensures that stakeholders are well informed about Project activities and particularly activities that might directly impact them. It also enables effective collaboration on mutually beneficial projects. Key performance objectives with respect to stakeholder engagement include:

### 11.2.1 Objective 6: Consult Stakeholders and consider their concerns in Project Decisions

The communication strategies to ensure that key stakeholders are well informed about the Project and its impacts are presented in Section 6 of the Stakeholder Engagement Plan. The key concerns of stakeholders expressed at meetings held in potential areas of impact at the commencement of the baseline study programme and the baseline socio-economic data is presented in Section 7. An assessment of the significance of these concerns and Project strategies to address them is presented in Section 9.2. These concerns included:

- Land acquisition and the associated Resettlement Action Plan with specific concerns about fair compensation and livelihood restoration and particularly loss of agricultural land.
- Potential loss of community infrastructure.
- Project impacts on community health.
- Impact on community water supply and other services.
- Pollution of downstream waterways.
- Potential for increased violence against women.
- Distribution of Royalties.
- Opportunity for employment with the Project.
- Restoration of mined land its return back to landowners.

Details of stakeholder engagement over the life of the Project including meeting minutes will be presented in the publicly available Annual Environmental Report (AER) along with a performance assessment of performance with stakeholder engagement objectives and targets.

The minutes of community meetings including those presented in Section 8 of the ESIA report reflect a philosophy of inclusiveness and open dialogue. This in turn is reflected in the issue specific

management plans of the ESMP (refer ESMP Volumes 1-8). The views of stakeholders have been reflected in both the impact assessment processes and the development of management plans.

Performance with this objective will be gauged from a review of meeting minutes included in a publicly available AER and from community perception surveys which will be undertaken every 3 years. The achievement of this objective will also be reflected in a low number of unresolved community issues which will also be reported in the AER.

#### **11.2.2 Objective 7: Engage Stakeholders in the development of Management Plans**

Stakeholder input is apparent in each of the issue specific management plans and in the ESMP in general. The Plans will additionally be updated with the assistance of Ugandan experts directly involved with the collection of baseline data including those affiliated with NGOs.

The achievement of this objective will be reflected in the type and number of stakeholder complaints received for the issue specific management plans during the public consultation phase of the ESIA approval. It will also be reflected in the ongoing adjustments to objectives and strategies embedded within the Plans in response to evolving stakeholder views. All targets and improvement programmes will be reported in a publicly available AER.

#### **11.2.3 Objective 8: Establish Strong and Enduring Relationships with key Stakeholders**

Makuutu will achieve this objective by convening routine meetings with key stakeholders (as elaborated in Section 8) and employing a full time Community Relations Officer as a point of contact. Makuutu will have an open-door policy and treat all community complaints as incidents via the well communicated Grievance Mechanism. These will be entered into a Community Complaints Register or Grievance Log and thoroughly investigated. The complainant will be informed of the results of the investigation and the reasons for the completion or non-completion of certain actions.

The achievement of this objective will be gauged from responses to formal perception surveys distributed to the community and other stakeholders. It will also be gauged from the number of issues and complaints received by the company about social or environmental performance. The preparedness of stakeholders to defend the company and the content and nature of media reports about the company will be yet another indicator.

### **11.3 Volume 3: Community Development Plan**

The Community Development Plan (CDP) presents the strategy that will be used by the Makuutu Rare Earths Project (Makuutu) to facilitate the development of independent communities with strong capacity in the areas of health, education, food security, infrastructure and sustainable livelihoods. The CDP has been developed in fulfilment of Makuutu Policy objectives, legal requirements, stakeholder expectations and the mitigation of risk.

Under Ugandan Tax Law, 20% of Project Royalty payments are required to return to the area through mandated local government (17%) and landowner (3%) share of Project Royalties. This amounts to US\$76 million over the life of the Project which would be dedicated to the areas adjacent to the Project. Additionally, the Company is proposing to make separate standalone contributions of approximately US\$47 million over the 27-year life of the currently proposed Project, and as a good corporate citizen and stakeholder in the local community across the districts that host the Makuutu REE deposit.

It is proposed that the Project adopt a community program contribution plan based initially on a fixed percentage of Project revenue, which slightly reduces over time, such that the local community can directly benefit from Project growth and success. It is proposed that this initial contribution be set at 1% of Project Revenue, which for a 2-module plant capacity at the Project would be about US\$1million per year. This proportion would be gradually reduced as the Project expands and reach a maximum contribution of US\$2million per year by Year 7. It would then be capped and remain at this level until Year-26 prior to dropping to US\$1million in the final year of the Project.

The CDP includes a number of specific performance objectives.

#### **11.3.1 Objective 9: Plan and manage in-migration of outsiders into local communities directly impacted by the Project.**

The management of in-migration is a common objective in multiple Management Plans including the Preliminary Compensation and Resettlement Action Plan (refer ESMP Volume 4 as summarised in Section 11.4). The strategies to control in-migration are area specific but include an underlying theme of clarifying and securing land tenure. This objective is less about limiting population growth and more about ensuring it is well managed and controlled. Its success will be largely gauged from the degree of success in implementing an integrated land management plan which will be developed with key stakeholders. Details of this Plan and performance against its objectives will be included in a publicly available AER.

#### **11.3.2 Objective 10: Support the principle of land tenure for local people to prevent loss of land and resources to outsiders in-migrating into Project areas.**

Securing land tenure controls in-migration by limiting access to land but it is also fundamental to integrated land use planning. This objective will be considered achieved when formal land title is granted to relevant local communities. Land tenure maps will be presented in a publicly available AER.

#### **11.3.3 Objective 11: Improve food security for expanding local communities.**

Improving food security is essential to alleviating hunger in a growing community. Improving food security through subsidy or intensive agriculture may additionally reduce the incentive to clear land for inefficient shifting cultivation. An increase in the demand for food may also increase the price of food. Food security can be improved by either fostering intensive agriculture or by subsidising imported food for a period of time so that it is affordable, keeping in mind the potential negative impacts of this on existing food vendors who may find themselves faced with unfair competition. The proposal to establish intensive fish farms in mine pits and to establish a local Agricultural Research Centre with a focus on agroforestry and intensive food production in rehabilitated areas is particularly relevant to both food security and sustainable livelihoods.

Ongoing socio-economic monitoring such as that presented in the baseline studies (refer Section 7) will enable the tracking of the affordability and availability of food in the community and of food production volumes. These data will be presented in a publicly available AER.

#### **11.3.4 Objective 12: Combat the spread of HIV and other diseases in expanding local communities**

Project strategies to prevent the spread of communicable diseases has already been presented (refer Section 9.2.8.10). An expanding community will need greater medical capacity and pro-active health programmes. Improving the capacity of medical services in the community is an important part of the

CDP. In addition to capacity building, site medical expertise and facilities, including medical evacuation capacity, will be made available to the local community in emergency situations and direct assistance will be provided to the control of debilitating diseases such as malaria and schistosomiasis which affect 25% of local people.

The effectiveness of these measures will be formally assessed each year from a review of medical statistics and performance targets and work programmes reviewed and set for the next year.

#### **11.3.5 Objective 13: Ensure high standards of road safety on access roads within Project areas.**

This issue was previously reviewed (refer Section 9.2.7.7). The complete separation of internal roads from public roads will limit the interaction of public and Project traffic and secure higher standards of road safety but access roads to the site will be shared roads. The Makuutu driving Policy encompassing aspects such as vehicle roadworthiness, speed limits, fitness for work and driver competence will mitigate the risk of an accident on shared public roads and the potential for people or livestock to be run over. Effective strategies to prevent and manage new settlement along the new roads and to separate haul roads from public roads will be important in securing high levels of public road safety (refer Preliminary Compensation and Resettlement Action Plan, Volume 4 as summarised in Section 11.4). There will, however, be increased traffic on local roads and on the major roads used for the trucking of large volumes of process chemicals from Mombasa in Kenya and Sulfuric Acid from the Sukulu Phosphate Plant located 83 kilometres to the NW of the Project site. Some upgrades of shared public roads might be appropriate as negotiated with District Planners and the Ugandan National Roads Authority.

All incidents and near misses with respect to public safety will be reported in both the monthly environmental report and a publicly available AER. Performance targets will be set annually.

#### **11.3.6 Objective 14: Facilitate community training and education to enable local communities to take advantage of Project opportunities and facilitate employment and business development opportunities in local communities.**

The provision of targeted training and education to the community is essential for the project to secure a high-capacity local workforce. This will additionally provide people with opportunity as well as building their capacity to be self-sustaining and to manage their resources sustainably.

Makuutu's underlying philosophy is the provision of opportunity. This will be provided through a combination of employment and business opportunity with the Makuutu Project. The provision of skills training, micro-finance and market opportunity are critical components of this. In addition to direct employment Makuutu will discuss business opportunity with local communities. Such opportunities could include things like cleaning, garden maintenance, waste management, site earthworks, security, embroidery and clothing and, the supply of fresh vegetables and fruit to the Makuutu Project kitchens. Assistance could also be provided to Makuutu on an intermittent basis with things like monitoring and as Community Liaison Officers. On a broader front locally established accommodation units and restaurants will benefit from custom from Makuutu employees and visitors.



As with the other objectives annual targets specific to business development will be established with performance reported in a publicly available AER. Ongoing socio-economic monitoring would enable community livelihoods to be tracked and these data would also be presented in the AER.

#### **11.3.7 Objective 15: Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities directly impacted by the Project.**

The development of community infrastructure including water supply, electricity, communications systems and roads is essential to a functional community. While Makuutu can contribute funding for this infrastructure in negotiation with District Planners and other stakeholders, it is important, that these it is provided independently so that is secure when the mine ultimately closes. The direct provision of services by the Project will create ongoing operating liability. An independent power supply for example is preferable to an off-take off the company power system. A community relying on the company for power will become angry with the Project should the power supply be disrupted for any reason and constant consideration of community needs can compromise company decision making.

The achievement of this objective will be tracked through ongoing socio-economic surveys and the establishment of performance targets linked to specific infrastructure programmes. Performance will be reported in a publicly available AER.

#### **11.3.8 Objective 16: Establish woodlots, aquaculture and intensive agriculture Projects on revegetated project Land**

This is also encompassed in the Preliminary Compensation and Resettlement Action Plan (Refer Section 11.4) and the Life of Mine Rehabilitation and Closure Plan (Refer Section 11.8). The rehabilitation strategy for mined land at Makuutu is to backfill the pits to reinstate the original contours prior to capping with stored topsoil. The 1,000 hectares of land to be disturbed during the 27-year life of the Makuutu Project would therefore be returned to productive agricultural land. There is, however, opportunity to pursue other productive land-uses that would enhance food security and establish long-term businesses on mined land that would continue indefinitely at the end of mine-life.

An Agricultural Research Institute for example could be established in a nearby community and utilise unmined and rehabilitated land within the 3.4 km<sup>2</sup> mining area of the 1-to-10-year Pit and future pits to undertake trials on food crops, woodlots, aquaculture, plantation timber and, to educate local farmers about best practice agriculture. This would provide employment and income as well as enhancing food security. Groups such as the United Nations Food and Agriculture Organisation (FAO) and the Ugandan Agriculture Ministry would be consulted. The highly productive land in combination with abundant good quality mine water that could be used for irrigation makes the mining area an ideal location for this type of venture.

### **11.4 Volume 4: Preliminary Compensation and Resettlement Action Plan**

This ESMP Volume is preliminary in the absence of detailed Project design and pending land-use agreements. It presents the strategy for compensation and resettlement and will be superseded by a Detailed Compensation and Resettlement Plan following detailed Project design and the completion of formal land access agreements. There will, however, be no immediate need to resettle people which will allow negotiation to take place over a number of years after the Project commences.

- The proposed Process Plant location is a largely uninhabited sugar cane farm and there will be sufficient buffer between the processing facilities and roadside communities, including the Nakivumbi Trading Centre, to not require any resettlement in this area.
- Mining in the Year 1-Year 10 Central Makuutu mining pit can additionally be staged to commence in uninhabited areas of the future mining pit footprint. Resettlement can therefore be delayed until late in Year 1-Year 10 mining plan allowing time to construct an appropriate resettlement village well in advance of the staged resettlement schedule.
- Progressive rehabilitation will additionally provide the opportunity to establish livelihood ventures such as intensive agriculture, fish farms and agroforestry on rehabilitated land.

This Preliminary RAP encompasses

- The Ugandan Resettlement Legal Framework and the International Best Practice Standards and approaches that will be applied to Relocation at the Makuutu REE Project site.
- The risk context of the Project with respect to physical and livelihood impacts and measures to mitigate these risks including, Project efforts to avoid Resettlement through an Options Assessment for the location of the 200 ha Process Plant which resulted in the selection of Option 5.
- The expected scale, severity and cost of resettlement impacts.
- Feedback from stakeholder meetings including resettlement related organisations and consequent ideas for livelihood restoration.

Key Objectives relating to compensation and resettlement include:

#### **11.4.1 Objective 17: Achieve voluntary negotiated agreements with impacted stakeholders to minimise the need for involuntary resettlement.**

The achievement of voluntary negotiated agreements eliminates many of the social risks associated with involuntary resettlement. The need for people to resettle to make room for Project infrastructure is largely confined to the mining pits which will be progressively rehabilitated to provide opportunities for both future resettlement and for Development Projects that would provide food security, sustain livelihoods and provide long-term development. This process will involve:

- Ensuring that impacted communities are well informed about the Project and in particular understand why the selected area was chosen and what measures are being taken to avoid impacts on them.
- Securing agreements with impacted people will be negotiated consistently, transparently and fairly by the processes presented in Section.
- Resettling people in a nearby area or new resettlement village to ensure that they retain their social connections.
- Pursuing development options on rehabilitated land such as fish farming that sustain livelihoods and enhance food security

The achievement of this Objective will be gauged on the avoidance of involuntary resettlement. Makuutu REE will continue to monitor and engage compensated groups to ensure that they

have not been disadvantaged. The status of resettled and compensated people will be included in the Annual Environmental Report for at least 2 years following resettlement.

#### **11.4.2 Objective 18: Manage the in-migration of outsiders into the compensation zone during the negotiation process.**

Directly impacted people and District Planners will be provided with an opportunity to participate in the impact mitigation process and will be consulted on strategies to best manage the in-migration of outsiders.

A properly planned staged resettlement of people from the mining pit areas in combination with securing vacated land with fencing and security personnel will ensure that active Project areas do not experience resettlement. The stakeholder engagement process and consequent high level of awareness about the need to secure their land tenure will additionally ensure that land tenure is well defined in Project areas, and this will be confirmed in the quantitative and quality socio-economic baseline data (refer ESIA Section 7). The availability of good baseline data including high-quality satellite imagery will enable the degree of population influx to be assessed. These details will be reported in the AER. Land access for settlers is generally provided by the local chiefs and having their support to limit settlement of outsiders into the impact zone is important.

#### **11.4.3 Objective 19: Ensure adversely impacted people are compensated in a transparent and consistent manner.**

In addition to fair payments to individuals for compensation for physical or economic displacement, consideration will also be given to providing targeted community development funding to compensate the community for generalised impacts to the amenity of the community as a whole. Such development funding would be negotiated at a community level and prioritised by the needs of the community as seen by the community.

All compensation claims will need to be justified and, in most cases, this will be a matter of aligning claims with tangible assets. Situations of economic displacement will be less straightforward, but the legitimacy of an existing business will be assessed by firstly verifying its physical existence, verifying ownership and perhaps verifying its economic strength. In both situations, problems will only arise if there is dispute over ownership and in this case the local chief will be requested to arbitrate.

The Makuutu REE Project is currently a 27-year project based on indicated and inferred resources. In the first 15 years it is anticipated that the occupants of mainly roadside residences from the Year 1-10 Mining Pit and the adjacent pit to the east will need to be resettled to nearby areas outside of the mining pit footprint.

Negotiations will need to be undertaken with Ugandan officials including the Ministry of Lands Housing and Urban Development and District Planners. Accountability for payment will need to be clear for the key compensation components of:

- Cost of purchase of the land within the Year 1-10 and adjacent pit to the east.
- Financial contribution to the implementation of a strategy with the District Planners to decommission the roads within the mining envelope and to relocate public

infrastructure and roadside dwellings to new locations which could include a combination of:

- New public roads
- Upgraded existing roads
- Development of existing centres
- Creation of new planned town

This resettlement could be staged over the 10-year life of the Year 1 to 10 mining pit with the opportunity to place new infrastructure and even a new town within the progressively rehabilitated mining area supported by development projects.

#### **11.4.4 Objective 20: Ensure that the economic impact of displacement is mitigated.**

The socio-economic baseline survey (refer ESIA Section 7) includes a census of people in the impact zone with most identified as roadside settlers. The low numbers of directly impacted people ensures there is low likelihood of any directly impacted people being overlooked in the negotiation process.

The resettlement of people in most situations will be to a nearby geographical area with little change in social context or client base. The exception to this is temporary loss of fields and orchards until alternate farms can be established. These impacts will be fairly compensated and direct assistance to re-establish fields and orchards and providing short term food security will also be considered. These decisions will be made on their merit.

#### **11.4.5 Objective 21: Target development opportunities for displaced people**

The provision of community development projects will be implemented strategically and in close consultation with the community. Intensive agriculture and aquaculture for example will provide food security and a source of income but any community development programmes will be undertaken consultatively and in collaboration with key stakeholders such as Government Ministries, NGOs and local communities.

#### **11.4.6 Objective 22: Seek Government support to secure compensated land**

The Makuutu REE Project has no objection to people continuing to use productive agricultural land and associated public roads within the future mine footprint until it is needed for mining but this would be done under a transitional arrangement that ensures that the land is available when it is required. Strategies such as withholding final payment until the premises are vacated could facilitate this but a person living in a compensated house may be difficult to move when required to, particularly if the compensation money has been spent and the person in effect becomes homeless.

An important enabler for Makuutu is the closure of public roads which will need to be undertaken with government assistance. This could only happen following the establishment a new access route in the form of a new road, or upgraded alternate road in combination with a resettlement location as negotiated with the Ministry of Lands Housing and Urban Development and, the District Planners. Once this is in place, Makuutu will provide people with a reasonable date by which they must be leave the house and or harvest their crops. This will provide the tenant with an incentive to establish their new home without providing undue pressure to leave

their old house quickly before their new house is constructed. This is particularly important in situations where building materials such as roofing iron will be recycled from the old house to the new. It will also prevent the unnecessary waste of food by allowing the harvesting of crops.

Once land has been acquired it needs to be secured to prevent it being resettled and potentially having to be re-compensated as previously discussed. In the period between land acquisition and construction there will be routine surveillance of the easement to ensure there is no resettlement or development.

## 11.5 Volume 5: Emergency Management Plan

This Emergency Management Plan (EMP) is designed to assist with the prevention and timely and effective response to social and environmental emergency situations experienced by the Makuutu Project. This EMP encompasses the Mining, Process Plant and connecting haul roads. The content details in the embedded flowcharts of the EMP reflect the situation at August 2021. The EMP is, however, a living document and the Plan will be reviewed and updated annually and following any emergency situation over the life of the operation. It additionally draws on the Community Health and Safety baseline completed as part of the ESIA (refer Section 6.6).

### 11.5.1 Objective 23: Proactively manage Project activities to minimise the risk of emergencies.

Environmental and other emergencies will be prevented by the implementation of suitable controls to mitigate inherent risk. The prevention of emergencies as with other aspects of HSEC performance is dependent on the provision of fit for purpose equipment and facilities, good procedures and competent people. An overview of these aspects with relevance to Emergency prevention follows.

#### 11.5.1.1 Facilities and Equipment

The provision of appropriate facilities and equipment is a fundamental first step in preventing accidents. All structures and facilities at the Makuutu Project including roads, the open mining pits and major infrastructure at the Process Plant will be designed and engineered to international standards. They will also be subject to an ongoing inspection and planned maintenance regime to prevent deterioration over the life of the mine. Mobile equipment will additionally be subject to a formal and logged prestart check prior to operation each day. This check will include aspects such as fluid levels, vehicle condition, tyre conditions, alarms and indicators and key safety equipment such as satellite phones, fire extinguishers and self-rescue equipment. Key facilities such as the major fuel and chemical storage facilities will additionally be subject to independent inspection and surveillance by the regulatory authorities. Key emergency response equipment including fire extinguishers, safety harnesses, spill clean-up equipment and, emergency response vehicles such as the ambulance will be well maintained for use in emergency situations by the relevant area Manager.

In addition to this there will be collaboration with local institutions such as the Iganga Hospital to improve the hospital facilities and to upgrade currently poor roads that will both reduce the risk of accidents and facilitate emergency response access to an accident on the public road.

#### 11.5.1.2 Standard Operating Procedures

In addition to the provision of high standard facilities and equipment it is important to have good procedures to prevent accidents. In the critical area of road safety this will include mandatory prestart vehicle checks to ensure vehicle roadworthiness, the imposition of speed limits such as no greater



than 100 kph on sealed roads, 60 kph on unsealed roads and 40 kph through villages, driver fitness for work including mandatory rest periods and random drug and alcohol testing and, routine call ins using mobile or satellite phones.

Collaborative programmes to upgrade damaged roads to reduce accident risk to facilitate access by Emergency vehicles will be undertaken as well as increasing the capacity of local facilities such as the Iganga Hospital and the Busoga East fire and emergency rescue facilities.

#### *11.5.1.3 Operator Competence*

Operator competence is the third pillar of accident prevention. The Makuutu Project will select suitably qualified people to undertake work and will additionally provide appropriate skills and safety training. Operators will need to be deemed competent by their supervisor before commencing work. In the case of road safety all drivers will also need to have satisfactorily completed a defensive driving course. Commute travellers are additionally required to complete a driver assessment questionnaire at the end of journey on driver competence and adherence to set procedures.

### **11.5.2 Objective 24: Respond quickly and effectively to emergency situations to mitigate consequences.**

An emergency is any event which endangers the health and safety of the Environment, Community, Makuutu Project staff and contractors and, which requires an immediate response. Emergencies can occur despite the best systematic efforts but the consequences can be mitigated by the speed and effectiveness of the response.

Makuutu will have a well-equipped site medical centre and trained emergency repose team. It will additionally collaborate with local institutions. This will be particularly important for Project personnel involved in an accident on the public road or for emergency situations on-site requiring external assistance. The site will have specialised equipment such as “jaws of life” and can assist with offsite incidents such as serious road accidents unrelated to the Project.

The Project will implement a three-tiered incident response management system (i.e., Incident, Emergency and Crisis) reliant on the deployment of structured, well equipped, and well-trained teams.

#### *11.5.2.1 Roles and Responsibilities*

##### *11.5.2.1.1 First Responder*

The first responder will often be a witness or directly involved in the incident. It is their responsibility to immediately take whatever actions are appropriate such as “first aid” to mitigate the immediate impacts of the incident whilst always being aware of the importance of protecting their own safety.

##### *11.5.2.1.2 Makuutu Mines Rescue Team*

The Operator will page the Mines Rescue Team Leader on their pager after receiving the emergency call. The Mines Rescue Team leader will then assess the situation and make a decision on whether or not to activate the Mines Rescue Team.

The Mines Rescue Team will be in place and staffed by Makuutu Project volunteers and attend formal weekly training courses. The Mines Rescue Team Leader will ensure that rescue and other equipment are well maintained.

#### 11.5.2.1.3 Makuutu Emergency Response Team

The ERT will be comprised of various specialist site-based people such as Environment, Community, Health and Safety, Transport, Supply, Processing, Mining, Geology and Administration. The ERT will deploy available site resources to manage the situation. The Emergency Response Team Leader will then decide on whether to activate the Makuutu Crisis Response Team if the situation has offsite implications or requires offsite resources. This will be the situation for incidents likely to attract international media attention such as a major offsite chemical or oil spill. The ERT will attend at least one training exercise every 6 months.

#### 11.5.2.1.4 Makuutu Crisis Response Team

The Makuutu Crisis Response Team will be comprised of senior Makuutu staff largely based off site and with members trained to handle national and international media, liaise with third parties such as the Ugandan Government and deploy additional resources. Team members will include General Managers responsible for Public Relations, Finance, Environment, Health and Safety and Administration as well as the Makuutu Project Country Manager in Uganda. The CRT will attend at least one formal training course a year.

### 11.5.2.2 Response Plans

#### 11.5.2.2.1 Medical Evacuation Plan

The Medical Evacuation Plan ties together internal Makuutu procedures and the medical response capabilities of the site based Medical and Security Supervisor (MSS), Accident and Health International (insurer) and the global medical assistance company.

#### 11.5.2.2.2 Security Emergency Plan

Uganda is a relatively safe country and especially in the area of the Makuutu Project. However, developing countries the world over and particularly countries in Africa are prone to a rapid deterioration of law and order. A security threat can be via a number of different sources such as widespread indiscriminate targeting in a civil unrest situation; threats targeted towards specific groups or nationalities; or threats targeting individuals as a result of inappropriate behaviour. The aim of the Makuutu Security Evacuation Plan is to provide guidance to operational staff and field personnel in the event of a security incident whereby personnel may be targeted. The plan provides a logical flow of information to ensure all appropriate action is undertaken to mitigate the threat of harm to staff.

#### 11.5.2.2.3 Missing Persons Plan

The Missing Persons Plan is activated when indicators suggest that a member of Makuutu is missing. This could be due to a number of reasons including; lost communications, medical situations, natural disasters, or the member failing to adhere to predetermined reporting schedules. The key factor in initiating the Missing Persons Plan will be the person in question not reporting in at the scheduled time. Once the missing person's contact numbers have been exhausted, the Missing Persons Plan is deemed to be 'in action'. The purpose of the Makuutu Missing Persons Plan is to provide guidance to operational staff and field personnel in the event of such an incident occurring. The plan provides a logical flow of information to ensure all appropriate action is undertaken to locate the missing person in a timely manner.

#### 11.5.2.2.4 Spill Response Plan

Spills of fuels or chemicals will be prevented through the use of an effective HSEC Management System that delivers fit for purpose facilities and equipment, effective procedures and competent people. When a significant spill occurs, however, it is important that it is dealt with quickly and effectively to mitigate social and environmental impacts. It is particularly important that the health and safety of communities is protected and particularly with respect to the potential contamination of drinking water supplies. This Plan specifically encompasses spills to the terrestrial environment. This Spill Response Plan provides guidance to Makuutu operational staff and field personnel in the event of a major chemical, fuel or tailings spill to ensure efficient and timely response and to mitigate social, environmental and reputational impact.

#### 11.5.3 Objective 25: Fully investigate all emergencies and provide effective post-emergency support to mitigate consequences and reduce the risk of a recurrence.

Just as most emergency situations can be systematically prevented most emergencies are the result of systems failure. It is critical therefore that all emergencies are fully investigated so that root causes can be identified, and system deficiencies remedied. All incidents will be thoroughly investigated and reported. The investigation team will include the relevant Supervisor and a Health Safety and Environment representative. The team will be led by a person trained in incident investigation. The investigation will result in the scoping of actions to address root causes and prevent a recurrence. Details of all incidents, investigations and follow-up action will be included in a publicly available AER.

### 11.6 Volume 6: Waste Management Plan

The Waste Management Plan presents the strategy for managing solid and liquid waste generated by the Project over its life. These will be managed within a Reduce Reuse Recycle framework with appropriate disposal a last resort. The waste management plan encompasses descriptions and volumes of waste streams, logistics of waste management and strategies to achieve key Waste Management Objectives:

#### 11.6.1 Objective 26: Implement an Integrated Recycling System.

The planned management of regulated waste including oily waste and chemical waste will prevent the disposal of hazardous materials in the site landfill. It will rely on the provision of adequate labelled bins, workforce training and good supervision. Work area inspections of conformance with waste segregation requirements and of the landfill facility will ensure high levels of conformance. Non-conformance will result in the raising of an incident report with subsequent investigation and implementation of appropriate corrective and preventative action.

Conformance with this objective will be tracked via routine inspections of the landfill with results reported in the monthly and annual environmental reports.

The management of non-hazardous recyclables will include an integrated recycling system to minimise the unnecessary loss of useful materials and reduce consumption of the capacity of the landfill facility. Some aspects such as scrap metal recycling in particular can turn waste

management costs into an income. The establishment of specific recycling targets and close tracking of waste volumes will help ensure continual improvement of the recycling system.

The volumes of waste materials produced, recycled and disposed will be presented in the AER.

#### **11.6.2 Objective 27: No unauthorised disposal of hydrocarbon and chemical waste to landfill.**

Significant volumes of oil and grease will be removed from mobile equipment at the wash-pads during routine degreasing and washing operations prior to servicing. The oily wastewater and contaminated sediment will enter a sediment trap adjacent to the wash-pad which will allow the sediment to settle and the oil to break-free from the water and form a slick. This process is facilitated by the use of water-soluble quick-break detergents and degreasers that prevent the formation of untreatable emulsions. The use of high-pressure steam-cleaners will minimise the need for chemicals. The waste oil is then removed from the water through an oil/water separation system prior to the discharge or recycling of the wastewater. Any water discharged to the environment will contain less than 10 ppm dissolved hydrocarbons (Queensland Stormwater Standard). The collected waste-oil will be placed in a waste oil tank pending off-site removal by a waste oil contractor. Oily waste sediment is periodically excavated from the sediment trap with a back-hoe or similar and taken to a clay-lined bioremediation area for treatment.

Conformance with this objective will be tracked via routine monitoring of discharge water quality with results reported in Monthly and Annual Environmental Reports.

#### **11.6.3 Objective 28: Management of the site landfill to ensure legal compliance and environmental protection.**

With most waste recycled, the Project proposes operate a single landfill that would be classified as a Class II landfill for inert waste under the National Environment (Waste Management) Regulations, 2020. It would be an unlined facility suitable for inert industrial waste including paper, cardboard, plastics, rubber (excluding tyres), non- recyclable scrap metal and building rubble. It will not receive oily or chemical waste or significant volumes of food waste, but it could receive some inadvertently mixed with general office waste. It will be constructed of narrow slots allowing daily compaction and burial with a front-end loader. It would be fenced to prevent wind-blown litter.

1. The land-fill site will contain an area for non-useful waste wood and other plastic-free combustibles. This material could be mulched to reduce the volume of material requiring landfilling with mulch applied to revegetated areas.
2. The location of the landfill facility will be entered into a Contaminated Sites Register which will form part of the Closure Plan.
3. Conformance with this objective will be tracked via routine inspections of the landfill with results reported in Monthly and Annual Environmental Reports.

#### 11.6.4 Objective 29: Appropriate disposal of medical waste to eliminate risk of infection to workforce or the community.

The facility will not generate significant volumes of medical waste but might generate some from the onsite medical centre. Any medical waste will be incinerated at high temperature either onsite or at a licenced external facility. The process for the management and correct disposal of medical waste will be assessed through routine checks of bins and landfill facilities during work area inspections. Any non-conformance with requirements will be reported as an incident and investigated with appropriate corrective action put in place. Conformance with requirements will be reported in Monthly and Annual Environmental Reports.

#### 11.6.5 Objective 30: Ensure workforce compliance with waste procedures.

The Makuutu Waste Management Plan will utilise the principles of Reduce, Reuse, Recycle and appropriate disposal all of which will require a high level of workforce involvement, commitment and competence. The first step will be ensuring adequacy of facilities including provision of sufficient clearly labelled bins and containers in work areas. The next step is ensuring good procedures including an efficient waste processing and removal system to avoid issues with overflowing bins. The third step is to improve workforce competence. All employees and contractors will receive training in the waste management system and clearly understand their requirements and responsibilities. Adherence to these requirements will then be encouraged through a combination of peer pressure and good supervision. Regular audits will also be routinely undertaken by the site Environmental Officer to verify compliance with requirements and degree of compliance will be formally reported in monthly and annual environmental reports. Minor non-conformances will be addressed through the Action Management system and major non-conformances such as disposal of significant oily waste in landfill will be reported as an incident and fully investigated.

Conformance with this objective will be tracked via routine work area inspections with results reported in monthly and Annual Environmental Reports.

### 11.7 Volume 7: Greenhouse Gas Abatement and Climate Change Adaptation Plan

This Greenhouse Gas Abatement and Climate Change Adaptation Plan presents Makuutu's strategy to minimise emissions of greenhouse gasses during the construction and operation of the Makuutu Project and to plan for increased rainfall and longer periods of dry weather expected from climate change.

On current estimates, the Project will emit 1.5 million tonnes of CO<sub>2</sub> from the combustion of diesel fuel over its 27-year life while producing sufficient Heavy Rare Earth Elements to produce 90 GW of offshore wind turbines which would displace over 300 million tonnes per year of coal fired CO<sub>2</sub> emissions. The design and operation of Makuutu is described in detail in section 3 of this ESIA.

The Greenhouse Gas Abatement Plan also encompasses adaptation to climate change as required by the Ugandan National Environment (Environmental and Social Assessment) Regulations of 2020. The Project will design pumping systems to accommodate greater rainfall than historically received and, dust suppression systems to accommodate increasingly long dry spells. The proposed agricultural



research centre (refer CDP Section 11.3) will additionally provide outreach support to local farmers to optimise farming strategies in a changing climate.

Some key performance objectives in the Greenhouse Gas Abatement and Climate Change Adaptation Plan include:

#### 11.7.1 Objective 31: Optimise greenhouse gas emissions in design, construction and operation of the Project

Minimising greenhouse gas emissions is largely inherent in the design and construction of Makuutu with energy efficiency being a significant cost consideration. Of particular note are:

- The clay orebody eliminating the need for energy intensive crushing makes this Project intrinsically much more efficient than its hard rock competitors that typically consume 0.11-0.12 GJ (or 33 kW Hours) of energy per tonne of ore for fine grinding. At peak production of 12.5 million tonnes of ore a year at Makuutu this would equate to 412,500 MW which with coal power would emit 412,500 tonnes of CO<sub>2</sub>. The Makuutu Project is therefore much more energy efficient than its hard rock competitors.
- The decision to use renewable hydro-power for Project electricity. If coal power were used the 1 million MW of power consumed over the Project life would emit 1 million tonnes of CO<sub>2</sub> almost doubling the CO<sub>2</sub> emissions of the Project.
- The decision to purchase locally produced sulfuric acid from the Sukulu Phosphate Plant 81 km by road from the Project as opposed to trucking it 940 km from Mombasa results in an 11-fold decrease in CO<sub>2</sub> emissions from this component which at peak production from Year 10 to Year 25 would be 338,580 L of diesel per year instead of 3,724,380 L of diesel and preventing 8,870 tonnes of CO<sub>2</sub> from being emitted.
- Optimising the Life of Mine mining plan to minimise double handling and to efficiently move ore and overburden over the life of the Project.
- Selecting energy efficient trucks, pumps and other equipment. Mobile equipment and particularly haul trucks and loaders will be optimally sized for efficient movement of ore and overburden.

The energy and consequent GHG emissions needed to backfill the mine pit to restore the original landscape and return it to productive farmland is offset by the opportunity to utilise some of this area for plantation timber. Under current conceptual planning this would sequester 226,8000 tonnes of CO<sub>2</sub> over the life of the mine and then continue to sequester carbon indefinitely.

A number of opportunities have been identified with substantial potential to reduce the carbon footprint at Makuutu. These will be explored in the next phase of studies on the Makuutu Rare Earths Project, and include but are not limited to the following;

- Installation of ore conveying systems to transport ore from the mining pits to the process plant, utilising hydroelectric power to offset diesel consumed by trucking.
- Options to produce reagents on site or in close proximity of the project area thereby reducing carbon footprint due to transport and developing more extensive industry for Uganda.
- The potential for in situ solution mining will also be assessed. This would eliminate the need for earthmoving and dramatically reduce greenhouse gas emissions.

### 11.7.2 Objective 32: Publicly report progress on greenhouse gas abatement planning in all areas of operation

The Makuutu Project will produce an annual Energy Efficiency and Greenhouse Gas Abatement Report as part of the Annual Environmental Report. This will include emissions efficiency data based on actual fuel and electrical use and actual production data. Patterns of fuel and electrical use will be analysed, and potential improvement opportunities identified. Improvement programmes and targets will then be set for the following year and performance will be reported in the next annual report.

With electrical power sourced from renewable hydropower most of the GHG emissions will be from the combustion of diesel fuel used in mining equipment and the delivery of process chemicals to site.

### 11.7.3 Objective 33: Integrate greenhouse gas efficiency into operational decisions.

Numeric and activity targets to achieve energy and emissions objectives will be embedded in the business plan and progress will be formally reviewed each month to ensure programmes and performance remains on target. Any slippage will be addressed with corrective action or a revision of targets. In addition to capital improvement programmes such as the replacement of inefficient electrical machinery there will be a focus on improving procedures and workforce awareness on the importance of energy efficiency. A robust electrical and fuel use monitoring programme will be put in place.

### 11.7.4 Climate Change Mitigation

Climate change is not expected to impact on the average magnitude of rainfall during the life of the Project, but the pattern of rainfall is expected to change with higher intensity wet seasons and longer dry seasons. The Project will plan for this by:

- Sizing pumps and culverts to manage extreme rain events.
- Install roll-on roll-off rain covers on the heap leach stockpiles to prevent excessive rain infiltration.
- Sheeting haul roads with aggregate to prevent slipperiness.
- Deploy water trucks and sprinklers to suppress road dust during periods of extended dry weather.

The Community Development Plan (refer ESMP Volume 3 as summarised in Section 11.3) additionally proposes a number of strategies to help local communities adapt to climate change and impacts on agriculture. This includes measures such as:

- An agricultural research centre to conduct trials on rehabilitated land and to provide outreach support to local farms which would include advice on adapting cropping to a warmer less stable climate.
- Community health support include programmes to combat malaria which will be exacerbated by a warming climate.
- Establishment of woodlots, intensive food cropping and fish-farms to sustain livelihoods and enhance food security.

## 11.8 Volume 8: Life of Mine Rehabilitation and Closure Plan

The Life of Mine Rehabilitation and Closure Plan is designed to eliminate economic, social and environmental legacies throughout the lifecycle of the Makuutu Project. It also includes a Conceptual Closure Plan which will evolve into an annually reviewed Working Closure Plan during the operational phase of the Project. A Final Closure Plan will be developed within 5 years of decommissioning and ultimate closure. The Final Closure Plan will be developed with the assistance internal and external stakeholders and in particular an appointed Mine Closure Committee.

The Closure Plan presents the strategies for avoiding legacies over the life of the mine and to ultimately relinquish the leases. It also presents the financial mechanisms that will be put in place by Makuutu to ensure that the mine is properly decommissioned without incurring liability for the State of Uganda in the event of an unplanned closure.

The key objectives are as follows.

### 11.8.1 Objective 34: Develop Physical completion criteria and rehabilitation techniques to the satisfaction of key stakeholders.

Makuutu is committed to avoiding social, environmental and financial legacies and will relinquish the lease in a condition that satisfies key stakeholders. Makuutu's approach to mine closure is "Helping others help themselves and leaving behind a better future". Makuutu's approach is aligned to international standards and includes:

- Promote public safety and safe-guard human health.
- Minimise and eliminate long term environmental impacts.
- Assist stakeholders in preparing themselves for mine closure and in enhancing the sustainability of their communities and institutions.
- Develop a Project specific, cost-effective approach to mine closure.
- Engage stakeholders in a transparent, consultative process that finds a balance between the many social, environmental and economic issues associated with mine closure and sustainability.
- Ensure that rehabilitated areas have no greater management liability and expense than un-mined analogue sites.
- Ensure closure criteria established in consultation with the Ugandan Government are met to facilitate lease relinquishment. These criteria will be presented in the Final Closure Plan and encompass both biophysical and social aspects of closure.

Makuutu proposes to adopt the following criteria for mine closure (refer Table 144).

Table 144: Completion criteria for project relinquishment

Criteria Type	Key Completion Criteria
Water Quality	The quality of surface waters draining the leases shall not be significantly different from the pre-mining baseline quality.
Physical Stability and Contamination	Land contamination levels of all areas should be at levels that pose negligible health risks to settlers assumed to be establishing gardens.
Vegetation	Land surfaces will be re-profiled and re-vegetated to pre-mining agriculture use or to agroforestry or aquaculture as agreed with stakeholders.
Post-mining Land-use	<ul style="list-style-type: none"> <li>• Infrastructure with no on-going beneficial use will be removed from the site or buried.</li> <li>• Major infrastructure such as roads or power lines will be adopted by Uganda.</li> <li>• Roads and open areas with no ongoing community use will be re-vegetated.</li> <li>• There should be no open pits or waste dumps to create community hazard.</li> <li>• Established Projects such as aquaculture and agroforestry will be handed over to third parties and continue to operate.</li> </ul>
Social (Site Relinquishment)	Safe, stable, adequately drained post-mining landforms consistent with the local surrounding landscape and suitable for sustaining the economic and social needs of settlers.

### 11.8.2 Objective 36: Formally determine the project Asset Retirement Obligation (ARO) annually and ensure sufficient funds are in place

Makuutu will comply with the requirements of FAS 143 with respect to unplanned closure. Financial Accounting Standards Board Statement No. 143: Accounting for Obligations Associated with the Retirement of Long-lived Assets (FAS 143) (Financial Accounting Standards Board, 2001). Makuutu will maintain an Asset Retirement Obligation (ARO) Register detailing the financial liability that would be incurred to decommission and rehabilitate the mine to a high standard should the mine be forced to close prematurely for any reason. The ARO includes the costs of dismantling and removing all infrastructure and rehabilitating all disturbed areas to meet the completion criteria. The ARO would be financially supported by a bank guarantee or similar assurance.

The ARO assessment is a separate process to the determination of the planned Life of Mine Closure costs presented in the Conceptual Closure Plan. The Conceptual Closure Plan will become a Working Closure Plan which will also be reviewed annually in line with changes to the Life of Mine Plan, rehabilitation technologies, progressive rehabilitation programmes and the expectations of key stakeholders including the Ugandan Government.

### 11.8.3 Objective 37: Develop a conceptual life of mine and closure plan

The conceptual life of mine and closure plan will become an annually reviewed Working Closure Plan during operations. The Working Closure Plan will include a detailed description of the Project and its social and environmental context. For the purposes of this document detailed Project information previously presented (refer Section 3) is not repeated here.

#### 11.8.4 Closure Framework

- The legal framework for reclamation and closure including site specific conditions and commitments is clearly defined and updated as required.
- The closure objectives and standards including final land use are reviewed annually and included in the Annual Environmental Report.
- Completion criteria will be progressively refined as the knowledge base grows and monitoring data accumulates. Monitoring programs are routinely reviewed to ensure relevant data is being collected and summarised in the annual report.
- Stakeholder engagement strategies are developed, reviewed annually and reported in the Annual Environmental Report.
- Progressive review of closure liability is undertaken to take into account revised areas of disturbance, progressive reclamation and rehabilitation costs.
- Closure cost estimates are based on evolving reclamation strategies (+/- 25%).

#### 11.8.5 Closure Planning

- The knowledge base for site features (e.g., as-built designs for major features, refined hydrology, characterisation of soils, waste rock, low-grade, rehabilitation materials, tailings etc) will be continually updated and the Document Register expanded as required.
- Knowledge deficiencies will be resolved through processes such as negotiations and technical investigations in order to develop final closure strategies.
- The conceptual reclamation strategy will be further developed for each feature based on the current level of knowledge and also from lessons learned from other sites. This strategy will be integrated into the mine operational and business plan.
- An Actions and Tasks Register will be developed to act as a guiding framework for the environmental department. These tasks will be prioritised in terms of risk and form Key Performance Indicators (KPIs) for the environmental and service departments. Actions and tasks will be reviewed and updated regularly.

#### 11.8.6 Closure Documentation

A Document Register is a useful tool to manage the issue of 'memory loss' associated with staff turnover. An electronic Document Register will be attached to the closure planning document and list all:

- Approvals documents
- Construction and design documents
- Sub-consultant reports relevant to reclamation and closure
- Anecdotal evidence
- Operational monitoring and research data including baseline
- Stakeholder closure consultation documentation



All Registered documents will be made available electronically and through the closure document, i.e., independent of the mine site. The Document Register will support the development of a knowledge base for each feature.

#### 11.8.7 Site Infrastructure

Most Project infrastructure, including the process plant, will be removed on closure but a decision will need to be made on the merit of leaving water storage dams for community use with the assurance that they will be maintained and not become a risk to the community. Decisions will likewise need to be made on the retention of Project roads. Valuable developments such as plantation forests and fish farms would be retained by the Ugandan Government.

#### 11.8.8 Mine Completion Consultation

This Conceptual Closure Plan will be developed during operations from consultation with all stakeholders and become a Working Closure Plan. Within 7 years of planned closure a formal Mine Closure Committee will be developed to determine the parameters of a Final Closure Plan which will be completed within 5 years of closure. It is anticipated that this Committee would meet quarterly. Key stakeholders will include regulatory authorities and public interest groups including local communities who will inherit the rehabilitated areas. NGOs would also be engaged in this process to help scope the parameters for sustainable land-use post-mining.

Makuutu's Closure Vision of avoiding legacies and leaving Ugandan stakeholders with a sustainable future will be achieved through a focus on the following Mine Closure Objectives.

- Promote public safety and safe-guard human health.
- Minimise and eliminate long term environmental impacts.
- Assist stakeholders in preparing themselves for mine closure and in enhancing the sustainability of their communities and institutions.
- Develop a Project specific, cost-effective approach to mine closure
- Engage stakeholders in a transparent, consultative process that finds a balance between the many social, environmental and economic issues associated with mine closure and sustainability.

##### 11.8.8.1 Government Agencies

The Conceptual Mine Closure Plan will be reviewed collaboratively with the Ugandan Department as part of the ESIA consultation process. Formal meetings will be minuted and the Plan will be appropriately amended to address any issues and concerns.

##### 11.8.8.2 Public Consultation

Mine Closure strategy will also be discussed with directly affected stakeholders including local people as part of the ESIA process and as with the government meetings will be minuted and concerns and issues encompassed in the reviewed Conceptual Closure Plan document.

#### 11.8.9 Risk Control and Decommissioning Costs

The absence of tailings dams, open pits and waste rock dumps greatly simplifies final decommissioning as does the integrated and progressive reinstatement of agricultural land over the life of the project.

#### 11.8.10 Open Areas on Site

By mine closure, after a 27-year mine life and an expected mining rate of 35 hectares a year the Project will likely have disturbed about 945 hectares from mining in addition to the 200-hectare process plant. The mining areas will have been progressively returned to agriculture or other land-uses agreed with stakeholders including fish ponds and agroforestry (refer Volume 3 Community Development Plan as summarised in Section 11.3).

At the Process Plant, all equipment including bulk storage tanks for process chemicals, will have been removed and the heap-leach material will have been returned to the mining pits along with the liners. This will allow the site to be land-formed, topsoiled and returned to agricultural use. A decision will need to be made on whether to decommission the stormwater pond or to leave it as a water storage asset for the Nakivumbi community.

As a cleared, uninhabited industrial site the cleared pad could alternatively be utilised for other purposes. It could for example be utilised for a 200 MW solar farm similar to the solar farm and battery being developed on a 149-hectare site in Australia <https://www.pv-magazine.com/2020/12/07/australia-to-host-200-mw-solar-farm-big-battery-project/>. The site will already be connected to the main 132 kV eastern transmission line from the Jinja hydro-power plant so would be well-placed for such a purpose.

#### 11.8.11 Site infrastructure removal

Negotiations will need to be completed with regulators and landowners on the retention of roads and other infrastructure for future community use. For the purposes of this conceptual document, it is assumed that all infrastructure will be removed, and the areas rehabilitated with the exception of areas dedicated to community development projects such as fish ponds and agroforestry.

#### 11.8.12 Contaminated Land

Areas where process reagents and petroleum hydrocarbons have been stored and used will be sampled for contamination. Where contamination is identified, contaminated material will be excavated and phytoremediated. There is no land contamination standard in Uganda and Australian Land Contamination regulations will be applied. Contamination is, however, not anticipated particularly in a situation where all spills will be required to be cleaned up immediately.

#### 11.8.13 Storm Water and Contingency Features

The initial hydrology study used to predict stormwater flows and provide design information will be supplemented with ongoing hydrological information collected over the life of mine. This information will be used to determine final design criteria for site water management on closure including that relating to tailings dam and open-pit run-off and drainage.

#### 11.8.14 Landfill

The Makuutu site has a Waste Management Plan (refer ESMP Volume 6 as summarised in Section 11.6) based on the principles of reduce, reuse and recycle. This minimizes the volumes of waste needing to be disposed on site. The remaining waste streams can be broadly separated into putrescibles (e.g., food scraps), combustibles (e.g. non-recyclable wood, cardboard and paper) and inert industrial waste. Combustibles, with the exception of recyclables, will be either burnt or composted. With close attention to waste management practices during operation there is no

expectation of groundwater contamination issues at the proposed inert landfill. The landfill will be covered and progressively rehabilitated over the life of mine and marked on a Contaminated Sites Register. No specific remedial work at closure is anticipated but it is possible that landfill material will settle.

#### **11.8.15 Post Closure Management**

Management and support services will be necessary throughout the decommissioning, deconstruction, and land rehabilitation processes.

#### **11.8.16 Social Requirements**

Social support on Closure will be scoped in detail in the Final Closure Plan. It is hoped that with a focus on capacity building during operations that the local community will be functional and with a low dependency on the mining operation. There may, however, be a need to support the community in the period leading up to and following closure to ensure sustainable livelihoods. Potential programmes include:

- Business development support to provide alternate sources of income including the Development Projects proposed in the Community Development Plan (refer Volume 3 of the ESMP as summarised in Section 11.3).
- Food security support (refer Section 11.3).
- Resettlement incentives and support for the mobile portion of the population (refer Section 16.4).
- Community health support (refer Section 11.3).
- If the community, despite the best intentions of Makuutu to avoid it, has become dependent on the Project for critical infrastructure then this too may need to be supported. This includes potential aspects such as:
  - Communications (e.g., If a mine mobile phone tower was removed)
  - Electrical power (e.g., If power supplied by the mine was discontinued)
  - Potable water (e.g., If water supplied by the mine was discontinued)
  - Road maintenance (e.g., If roads maintained by the company were no longer maintained).

It will be important to ensure the continuity post closure of company funded social programmes delivered by Ugandan Institutions and NGOs, perhaps through the development of a Sustainability Fund during operations.

#### **11.8.17 Severance Costs**

The issue of severance costs to the Makuutu workforce needs to be considered and potentially included in the scope of the Closure Plan but in practice the workforce would be systematically downsized in the period leading up to Closure. Despite this, however, the legal structures within Uganda with respect to labour and redundancies will likely result in these costs being significant particularly in the case of unplanned closure.

#### **11.8.18 Post-Closure Monitoring**

Post Closure environmental monitoring is planned for a duration of 5 years after cessation of operations. The monitoring program and costs assume a comprehensive sampling program that is gradually scaled down in close consultation with regulatory authorities on verification of low and

acceptable impacts on aspects such as surface water quality and confirmation of high-quality rehabilitation.

## 11.9 Volume 9: Occupational Health and Safety

The Occupational Health and Safety Plan presents the strategy that the Makuutu Project will adopt to secure zero harm to people as consistent with the Makuutu Project Safety Health and Hygiene Policy (refer Section 2). Makuutu is committed to the concept of zero harm to people and the environment and believes that all accidents are preventable. Accidents will be prevented through a combination of a robust OHS management system and a culture where everyone takes personal responsibility for their own safety and the safety of others.

### 11.9.1 Effective Safety Management System

Makuutu will develop an effective OHS Management System utilising the Nertney Wheel approach of managing risks to secure: Fit for Purpose Equipment, Safe Work Practices, Competent People and a Controlled Work Environment (refer Figure 171).

- Makuutu will provide suitable and adequate information, training and instruction to ensure that all workers have the required skills and knowledge to complete their work without adverse health or safety impact and that they are fit for work.
- Makuutu will ensure that all workers diligently follow defined work plans and procedures that will be developed to minimise health and safety risks.
- Plant and equipment will be selected, properly maintained and routinely checked and audited to ensure that it is fit for purpose and with low risk of failure.



Figure 171: Nertney Wheel Work Process Model

### 11.9.2 Strong and Sustainable Safety Culture

An effective OHS Management System (refer Section 11.9.1) reduces the risk of accidents and injury through the elimination of hazards. In the absence of a good safety culture, however, it requires a top-down approach with prescriptive “command and control” hierarchies. Good safety performance can still be secured but accidents and incidents might occur when the boss isn’t watching and people break the rules. The development of an interdependent safety culture where everyone takes personal responsibility for their own safety and the safety of others is much more sustainable. The workforce is additionally much happier and more productive when they feel that they are trusted. The journey from a reactive to an interdependent culture is defined by the Bradley Curve (refer Figure 172). The frequency of accidents and injuries decreases with the journey along the curve. Excellent Safety performance is ultimately an outcome of a good and productive work culture and the OHS Management system must be fully integrated as a way of doing business as opposed to a bolted-on system that is mainly the responsibility of the Safety Department.



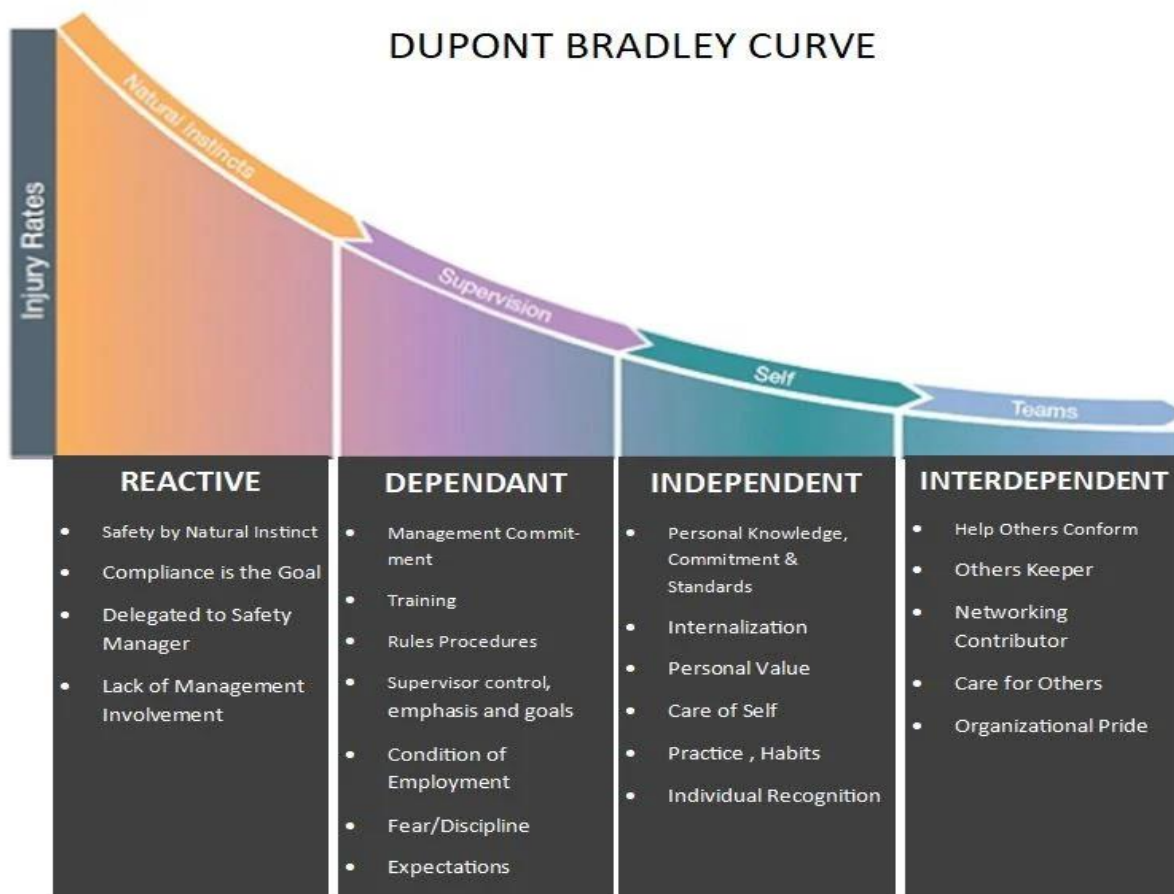


Figure 172: The Dupont Bradley Curve defining the reduction in injuries that happens as a site moves from a reactive culture to an interdependent culture.

### 11.9.3 Site Safety Committee

Makuutu will establish a Makuutu Site Safety Committee comprised of elected safety representatives from each work area, senior management and technical HSE staff. Large groups working shift-work will have a representative from each shift. Safety representatives will be expected to champion safety in their work areas and to convene a monthly safety meeting with their work team and a technical representative from the site Safety Health Environment and Community (SHEC) team. These meetings provide opportunity to drive safety initiatives and serve as a platform for all workers to raise safety concerns.

The Site Safety Committee will also meet each month. The meeting will commence with an overview of site safety performance and current safety initiatives. Elected safety representatives will then present the issues and concerns raised during their work area safety meetings. The Site Safety Committee will then develop appropriate actions to address these concerns with a specific Who is required to do What by When. These actions will be entered into a consolidated Register and the status of all outstanding actions is reviewed with adjustments made as necessary. The Safety representatives will then provide feedback to their teams at the next area safety meeting about what was discussed and what actions had been decided to address any concerns they may have raised.

## 12 Summary and Conclusion

### 12.1 Summary

The Makuutu Project will deliver significant social, environmental and economic benefit to local communities and to Uganda more broadly. It will also be a globally significant enabler of the necessary transition from fossil fuel to renewable energy by addressing a bottleneck in the world supply of heavy REE needed for the production of neo-magnets. The Makuutu Project will produce sufficient heavy REE over its life to enable the construction of 90 GW of renewable wind power which would displace 300 million tonnes of coal fired carbon dioxide emissions per year. This is 6 times the total annual 49 million tonnes of carbon dioxide emissions from Uganda. It is also orders of magnitude higher than the estimated 1.5 million tonnes of CO<sub>2</sub> that Makuutu will emit from the combustion of diesel in mining machinery and process chemical delivery trucks over its life.

Makuutu facilities including the Process Plant and haul road will be located in largely uninhabited places to avoid the need to displace people. There will, however, be people in the proposed mining footprint who will need to be compensated and resettled in a staged manner to good standard housing and with livelihoods secured (refer Section 11.4). The scale of this resettlement will be minimised by staged resettlement over the 27-year life of mine as enabled by the progressive return of mined land to productive farmland. At the end of mining, there will no legacy open pits, no waste-dumps and no tailings dam and the agricultural capacity of the land should be much higher than its pre-mining situation through a process of liming and full fertilization to restore currently impoverished soil.

The environmental footprint of Makuutu will be small due to the near-surface location of the clay ore-clay orebody. This has resulted in a very low strip ratio (i.e., weight of waste/weight of ore) of 0.78 which means that there will be 100 tonnes of ore mined for every 78 tonnes of waste mined. The ore is additionally clay which can be freely dug without the need for blasting, crushing or grinding. As well as significantly lowering the energy costs of the Project compared to its hard-rock mine competitors, this greatly lessens noise and vibration impacts on local communities. The ore-body is also low in Uranium and Thorium radionuclides which are typically challenging for Rare Earth Projects. The mining sequence will involve removal and storage of 1m of topsoil followed by removal of the uneconomic over-burden to expose the ore. The ore will then be transported to the Process Plant where the ionically absorbed REE will be desorbed through a heap-leach process and precipitated as a REE carbonate product that will be filtered, dried and bagged. The spent ore will then be returned to the mining pit along with the overburden prior to contouring to the desired drainage pattern followed by topsoiling and revegetation. The mine pit will expand at a rate of about 35 hectares a year and the mine footprint at any point in time will be less than 50 hectares. The rehabilitated land will support community development projects such as aquaculture, forestry and intensive agriculture. Makuutu will additionally have strong environmental controls coupled with extensive environmental monitoring to ensure that emissions are well controlled and in particular that the quality and quantity of downstream river systems is not impacted by the Project.

Makuutu will deliver significant economic benefit to Uganda including estimated gross royalty payments of US\$380M plus corporate tax contributions of US\$965M over the life of the project. In addition to this the project will preferentially employ Ugandan people for a workforce which at peak

production by Year 10 will number 1,200 people. It is the intention of Makuutu that 100% of employees will be Ugandan people by Year 7. Makuutu will not have an onsite camp or FIFO workforce which will mean that local businesses including hotels and restaurants will benefit from Makuutu visitors. With taxes, employment, the Project purchase of Ugandan goods and services and the multiplier effect of all of this taken into the account Makuutu will contribute billions of dollars to Uganda's economy over the life of the project as well as serving as a catalyst for other major mining projects in Uganda. This is consistent with Uganda's NDPIII to unlock Uganda's mineral wealth to achieve Uganda's Vision 40 of being a prosperous middle-income country by 2040.

The largest risk of Makuutu is associated with the compensation and resettlement of Project affected Persons. The largest opportunity on the other hand is to significantly improve the lives of some of the poorest people in the world through the strategic investment of an estimated US\$47million of direct Makuutu expenditure on Community Development in combination with an estimated US\$76 million of Project Royalties that would be returned to the local Districts under Ugandan Tax Law. This money would be spent on infrastructure upgrades, community health, education and sustainable livelihoods. Of particular relevance are the three development projects proposed for rehabilitated land as scoped in the Community Development Plan. These include:

1. An agricultural research centre undertaking intensive agriculture trials on rehabilitated project land and providing outreach services to local farmers. This is particularly relevant to climate change adaptation.
2. Agro-forestry plantations that could reach 400 hectares by the end of mining and which would be sequestering 16,000 tonnes of CO<sub>2</sub>/year as well as providing direct employment and downstream industry (e.g., housing timber, furniture making, firewood etc.).
3. Intensive fish farms potentially covering 100 hectares by Year 10 and producing 1,000 tonnes of fish in a cycle to employ large numbers of people and produce large volumes of food.

These projects will provide food security and livelihoods for large numbers of people during the operation of the project and will continue to do so after the project is ultimately closed.

## 12.2 Conclusion

The Makuutu Project is intrinsically safe from an environmental and human health perspective, and it can be managed so that it does not create any legacies for Uganda. Its potential to enable the global reduction of 300 million tonnes of CO<sub>2</sub>/year by supplying the heavy REE necessary for 90 GW a year of renewable wind power is particularly significant.

The most significant risk for the Project is the challenge associated with compensating and resettling Project Affected People. This can, however, be achieved with no PAPs becoming socially or economically disadvantaged and with food security and livelihoods secured (refer Section 11.4).

The Project is highly consistent with Uganda's National Development Plan three (NDPIII) of unlocking Uganda's mineral potential and enabling Uganda to become a wealthy middle-income country by 2040 as per the Vision 40. Makuutu will generate significant wealth for Uganda and serve as a catalyst for other major mining projects as well as contributing to the delivery of positive social and environmental outcomes.

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## **PART 2: ESIA ANNEXES**



## 14 Annex I: NEMA Approval of Terms of Reference

The ESIA Scoping Study and Terms of Reference (refer attachment following) was approved by NEMA on 22<sup>nd</sup> February 2021. This approval did, however, emphasise the need to incorporate a number of additional considerations into the ESIA Report. A summary of the ESIA work commitments in the approved Terms of Reference and the additional considerations identified by NEMA follows.

### 14.1 NEMA approved ESIA Work Programme in Scoping Study and Terms of Reference Report

#### 14.1.1 ESIA Objectives

The objectives of the assignment are as follows:

- To identify and assess the potential environmental and social impacts for the proposed project
- Obtaining views, concerns and suggestions from key stakeholders regarding the impacts associated with the proposed project.
- To recommend enhancement measures for positive environmental and social impacts and mitigation measures for the adverse negative environmental and social impacts
- To prepare an Environmental and Social Impact Assessment (ESIA) Report for approval by the National Environment Management Authority.

#### 14.1.2 ESIA Scope

The scope of the ESIA includes:

1. Project description
2. Literature Review
3. Analysis of Alternatives
4. Baseline Investigations including:
  - Topography
  - Hydrology
  - Geology and Soils
  - Water quality
  - Climate (temperature, rainfall, etc.)
  - Air quality (SO<sub>2</sub>, NO<sub>2</sub>, CO, PM<sub>2.5</sub> and PM<sub>10</sub>)
  - Noise (LAeq)
  - Land use and land cover
  - Vegetation (flora)
  - Fauna (mammals, birds, reptiles, amphibians, butterflies, etc.)
  - Socioeconomics (various such as demographics, gender, vulnerability, physical cultural resources, education, health, etc.).
5. Assess land tenure systems and owners (if known).
6. Stakeholder Consultations.
7. Impact Identification and Assessment.
8. Provide detailed evaluation of the potential environmental impacts, risks and residual impacts associated with the proposed project components and activities.
9. Development of Enhancement and Mitigation Measures: The ESIA shall propose enhancement measures for each identified positive impact described.
10. The enhancement actions will be described in the ESMP to show the preferred period of implementation, responsible parties, estimate cost, etc. Measures will be proposed to eliminate, mitigate, or compensate undesired effects. Mitigation measures will be designed, in order to avoid, reduce, mitigate, or compensate for adverse environmental and social

impacts. These will be incorporated into an Environmental and Social Management Plan (ESMMP), based on an analysis of local and national capacity to implement mitigation measures. These measures must be technically feasible, economically sound and socially acceptable (i.e. they must consider the views of the main stakeholders).

11. Formulation of Environmental and Social Management and Monitoring Plan: The ESMMP will include measures to avoid, prevent, reduce, mitigate, remedy or compensate any adverse effects on the environment and social in relation to the construction and operation of the project.

#### 14.1.3 Additional Considerations Identified by NEMA

1. Incorporate the requirement of the revised environmental regulations including: The National Environment (Environmental and Social Impact Assessment) Regulations 2020 and; the National Environment (Standards of Discharge of Effluent into the Water or Land) Regulations 2020.

In addition to updating the referencing the Environmental and Social Impact Statement follows the format and includes the content prescribed in the Environmental and Social Impact Assessment Regulations 2020 and the base-line water quality assessment has included the parameters prescribed in the Standards of Discharge of Effluent into the Water or Land.

2. Develop a proper Stakeholder Engagement Plan.  
A comprehensive Stakeholder Engagement Plan has been developed for the Project by Atacama Consulting and encompassing Stakeholder Mapping, External Communication processes and, a Grievance Mechanism (refer ESMP Volume 2). The stakeholder consultation required by the Environmental and Social Impact Assessment Regulations 2020 was undertaken by Atacama Consulting and reported in the ESIA.
3. Comprehensive discussion of the concerns of the stakeholders within 100-500 m radius of the site to be mined and associated mineral processing facilities and mitigation measures provided.  
This forms part of the ESIA.
4. Detailed Project Description including exact locations and high-quality maps.  
This forms part of the ESIA.
5. Undertake assessment of the social services and ecosystem services that shall be impacted by the Project and propose and develop appropriate mitigation strategies.  
A comprehensive assessment of the risks of Project impacts on social and environmental services is a key outcome of the ESIA process and enabled the development of performance objectives and targets to be achieved by strategies presented in the 8 volume Environment and Social Management Plan submitted as a supplement to the Environmental and Social Impact Statement.
6. Collect accurate baseline information.  
This formed part of the original ESIA Scoping Study and Terms of Reference and is supplemented with the production of high-quality maps including water catchment maps critical to hydrological assessment.

7. Provide comprehensive evaluation of pollution sources, the methods of handling, containment and disposing of the different kinds of waste and measures controlling pollution of air, water and land as a result of project activities.  
This is the centrepiece of the Environment and Social Assessment with the following volumes of the Environmental and Social Management Plan particularly relevant:
  - Volume 1: Environmental and Social Management and Monitoring Plan
  - Volume 5: Emergency Management Plan
  - Volume 6: Waste Management Plan
  
8. Undertake a comprehensive environmental risk assessment of chemicals to be utilised and develop a robust system for chemical management and associated waste.  
This is encompassed in the Project Description Section of the ESIA as the following volumes of the Environmental and Social Management Plan.
  - Volume 1: Environmental and Social Management and Monitoring Plan
  - Volume 5: Emergency Management Plan
  - Volume 6: Waste Management Plan
  
9. Provide a detailed environmental and social management and monitoring plan against the identified environmental impacts including monitoring requirements, roles and responsibilities of the developer, regulatory agencies and other stakeholders.  
This is encompassed in the Environmental and Social Management and Monitoring Plan submitted in support of the Environmental and Social Impact Statement.
  
10. Provide comprehensive strategies for resettlement and compensation of persons physically/economically displaced by the Project.  
A Preliminary Compensation and Resettlement Action Plan has been produced as Volume 4 of the 8-volume Environmental and Social Management Plan as a precursor to a detailed Compensation and Resettlement Plan that will be produced following detailed design. A Community development Plan produced as Volume 3 of the Environmental and Social Management Plan also has high relevance to resettlement and compensation of Project affected Persons.
  
11. Evaluate any cumulative impacts that may arise from implementation of the project in combination with other previously existing developments.  
This is included as a specific chapter of the Environmental and Social Impact Statement.
  
12. Indicate the actual project (investment) cost including a copy of the investment licence and/or certificate of valuation by a certified professional valuer/quantity surveyor (refer Project Description ESIA Table 5 which includes the economic highlights of the Project from the Project Scoping Study Document that was publicly released to the Australian Stock Exchange and key stakeholders in April 2021).
  
13. Append to the ESIA report a copy of the approved Scoping Report and Terms of Reference in its entirety. This is appended below.

NEMA also notes that only registered EIA practitioners including the team leader should be contracted to carry out the ESIA for the proposed project and that the team must include an expert in mining and mineral processing, biodiversity assessment, health and safety and hydrology whose names should be included in the ESIA Report.

## 14.2 NEMA Approval of ESIA Terms of Reference



### NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

#### NEMA/4.5

22<sup>nd</sup> February, 2021

The Chief Executive Officer,  
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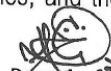
Website: [www.nemaug.org](http://www.nemaug.org)

#### RE: REVIEW OF SCOPING REPORT AND TERMS OF REFERENCE FOR THE ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED MAKUUTU RARE EARTHS PROJECT

Reference is made to the Scoping Report and Terms of Reference (TOR) to undertake an Environment and Social Impact Assessment (ESIA) for the proposed Makuutu Rare Earths Project in the districts of Bugweri, Mayuge and Bugiri, that were submitted to this Authority for consideration. The review of the Scoping Report and TOR has been finalised and this Authority hereby grants formal **APPROVAL**.

**Please, note that approval of the Scoping Report and TOR DOES NOT GIVE YOU PERMISSION to start implementing any of the proposed activities.** In addition to the scope of work outlined in the TOR, you are advised to incorporate the following considerations during the conduct of the ESIA and preparation of the ESIA report.

- (i). Be mindful of the revised environmental regulations that are now in place. These include, the National Environment (Environmental and Social Impact Assessment) Regulations, 2020; and the National Environment (Standards for Discharge of Effluent into Water or Land) Regulations, 2020. Please, ensure proper application/reference and citation of the new laws during the ESIA and the associated report preparation.
- (ii). Develop a proper Stakeholder Engagement Plan to be utilized during the ESIA and related undertakings. While particularly being mindful of the Standard Operating Procedures (SOPs) in respect of the COVID-19 pandemic, carry out comprehensive consultation with all relevant key stakeholders including persons potentially affected by the project. The views/concerns of stakeholders consulted should be well documented and appended in the ESIA report.
- (iii). Provide a comprehensive discussion of the concerns of the key stakeholders and project affected persons (including communities/households found within 100 – 500 metres radius from the site to be mined and associated mineral processing facilities; and the mitigation measures provided.

  
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- (iv). Provide detailed description of the different project components, exact locations preferably with coordinates, clear and legible lay outs, land take requirements.
- (v). Undertake assessment of the social services and ecosystem services that shall be impacted by the project; and propose/develop appropriate mitigation strategies to maintain the provision/ function of the affected services.
- (vi). Ensure that accurate environment baseline information is obtained and utilized including the distances between the project area and any fragile sensitive ecosystems and settlements. The baseline data should be properly documented to inform the assessments, future monitoring, and site-restoration/rehabilitation among others.
- (vii). Provide comprehensive evaluation of potential pollution sources, the methods of handling, containment and disposing of the different kinds of waste, and measures for controlling pollution of air, water and land as a result of project activities.
- (viii). Undertake a comprehensive environment risk assessment for all chemicals to be utilised and develop a robust system for chemical management and associated waste.
- (ix). Provide a detailed environmental and social management/ monitoring plan against the identified environmental impacts including monitoring requirements, roles and responsibilities of the developer, regulatory agencies and other key stakeholders.
- (x). Provide comprehensive strategies for resettlement and compensation of persons physically /economically displaced by the project.
- (xi). Evaluate any cumulative impacts that may arise from implementation of the project in combination with other previously existing developments.
- (xii). Indicate the actual project (investment) cost including copy of the investment licence and/or certificate of valuation issued by a certified professional valuer/quantity surveyor.
- (xiii). Append to the ESIA report a copy of the approved Scoping Report and Terms of Reference in its entirety.

Please, note that only registered EIA Practitioners including the team leader should be contracted to carry out the ESIA for the proposed project; and the team must include an expert in mining and mineral processing, biodiversity assessment, health & safety, and hydrology, whose names should be included in the ESIA report.

This therefore, is to recommend that you proceed with carrying out the ESIA study for the proposed Makuutu Rare Earths Project in the districts of Bugweri, Mayuge and Bugiri.

Looking forward to receipt of a comprehensive ESIA report for our further action.



Isaac I.G. Ntujju

**FOR: EXECUTIVE DIRECTOR**



cc: The Director  
Directorate of Geological Survey and Mines  
Ministry of Energy and Mineral Development  
**ENTEBBE.**

cc: The District Environment Officer,  
Bugweri District Local Government  
**BUGWERI.**

cc: The District Environment Officer,  
Mayuge District Local Government  
**MAYUGE.**

cc: The District Environment Officer,  
Bugiri District Local Government  
**BUGIRI.**

## 15 ANNEX II: FLORA BASELINE REPORT

### 15.1 STUDY METHODS

To study the vegetation structure and composition of the Makuutu project area, field observations coupled with a GPS were used to locate quadrats within the sampled areas. A diameter tape was used to record tree diameters at 1.3 meters or breast height, a pair of tape measures and stick poles were used to demarcate the quadrats along transects. Measuring tree heights was done by using yardstick and estimates. Several regional flora keys were used in the field for better species identification.

#### 15.1.1 Quantitative Sampling

Inventories of demarcated plots have been widely used in floristic sampling and ecological studies in the recent years (Poulsen 1997). However, the results of species richness depend on the size, shape and number of the plots being used and the choice of the shape depends on the scope of the study (Grieg Smith, 1983). Circular plots are easier to measure and have fewer edge errors because edge length is minimized (Grieg Smith, 1983). Circular nested quadrats of 20m radius were used to make estimates comparable with previous surveys of researchers in the region.

Nineteen (19) transects were randomly generated using the Distance software and overlaid in the proposed processing plant, mining block CC, CB, WB, CA, EC, EBI, EB2, EA, and CD which were used for vegetation sampling. Alternating quadrats method was laid along the existing access road. All transects comprising of different vegetation types were selected for the vegetation sampling. A GPS was used to locate quadrats on each transect and to lay nested quadrats, which were spaced out at intervals of 250m along the transects in proposed mining areas/ pits, the site for the processing plant and the proposed new access road. Herbs were sampled in a 2-meter radius quadrat, while shrubs were sampled in a 10m and trees in 20m radius. All plants encountered rooted within the quadrat were recorded in their respective lifeforms. Tree diameters at breast height (Dbh) were measured and recorded in diameter classes of 2.5-9.9cm, 10-29.9cm, 30cm-49.9cm and  $\geq 50$ cm. The  $\geq 50$ cm classes were grouped in one class because their numbers have been always low.

Lianas were recorded by the presences or absence mechanism in the same quadrat as the trees. The data has been used to show the relative distribution and diversity of the species within the case study areas. Daubenmire method of canopy cover ranking, and frequency was employed for herbaceous cover estimates.

#### 15.1.2 Opportunistic Records

Although quadrats registered reasonable data on the distribution, diversity, and abundance of the various plant stratum according to the land use types of the area, a cumulative list was compiled from both the plots and opportunistic encounter that were recorded as they were encountered in the case study areas.

#### 15.1.3 Voucher Specimens

Plant species that could not be instantly identified were collected and photographed for further confirmation at Makerere University herbarium (MHU) where identification and archiving were done. The survey data was summarized into frequencies/percentages using Microsoft Excel 2007.

#### 15.1.4 Analysis

A plant species lists (species richness) have been compiled from the plot data and additional opportunistic observations and presented in tables and graphs.

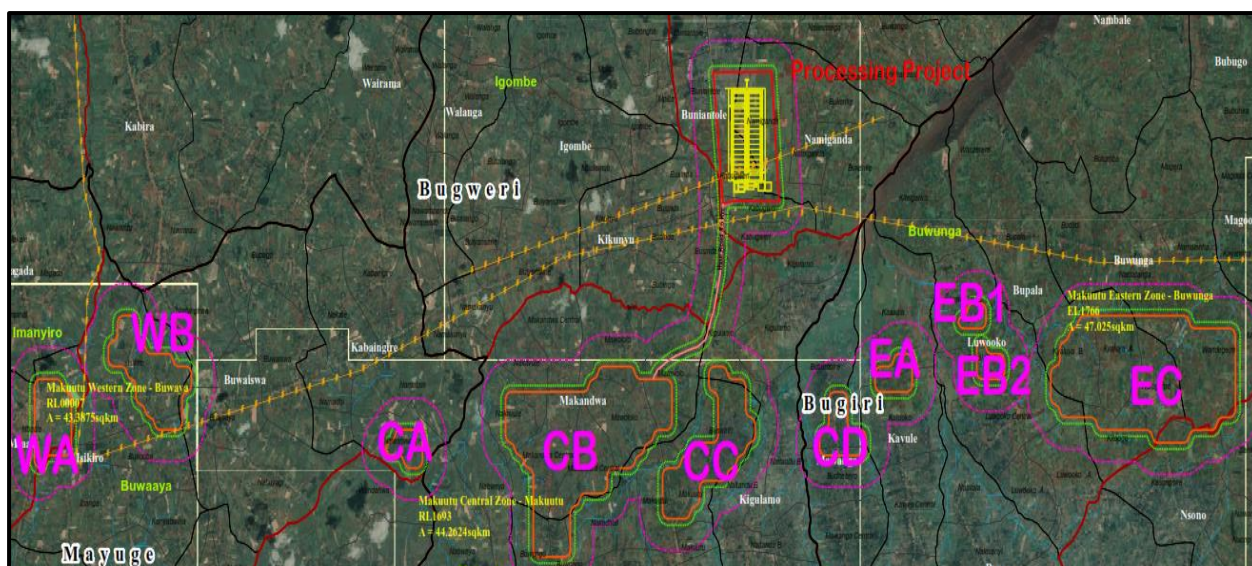


Figure 173: Map of the Study Areas

Table 145: Individual species and distribution per plant family from Makuutu

S/N	Family	No	S/N	Family	No
1	Fabaceae	77	46	Zingiberaceae	2
2	Poaceae	65	47	Asphodelaceae	1
3	Asteraceae	34	48	Adiantaceae	1
4	Euphorbiaceae	27	49	Agavaceae	1
5	Moraceae	25	50	Aizoaceae	1
6	Malvaceae	24	51	Aloaceae	1
7	Cyperaceae	22	52	Amaryllidaceae	1
8	Cucurbitaceae	13	53	Aristolochiaceae	1
9	Verbenaceae	13	54	Asphodelaceae	1
10	Rubiaceae	12	55	Bombacaceae	1
11	Apocynaceae	11	56	Bromeliaceae	1
12	Lamiaceae	11	57	Burseraceae	1
13	Solanaceae	11	58	Canaceae	1
14	Acanthaceae	10	59	Canellaceae	1
15	Amaranthaceae	7	60	Cannabinaceae	1
16	Commelinaceae	7	61	Capparaceae	1
17	Convolvulaceae	7	62	Caricaceae	1
18	Dioscoreaceae	7	63	Caryophyllaceae	1
19	Sapindaceae	7	64	Casuarinaceae	1
20	Anacardiaceae	6	65	Colchicaceae	1
21	Combretaceae	6	66	Davalliaceae	1
22	Meliaceae	6	67	Ebenaceae	1
23	Myrtaceae	6	68	Hydrocharitaceae	1
24	Vitaceae	5	69	Lauraceae	1
25	Bignoniaceae	4	70	Loranthaceae	1
26	Nyctaginaceae	4	71	Melastomataceae	1
27	Orchidaceae	4	72	Moringaceae	1

S/N	Family	No	S/N	Family	No
28	Palmae	4	73	Musaceae	1
29	Rutaceae	4	74	Nephrolepidaceae	1
30	Annonaceae	3	75	Oleaceae	1
31	Chenopodiaceae	3	76	Oliniaceae	1
32	Menispermaceae	3	77	Onagraceae	1
33	Oxalidaceae	3	78	Papaveraceae	1
34	Passifloraceae	3	79	Phytolaccaceae	1
35	pinaceae	3	80	Podocarpaceae	1
36	Polygonaceae	3	81	Polygalaceae	1
37	Portulacaceae	3	82	Polypodiaceae	1
38	Anthericaceae	2	83	Proteaceae	1
39	Apiaceae	2	84	Ranunculaceae	1
40	Asparagaceae	2	85	Rhamnaceae	1
41	Boraginaceae	2	86	Sapotaceae	1
42	Celastraceae	2	87	Ulmaceae	1
43	Dracaenaceae	2	88	Urticaceae	1
44	Pedaliaceae	2	89	Zamiaceae	1
45	Scrophulariaceae	2			

Table 146: Plant species distribution per proposed sites for the Rare Clay Mineral mining and processing areas

S/N	Family	Species	Haul Road	Block CA	Block CB	Block CC	Block CD	Block EA	Block EB1	Block EB2	Block EC	Block WA	Block WB	Processing Area	Status
1	Asphodelaceae	Bulbine abyssinica	X	X	X	X	X	X	X	X	1	X	X	X	LC
2	Acanthaceae	Asystasia gangetica	X	1	X	1	X	X	X	X	X	X	1	X	LC
3		Asystasia schimperi	1	X	X	X	X	X	X	X	X	X	X	X	LC
4		Dyschoriste radicans	1	1	1	1	1	X	1	1	1	1	1	1	LC
5		Hygrophila auriculata	1	X	X	X	X	X	X	X	X	X	X	X	LC
6		Justicia diclipteroides	X	X	X	X	X	X	X	X	1	X	X	X	LC
7		Justicia exigua	X	X	1	X	1	X	1	1	1	1	1	1	LC
8		Justicia schimperiana	X	1	1	X	1	X	1	1	1	1	X	1	LC
9		Phaulopsis imbricata	X	X	X	1	X	X	X	X	X	X	X	X	LC
10		Ruellia patula	X	X	X	X	X	X	X	X	1	X	X	X	LC
11		Thunbergia mildbraediana	X	X	1	X	X	X	X	X	X	X	X	X	LC
12	Adiantaceae	Adiantum thalictoides	X	X	X	X	X	X	X	X	X	X	1	1	LC
13	Agavaceae	Agave sisiliana	X	1	X	X	1	X	X	X	X	X	X	X	LC
14	Aizoaceae	Mollugo nudicaulis	X	X	X	X	X	X	X	X	1	X	X	X	LC
15	Aloaceae	Aloe dawei	X	X	X	1	X	X	X	X	X	X	X	1	LC
16	Amaranthaceae	Achyranthes aspera	X	1	X	1	X	X	X	1	X	1	X	1	LC
17		Alternanthera pungens	1	X	X	1	X	1	1	X	X	X	X	X	LC
18		Amaranthus graecizans	1	X	X	X	X	X	X	X	X	X	X	X	LC
19		Amaranthus lividus	X	X	X	X	1	X	1	X	X	1	X	X	LC
20		Celosia ssp	X	X	X	X	X	X	1	X	X	X	X	X	LC
21		Cyathura prostrata	X	1	X	1	X	X	X	X	X	1	1	X	LC
22		Gomphrena celosioides	1	X	1	X	X	X	1	X	X	X	1	1	LC
23	Amaryllidaceae	Scadoxus multiflorus	X	X	X	1	1	X	X	X	1	X	X	X	LC



24	Anacardiaceae	Lannea ssp	X	X	X	X	X	X	X	X	1	X	1	X	LC
25		Mangifera indica	1	1	1	1	1	1	1	1	1	1	1	1	LC
26		Margaritaria discoidea	X	X	X	X	X	1	1	X	X	X	X	X	LC
27		Pseudospondias microcarpa	1	1	X	1	X	X	X	X	X	X	X	X	LC
28		Rhus natalensis	X	X	X	X	X	X	X	X	1	X	X	X	LC
29		Rhus vulgaris	X	X	X	X	X	X	X	X	1	1	X	1	LC
30	Annonaceae	Annona senegalensis	X	X	X	X	X	X	1	1	1	X	X	X	LC
31		Annona ssp	X	X	X	X	1	X	X	X	X	X	X	X	LC
32		Annona stenophylla	X	X	X	X	X	X	1	X	X	X	X	X	LC
33	Anthericaceae	Chlorophytum blepharophyllum	X	X	X	X	X	X	X	X	1	X	1	X	LC
34		Chlorophytum lancifolium	X	X	X	1	X	X	X	X	X	X	X	X	LC
35	Apiaceae	Centella asiatica	1	1	X	X	1	X	1	1	1	1	1	1	LC
36		Steganotaenia araliacea	X	X	X	X	X	X	X	X	X	X	X	1	LC
37	Apocynaceae	Alstonia boonei	X	1	1	1	X	X	X	1	X	X	1	1	LC
38		Catharanthus roseus	X	X	1	X	X	X	X	X	X	X	1	X	LC
39		Mondia whitei	X	X	1	X	X	X	X	X	X	X	X	X	LC
40		Pentarrhinum insipidum	X	X	1	X	X	X	X	X	X	X	X	X	LC
41		Pergularia extensa	1	X	X	X	X	X	X	X	X	X	X	X	LC
42		Periploca linearifolia	X	X	X	1	X	X	X	X	X	X	X	X	LC
43		Periploca nigrescens	X	X	X	1	X	X	X	X	X	X	1	X	LC
44		Rauvolfia caffra	X	1	X	X	X	X	X	X	X	X	1	X	LC
45		Secamone africana	1	X	X	1	X	X	X	1	X	X	1	X	LC
46		Thevetia peruviana	X	X	X	X	1	X	1	1	1	1	X	X	LC
47		Voacanga thouarsii	X	X	1	X	X	X	X	X	X	X	X	X	LC
48	Aristolochiaceae	Aristolochia elegans	X	1	X	1	X	X	1	1	X	X	1	1	LC
49	Asparagaceae	Asparagus buehneri	X	X	1	X	X	X	X	X	X	X	X	X	LC
50		Asparagus racemosus	X	X	X	X	1	X	X	X	1	X	X	X	LC

51	Asphodelaceae	Aloe dawei	X	X	X	X	X	X	X	X	X	1	X	X	LC
52	Asteraceae	Acanthospermum hispidum	X	X	1	X	X	1	X	X	1	1	X	X	LC
53		Acmella caulirhiza	X	X	X	X	X	X	X	X	1	X	X	X	LC
54		Acmella mauritiana	X	X	X	X	X	X	X	X	X	X	X	1	LC
55		Acmella uliginosa	X	X	X	X	X	X	X	X	X	1	X	X	LC
56		Ageratum conyzoides	1	1	1	X	X	1	X	X	1	1	X	1	LC
57		Aspilia africana	X	X	X	X	X	X	X	X	1	X	X	1	LC
58		Aspilia kotschyi	X	X	1	1	X	X	X	X	1	X	1	X	LC
59		Asystasia gangetica	X	X	X	X	X	X	X	X	1	X	X	X	LC
60		Bidens pilosa	1	1	1	X	X	1	1	X	1	1	1	1	LC
61		Chromolaena odorata	1	1	1	1	X	X	1	1	1	1	1	1	LC
62		Conyza sumatrensis	1	1	1	1	X	X	1	X	1	1	1	1	LC
63		Crassocephalum montuosum	X	X	X	X	X	X	X	X	1	X	1	1	LC
64		Crassocephalum vitellinum	X	X	X	X	X	X	X	X	X	X	X	1	LC
65		Dichrocephala integrifolia	1	X	X	X	X	X	X	X	X	1	1	X	LC
66		Emilia abyssinica	1	X	1	1	X	1	X	X	1	1	1	1	LC
67		Emilia coccinea	X	X	1	X	X	X	X	X	X	X	X	X	LC
68		Erlangea globosa	X	X	X	X	X	X	X	X	X	1	X	X	LC
69		Galinsoga parviflora	X	X	X	X	X	1	X	X	X	1	1	1	LC
70		Guizotia scabra	X	1	1	X	X	1	X	X	1	X	1	1	LC
71		Gutenbergia cordifolia	1	1	1	1	X	1	1	X	1	X	1	1	LC
72		Lactuca schweinfurthii	X	1	1	X	X	X	X	X	X	1	X	X	LC
73		Launaea cornuta	X	X	1	X	X	X	X	X	X	X	X	X	LC
74		Microglossa pyrifolia	X	X	X	X	X	X	X	X	X	X	1	X	LC
75		Parthenium hysterophorus	1	X	1	1	1	X	X	X	1	1	X	X	LC
76		Schkuhria pinnata	X	X	1	X	X	X	X	X	1	1	X	X	LC
77		Siegesbeckia orientalis	1	X	X	X	X	X	1	X	X	1	X	X	LC

78		<i>Sonchus asper</i>	X	X	1	1	X	X	X	X	X	1	X	X	LC
79		<i>Synedrella nodiflora</i>	1	1	1	1	1	1	X	1	1	1	X	1	LC
80		<i>Tagetes minuta</i>	X	X	X	X	X	1	X	X	1	1	X	X	LC
81		<i>Tithonia diversifolia</i>	1	X	1	1	X	X	X	X	X	X	X	1	LC
82		<i>Tridax procumbens</i>	1	X	1	X	1	X	1	X	1	1	X	1	LC
83		<i>Vernonia amygdalina</i>	1	1	1	1	X	1	1	X	1	1	1	X	LC
84		<i>Vernonia cinerea</i>	X	1	X	X	X	X	X	X	X	X	X	X	LC
85		<i>Vernonia kirungae</i>	X	X	X	X	X	X	X	X	1	X	X	1	LC
86		<i>Xanthium strumarium</i>	1	X	X	X	X	X	X	X	X	X	X	1	LC
87	Bignoniaceae	<i>Kigelia africana</i>	X	X	X	X	1	X	X	1	X	1	X	1	LC
88		<i>Markhamia lutea</i>	1	1	X	1	1	1	1	1	1	1	1	X	LC
89		<i>Spathodea campanulata</i>	X	1	1	1	X	1	1	1	1	1	1	1	LC
90		<i>Stereospermum kunthianum</i>	X	X	1	X	X	1	1	1	X	X	X	1	LC
91	Bombacaceae	<i>Ceiba pentandra</i>	X	X	X	X	1	X	X	X	X	X	X	X	LC
92	Boraginaceae	<i>Cordia millenii</i>	X	X	1	1	X	X	X	X	X	X	X	X	EN A2ad
93		<i>Cynoglossum amplifolium</i>	X	X	X	X	X	X	X	X	X	X	1	X	LC
94	Bromeliaceae	<i>Ananas comosus</i>	1	X	X	X	X	X	X	X	X	X	X	X	LC
95	Burseraceae	<i>Canarium schweinfurthii</i>	1	1	1	1	1	1	X	1	1	1	1	1	LC
96	Canaceae	<i>Cana indica</i>	X	1	X	1	X	X	1	X	X	1	X	1	LC
97	Canellaceae	<i>Warburgia ugandensis</i>	X	X	1	X	X	X	X	X	X	X	X	X	VU A2ad
98	Cannabaceae	<i>Cannabis sativa</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
99	Capparaceae	<i>Gynandropsis gynandra</i>	X	X	X	X	X	X	1	X	X	X	X	X	LC
100	Caricaceae	<i>Carica papaya</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
101	Caryophyllaceae	<i>Drymaria cordata</i>	X	X	1	X	X	X	X	X	X	X	X	X	LC
102	Casuarinaceae	<i>Casuarina equisetifolia</i>	X	X	1	X	X	X	X	X	X	X	X	1	LC
103	Celastraceae	<i>Maytenus caffra</i>	X	X	X	X	X	X	1	X	X	X	X	X	LC
104		<i>Maytenus undata</i>	X	X	1	X	X	X	X	X	X	X	X	X	LC

105	Chenopodiaceae	Chenopodium ambrosioides	X	X	X	X	X	X	X	X	X	1	X	X	LC
106		Chenopodium foetidum	X	X	X	X	X	X	X	X	X	1	X	X	LC
107		Chenopodium opulifolium	X	X	X	X	X	X	X	X	X	X	X	1	LC
108	Colchicaceae	Gloriosa superba	X	X	1	X	X	1	X	X	1	X	X	1	LC
109	Combretaceae	Combretum collinum	X	X	1	X	X	X	X	X	1	X	X	X	LC
110		Combretum molle	X	X	1	X	X	X	X	X	1	X	X	X	LC
111		Combretum paniculatum	X	X	X	1	X	X	X	X	X	X	X	X	LC
112		Terminalia erici-rosenii	X	X	1	X	X	X	X	X	X	X	1	X	LC
113		Terminalia mentaly	1	X	X	1	1	X	X	X	X	X	X	X	LC
114		Terminalia superba	X	X	X	X	1	X	X	X	X	1	X	X	LC
115	Commelinaceae	Commelina africana	1	X	1	X	X	1	X	X	1	1	1	1	LC
116		Commelina benghalensis	X	1	X	X	X	X	X	1	1	1	1	1	LC
117		Commelina diffusa	X	1	X	X	X	X	X	1	1	1	1	1	LC
118		Cyanotis barbata	X	X	X	X	X	X	X	X	X	X	X	1	LC
119		Cyanotis lanata	X	X	1	X	X	X	X	X	1	X	X	X	LC
120		Murdania simplex	X	X	X	X	X	X	X	X	1	1	X	X	LC
121		Murdannia clarkeana	1	X	X	X	X	X	X	X	1	X	X	X	LC
122	Convolvulaceae	Cuscuta kilimanjari	X	X	X	1	X	X	X	X	X	1	X	X	IN
123		Dichondra micrantha	X	X	X	1	X	X	X	X	X	1	1	X	LC
124		Hewittia scandens	X	1	X	X	X	X	1	X	1	X	1	1	LC
125		Ipomoea batatus	X	X	X	1	X	X	X	X	X	X	X	X	LC
126		Ipomoea blepharophylla	X	X	1	X	X	X	X	X	X	X	X	X	LC
127		Ipomoea hederifolia	X	1	X	X	X	X	X	X	1	X	X	X	LC
128		Ipomoea obscura	X	X	X	X	X	X	X	X	X	X	X	1	LC
129	Cucurbitaceae	Citrullus lanatus	X	X	X	X	X	X	X	X	X	X	X	1	LC
130		Cucurbita maxima	X	X	X	X	X	X	X	1	1	X	X	X	LC
131		Curcuma domestica	X	X	X	X	1	X	X	X	X	X	X	X	LC

132		Diplocyclos palmatus	X	X	X	X	X	X	X	X	1	X	X	1	LC
133		Kedrostis foetidissima	X	X	1	X	X	X	X	X	X	X	X	X	LC
134		Lagenaria rufa	X	X	X	X	1	X	X	1	X	X	X	X	LC
135		Lagenaria sphaerica	X	X	X	X	X	X	X	X	X	1	X	X	LC
136		Momordica calantha	X	1	X	X	X	X	X	X	X	X	X	X	LC
137		Momordica foetida	X	1	1	X	X	X	X	X	X	X	1	1	LC
138		Mukia maderaspatana	X	X	X	X	X	X	X	X	X	X	X	1	LC
139		Sechium edule	X	X	X	X	1	X	X	X	X	X	X	X	LC
140		Telfairia occidentalis	X	X	1	1	X	1	1	X	1	X	X	X	LC
141		Zehneria capillacea	X	X	1	X	X	X	X	X	X	X	1	X	LC
142	Cyperaceae	Bulbostylis barbata	X	X	X	X	X	X	X	X	1	X	X	X	LC
143		Cyperus denudatus	1	X	X	X	X	X	X	X	X	X	X	X	LC
144		Cyperus difformis	1	X	X	X	X	X	X	X	1	X	X	1	LC
145		Cyperus distans	X	X	X	X	X	X	X	X	1	X	1	X	LC
146		Cyperus dives	1	X	X	X	X	X	X	X	1	X	X	X	LC
147		Cyperus esculentus	X	X	X	X	X	X	X	X	X	X	X	1	LC
148		Cyperus mortonii	X	X	X	X	X	X	X	X	X	X	X	1	LC
149		Cyperus rotundus	1	X	X	X	X	X	1	X	X	X	X	1	LC
150		Cyperus schimperianus	X	X	X	X	X	X	X	X	X	X	X	1	LC
151		Cyperus tenax	1	X	X	X	X	X	X	X	X	X	X	X	LC
152		Fimbristylis dichotoma	1	X	X	X	X	X	X	X	1	X	X	1	LC
153		Fimbristylis pilosa	1	X	X	X	X	X	X	X	X	X	X	X	LC
154		Fuirena umbellata	X	X	X	X	X	X	X	X	1	X	X	1	LC
155		Kyllinga bulbosa	X	X	X	X	X	X	X	X	1	1	1	X	LC
156		Kyllinga chrysantha	1	X	X	X	X	X	X	X	X	X	X	1	LC
157		Kyllinga crassipes	X	X	X	X	X	X	X	X	1	X	1	X	LC
158		Kyllinga melanosperma	X	X	X	X	X	X	X	X	1	X	X	X	LC



159		Kyllinga stenophylla	X	1	X	X	X	X	X	X	X	X	X	X	LC
160		Mariscus dubius	X	1	X	X	X	X	X	X	X	1	X	X	LC
161		Mariscus sumatrensis	1	1	1	X	1	1	X	X	X	1	1	1	LC
162		Pycreus mortonii	X	X	X	X	X	X	X	X	1	X	X	X	LC
163		Pycreus pumilus	X	X	X	X	X	X	X	X	1	X	X	1	LC
164	Davalliaee	Davallia chaerophylloides	X	X	X	X	X	X	X	X	X	X	X	1	LC
165	Dioscoreaceae	Dioscorea abyssinica	X	X	1	1	X	X	X	X	X	1	X	X	LC
166		Dioscorea alata	X	X	1	X	X	X	X	X	X	X	X	X	LC
167		Dioscorea baya	X	X	X	1	X	X	X	X	X	X	X	X	LC
168		Dioscorea bulbifera	X	1	X	X	1	X	X	X	X	X	1	X	LC
169		Dioscorea minutiflora	X	X	X	1	X	X	X	X	X	X	X	X	LC
170		Dioscorea odoratissima	X	X	1	1	X	X	X	1	X	X	X	X	LC
171		Dioscorea preussii	X	X	X	X	X	X	X	X	X	1	1	X	LC
172	Dracaenaceae	Dracaena fragrans	X	X	X	1	X	X	X	X	1	X	1	X	LC
173		Dracaena steudneri	X	X	1	X	X	1	X	X	1	X	X	X	LC
174	Ebenaceae	Dioscorea abyssinica	X	X	X	1	X	X	X	X	X	X	X	X	LC
175	Euphorbiaceae	Acalypha bipartita	X	X	X	1	X	X	X	X	X	X	X	1	LC
176		Acalypha ciliata	X	X	X	X	X	X	X	1	X	X	X	X	LC
177		Acalypha cordata	X	X	1	X	X	X	X	X	X	1	X	1	LC
178		Acalypha villicaulis	X	X	X	X	X	X	X	X	1	X	X	X	LC
179		Alchornea cordifolia	1	X	X	X	X	X	X	X	X	X	1	X	LC
180		Aleurites moluccanus	X	X	1	X	1	1	X	1	1	X	X	X	LC
181		Bridelia micrantha	X	1	X	X	X	X	X	X	X	1	1	1	LC
182		Bridelia scleroneura	X	X	1	X	X	X	X	X	1	X	X	1	LC
183		Erythrococca bongensis	1	1	X	X	X	X	X	X	1	X	X	X	LC
184		Euphorbia candelabrum	X	X	X	X	X	X	X	X	X	1	X	X	LC
185		Euphorbia heterophylla	1	1	1	1	X	1	1	X	X	X	1	1	LC

186		<i>Euphorbia hirta</i>	1	X	1	X	X	1	X	X	1	1	1	1	LC
187		<i>Euphorbia tirucalli</i>	1	X	1	1	X	1	X	X	X	X	1	X	LC
188		<i>Flueggea virosa</i>	X	X	1	1	X	X	X	X	1	X	1	1	LC
189		<i>Jatropha curcas</i>	X	1	X	1	X	1	1	X	1	1	1	X	LC
190		<i>Manihot dichotoma</i>	X	1	X	X	1	X	1	X	1	X	1	X	LC
191		<i>Manihot esculenta</i>	X	X	1	1	X	X	X	X	1	X	1	1	LC
192		<i>Margaritaria discoidea</i>	X	X	1	1	X	X	X	X	1	X	1	1	LC
193		<i>Micrococca mercurialis</i>	X	X	X	X	X	X	X	X	X	1	X	X	LC
194		<i>Phyllanthus amarus</i>	X	1	1	X	X	1	X	X	1	1	X	X	LC
195		<i>Phyllanthus fraternus</i>	1	X	1	X	X	X	X	X	X	X	1	1	LC
196		<i>Phyllanthus ovalifolius</i>	1	1	1	X	X	1	1	X	1	X	1	X	LC
197		<i>Phyllanthus pseudoniruri</i>	X	X	1	X	X	X	X	X	1	X	1	X	LC
198		<i>Phyllanthus somalensis</i>	X	X	X	X	X	X	X	X	X	X	1	X	LC
199		<i>Phyllanthus suffrutescens</i>	X	X	X	X	1	X	X	X	1	X	X	X	LC
200		<i>Ricinus communis</i>	X	1	X	X	X	X	X	X	1	X	X	1	LC
201		<i>Shirakiopsis elliptica</i>	X	1	1	1	X	X	X	X	X	X	1	1	LC
202	Fabaceae	<i>Abrus precatorius</i>	X	X	1	1	X	X	X	X	X	X	X	X	LC
203		<i>Acacia hockii</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
204		<i>Acacia polyacantha</i>	1	X	X	1	1	X	X	1	X	X	1	X	LC
205		<i>Acacia sieberiana</i>	X	X	X	1	X	X	X	X	X	X	X	X	LC
206		<i>Acrocarpus fraxinifolius</i>	X	X	X	1	X	X	X	X	X	X	X	X	LC
207		<i>Aeschynomene abyssinica</i>	1	X	1	X	X	X	X	X	X	X	X	1	LC
208		<i>Albizia coriaria</i>	1	1	1	1	1	1	1	1	1	1	1	1	LC
209		<i>Albizia glaberrima</i>	X	X	1	X	X	1	X	1	X	1	1	X	LC
210		<i>Albizia grandibracteata</i>	X	X	X	1	X	X	X	X	X	X	X	1	LC
211		<i>Albizia zygia</i>	X	1	1	1	X	1	X	X	1	X	1	1	LC
212		<i>Alysicarpus glumaceus</i>	X	X	X	1	X	X	X	X	X	X	X	X	LC

213		<i>Alysicarpus rugosus</i>	X	X	X	X	X	1	X	X	1	X	1	X	LC
214		<i>Alysicarpus zeyheri</i>	X	X	X	X	X	X	X	X	X	X	X	1	LC
215		<i>Amphicarpaea africana</i>	X	1	X	X	X	X	X	X	X	X	1	X	LC
216		<i>Arachis hypogaea</i>	X	X	X	X	X	X	X	X	X	X	X	1	LC
217		<i>Bauhinia variegata</i>	X	X	X	X	1	X	X	X	1	1	X	X	LC
218		<i>Caesalpinia decapetala</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
219		<i>Caesalpinia major</i>	X	X	X	1	X	X	X	X	X	X	X	X	LC
220		<i>Cajanus cajan</i>	X	X	X	X	X	X	X	X	X	1	X	X	LC
221		<i>Canavalia gladiata</i>	X	X	1	1	X	X	X	1	X	X	X	X	LC
222		<i>Cassia alba</i>	X	X	1	X	X	X	X	X	X	X	X	X	LC
223		<i>Cassia didymobotrya</i>	X	X	X	X	X	X	X	X	X	X	1	X	LC
224		<i>Cassia mimosoides</i>	X	X	1	X	X	X	X	X	1	X	X	1	LC
225		<i>Centrosema pubescens.</i>	X	X	X	X	X	X	X	X	X	X	1	1	LC
226		<i>Clitoria ternatea</i>	X	X	X	1	X	X	X	X	X	X	X	X	LC
227		<i>Craibia grandiflora</i>	X	X	1	X	X	X	X	X	X	X	X	X	LC
228		<i>Crotalaria brevidens</i>	X	X	1	1	X	1	1	X	X	X	X	X	LC
229		<i>Crotalaria caudata</i>	X	X	X	X	X	X	X	X	X	X	X	1	LC
230		<i>Crotalaria cylindrica</i>	X	X	X	X	X	X	X	X	X	X	X	1	LC
231		<i>Crotalaria spinosa</i>	1	X	X	X	X	X	1	X	1	1	1	1	LC
232		<i>Davallia chaerophylloides</i>	X	X	1	X	X	X	X	X	X	X	X	X	LC
233		<i>Delonix regia</i>	X	X	X	X	1	X	X	1	X	1	X	X	LC
234		<i>Desmodium dregeanum</i>	X	1	X	X	X	X	X	X	X	1	1	X	LC
235		<i>Desmodium hirtum</i>	X	X	X	X	X	X	X	X	X	X	X	1	LC
236		<i>Desmodium stolzii</i>	1	X	X	X	X	X	X	X	X	X	X	X	LC
237		<i>Desmodium tortuosum</i>	1	X	1	1	X	X	X	X	X	X	X	1	LC
238		<i>Desmodium triflorum</i>	X	X	X	X	X	1	1	X	1	1	1	1	LC
239		<i>Desmodium velutinum</i>	X	X	1	X	X	X	X	X	X	X	1	X	LC

240	Dichrostachys cinerea	1	X	X	X	1	X	X	X	1	X	X	X	LC
241	Entada abyssinica	X	X	X	X	X	X	X	1	1	X	1	X	LC
242	Eriosema flexuosum	X	X	X	X	X	X	X	X	X	X	1	X	LC
243	Eriosema psoraleoides	X	X	X	X	X	X	X	X	1	X	X	X	LC
244	Glycine wightii	X	X	X	X	X	X	X	X	1	1	1	1	LC
245	Indigofera arecta	X	1	X	1	X	X	X	X	X	1	1	X	LC
246	Indigofera circinella	X	X	1	X	X	X	X	X	1	X	X	X	LC
247	Indigofera hirsuta	1	X	X	X	X	X	X	X	1	X	1	1	LC
248	Indigofera mimosoides	X	X	X	X	X	X	X	X	1	X	X	X	LC
249	Indigofera oblongifolia	X	X	1	X	X	X	X	X	X	X	X	X	LC
250	Indigofera spicata	1	X	X	X	X	1	1	X	X	X	X	X	LC
251	Lablab purpureus	X	X	1	X	X	X	X	X	X	X	X	X	LC
252	Macrotyloma axillare	X	X	X	X	X	X	X	X	X	1	1	X	LC
253	Milletia ssp	X	X	X	X	X	X	X	X	X	1	X	X	LC
254	Mimosa pigra	1	X	X	X	X	X	X	X	1	1	X	X	LC
255	Mimosa pudica	1	1	1	1	X	X	1	1	1	1	1	1	LC
256	Mucuna gigantea	X	X	1	X	X	X	X	X	X	X	1	1	LC
257	Piliostigma thonningii	X	X	X	X	X	1	X	X	X	1	X	X	LC
258	Pseudarenna hookeri	X	X	X	X	X	X	X	X	X	X	1	X	LC
259	Rhynchosia luteola	X	X	X	X	X	X	X	X	1	X	X	X	LC
260	Rhynchosia monophylla	X	X	X	1	X	X	X	X	X	X	X	X	LC
261	Rhynchosia resinosa	X	X	X	X	X	X	X	X	X	X	X	1	LC
262	Senna hirsuta	X	X	1	1	X	X	1	X	1	1	1	X	LC
263	Senna occidentalis	X	X	X	X	X	1	X	X	X	1	X	X	LC
264	Senna siamea	X	1	1	1	1	1	X	1	1	1	1	1	LC
265	Senna spectabilis	X	1	X	1	X	X	X	1	1	1	1	X	LC
266	Sesbania sesban	X	X	X	X	X	X	X	X	X	1	X	X	LC

267		<i>Stylosanthes fruticosa</i>	1	X	X	X	X	X	X	X	X	1	1	X	LC
268		<i>Tamarindus indica</i>	X	X	1	1	1	1	X	1	1	1	X	1	VU A2acd
269		<i>Tephrosia pumila</i>	X	1	1	X	X	X	X	X	X	X	1	1	LC
270		<i>Teramnus labialis</i>	X	X	X	X	X	X	X	X	X	X	X	1	LC
271		<i>Tylosema fassoglensis</i>	X	1	1	1	1	1	X	1	X	X	1	1	LC
272		<i>Vigna ambacensis</i>	1	X	X	X	X	X	X	X	X	X	X	X	LC
273		<i>Vigna comosa</i>	1	X	X	X	X	X	X	X	X	X	X	X	LC
274		<i>Vigna parkeri</i>	X	1	X	X	X	X	X	X	1	1	1	1	LC
275		<i>Vigna sativa</i>	X	X	X	X	X	X	X	X	X	X	1	X	LC
276		<i>Vigna schimperi</i>	X	X	X	X	X	1	X	X	X	X	X	1	LC
277		<i>Zornea setosa</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
278	Hydrocharitaceae	<i>Ottelia ulvifolia</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
279	Lamiaceae	<i>Becium angustifolium</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
280		<i>Hoslundia opposita</i>	X	X	X	X	1	X	X	X	1	1	1	1	LC
281		<i>Hyptis suaveolens</i>	X	1	1	1	X	1	1	X	1	1	1	1	LC
282		<i>Leonotis nepetifolia</i>	1	1	1	X	X	X	1	1	1	1	1	1	LC
283		<i>Leucas deflexa</i>	X	X	X	X	X	X	X	X	X	1	X	1	LC
284		<i>Ocimum gratissimum</i>	1	X	1	X	X	X	X	X	X	X	1	1	LC
285		<i>Ocimum lamiifolium</i>	X	X	X	X	X	X	X	X	X	X	1	X	LC
286		<i>Ocimum punctatum</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
287		<i>Solenostemon thyrsoiflorum</i>	X	X	1	X	X	X	X	X	X	X	X	X	LC
288		<i>Tetradenia riparia</i>	X	X	1	X	X	X	X	X	X	X	1	X	LC
289		<i>Urena lobata</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
290	Lauraceae	<i>Persea americana</i>	1	X	1	1	1	X	1	1	1	1	1	X	LC
291	Loranthaceae	<i>Englerina woodfordioides</i>	X	X	X	1	X	X	X	X	X	X	X	X	LC
292	Malvaceae	<i>Abelmoschus esculentus</i>	X	X	X	X	X	X	X	X	X	1	X	X	LC
293		<i>Abutilon mauritianum</i>	X	X	1	X	1	X	X	X	X	1	X	X	LC



294		Corchorus tridens	X	X	X	X	X	1	1	X	1	1	1	1	LC
295		Grewia mollis	X	X	X	X	X	X	X	X	1	1	X	1	LC
296		Grewia similis	X	X	X	1	X	X	X	X	X	X	X	X	LC
297		Grewia trichocarpa	1	X	1	1	X	1	1	X	1	X	X	1	LC
298		Hibiscus cannabinus	X	X	X	X	X	X	X	X	X	X	X	1	LC
299		Hibiscus ovalifolius	X	X	1	X	X	X	X	X	X	1	X	X	LC
300		Hibiscus palmatus	X	X	X	X	X	X	X	X	X	1	X	X	LC
301		Malvastrum coromandelianum	X	X	X	X	1	X	1	1	1	1	1	X	LC
302		Malvaviscus arboreus	X	X	X	X	X	X	X	X	1	1	X	X	LC
303		Sida acuta	1	X	1	1	1	X	X	1	1	X	X	1	LC
304		Sida alba	X	1	X	X	X	1	1	X	X	X	X	1	LC
305		Sida cordifolia	1	X	1	1	X	1	X	X	1	X	1	1	LC
306		Sida cuneifolia	1	X	X	X	X	X	X	X	X	X	X	X	LC
307		Sida erecta	X	X	X	X	X	X	X	X	X	X	1	X	LC
308		Sida rhombifolia	X	1	1	X	X	1	X	X	1	1	1	1	LC
309		Sida ternata	X	X	X	1	X	X	X	X	X	X	X	X	LC
310		Sida urens	X	X	X	X	X	X	X	X	X	1	X	X	LC
311		Theobroma cacao	X	X	X	X	X	X	1	X	X	X	X	X	LC
312		Triumfetta rhomboidea	X	1	1	1	X	1	1	X	X	X	1	1	LC
313		Triumfetta trichocarpa	1	X	X	X	X	X	X	X	X	X	X	X	LC
314		Urena lobata	1	1	1	X	X	1	1	1	1	1	1	1	LC
315		Waltheria indica	X	X	1	X	X	1	X	X	1	1	X	X	LC
316	Melastomataceae	Dissotis senegambiensis	X	X	X	X	X	X	X	X	1	X	X	X	LC
317	Meliaceae	Azadirachta indica	1	X	X	X	1	1	1	X	1	1	1	X	LC
318		Ekebergia capensis	X	X	X	X	X	X	X	X	1	X	X	X	LC
319		Khaya anthotheca	X	X	X	X	1	X	X	X	1	X	X	X	EN A2acd
320		Trichilia degreana	X	X	X	X	X	X	X	X	X	X	1	X	LC

321		Trichilia emitica	X	X	X	X	X	X	X	X	X	X	1	X	LC
322		Trichilia prieuriana	X	X	X	X	X	X	X	X	X	X	1	X	LC
323	Menispermaceae	Chasmanthera dependens	1	X	X	1	1	X	X	1	X	X	1	1	LC
324		Cissampelos mucronata	1	X	1	1	X	X	X	1	1	X	1	X	LC
325		Tinospora caffra	X	X	X	X	X	X	X	X	X	1	1	X	LC
326	Moraceae	Antiaris toxicaria	X	1	1	1	1	X	X	1	X	X	X	X	LC
327		Artocarpus heterophylla	1	1	1	1	1	1	1	1	1	1	1	1	LC
328		Broussonetia papyrifera	X	1	X	1	X	X	X	1	1	X	1	1	LC
329		Ficu sansibarica	X	X	X	X	X	X	X	X	X	1	X	X	LC
330		Ficus asperifolia	X	X	X	1	X	X	X	X	X	X	1	X	LC
331		Ficus conraui	1	1	1	X	X	X	X	X	X	X	X	1	LC
332		Ficus cordata	X	X	X	X	X	X	X	X	X	1	X	X	LC
333		Ficus exasperata	X	X	1	1	X	X	X	X	X	X	X	1	LC
334		Ficus ingens	X	X	X	X	X	X	X	X	X	X	X	1	LC
335		Ficus mucuso	X	X	X	1	X	X	X	X	1	X	1	X	LC
336		Ficus natalensis	1	1	1	X	1	X	1	1	1	X	1	1	LC
337		Ficus ottoniifolia	X	X	X	X	X	X	X	X	X	1	X	X	LC
338		Ficus ovata	1	1	X	1	X	X	1	X	1	1	1	1	LC
339		Ficus polita	X	X	X	1	X	X	X	X	X	X	1	X	LC
340		Ficus pseudomangifera	X	1	X	1	X	X	X	X	X	X	X	X	LC
341		Ficus sansibarica	1	1	X	1	1	1	X	X	1	X	1	1	LC
342		Ficus saussureana	X	X	1	1	X	X	X	1	X	X	1	X	LC
343		Ficus ssp	X	X	X	X	X	X	X	X	X	X	X	1	LC
344		Ficus sur	X	X	X	X	X	X	1	X	X	1	1	X	LC
345		Ficus sycomorus	X	1	1	1	1	X	1	X	1	X	1	1	LC
346		Ficus thonningii	X	X	X	X	X	1	X	X	1	1	X	1	LC
347		Ficus vallis choudae	X	X	1	X	1	X	X	X	X	1	1	1	LC

348		<i>Ficus vasta</i>	X	X	1	X	1	X	X	X	1	X	X	X	LC
349		<i>Milicia excelsa</i>	1	1	1	1	1	1	1	1	1	1	1	1	EN A2acd
350		<i>Morus alba</i>	X	X	X	X	1	X	X	X	X	X	X	X	LC
351	Moringaceae	<i>Moringa oleifera</i>	X	X	X	X	1	1	X	X	X	1	X	X	LC
352	Musaceae	<i>Musa ssp</i>	X	X	1	X	X	X	X	X	X	X	1	X	LC
353	Myrtaceae	<i>Eucalyptus camadulensis</i>	X	X	1	X	X	X	X	X	X	X	X	X	LC
354		<i>Eucalyptus globulus</i>	X	X	1	X	1	X	1	1	1	1	X	X	LC
355		<i>Eucalyptus grandis</i>	1	X	X	1	X	X	X	X	X	X	X	X	LC
356		<i>Psidium guajava</i>	1	1	X	1	X	1	1	1	X	X	1	1	LC
357		<i>Pudica ssp</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
358		<i>Syzygium cumini</i>	X	X	X	X	X	X	X	1	1	1	1	1	LC
359	Nephrolepidaceae	<i>Arthropteris undulata</i>	X	X	X	X	X	X	X	X	X	X	X	1	LC
360	Nyctaginaceae	<i>Bougainvillea grabra</i>	X	X	X	X	X	X	X	X	X	X	1	X	LC
361		<i>Commicarpus pedunculatus</i>	X	X	X	X	X	X	1	X	X	X	X	X	LC
362		<i>Gomphrena celosioides</i>	X	X	X	X	X	1	X	X	X	1	X	X	LC
363		<i>Mirabilis jalapa</i>	X	X	X	X	X	X	X	X	X	X	X	1	LC
364	Oleaceae	<i>Jasminum fluminense</i>	X	X	X	X	X	X	X	X	X	X	X	1	LC
365	Oliniaceae	<i>Olinia rochetiana</i>	X	X	X	X	X	X	X	1	X	X	X	X	LC
366	Onagraceae	<i>Ludwigia abyssinica</i>	1	X	X	X	X	X	X	X	1	X	X	X	LC
367	Orchidaceae	<i>Aerangis brachycarpa</i>	X	X	1	X	X	X	X	X	X	X	X	X	LC
368		<i>Diaphanante fragrantissima</i>	X	X	X	X	X	X	X	X	1	X	X	1	LC
369		<i>Tridactyle tridentata</i>	X	X	X	X	X	X	X	X	X	X	1	X	LC
370		<i>Vanilla bampsiana</i>	X	X	X	X	1	X	X	X	X	X	X	X	LC
371	Oxaliadaceae	<i>Biophytum abyssinicum</i>	X	X	X	X	X	X	X	X	X	1	X	X	LC
372		<i>Oxalis latifolia</i>	X	1	X	X	X	X	X	X	X	X	X	X	LC
373	Oxalidaceae	<i>Biophytum abyssinicum</i>	1	X	X	X	X	X	X	X	1	X	1	1	LC
374		<i>Oxalis latifolia</i>	X	X	1	X	X	X	1	1	X	X	1	1	LC

375		<i>Oxalis obliquifolia</i>	X	X	1	X	X	X	X	X	X	X	X	X	LC
376	Palmae	<i>Borassus aethiopicum</i>	X	X	1	1	X	X	X	X	X	X	X	X	LC
377		<i>Elaeis guineensis</i>	X	X	X	X	X	X	X	X	X	X	X	1	LC
378		<i>Phoenix reclinata</i>	1	X	1	X	1	X	1	X	X	1	1	X	LC
379		<i>Roystonea regia</i>	X	X	X	X	1	X	X	X	X	X	1	X	LC
380	Papaveraceae	<i>Argemone mexicana</i>	X	X	X	1	X	X	X	X	X	X	X	X	LC
381	Passifloraceae	<i>Adenia cissampeloides</i>	X	X	X	1	X	X	X	X	X	X	1	X	LC
382		<i>Adenia gummiferum</i>	X	X	X	1	X	X	X	X	X	X	X	X	LC
383		<i>Passiflora edulis</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
384	Pedaliaceae	<i>Sesamum angustifolium</i>	X	X	X	X	X	X	X	X	1	X	X	1	LC
385		<i>Sesum indica</i>	X	X	X	X	X	1	X	X	X	X	X	X	LC
386	Phytolaccaceae	<i>Phytolacca dodecandra</i>	X	X	X	X	X	X	X	X	1	X	1	X	LC
387	pinaceae	<i>Pinus caribea</i>	X	X	X	X	X	X	X	X	X	1	1	X	LC
388		<i>Pinus oocarpa</i>	1	X	X	X	X	X	1	X	X	1	X	X	LC
389		<i>Pinus patula</i>	X	X	1	1	1	X	1	1	1	X	1	X	LC
390	Poaceae	<i>Bambusa vulgaris</i>	X	X	X	X	1	X	X	X	X	X	X	X	LC
391		<i>Brachiaria brizantha</i>	X	X	X	X	X	X	X	X	X	X	X	1	LC
392		<i>Brachiaria documbens</i>	1	X	X	X	X	X	X	X	X	X	X	1	LC
393		<i>Brachiaria comata</i>	X	X	1	1	X	1	1	X	1	1	1	1	LC
394		<i>Brachiaria documbens</i>	X	1	1	1	1	1	1	1	1	1	1	1	LC
395		<i>Brachiaria jubata</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
396		<i>Brachiaria leersioides</i>	X	X	X	X	X	X	X	X	X	X	1	X	LC
397		<i>Chloris pilosa</i>	X	X	1	X	X	X	X	X	X	X	X	X	LC
398		<i>Chloris pycnothrix</i>	X	X	1	X	X	1	X	X	X	1	1	1	LC
399		<i>Cymbopogon nardus</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
400		<i>Cymbopogon ssp</i>	X	X	X	X	X	X	1	X	X	X	X	X	LC
401		<i>Cynodon aethiopicus</i>	X	X	X	X	X	X	X	X	X	X	1	X	LC

402	Cynodon dactylon	1	1	1	1	X	1	1	X	1	1	X	1	LC
403	Dactyloctenium aegypticum	X	X	X	X	X	X	1	X	X	1	X	X	LC
404	Digitaria abyssinica	1	1	1	1	X	X	1	X	1	1	X	1	LC
405	Digitaria longiflora	1	X	X	X	X	1	X	X	1	1	1	1	LC
406	Digitaria scalarum	X	X	X	X	X	X	X	X	1	X	X	X	LC
407	Digitaria ternata	1	X	X	X	X	1	1	X	1	1	X	1	LC
408	Digitaria velutina	X	X	1	X	X	X	1	X	1	1	1	X	LC
409	Echinochloa hapoclada	X	X	X	X	X	X	X	X	X	1	1	X	LC
410	Echinochloa ugandensis	1	X	X	X	X	X	X	X	X	X	X	1	LC
411	Eleusine indica	1	1	1	1	X	X	1	X	1	1	1	1	LC
412	Eragrostis aspera	X	X	1	X	X	X	X	X	X	X	X	1	LC
413	Eragrostis ciliaris	X	X	X	X	X	X	X	X	X	X	X	1	LC
414	Eragrostis exasperata	X	X	X	X	X	X	X	X	1	X	1	X	LC
415	Eragrostis namaquensis	X	X	1	X	X	X	X	X	X	X	X	X	LC
416	Eragrostis olivacea	X	X	X	X	X	X	X	X	1	X	X	X	LC
417	Eragrostis superba	X	X	X	X	X	X	X	X	1	X	X	X	LC
418	Eragrostis tenuifolia	1	1	1	X	X	1	1	X	1	1	1	1	LC
419	Eriochloa fatmensis	X	X	X	X	1	1	1	1	1	X	X	X	LC
420	Harpachne schimperi	X	X	X	X	X	X	X	X	1	X	X	X	LC
421	Hyparrhenia collina	1	X	1	X	X	X	X	X	1	X	1	1	LC
422	Hyparrhenia filipendula	X	X	X	X	X	X	X	X	1	X	X	X	LC
423	Hyperthelia dissoluta	X	X	X	X	X	X	X	X	1	X	X	X	LC
424	Imperata cylindrica	X	1	1	1	X	1	1	X	1	X	1	X	LC
425	Leersia hexandra	1	X	1	X	X	X	X	X	1	X	X	1	LC
426	Loudetia kagerensis	X	X	X	X	X	X	X	X	1	X	X	X	LC
427	Melinis repens	X	X	1	X	X	X	1	X	1	X	1	1	LC
428	Microchloa kunthii	X	X	X	X	X	X	X	X	1	X	X	1	LC



429		Ocimum punctatum	X	X	X	X	X	X	X	X	X	1	X	X	LC
430		Oplismenus hirtellus	X	1	X	X	X	X	X	X	X	X	X	X	LC
431		Oryza sativa	X	X	X	X	X	X	X	X	1	X	X	X	LC
432		Panicum maximum	1	1	1	1	X	1	1	X	1	1	1	1	LC
433		Panicum trichocladum	1	1	1	1	X	X	X	X	X	X	1	1	LC
434		Paspalum notatum	X	X	X	X	X	X	X	X	1	X	1	1	LC
435		Paspalum scrobiculatum	1	1	1	1	1	1	1	1	1	1	1	1	LC
436		Pennisetum polystachion	X	1	1	X	X	1	1	X	1	X	1	X	LC
437		Pennisetum purpureum	X	X	1	1	X	X	X	1	1	X	X	1	LC
438		Phragmites mauritianus	1	X	1	X	X	X	X	X	X	1	X	X	LC
439		Pseudochinolaena polystachya	X	X	X	X	X	X	X	X	X	X	1	X	LC
440		Rottboellia cochinchinensis	X	X	1	1	X	X	1	X	1	1	1	X	LC
441		Saccharum officinarum	X	X	X	X	X	X	X	X	X	X	1	1	LC
442		Saccharum spontaneum	X	1	1	X	X	X	X	X	1	1	X	1	LC
443		Sacciolepis indica	X	X	X	X	X	X	X	X	X	X	X	1	LC
444		Setaria kagerensis	X	X	1	X	X	X	X	X	X	1	1	X	LC
445		Setaria megaphylla	X	1	X	1	X	X	X	X	X	X	X	X	LC
446		Setaria pumila	X	X	X	X	X	X	X	X	X	1	1	X	LC
447		Setaria sphacelata	X	X	X	X	X	X	X	X	1	1	X	X	LC
448		Sorghum arundinaceum	1	1	1	X	X	1	X	1	X	1	1	1	LC
449		Sorghum bicolor	X	X	X	X	X	1	1	X	1	X	X	X	LC
450		Sorghum verticilliflorum	1	X	X	X	X	X	X	X	X	X	X	X	LC
451		Sporobolus pyramidalis	1	X	1	X	X	X	X	X	1	1	1	1	LC
452		Sporobolus stapfianus	X	X	X	X	X	X	X	X	1	X	X	1	LC
453		Themeda triandra	X	X	X	X	X	X	X	X	1	X	X	X	LC
454		Zea mays	X	X	1	X	X	X	1	X	1	X	1	1	LC
455	Podocarpaceae	Podocarpus latifolius	X	X	X	X	1	X	X	X	X	X	X	X	VU A2cd

456	Polygalaceae	<i>Polygala stenopetala</i>	X	X	X	1	X	X	X	X	X	X	X	X	LC
457	Polygonaceae	<i>Oxygonum sinuatum</i>	1	X	1	X	1	X	1	X	1	1	X	1	LC
458		<i>Polygonum strigosum</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
459		<i>Rumex usambarensis</i>	X	X	X	1	X	X	X	X	X	X	X	X	LC
460	Polypodiaceae	<i>Drynaria laurentii</i>	X	X	X	X	X	X	X	X	X	X	1	X	LC
461		<i>Oxygonum sinuatum</i>	X	X	X	X	X	X	X	X	X	X	1	X	LC
462	Portulacaceae	<i>Portulaca foliosa</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
463		<i>Portulaca oleraceae</i>	1	X	X	X	X	1	X	X	1	X	X	X	LC
464		<i>Portulaca quadrifida</i>	X	X	X	X	X	1	X	X	X	X	X	X	LC
465	Proteaceae	<i>Gravillea robusta</i>	X	1	1	1	1	1	1	1	1	1	1	X	LC
466	Ranunculaceae	<i>Clematis hirsuta</i>	X	X	X	1	X	X	X	X	X	X	X	X	LC
467	Rhamnaceae	<i>Maesopsis eminii</i>	1	1	1	1	1	1	1	1	1	1	1	1	LC
468	Rubiaceae	<i>Alysicarpus rugosus</i>	X	X	X	X	X	X	1	X	X	X	X	X	LC
469		<i>Bathedavia ssp</i>	X	X	X	X	1	1	1	1	1	1	X	X	LC
470		<i>Coffea arabica</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
471		<i>Coffea canephora</i>	X	X	X	1	X	X	X	X	X	X	X	X	LC
472		<i>Coffea robusta</i>	X	X	X	X	X	X	1	1	1	X	1	X	LC
473		<i>Mitracarpus villosus</i>	1	X	1	X	X	X	X	X	1	1	X	1	LC
474		<i>Morinda lucida</i>	X	X	1	X	X	X	X	X	X	X	X	X	LC
475		<i>Oldenlandia corymbosa</i>	X	X	X	X	X	X	X	X	X	X	X	1	LC
476		<i>Oldenlandia herbacea</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
477		<i>Pavetta gardeniifolia</i>	X	X	X	X	X	X	X	X	X	X	1	X	LC
478		<i>Richardia scabra</i>	X	X	X	X	X	X	X	X	1	1	X	X	LC
479		<i>Vangueria madagascariensis</i>	X	X	X	X	X	X	X	X	X	X	X	1	LC
480	Rutaceae	<i>Citrus limon</i>	X	1	X	X	X	X	1	X	1	1	X	X	LC
481		<i>Citrus sinensis</i>	X	X	1	1	X	X	X	X	X	X	X	X	LC
482		<i>Clausena anisata</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC

483		<i>Vepris nobilis</i>	X	X	1	X	X	X	X	X	X	X	X	X	LC
484	Sapindaceae	<i>Allophylus africanus</i>	X	X	1	X	X	1	X	X	1	X	X	X	LC
485		<i>Blighia unijugata</i>	X	X	X	1	X	1	X	X	X	1	X	X	LC
486		<i>Cardiospermum grandiflorum</i>	X	X	1	1	X	X	1	X	X	X	X	X	LC
487		<i>Cardiospermum halicacabum</i>	X	X	X	1	X	X	X	X	X	X	X	1	LC
488		<i>Filicium decipiens</i>	X	X	X	X	1	X	X	X	X	X	X	X	LC
489		<i>Paullinia pinnata</i>	X	X	1	X	X	X	X	X	X	X	1	X	LC
490		<i>Sapindus saponaria</i>	X	X	X	X	X	1	X	X	X	X	X	X	LC
491	Sapotaceae	<i>Chrysophyllum albidum</i>	X	X	X	X	X	X	X	X	X	X	1	X	VU A2acd
492	Scrophulariaceae	<i>Craterostigma plantagineum</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
493		<i>Striga forbesii</i>	X	X	1	1	X	X	X	X	1	X	X	X	LC
494	Solanaceae	<i>Brugmansia suaveolens</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
495		<i>Capsicum frutescens</i>	X	X	X	X	X	X	X	X	X	X	X	1	LC
496		<i>Datura stramonium</i>	X	X	X	X	X	X	X	X	X	1	X	X	LC
497		<i>Physalis angulata</i>	X	X	1	X	X	X	X	X	1	X	1	1	LC
498		<i>Physalis peruviana</i>	X	1	X	X	X	X	X	X	X	X	X	X	LC
499		<i>Solanecio mannii</i>	X	X	1	X	X	X	X	X	X	X	X	X	LC
500		<i>Solanum incanum</i>	1	X	1	X	X	X	X	X	X	1	1	1	LC
501		<i>Solanum macranthum</i>	X	X	X	X	X	X	X	X	X	1	X	X	LC
502		<i>Solanum macrocarpon</i>	X	X	X	1	X	X	X	X	X	X	X	X	LC
503		<i>Solanum nigrum</i>	X	1	X	X	1	X	1	1	X	X	X	1	LC
504		<i>Withania somnifera</i>	X	X	X	X	1	X	X	X	X	X	X	X	LC
505	Ulmaceae	<i>Trema orientalis</i>	X	1	X	1	X	1	X	X	1	X	1	X	LC
506	Urticaceae	<i>Laportea alatis</i>	X	1	X	X	X	X	X	X	X	X	X	X	LC
507	Verbenaceae	<i>Clerodendrum capitatum</i>	X	X	1	X	X	X	X	X	X	X	X	X	LC
508		<i>Clerodendrum formicarum</i>	X	X	X	X	X	X	X	1	X	X	X	X	LC
509		<i>Clerodendrum rotundifolium</i>	X	X	X	X	X	X	X	X	X	X	X	1	LC
510		<i>Clerodendrum umbellatum</i>	X	X	X	X	X	1	X	X	1	X	X	1	LC

511		<i>Datura stramonium</i>	X	X	X	X	1	X	1	X	X	X	X	X	LC
512		<i>Duranta erecta</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
513		<i>Lantana camara</i>	1	1	1	X	1	1	1	X	1	1	1	1	LC
514		<i>Lantana trifolia</i>	X	X	X	X	X	X	X	X	1	1	X	1	LC
515		<i>Premna angolensis</i>	X	X	1	X	X	X	X	X	X	X	X	X	LC
516		<i>Stachytarpheta urticifolia</i>	1	X	1	X	X	X	1	X	1	1	1	1	LC
517		<i>Tectona grandis</i>	X	X	X	X	X	X	X	X	1	1	1	X	LC
518		<i>Vitex doniana</i>	X	X	1	1	X	X	X	X	1	1	1	1	LC
519		<i>Vitex keniensis</i>	X	X	1	1	X	X	X	X	1	X	X	X	LC
520	Vitaceae	<i>Ampelocissus africana</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
521		<i>Cayratia gracilis</i>	1	X	X	X	X	X	X	X	X	X	X	X	LC
522		<i>Cissus oliveri</i>	1	1	1	X	X	X	X	1	1	1	1	X	LC
523		<i>Cyphostemma adenocaulis</i>	X	X	1	X	X	X	X	X	X	X	1	X	LC
524		<i>Cyphostemma cyphopetalum</i>	X	1	1	X	X	X	X	1	1	X	1	1	LC
525	Zamiaceae	<i>Encephalartos ssp</i>	X	X	X	X	1	X	X	X	X	X	X	X	LC
526		Zingiberaceae	X	X	X	X	1	X	X	X	1	X	X	X	LC
527		<i>Curcuma domestica</i>	X	X	X	X	X	X	X	X	1	X	X	X	LC
528		<i>Zingiber officinale</i>	X	X	X	X	1	X	X	X	X	X	X	X	LC

## **16 ANNEX III: FAUNA BASELINE REPORT**

### **16.1 Sampling / survey methods**

Four main methods were employed in conducting the baseline survey. The four include:

### **16.2 Literature Review**

Literature was consulted to establish known fauna that is found in the project area. This was done by reviewing publication and various websites dedicated to avi-fauna conservation and research. Also reviewed was biodiversity survey report for South Busoga Central Forest Reserve published by the Forest Department (current National Forest Authority).

### **16.3 Field visits**

The fauna ecologist conducted a reconnaissance field visit to the project area. The purpose of the reconnaissance was to identify the sampling sites and or the various habitats in the project area, and also identify other issues that will be needed to prepare for the detailed ESIA survey.

### **16.4 Informal community consultations**

During the field visit and field sampling, the consultant informally consulted the community members especially those found working in the field. The purpose was to document information on fauna which the consultant may not be able to get during the field sampling. Among other things, it involved inquiry about the faunal groups / species that occur in the project area.

### **16.5 Field Sampling**

Field sampling was conducted using known scientific methods and international best practices. Fauna species found or living in the project area were registered or recorded. The methods used include the following

### **16.6 Butterflies**

#### **16.6.1 Sampling Method**

Pallard's sweep net method (Gall, 1985; New, 1991; Warren, 1992; De Vries 1997) was employed to sample butterflies along transects that were established within the project area. The method was used to document the fauna species richness, as well as estimate their relative abundance. The method was chosen because it is time-efficient. The method was also chosen because the negative effects that may be brought about during handling of individuals are avoided (Nowicki, P *et al.*, 2008).

Estimating species richness was assessed based on recorded species presence or absence at the different sites that were sampled. The observer recorded the species encountered as he moved through transects that were established for the purpose. A species list was then compiled from the records of the survey. Abundance estimation was assessed by counting and recorded the number of individuals of the different butterfly species that were encountered while sampling the established transects in the different project site.



### 16.6.2 Sampling design

At each of the project site, transects of 10m wide and 100m long were established. The fauna ecologists or data collector moved through the transect along a fixed line with 5m stretch on either side of the data collectors left and right hand. The observer moved at a slow and uniform / even pace of approximately (Pellet 2007) through the transect, recording individuals sighted within the 10m width. Sampling was conducted when weather warmed up or in sunny weather (13-17°C) and between 9am-5pm.

On spotting an individual butterfly, the fauna ecologist swept the net back and forth to capture the seen butterfly. On anticipation of a capture, the net was flipped over, with the bag hanging over the rim, trapping the individual fly. Trapped butterflies were gently removed from the net and identified. Once identified, the individuals were released. In case of encounter with an individual butterfly whose identity is not known, the butterfly was photographed and placed in collection envelopes, with details of GPS coordinates, Time and the photograph number written on the labels and taken to Makerere University Museum for identity determination. All trapped butterflies were identified to species level.

### 16.6.3 Data analysis

Species Richness: The number of species present in a given sample is a measure of Species richness (Hellmann and Fowler 1999). Species checklists of butterflies encountered at each sampling site were compiled. Standard guide by Larsen (1991) was used as basis of identification. Unidentified specimens were matched with Makerere University Museum collections. The species were arranged into families *Hesperiidae*, *Lycaenidae*, *Nymphalidae*, *Paeridae* and *Papilionidae* and their corresponding genera. Bar graphs were used to compare the results. The total number of individuals recorded per species was taken as the relative abundance of the butterfly population at the sampling sites.

### 16.6.4 Conservation status of species

The conservation status of each species was obtained from the 2019 published IUCN red data list and the National red list of Uganda's threatened species (Wildlife Conservation Society 2016). Through examining published distribution records and literature, assessment of the limits of distribution range of the different species, new records, lack of records of expected species, was done.

## 16.7 Dragonflies

### 16.7.1 Sampling methods

Pallard's sweep net method (Gall, 1985; New, 1991; Warren, 1992; De Vries 1997) was employed to sample dragonflies at the different project sites. Estimating species richness was assessed based on recorded species presence or absence at the different sites that were sampled. The observer recorded the dragonfly species encountered as he walked through transects sited at in the project sites. A species list which forms a measure of species richness was compiled from the records done during the transect walks. Abundance estimation was assessed by counting and recording the number of individuals of the different dragonfly species that were encountered while sampling the established transects at the project sites.

### 16.7.2 Sampling design

Same design as for butterflies (see above) was adopted. Dragonflies need sunny warm weather to fly; the temperature below 25 °C slowed the activity whereas an optimal temperature above 30 °C increased activity. If it is too cold or wet, they usually hide in vegetation. Sampling was therefore conducted when weather warms up. Each sampling event was conducted between 09:00h to 17:00h time and lasted about 1 hour. All dragonflies that were flying or be perched within 5m of transect routes were recorded. All flying species were easily detected within the project area and an aerial net was swept through the vegetation to elicit a flight response from less conspicuous, resting individuals. Same amount of sampling effort (time given to searches) was applied at each site. Sampling events were conducted during the wet season as well as during the dry season.

### 16.7.3 Data Analysis

The data collected were analyzed as follows:

Species Richness: The number of species present in a given sample is a measure of Species richness (Hellmann and Fowler 1999). Species checklists of dragonflies encountered at each sampling site were compiled. Standard guide by Klaas-Douwe B Dijkstra (2006) was used as basis of identification. Unidentified specimens were matched with Makerere University Museum collections. The species were arranged into families and genera. Bar graphs were used to compare the results.

### 16.7.4 Conservation status of species

The conservation status of each species was obtained from the 2019 published IUCN Red Data List of threatened species and the National red list of Uganda's threatened species published by Wildlife Conservation Society 2016. Through examining published distribution records and literature, assessment of the limits of distribution range of the different species, new records, lack of records of expected species was conducted.

## 16.8 Herpetofauna (Amphibians and Reptiles)

### 16.8.1 Sampling Methods

A combination of scientifically tested methods was used to collect information on herpetofauna as described by Heyer *et al.*, (1994); Fellers and Freel, (1995); Halliday, (1996); and Olson, *et al.*, (1997). The methods included the following:

- **Visual Encounter Surveys (VES):** The method involved moving through a habitat watching out for, and recording surface-active herpetofauna species. VES were complimented by visual searches, by examining under logs, leaf litter, in vegetation, and crevices. Species encountered and their numbers were recorded and where possible photographed;
- **Audio Encounter Surveys (AES):** This method uses the species-specific calls / sounds / advertising calls made by breeding males. The identity of the amphibian species heard calling and their numbers were counted and recorded;
- **Dip netting:** Using a dip net, ponds, pools, and streams and other water collection points were dip netted. Adult amphibians and tadpoles encountered were also recorded; and
- **Opportunistic Encounters:** Herpeto-fauna species encountered opportunistically while moving in the project area were recorded in order to accumulate a complete species checklist for each site.

### 16.8.2 Sampling Design

Transects of 10m wide and 200m long, were established in the different project areas and were sampled for herpetofauna. The Fauna ecologist or observer walked through the transect for a period of 1 hour (1-man hour), at a uniform pace, systematically searching for amphibians and reptiles. Each sampling event was conducted between 09:00h to 17:00h. Same amount of sampling effort (time given to searches) was applied at each sampling site. Many species of amphibians and reptiles (herpetofauna) tend to be nocturnal. Sampling was done during day time (07:00am-06:00 pm). A few night field visits (07:00-08:00pm) were done but limited by the night curfew imposed by the Government of Uganda to halt the spread of COVID-19. Herpetofauna were sampled using the above combined methods with sampling effort standardized by time constraint (Crump and Scott 1994).

### 16.8.3 Data analysis

Species Richness: Species checklist was compiled; which list gives a measure of herpetofauna species richness at each sampling site. Standard identification guides by Spawls *et al.*, 2008 and Branch, B. 2005 were used. Unidentified specimens were taken to Makerere University Museum for identification. Bar graphs were used to compare the results. Relative abundance was computed from the total number of individuals recorded per species within the herpetofauna population for the sampling sites.

### 16.8.4 Conservation status of species

The conservation status of each species was obtained from the 2019 published IUCN red data list and the National red list of threatened species for Uganda published by Wildlife Conservation Society 2016. Through examining published distribution records and literature, assessment of the limits of distribution range of the different species, new records, lack of records of expected species was determined.

## 16.9 Avi-fauna (Birds)

### 16.9.1 Sampling Method

Line transect method was used to sample birds at the different project sites. The method was chosen because of the advantages it provides and encompasses most species and can be used to survey a number of bird species together. With this method, multiple counts can be obtained by counting in the same study site repeatedly in the same season or by counting multiple study sites once. Therefore, by this method, temporal variations at sites within season, and spatial variation across the sites can be captured. The method was also chosen because of the time given for fieldwork was limited.

It is highly adaptive and can be used in terrestrial and freshwater systems. The method can be used to survey individual species, or groups of species. The method is also efficient in terms of the quantity of data collected per unit of effort expended, can be used to examine bird-habitat relationships and can be used to derive relative and absolute measures of bird abundance. It is also the best method for sampling diurnal species in grasslands, wetlands or other rather uniform vegetation conditions (Ribic and Sample. 2001).

### 16.9.2 Sampling design

During the sampling, the Fauna ecologist walked a predetermined route and recording birds on either side of the observer. Birds identified by sight or sound 50m (estimated by eye from the line) perpendicular to the

transect line were recorded when first detected. Fauna and especially birds are non-stationary objects and can be mobile (justifying use of 50m instead of 20m recommended by WB). The observer recorded birds continually within a fixed distance of 200m length. The sampling lasted a period of one hour. Birds seen flying over the survey area were counted and recorded. Double recording of the same individual of birds within a transect was avoided by use of careful observations. A few additional records were made of species found to be present in the area outside the time of the count. Bird observations were aided by a 10x40 binocular. Many bird species are highly seasonal, either moving between seasons to follow suitable habitat, or as part of larger migratory movement. This is especially true in the case of many wetland birds.

### 16.9.3 Data Analysis

Species Richness: Species checklist was compiled; which list gives a measure of the bird species richness at each sampling site. Standard identification guide by Stevenson and Fanshawe (2002), supported by the Uganda Bird checklist (Nature Uganda 2016) was used. Bar graphs were used to compare the collected data. Relative abundance was computed from the total number of individuals recorded per species.

### 16.9.4 Conservation status of species

The conservation status of each species was obtained from the 2019 published IUCN red data list of threatened species and the National red list for Uganda published by Wildlife Conservation Society 2016. Through examining the published distribution records and literature, assessment of the limits of distribution range of the different bird species was done.

## 16.10 Mammals

During the survey, the following were investigated and assessed; 1) species richness (number of species detected in each sample), 2) sample size (number of individual in a sample), and 3) their relative abundance (number of individuals of a species in each sample).

### 16.10.1 Sampling Method

Mammals were sampled using four main methods:

- Direct observation/opportunistic encounters: All mammals seen or opportunistically sighted while moving in the project area were identified, counted and recorded;
- Use of Signs e.g., footprints and/or dung or calls: Mammal species whose footprints and dung was seen and is recognizable were recorded for their presence;
- Use of Sherman Live traps; The method uses baited traps, set and left in place over night before they are moved to a different sampling sites. Trapping was used to survey small mammals. Live traps have been successfully used to detect patterns of richness, composition, and abundance of small mammal communities (Kelt 1996; Patterson et al. 1989; Yu1994). and;
- Local consultations: The fauna specialist also held informal discussions with community members who were found working in the project area, about the availability of mammal species in and around the proposed sites.

### 16.10.2 Sampling design

The large mammals seen through direct observation and indirectly through use of signs, were recorded. For small mammals, Trap lines were established in the different project areas. Each trap line consisted of a total

of 10 traps spaced at distance of 20meters apart. The traps were left open for one night. Traps were baited with a mixture of peanut butter, ghee and yellow banana and set under cover of shrubs or dense vegetation to conceal them and to provide some thermal insulation. Traps were checked twice daily, immediately after sunrise (0630-07030-hrs) and in late afternoon (1730-1830-hrs). Traps were baited daily in late afternoon with fresh bait. Small mammals caught were identified to species level and released back into the field at the point of capture (Gurnell and Flowerdew 1990).

### 16.10.3 Data analysis

Species Richness: the number of species caught at each site were used as a measure of species richness (Hellmann and Fowler 1999). The simplest measure of species richness is the number of species present in a sample (Hellmann and Fowler 1999). Species richness was compiled from the list of caught animals, or those casually encountered and from those whose signs will be spotted in the field and can be identified. Bar graphs were used to compare the data.

### 16.10.4 Conservation status of species

The conservation status of each mammal species encountered was ascertained using the 2019 version of the published IUCN red data list of threatened species and the National red list for Uganda 2016 (Wildlife Conservation Society 2016). Mammal identifications were based on Field guides by Kingdon (1974), Delany (1975) and Kingdon *et al.* (2013).

### 16.10.5 Site by Site butterfly species lists

#### 16.10.5.1 PROPOSED ACCESS ROAD

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Nymphalidae	<i>Acraea uvui</i> Tiny <i>Acraea</i>	14	Least Concern
Nymphalidae	<i>Danaus chrysippus</i> African Queen	3	Least Concern
Nymphalidae	<i>Junonia oenone</i> Blue Pansy	4	Least Concern
Nymphalidae	<i>Junonia sophia</i> Little Commodore	2	Least Concern
Nymphalidae	<i>Junonia stygia</i> Brown Pansy	3	Least Concern
Nymphalidae	<i>Phalanta eurytis</i> African Leopard Fritillary	2	Least Concern
Papilionidae	<i>Papilio dardanus</i> Flying Handkerchief / African Mocker Swallowtail	1	Least Concern
Papilionidae	<i>Papilio demodocus</i> Citrus Swallowtail	1	Least Concern
Papilionidae	<i>Papilio nireus</i> Narrow Blue-banded Swallowtail	1	Least Concern
Pieridae	<i>Belenois creona</i> Common White	3	Least Concern
Pieridae	<i>Colotis euippe</i> Round-winged Orange Tip	1	Least Concern
Pieridae	<i>Eurema desjaridinsi</i> Angled Grass Yellow	25	Least Concern

#### 16.10.5.2 PROCESSING PLANT AREA

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Lycaenidae	<i>Zizula hylax</i> Tiny Grass Blue	36	Least Concern
Nymphalidae	<i>Acraea sotikensis</i> Sotik <i>Acraea</i>	10	Least Concern
Nymphalidae	<i>Acraea uvui</i> Tiny <i>Acraea</i>	9	Least Concern



Nymphalidae	<i>Danaus chrysippus</i> African Queen	7	Least Concern
Nymphalidae	<i>Junonia oenone</i> Blue Pansy	6	Least Concern
Nymphalidae	<i>Junonia sophia</i> Little Commodore	8	Least Concern
Nymphalidae	<i>Junonia stygia</i> Brown Pansy	7	Least Concern
Nymphalidae	<i>Junonia terean</i> Soldier Commodore	5	Least Concern
Nymphalidae	<i>Neptidopsis ophione</i> Scalloped Sailer	1	Least Concern
Nymphalidae	<i>Pseudacraea</i> Lucretia False Diadem	1	Least Concern
Papilionidae	<i>Papilio demodocus</i> Citrus Swallowtail	5	Least Concern
Pieridae	<i>Belenois creona</i> Common White	4	Least Concern
Pieridae	<i>Eurema desjaridinsi</i> Angled Grass Yellow	10	Least Concern
Pieridae	<i>Eurema hecabe</i> Common Grass Yellow	1	Least Concern

#### 16.10.5.3 MAKUUTU MINING PIT CC

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Lycaenidae	<i>Zizula hylax</i> Tiny Grass Blue	1	Least Concern
Nymphalidae	<i>Acraea sotikensis</i> Sotik Acraea	16	Least Concern
Nymphalidae	<i>Acraea uvui</i> Tiny Acraea	12	Least Concern
Nymphalidae	<i>Junonia oenone</i> Blue Pansy	7	Least Concern
Nymphalidae	<i>Junonia sophia</i> Little Commodore	4	Least Concern
Nymphalidae	<i>Junonia stygia</i> Brown Pansy	6	Least Concern
Nymphalidae	<i>Junonia terean</i> Soldier Commodore	4	Least Concern
Nymphalidae	<i>Neptidopsis ophione</i> Scalloped Sailer	4	Least Concern
Nymphalidae	<i>Pseudacraea</i> Lucretia False Diadem	4	Least Concern
Papilionidae	<i>Papilio dardanus</i> Flying Handkerchief / African Mockers Swallowtail	3	Least Concern
Papilionidae	<i>Papilio demodocus</i> Citrus Swallowtail	6	Least Concern
Pieridae	<i>Belenois creona</i> Common White	4	Least Concern
Pieridae	<i>Eurema desjaridinsi</i> Angled Grass Yellow	8	Least Concern

#### 16.10.5.4 MAKUUTU MINING PIT CB

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Nymphalidae	<i>Acraea sotikensis</i> Sotik Acraea	10	Least Concern
Nymphalidae	<i>Acraea uvui</i> Tiny Acraea	33	Least Concern
Nymphalidae	<i>Danaus chrysippus</i> African Queen (African Monarch)	2	Least Concern
Nymphalidae	<i>Hypolimnas misippus</i> Diadem	2	Least Concern
Nymphalidae	<i>Junonia oenone</i> Blue Pansy	11	Least Concern
Nymphalidae	<i>Junonia sophia</i> Little Commodore	10	Least Concern
Nymphalidae	<i>Junonia stygia</i> Brown Pansy	17	Least Concern
Nymphalidae	<i>Junonia terean</i> Soldier Commodore	2	Least Concern
Nymphalidae	<i>Neptidopsis ophione</i> Scalloped Sailer	4	Least Concern
Nymphalidae	<i>Precis octavia</i> Gaudy Commodore	1	Least Concern
Nymphalidae	<i>Precis rauna</i> Forest Commodore	1	Least Concern
Nymphalidae	<i>Pseudacraea</i> Lucretia False Diadem	4	Least Concern
Papilionidae	<i>Papilio demodocus</i> Citrus Swallowtail	7	Least Concern

Papilionidae	<i>Papilio nireus</i> Narrow Blue-banded Swallowtail	1	Least Concern
Pieridae	<i>Belenois creona</i> Common White	8	Least Concern
Pieridae	<i>Catopsilia florella</i> African Migrant	5	Least Concern
Pieridae	<i>Eurema desjaridinsi</i> Angled Grass Yellow	16	Least Concern
Pieridae	<i>Eurema hecabe</i> Common Grass Yellow	2	Least Concern

16.10.5.5 MAKUUTU MINING PIT WB

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Nymphalidae	<i>Acraea serena</i> Orange Acraea	1	Least Concern
Nymphalidae	<i>Acraea sotikensis</i> Sotik Acraea	2	Least Concern
Nymphalidae	<i>Acraea uvui</i> Tiny Acraea	1	Least Concern
Nymphalidae	<i>Danaus chrysippus</i> African Queen	2	Least Concern
Nymphalidae	<i>Hypolimnas misippus</i> Diadem	1	Least Concern
Nymphalidae	<i>Junonia oenone</i> Blue Pansy	1	Least Concern
Nymphalidae	<i>Junonia sophia</i> Little Commodore	7	Least Concern
Nymphalidae	<i>Junonia stygia</i> Brown Pansy	7	Least Concern
Nymphalidae	<i>Junonia terean</i> Soldier Commodore	1	Least Concern
Nymphalidae	<i>Neptidopsis ophione</i> Scalloped Sailer	1	Least Concern
Nymphalidae	<i>Precis octavia</i> Gaudy Commodore	1	Least Concern
Nymphalidae	<i>Precis rauna</i> Forest Commodore	1	Least Concern
Pieridae	<i>Catopsilia florella</i> African Migrant	7	Least Concern
Pieridae	<i>Eurema desjaridinsi</i> Angled Grass Yellow	5	Least Concern

16.10.5.6 MAKUUTU MINING PIT WA

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Nymphalidae	<i>Acraea uvui</i> Tiny Acraea	2	Least Concern
Nymphalidae	<i>Danaus chrysippus</i> African Queen	3	Least Concern
Nymphalidae	<i>Hypolimnas misippus</i> Diadem	3	Least Concern
Nymphalidae	<i>Junonia oenone</i> Blue Pansy	2	Least Concern
Nymphalidae	<i>Junonia sophia</i> Little Commodore	8	Least Concern
Nymphalidae	<i>Junonia stygia</i> Brown Pansy	6	Least Concern
Nymphalidae	<i>Precis rauna</i> Forest Commodore	1	Least Concern
Nymphalidae	<i>Precis tugela</i> Eared Commodore	1	Least Concern
Papilionidae	<i>Papilio demodocus</i> Citrus Swallowtail	2	Least Concern
Pieridae	<i>Belenois creona</i> Common White	1	Least Concern
Pieridae	<i>Catopsilia florella</i> African Migrant	4	Least Concern
Pieridae	<i>Eurema desjaridinsi</i> Angled Grass Yellow	6	Least Concern

16.10.5.7 MAKUUTU MINING PIT CA

Family	Species Scientific and Common Name	No. Recorded	Red List Status
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Nymphalidae	<i>Neptidopsis ophione</i> Scalloped Sailer	1	Least Concern
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16.10.5.8 MAKUUTU MINING PIT EC

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Nymphalidae	<i>Acraea serena</i> Orange Acraea	3	Least Concern
Nymphalidae	<i>Acraea sotikensis</i> Sotik Acraea	5	Least Concern
Nymphalidae	<i>Hamanumida Daedalus</i> Guinea fowl Butterfly	2	Least Concern
Nymphalidae	<i>Hypolimnys misippus</i> Diadem	2	
Nymphalidae	<i>Junonia oenone</i> Blue Pansy	8	Least Concern
Nymphalidae	<i>Junonia sophia</i> Little Commodore	1	Least Concern
Nymphalidae	<i>Junonia stygia</i> Brown Pansy	14	Least Concern
Nymphalidae	<i>Precis rauna</i> Forest Commodore	12	Least Concern
Nymphalidae	<i>Pseudacraea Lucretia</i> False Diadem	1	Least Concern
Papilionidae	<i>Papilio demodocus</i> Citrus Swallowtail	1	Least Concern
Pieridae	<i>Catopsilia florella</i> African Migrant	10	Least Concern
Pieridae	<i>Eurema desjaridinsi</i> Angled Grass Yellow	29	LC

16.10.5.9 MAKUUTU MINING PIT EB1 and EB2

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Nymphalidae	<i>Junonia sophia</i> Little Commodore	1	Least Concern
Pieridae	<i>Catopsilia florella</i> African Migrant	10	Least Concern
Pieridae	<i>Eurema desjaridinsi</i> Angled Grass Yellow	29	LC

16.10.5.10 MAKUUTU MINING PIT EA

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Nymphalidae	<i>Acraea sotikensis</i> Sotik Acraea	2	Least Concern
Pieridae	<i>Eurema desjaridinsi</i> Angled Grass Yellow	1	Least Concern

16.10.5.11 MAKUUTU MINING PIT CD

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Nymphalidae	<i>Acraea sotikensis</i> Sotik Acraea	7	Least Concern
Nymphalidae	<i>Hypolimnys misippus</i> Diadem	1	
Nymphalidae	<i>Junonia oenone</i> Blue Pansy	9	Least Concern
Nymphalidae	<i>Junonia sophia</i> Little Commodore	1	Least Concern
Nymphalidae	<i>Junonia stygia</i> Brown Pansy	1	Least Concern

Nymphalidae	Precis rauna Forest Commodore	1	Least Concern
Papilionidae	<i>Papilio demodocus</i> Citrus Swallowtail	1	Least Concern
Pieridae	Catopsilia florella African Migrant	7	Least Concern
Pieridae	<i>Eurema desjaridinsi</i> Angled Grass Yellow	4	LC

#### 16.10.6 Summary of butterfly representation in the project sites

	No. of Families	No. of Genera	No. of Species
Road	3	8	12
Processing Plant site	4	9	14
Mining PIT CA	1	1	1
Mining PIT CB	3	11	18
Mining PIT CC	4	8	13
Mining PIT CD	3	7	9
Mining PIT EA	2	2	2
Mining PIT EB1 and EB2	2	3	3
Mining PIT EC	3	9	12
Mining PIT WB	2	8	14
Mining PIT WA	3	9	12

## 16.11 Amphibian Species Checklist for Makuutu Rare Metal Project Area

### 16.11.1.1 PROPOSED ACCESS ROAD

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Phrynobatrachidae	Natal Puddle Frog <i>Phrynobatrachus natalensis</i>	11	Least Concern
Ptychadenidae	<i>Ptychadena mascareniensis</i> Mascarene Rocket Frog	4	Least Concern (U-DD)
Hyperoliidae	<i>Hyperolius kivuensis</i> Kivu Reed Frog	1	Least Concern
Dicroglossidae	<i>Hoplobatrachus occipitalis</i> Eastern Groove-crowned Bullfrog	1	Least Concern

### 16.11.1.2 PROCESSING PLANT AREA – PROJECT SITE

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Bufonidae	<i>Sclerophrys gutturalis</i> Guttural Toad	1	LC
Bufonidae	<i>Sclerophrys steindachneri</i> Steindachner's Toad	2	LC
Dicroglossidae	<i>Hoplobatrachus occipitalis</i> Eastern Groove-crowned Bullfrog	6	LC
Hyperoliidae	<i>Afraxalus quadrivittatus</i> Four-lined Spiny Reed Frog	2	Least Concern /Data Deficient
Hyperoliidae	<i>Hyperolius kivuensis</i> Kivu Reed Frog	1	LC
Hyperoliidae	<i>Kassina senegalensis</i> Senegal Kassina	2	Least Concern
Phrynobatrachidae	Natal Puddle Frog <i>Phrynobatrachus natalensis</i>	1	LC
Phrynobatrachidae	<i>Phrynobatrachus mababiensis</i> Dwarf Puddle Frog	5	LC
Ptychadenidae	<i>Ptychadena anchietae</i> Anchieta's Rocket Frog	2	LC
Ptychadenidae	<i>Ptychadena mascareniensis</i> Mascarene Rocket Frog	44	LC (U-DD)

Bufonidae	Flat backed toad <i>Sclerophrys maculatus</i>	1	LC
Bufonidae	Kisolo Toad <i>Sclerophrys kisoloensis</i>	3	LC

Tadpoles is an indication that amphibians are breeding in the project site.



#### 16.11.2 MAKUUTU MINING PIT CC

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Bufonidae	<i>Sclerophrys maculatus</i> Flat-backed Toad	3	Least Concern
Hyperoliidae	<i>Hyperolius kivuensis</i> Kivu Reed Frog	1	Least Concern
Phrynobatrachidae	Natal Puddle Frog <i>Phrynobatrachus natalensis</i>	1	Least Concern
Phrynobatrachidae	<i>Phrynobatrachus mababiensis</i> Dwarf Puddle Frog	2	Least Concern
Ptychadenidae	<i>Ptychadena anchietae</i> Anchieta's Rocket Frog	4	Least Concern
Ptychadenidae	<i>Ptychadena mascareniensis</i> Mascarene Rocket Frog	4	Least Concern (U-DD)

#### 16.11.3 MAKUUTU MINING PIT CB

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Phrynobatrachidae	<i>Phrynobatrachus mababiensis</i> Dwarf Puddle Frog	1	Least Concern
Hyperoliidae	<i>Hyperolius kivuensis</i> Kivu Reed Frog	1	Least Concern
Phrynobatrachidae	Natal Puddle Frog <i>Phrynobatrachus natalensis</i>	16	Least Concern
Ptychadenidae	<i>Ptychadena mascareniensis</i> Mascarene Rocket Frog	5	Least Concern (U-DD)
Ptychadenidae	<i>Ptychadena anchietae</i> Anchieta's Rocket Frog	9	Least Concern
Bufonidae	<i>Sclerophrys maculatus</i> Flat-backed Toad	5	Least Concern

Bufo maculatus Flat-backed Toad tadpoles seen in the area.

#### 16.11.4 MAKUUTU MINING PIT WB

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Bufonidae	<i>Sclerophrys gutturalis</i> Guttural Toad	2	Least Concern
Bufonidae	<i>Sclerophrys steindachneri</i> Steindachner's Toad	1	Least Concern
Hyperoliidae	<i>Hyperolius kivuensis</i> Kivu Reed Frog	1	Least Concern
Phrynobatrachidae	<i>Phrynobatrachus mababiensis</i> Dwarf Puddle Frog	1	Least Concern
Phrynobatrachidae	<i>Phrynobatrachus natalensis</i> Natal Puddle Frog	1	Least Concern
Ptychadenidae	<i>Ptychadena anchietae</i> Anchieta's Rocket Frog	3	Least Concern
Ptychadenidae	<i>Ptychadena mascareniensis</i> Mascarene Rocket Frog	2	Least Concern (U-DD)

Road Kill for *Sclerophrys gutturalis* Guttural Toad .

Big snakes, tortoises, chameleon are rare because of Sugarcane growing and spraying

#### 16.11.5 MAKUUTU MINING PIT WA`

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Phrynobatrachidae	<i>Phrynobatrachus mababiensis</i> Dwarf Puddle Frog	4	Least Concern
Hyperoliidae	<i>Hyperolius kivuensis</i> Kivu Reed Frog	3	Least Concern
Phrynobatrachidae	<i>Phrynobatrachus natalensis</i> Natal Puddle Frog	1	Least Concern
Bufonidae	<i>Sclerophrys gutturalis</i> Guttural Toad	2	Least Concern

Road Kill for *Sclerophrys gutturalis* Guttural Toad

#### 16.11.6 MAKUUTU MINING PIT CA

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Bufonidae	<i>Sclerophrys steindachneri</i> Steindachner's Toad	3	Least Concern
Bufonidae	<i>Sclerophrys kisolensis</i> Kisolo Toad	2	Least Concern
Ptychadenidae	<i>Ptychadena anchietae</i> Anchieta's Rocket Frog	2	Least Concern

#### 16.11.7 MAKUUTU MINING PIT EC

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Bufonidae	<i>Sclerophrys gutturalis</i> Guttural Toad	5	Least Concern
Bufonidae	<i>Sclerophrys steindachneri</i> Steindachner's Toad	1	LC
Dicroglossidae	<i>Hoplobatrachus occipitalis</i> Eastern Groove-crowned Bullfrog	11	LC
Hyperoliidae	<i>Hyperolius kivuensis</i> Kivu Reed Frog	1	LC
Hyperoliidae	<i>Kassina senegalensis</i> Senegal Kassina	1	Least Concern
Phrynobatrachidae	<i>Phrynobatrachus mababiensis</i> Dwarf Puddle Frog	65	LC
Phrynobatrachidae	<i>Phrynobatrachus natalensis</i> Natal Puddle Frog	72	LC
Ptychadenidae	<i>Ptychadena anchietae</i> Anchieta's Rocket Frog	2	LC
Ptychadenidae	<i>Ptychadena mascareniensis</i> Mascarene Rocket Frog	32	LC (U-DD)

Road kill for *Sclerophrys gutturalis* Guttural Toad

#### 16.11.8 MAKUUTU MINING PIT EB1 and EB2

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Ptychadenidae	<i>Ptychadena anchietae</i> Anchieta's Rocket Frog	1	LC
Bufonidae	<i>Sclerophrys gutturalis</i> Guttural Toad	8	Least Concern

Six *Sclerophrys gutturalis* Guttural Toad were road kills

#### 16.11.9 MAKUUTU MINING PIT EA

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Bufonidae	<i>Sclerophrys gutturalis</i> Guttural Toad	1 (road kill)	Least Concern

The *Sclerophrys gutturalis* Guttural Toad was a road kill.

#### 16.11.10 MAKUUTU MINING PIT CD

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Bufonidae	<i>Sclerophrys gutturalis</i> Guttural Toad	2	Least Concern

*Sclerophrys gutturalis* Guttural Toad was a roadkill seen.

#### 16.11.11 Overall Data

	No. of Families	No. of Genera	No. of Species
Road	3	8	12
Processing Plant site	4	9	14
Mining PIT CA	1	1	1
Mining PIT CB	3	11	18
Mining PIT CC	4	8	13
Mining PIT CD	3	7	9
Mining PIT EA	2	2	2
Mining PIT EB1 and EB2	2	3	3
Mining PIT EC	3	9	12
Mining PIT WB	2	8	14
Mining PIT WA	3	9	12

## 16.12 Reptile species recorded at each of the project site

### 16.12.1 Site by site reptile analysis

#### 16.12.1.1 PROPOSED ACCESS ROAD

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Elapidae	<i>Naja melanoleuca</i> Forest Cobra	Reported	Least Concern
Agamidae	<i>Agama agama</i> Red-Headed Rock Agama	reported	Least Concern
Agamidae	<i>Acanthocercus atricolis</i> Blue Headed Tree Agama	Reported	Least Concern
Varanidae	<i>Varanus niloticus</i> Nile Monitor	1	Least Concern
Scincidae	<i>Trachylepis margaritifera</i> Rainbow skink	3	Least Concern

#### 16.12.1.2 PROCESSING PLANT AREA – PROJECT SITE

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Scincidae	<i>Trachylepis striata</i> Striped Skink	3	Least Concern
Scincidae	<i>Trachylepis margaritifera</i> Rainbow skink	6	Least Concern

#### 16.12.1.3 MAKUUTU MINING PIT CC

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Testudinidae	<i>Kinixys belliana</i> Bell's Hinged Tortoise	reported	Least Concern
Varanidae	<i>Varanus niloticus</i> Nile Monitor	reported	Least Concern
Elapidae	<i>Naja melanoleuca</i> Forest Cobra	Reported	Least Concern

#### 16.12.1.4 MAKUUTU MINING PIT CB

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Elapidae	<i>Naja melanoleuca</i> Forest Cobra	Reported	Least Concern
Agamidae	<i>Acanthocercus atricolis</i> Blue Headed Tree Agama	reported	LC
Scincidae	<i>Trachylepis striata</i> Striped Skink	3	LC
Scincidae	<i>Trachylepis maculilabris</i> Speckled-lipped Skink	1	LC

#### 16.12.1.5 MAKUUTU MINING PIT WB

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Varanidae	<i>Varanus niloticus</i> Nile Monitor	reported	Least Concern
Elapidae	<i>Naja melanoleuca</i> Forest Cobra	Reported	Least Concern

#### 16.12.1.6 MAKUUTU MINING PIT WA`

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Varanidae	<i>Varanus niloticus</i> Nile Monitor	reported	Least Concern
Elapidae	<i>Naja melanoleuca</i> Forest Cobra	Reported	Least Concern
Agamidae	<i>Agama agama</i> Red-Headed Rock Agama	reported	Least Concern
Scincidae	<i>Trachylepis striata</i> Striped Skink	3	Least Concern
Colubridae	<i>Lamprophis olivaceus</i> Olive House Snake	Reported killed	Least Concern
Pythonidae	<i>Python sebae</i> Central Africa Rock Python	Reported	Least Concern, CITES Appendix II Listed

16.12.1.7 MAKUUTU MINING PIT CA

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Varanidae	<i>Varanus niloticus</i> Nile Monitor	reported	Least Concern
Elapidae	<i>Naja melanoleuca</i> Forest Cobra	Reported	Least Concern

16.12.1.8 MAKUUTU MINING PIT EC

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Elapidae	<i>Naja melanoleuca</i> Forest Cobra	Reported	Least Concern
Scincidae	<i>Trachylepis striata</i> Striped Skink	3	LC
Scincidae	<i>Trachylepis maculilabris</i> Speckled-lipped Skink	1	LC

16.12.1.9 MAKUUTU MINING PIT EB1 and EB2

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Elapidae	<i>Naja melanoleuca</i> Forest Cobra	Reported	Least Concern

16.12.1.10 MAKUUTU MINING PIT EA

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Testudinidae	<i>Kinixys belliana</i> Bell's Hinged Tortoise	reported	Least Concern
Pelomedusidae	<i>Pelusios williamsi</i> Williams Hinged Terrapin	reported	Least Concern
Elapidae	<i>Naja melanoleuca</i> Forest Cobra	Reported	Least Concern

16.12.1.11 MAKUUTU MINING PIT CD

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Testudinidae	<i>Kinixys belliana</i> Bell's Hinged Tortoise	reported	Least Concern
Varanidae	<i>Varanus niloticus</i> Nile Monitor	reported	Least Concern
Agamidae	<i>Acanthocercus atricolis</i> Blue Headed Tree Agama	reported	Least Concern
Agamidae	<i>Agama agama</i> Red-Headed Rock Agama	reported	Least Concern
Scincidae	<i>Trachylepis striata</i> Striped Skink	1	Least Concern
Chamaeleonidae	<i>Chamaeleo gracilis</i> Slender Chameleon	1	Least Concern



16.12.1.12 Overall Reptiles Checklist for species recorded in Makuutu Rare Metal Project Area

Family	Species Scientific and Common Name	No. Recorded	Red List Status
Chamaeleonidae	<i>Chamaeleo gracilis</i> Slender Chameleon	1	Least Concern
Scincidae	<i>Trachylepis maculilabris</i> Speckled-lipped Skink	2	Least Concern
Scincidae	<i>Trachylepis margaritifer</i> Rainbow skink	9	Least Concern
Scincidae	<i>Trachylepis striata</i> Striped Skink	13	Least Concern
Varanidae	<i>Varanus niloticus</i> Nile Monitor	1	Least Concern
Agamidae	<i>Acanthocercus atricolis</i> Blue Headed Tree Agama	Reported	Least Concern
Agamidae	<i>Agama agama</i> Red-Headed Rock Agama	reported	Least Concern
Colubridae	<i>Lamprophis olivaceus</i> Olive House Snake	Reported	Least Concern
Elapidae	<i>Naja melanoleuca</i> Forest Cobra	Reported	Least Concern
Pelomedusidae	<i>Pelusios williamsi</i> Williams Hinged Terrapin	reported	Least Concern
Pythonidae	<i>Python sebae</i> Central Africa Rock Python	Reported	Least Concern
Testudinidae	<i>Kinixys belliana</i> Bell's Hinged Tortoise	reported	Least Concern

	No. of Families	No. of Genera	No. of Species
Road	2	2	2
Processing Plant site	1	1	2
Mining PIT CA	0	0	0
Mining PIT CB	1	1	2
Mining PIT CC	0	0	0
Mining PIT CD	2	2	2
Mining PIT EA	0	0	0
Mining PIT EB1 and EB2	1	1	1
Mining PIT EC	1	1	2
Mining PIT WB	0	0	0
Mining PIT WA	1	1	1

## 16.13 Birds Checklist per site

### 16.13.1 Site by site bird analysis

#### 16.13.1.1 PROPOSED ACCESS ROAD

Family	Species Scientific and Common Names	Numbers Recorded	Red List Status
ACCIPITRIDAE	122 - <i>Lophaelus occipitalis</i> Long-Crested Eagle - F	1	Least Concern
ACCIPITRIDAE	75 - <i>Milvus migrans</i> Black Kite – pA (widespread	3	PM & Least Concern
ALCEDINIDAE	375 - <i>Halcyon senegalensis</i> Woodland Kingfisher - A - O	3	Least Concern
ALCEDINIDAE	383 - <i>Ceryle rudis</i> Pied Kingfisher - W	2	Least Concern
APODIDAE	365 - <i>Apus affinis</i> Little Swift – O	3	Least Concern
ARDEIDAE	22 - <i>Ardea intermedia</i> Intermediate Egret - W	19	Least Concern
COLUMBIDAE	270 - <i>Turtur tympanistria</i> Tambourine Dove - F	2	Least Concern
COLUMBIDAE	281 - <i>Columba guinea</i> Speckled Pigeon - f	1	Least Concern
COLUMBIDAE	284 - <i>Streptopelia decipiens</i> African Mourning Dove - O	1	Least Concern
CORACIIDAE	396 - <i>Coracias naevius</i> Rufous-Crowned Roller - f	1	Least Concern
CORVIDAE	855 - <i>Corvus albus</i> Pied Crow - widespread	1	Least Concern
CORVIDAE	858 - <i>Ptilostomus afer</i> Piapiac - O	3	Least Concern
CUCULIDAE	323 - <i>Centropus superciliosus</i> White-Browed Coucal – O	1	Least Concern
ESTRILIDIDAE	981 - <i>Spermestes bicolor</i> Black-and-White Mannikin - f	4	Least Concern
MALACONOTIDAE	843 - <i>Laniarius erythrogaster</i> Black-Headed Gonolek - f	7	Least Concern
MOTACILLIDAE	520 - <i>Motacilla aguimp</i> African Pied Wagtail - w	4	Least Concern
MUSOPHAGIDAE	305 - <i>Crinifer zonurus</i> Eastern Grey Plantain-Eater - widespread	1	Least Concern
NUMIDIDAE	142 - <i>Numida meleagris</i> Helmeted Guinea fowl - O	3	Least Concern
PASSERIDAE	881 - <i>Passer griseus</i> Northern Grey-Headed Sparrow - O	6	Least Concern
PLOCEIDAE	903 - <i>Ploceus intermedius</i> Lesser Masked Weaver - W	35	Least Concern
PYCNONOTIDAE	732 - <i>Pycnonotus barbatus</i> Common Bulbul - f	4	Least Concern
STRIGIDAE	338 - <i>Strix woodfordii</i> African Wood Owl - F	1	Least Concern
STURNIDAE	872 - <i>Lamprolornis purpuroptera</i> Ruppell's Starling - O	3	Least Concern
THRESKIORNITHIDAE	39 - <i>Bostrychia hagedash</i> Hadada Ibis - w	11	Least Concern
THRESKIORNITHIDAE	42 - <i>Threskiornis aethiopicus</i> SACRED IBIS - W	2	Least Concern

16.13.1.2 PROCESSING PLANT AREA – PROJECT SITE

Family	Species Scientific and Common Names	Numbers Recorded	Red List Status
ACCIPITRIDAE	122 - <i>Lophaetus occipitalis</i> Long-Crested Eagle - F	1	Least Concern
ACCIPITRIDAE	73 - <i>Elanus caeruleus</i> Black-Shouldered Kite - G	2	Least Concern
ACCIPITRIDAE	75 - <i>Milvus migrans</i> Black Kite – pA (widespread)	11	PM
ALCEDINIDAE	375 - <i>Halcyon senegalensis</i> Woodland Kingfisher - A - O	6	Least Concern
APODIDAE	367 - <i>Tachymarptis melba</i> Alpine Swift – p - O	1	PM
ARDEIDAE	17 - <i>Bubulcus ibis</i> Cattle Egret - G	9	Least Concern
ARDEIDAE	26 - <i>Ardea melanocephala</i> Black-Headed Heron - w	2	Least Concern
CISTICOLIDAE	657 - <i>Cisticola ayresii</i> Wing-Snapping Cisticola - G	1	Least Concern
CISTICOLIDAE5	677 - <i>Camaroptera brachyura</i> Grey-Backed Camaroptera - f	5	Least Concern
COLLIIDAE	369 - <i>Colius striatus</i> Speckled Mousebird - O	10	Least Concern
COLUMBIDAE	281 - <i>Columba guinea</i> Speckled Pigeon - f	6	Least Concern
COLUMBIDAE	284 - <i>Streptopelia decipiens</i> African Mourning Dove - O	6	Least Concern
CORACIIDAE	401 - <i>Eurystomus glaucurus</i> Broad-Billed Roller – Afw	3	Least Concern
CORVIDAE	855 - <i>Corvus albus</i> Pied Crow – wide spread	1	Least Concern
CUCULIDAE	323 - <i>Centropus superciliosus</i> White-Browed Coucal - O	6	Least Concern
ESTRILIDIDAE	974 - <i>Uraeginthus bengalus</i> Red-Checked Cordon-Bleu- O	3	Least Concern
ESTRILIDIDAE	980 - <i>Spermestes cucullata</i> Bronze Mannikin - (widespread)	11	Least Concern
ESTRILIDIDAE	981 - <i>Spermestes bicolor</i> Black-and-White Mannikin - f	34	Least Concern
MALACONOTIDAE	843 - <i>Laniarius erythrogaster</i> Black-Headed Gonolek - f	6	Least Concern
MOTACILLIDAE	520 - <i>Motacilla aguimp</i> African Pied Wagtail - w	1	Least Concern
MUSCICAPIDAE	592 - <i>Saxicola torquatus</i> African Stonechat - O	1	Least Concern
MUSOPHAGIDAE	305 - <i>Crinifer zonurus</i> Eastern Grey Plantain-Eater - widespread	10	Least Concern
NUMIDIDAE	142 - <i>Numida meleagris</i> Helmeted Guineafowl - O	2	Least Concern
PASSERIDAE	881 - <i>Passer griseus</i> Northern Grey-Headed Sparrow - O	4	Least Concern
PLOCEIDAE	903 - <i>Ploceus intermedius</i> Lesser Masked Weaver - W	19	Least Concern
PLOCEIDAE	908 - <i>Ploceus cucullatus</i> Black-Headed Weaver - O	20	Least Concern
PLOCEIDAE	932 - <i>Euplectes axillaris</i> Fan-Tailed Widowbird - w	8	Least Concern
PYCNONOTIDAE	732 - <i>Pycnonotus barbatus</i> Common Bulbul - f	37	Least Concern
STURNIDAE	872 - <i>Lamprotornis purpuroptera</i> Ruppell's Starling - O	6	Least Concern
THRESKIORNITHIDAE	39 - <i>Bostrychia hagedash</i> Hadada Ibis - w	9	Least Concern
VIDUIDAE	985 - <i>Vidua macroura</i> Pin-Tailed Whydah - widespread	2	Least Concern

16.13.1.3 MAKUUTU MINING PIT CC

Family	Species Scientific and Common Name	No. Counted	Red List Status
ACCIPITRIDAE	122 - <i>Lophaelus occipitalis</i> Long-Crested Eagle - F	1	Least Concern
ACCIPITRIDAE	73 - <i>Elanus caeruleus</i> Black-Shouldered Kite - G	1	Least Concern
ACCIPITRIDAE	75 - <i>Milvus migrans</i> Black Kite – pA (wide spread)	1	PM
ALCEDINIDAE	375 - <i>Halcyon senegalensis</i> Woodland Kingfisher - A - O	2	Least Concern
ARDEIDAE	17 - <i>Bubulcus ibis</i> Cattle Egret - G	1	Least Concern
BUCEROTIDAE	409 - <i>Bucorvus abyssinicus</i> Abyssinian Ground-Hornbill -	3	Least Concern
CISTICOLIDAE	677 - <i>Camaroptera brachyura</i> Grey-Backed Camaroptera - f	1	Least Concern
COLUMBIDAE	281 - <i>Columba guinea</i> Speckled Pigeon	5	Least Concern
COLUMBIDAE	284 - <i>Streptopelia decipiens</i> African Mourning Dove - O	5	Least Concern
CORACIIDAE	396 - <i>Coracias naevius</i> Rufous-Crowned Roller -	1	Least Concern
CORVIDAE	858 - <i>Ptilostomus afer</i> Piapiac -	1	Least Concern
ESTRILIDIDAE	980 - <i>Spermestes cucullata</i> Bronze Mannikin - widespread	33	Least Concern
ESTRILIDIDAE	981 - <i>Spermestes bicolor</i> Black-and-White Mannikin - f	3	Least Concern
MALACONOTIDAE	843 - <i>Laniarius erythrogaster</i> Black-Headed Gonolek - f	4	Least Concern
MUSCICAPIDAE	576 - <i>Cossypha heuglini</i> White-Browed Robin-Chat - f	2	Least Concern
MUSOPHAGIDAE	305 - <i>Crinifer zonurus</i> Eastern Grey Plantain-Eater - widespread	4	Least Concern
NECTARINIIDAE	785 - <i>Chalcomitra rubescens</i> Green-Throated Sunbird - F	1	Least Concern
NECTARINIIDAE	804 - <i>Cinnyris bifasciatus</i> Purple-Banded Sunbird - f	2	Least Concern
PASSERIDAE	881 - <i>Passer griseus</i> Northern Grey-Headed Sparrow - O	1	Least Concern
PLOCEIDAE	908 - <i>Ploceus cucullatus</i> Black-Headed Weaver - O	3	Least Concern
PSITTACIDAE	292 - <i>Poicephalus meyeri</i> Brown Parrot - O	2	Least Concern
PYCNONOTIDAE	732 - <i>Pycnonotus barbatus</i> Common Bulbul - f	21	Least Concern
THRESKIORNITHIDAE	39 - <i>Bostrychia hagedash</i> Hadada Ibis - w	2	Least Concern
TURDIDAE	612 - <i>Turdus pelios</i> African Thrush - f	1	Least Concern

Family	Species Scientific and Common Name	No. Recorded	Red List Status
ACCIPITRIDAE	122 - <i>Lophaetus occipitalis</i> Long-Crested Eagle - F	1	Least Concern
ACCIPITRIDAE	75 - <i>Milvus migrans</i> Black Kite - pA	2	PM
ALCEDINIDAE	375 - <i>Halcyon senegalensis</i> Woodland Kingfisher - A	4	Least Concern
ARDEIDAE	17 - <i>Bubulcus ibis</i> Cattle Egret - G	11	Least Concern
ARDEIDAE	26 - <i>Ardea melanocephala</i> Black-Headed Heron - w	1	Least Concern
BUCEROTIDAE	409 - <i>Bucorvus abyssinicus</i> Abyssinian Ground-Hornbill	1	Least Concern
BUCEROTIDAE	420 - <i>Lophoceros nasutus</i> African Grey Hornbill -	3	Least Concern
CISTICOLIDAE	650 - <i>Cisticola natalensis</i> Croaking Cisticola -	2	Least Concern
CISTICOLIDAE	677 - <i>Camaroptera brachyura</i> Grey-Backed Camaroptera - f	2	Least Concern
COLLIIDAE	369 - <i>Colius striatus</i> Speckled Mousebird -	15	Least Concern
COLUMBIDAE	270 - <i>Turtur tympanistria</i> Tambourine Dove - F	2	Least Concern
COLUMBIDAE	281 - <i>Columba guinea</i> Speckled Pigeon	3	Least Concern
COLUMBIDAE	284 - <i>Streptopelia decipiens</i> African Mourning Dove -	8	Least Concern
CORVIDAE	855 - <i>Corvus albus</i> Pied Crow	5	Least Concern
CUCULIDAE	323 - <i>Centropus superciliosus</i> White-Browed Coucal -	10	Least Concern
ESTRILIDIDAE	974 - <i>Uraeginthus bengalus</i> Red-Checked Cordon-Bleu	3	Least Concern
ESTRILIDIDAE	980 - <i>Spermestes cucullata</i> Bronze Mannikin	15	Least Concern
ESTRILIDIDAE	981 - <i>Spermestes bicolor</i> Black-and-White Mannikin - f	16	Least Concern
HIRUNDINIDAE	506 - <i>Cecropis daurica</i> Red-Rumped Swallow	1	Least Concern
MALACONOTIDAE	843 - <i>Laniarius erythrogaster</i> Black-Headed Gonolek - f	8	Least Concern
MONARCHIDAE	740 - <i>Terpsiphone rufiventer</i> Red-Bellied Paradise-Flycatcher - F	3	Least Concern
MOTACILLIDAE	520 - <i>Motacilla aguimp</i> African Pied Wagtail - w	2	Least Concern
MUSOPHAGIDAE	305 - <i>Crinifer zonurus</i> Eastern Grey Plantain-Eater	5	Least Concern
NECTARINIIDAE	790 - <i>Nectarinia kilimensis</i> Bronze Sunbird - f	2	Least Concern
NUMIDIDAE	141 - <i>Guttera edouardi</i> Crested Guineafowl - F	2	Least Concern
PASSERIDAE	881 - <i>Passer griseus</i> Northern Grey-Headed Sparrow -	5	Least Concern
PLOCEIDAE	908 - <i>Ploceus cucullatus</i> Black-Headed Weaver -	25	Least Concern
PLOCEIDAE	930 - <i>Euplectes franciscanus</i> Northern Red Bishop - G	2	Least Concern
PSITTACIDAE	292 - <i>Poicephalus meyeri</i> Brown Parrot -	2	Least Concern
PYCNONOTIDAE	732 - <i>Pycnonotus barbatus</i> Common Bulbul	52	Least Concern
VIDUIDAE	985 - <i>Vidua macroura</i> Pin-Tailed Whydah - G	6	Least Concern



16.13.1.5 MAKUUTU MINING PIT WB

Family	Species Scientific and common Name	No. Recorded	Red List Status
ACCIPITRIDAE	73 - <i>Elanus caeruleus</i> Black-Shouldered Kite - G	5	Least Concern
ACCIPITRIDAE	75 - <i>Milvus migrans</i> Black Kite - pA	4	PM
ALCEDINIDAE	375 - <i>Halcyon senegalensis</i> Woodland Kingfisher - A	4	Least Concern
APODIDAE	358 - <i>Cypsiurus parvus</i> African Palm Swift -	3	Least Concern
ARDEIDAE	17 - <i>Bubulcus ibis</i> Cattle Egret - G	1	Least Concern
ARDEIDAE	26 - <i>Ardea melanocephala</i> Black-Headed Heron - w	1	Least Concern
COLLIIDAE	369 - <i>Colius striatus</i> Speckled Mousebird -	2	Least Concern
COLUMBIDAE	270 - <i>Turtur tympanistria</i> Tambourine Dove - F	7	Least Concern
COLUMBIDAE	281 - <i>Columba guinea</i> Speckled Pigeon	1	Least Concern
COLUMBIDAE	284 - <i>Streptopelia decipiens</i> African Mourning Dove -	11	Least Concern
Corvidae	855 - <i>Corvus albus</i> Pied Crow	2	Least Concern
CORVIDAE	858 - <i>Ptilostomus afer</i> Piapiac -	9	Least Concern
CUCULIDAE	309 - <i>Cuculus solitarius</i> Red-Chested Cuckoo - AF	1	Least Concern
CUCULIDAE	323 - <i>Centropus superciliosus</i> White-Browed Coucal -	1	Least Concern
ESTRILIDIDAE	974 - <i>Uraeginthus bengalus</i> Red-Checked Cordon-Bleu	9	Least Concern
HIRUNDINIDAE	506 - <i>Cecropis daurica</i> Red-Rumped Swallow -	2	Least Concern
MALACONOTIDAE	843 - <i>Laniarius erythrogaster</i> Black-Headed Gonolek - f	2	Least Concern
MUSOPHAGIDAE	305 - <i>Crinifer zonurus</i> Eastern Grey Plantain-Eater	6	Least Concern
NECTARINIIDAE	787 - <i>Chalcomitra senegalensis</i> Scarlet-Chested Sunbird - f	1	Least Concern
PASSERIDAE	881 - <i>Passer griseus</i> Northern Grey-Headed Sparrow -	7	Least Concern
PHASIANIDAE	155 - <i>Pternistis squamatus</i> Scaly Francolin - F	2	Least Concern
PLOCEIDAE	908 - <i>Ploceus cucullatus</i> Black-Headed Weaver -	17	Least Concern
PLOCEIDAE	920 - <i>Malimbicus rubricollis</i> Red-Headed Malimbe - FF	2	Least Concern
PLOCEIDAE	930 - <i>Euplectes franciscanus</i> Northern Red Bishop - G	1	Least Concern
PYCNONOTIDAE	732 - <i>Pycnonotus barbatus</i> Common Bulbul	19	Least Concern
STURNIDAE	872 - <i>Lamprotornis purpuroptera</i> Ruppell's Starling -	2	Least Concern
TURDIDAE	612 - <i>Turdus pelios</i> African Thrush - f	2	Least Concern

Family	Species Scientific and common Name	No. Recorded	Red List Status
ALCEDINIDAE	375 - <i>Halcyon senegalensis</i> Woodland Kingfisher - A	2	Least Concern
BUCEROTIDAE	409 - <i>Bucorvus abyssinicus</i> Abyssinian Ground-Hornbill	2	Least Concern
COLLIIDAE	369 - <i>Colius striatus</i> Speckled Mousebird -	1	Least Concern
COLUMBIDAE	270 - <i>Turtur tympanistria</i> Tambourine Dove - F	1	Least Concern
COLUMBIDAE	283 - <i>Streptopelia semitorquata</i> Red-Eyed Dove - f	1	Least Concern
COLUMBIDAE	284 - <i>Streptopelia decipiens</i> African Mourning Dove -	9	Least Concern
CUCULIDAE	309 - <i>Cuculus solitarius</i> Red-Chested Cuckoo - AF	1	Least Concern
CUCULIDAE	323 - <i>Centropus superciliosus</i> White-Browed Coucal -	1	Least Concern
ESTRILIDIDAE	974 - <i>Uraeginthus bengalus</i> Red-Checked Cordon-Bleu	5	Least Concern
ESTRILIDIDAE	981 - <i>Spermestes bicolor</i> Black-and-White Mannikin - f	14	Least Concern
MALACONOTIDAE	843 - <i>Laniarius erythrogaster</i> Black-Headed Gonolek - f	5	Least Concern
MUSOPHAGIDAE	305 - <i>Crinifer zonurus</i> Eastern Grey Plantain-Eater	7	Least Concern
NUMIDIDAE	142 - <i>Numida meleagris</i> Helmeted Guineafowl - G	10	Least Concern
PASSERIDAE	881 - <i>Passer griseus</i> Northern Grey-Headed Sparrow -	1	Least Concern
PLOCEIDAE	932 - <i>Euplectes axillaris</i> Fan-Tailed Widowbird - w	2	Least Concern
PYCNONOTIDAE	732 - <i>Pycnonotus barbatus</i> Common Bulbul	10	Least Concern
SCOPIDAE	28 - <i>Scopus umbretta</i> Hamerkop - w	1	Least Concern
STURNIDAE	872 - <i>Lamprolornis purpuroptera</i> Ruppell's Starling -	1	Least Concern
THRESKIORNITHIDAE	39 - <i>Bostrychia hagedash</i> Hadada Ibis - w	3	Least Concern
VIDUIDAE	985 - <i>Vidua macroura</i> Pin-Tailed Whydah - G	1	Least Concern

## 16.13.1.7 MAKUUTU MINING PIT CA

Family	Species Scientific and common Name	No. Recorded	Red List Status
ALCEDINIDAE	375 - <i>Halcyon senegalensis</i> Woodland Kingfisher - A	1	Least Concern
COLUMBIDAE	270 - <i>Turtur tympanistria</i> Tambourine Dove - F	4	Least Concern
COLUMBIDAE	281 - <i>Columba guinea</i> Speckled Pigeon	3	Least Concern
COLUMBIDAE	284 - <i>Streptopelia decipiens</i> African Mourning Dove -	3	Least Concern
CUCULIDAE	309 - <i>Cuculus solitarius</i> Red-Chested Cuckoo - AF	2	Least Concern
CUCULIDAE	323 - <i>Centropus superciliosus</i> White-Browed Coucal -	1	Least Concern
ESTRILIDIDAE	981 - <i>Spermestes bicolor</i> Black-and-White Mannikin - f	6	Least Concern
HIRUNDINIDAE	500 - <i>Riparia riparia</i> Common Sand Martin - PW	2	PM
MUSOPHAGIDAE	305 - <i>Crinifer zonurus</i> Eastern Grey Plantain-Eater	7	Least Concern
NECTARINIIDAE	787 - <i>Chalcomitra senegalensis</i> Scarlet-Chested Sunbird - f	1	Least Concern
PLOCEIDAE	908 - <i>Ploceus cucullatus</i> Black-Headed Weaver -	4	Least Concern
PYCNONOTIDAE	732 - <i>Pycnonotus barbatus</i> Common Bulbul	8	Least Concern
THRESKIORNITHIDAE	39 - <i>Bostrychia hagedash</i> Hadada Ibis - w	1	Least Concern

## 16.13.1.8 MAKUUTU MINING PIT EC

Family	Species Scientific and common Name	No. Recorded	Red List Status
ACCIPITRIDAE	119 - <i>Aquila spilogaster</i> African Hawk-Eagle -	1	Least Concern
ACCIPITRIDAE	122 - <i>Lophaelagus occipitalis</i> Long-Crested Eagle - F	1	Least Concern
ACCIPITRIDAE	73 - <i>Elanus caeruleus</i> Black-Shouldered Kite - G	4	Least Concern
ACCIPITRIDAE	75 - <i>Milvus migrans</i> Black Kite - pA	2	PM
ALCEDINIDAE	375 - <i>Halcyon senegalensis</i> Woodland Kingfisher - A	1	Least Concern
ALCEDINIDAE	378 - <i>Ispidina picta</i> African Pygmy Kingfisher - fw	2	Least Concern
ARDEIDAE	17 - <i>Bubulcus ibis</i> Cattle Egret - G	4	Least Concern
ARDEIDAE	26 - <i>Ardea melanocephala</i> Black-Headed Heron - w	2	
BUCEROTIDAE	420 - <i>Lophoceros nasutus</i> African Grey Hornbill -	6	Least Concern
CISTICOLIDAE	677 - <i>Camaroptera brachyura</i> Grey-Backed Camaroptera - f	1	Least Concern
COLLIIDAE	369 - <i>Colius striatus</i> Speckled Mousebird -	8	Least Concern
COLUMBIDAE	270 - <i>Turtur tympanistria</i> Tambourine Dove - F	5	Least Concern
COLUMBIDAE	283 - <i>Streptopelia semitorquata</i> Red-Eyed Dove - f	5	Least Concern
COLUMBIDAE	284 - <i>Streptopelia decipiens</i> African Mourning Dove -	12	Least Concern
Corvidae	855 - <i>Corvus albus</i> Pied Crow	2	Least Concern

CORVIDAE	858 - <i>Ptilostomus afer</i> Piapiac -	29	Least Concern
CUCULIDAE	323 - <i>Centropus superciliosus</i> White-Browed Coucal -	12	Least Concern
ESTRILIDIDAE	974 - <i>Uraeginthus bengalus</i> Red-Checked Cordon-Bleu	1	Least Concern
ESTRILIDIDAE	981 - <i>Spermestes bicolor</i> Black-and-White Mannikin - f	14	Least Concern
MALACONOTIDAE	843 - <i>Laniarius erythrogaster</i> Black-Headed Gonolek - f	12	Least Concern
MUSOPHAGIDAE	305 - <i>Crinifer zonurus</i> Eastern Grey Plantain-Eater	11	Least Concern
NECTARINIIDAE	787 - <i>Chalcomitra senegalensis</i> Scarlet-Chested Sunbird - f	1	Least Concern
NECTARINIIDAE	790 - <i>Nectarinia kilimensis</i> Bronze Sunbird - f	3	Least Concern
NUMIDIDAE	141 - <i>Guttera pucherani</i> Crested Guineafowl - F	3	Least Concern
NUMIDIDAE	142 - <i>Numida meleagris</i> Helmeted Guineafowl - G	1	Least Concern
PASSERIDAE	881 - <i>Passer griseus</i> Northern Grey-Headed Sparrow -	2	Least Concern
PLOCEIDAE	908 - <i>Ploceus cucullatus</i> Black-Headed Weaver -	107	Least Concern
PYCNONOTIDAE	732 - <i>Pycnonotus barbatus</i> Common Bulbul	20	Least Concern
THRESKIORNITHIDAE	39 - <i>Bostrychia hagedash</i> Hadada Ibis - w	4	Least Concern
VIDUIDAE	984 - <i>Vidua chalybeata</i> Village Indigobird	1	Least Concern
VIDUIDAE	985 - <i>Vidua macroura</i> Pin-Tailed Whydah - G	2	Least Concern

16.13.1.9 MAKUUTU MINING PIT EB1 and EB2

Family	Species Scientific and common Name	No. Recorded	Red List Status
ACCIPITRIDAE	73 - <i>Elanus caeruleus</i> Black-Shouldered Kite - G	1	Least Concern
ALCEDINIDAE	375 - <i>Halcyon senegalensis</i> Woodland Kingfisher - A	9	Least Concern
ARDEIDAE	17 - <i>Bubulcus ibis</i> Cattle Egret - G	2	Least Concern
ARDEIDAE	21 - <i>Egretta garzetta</i> Little Egret - W	1	Least Concern
BUCEROTIDAE	409 - <i>Bucorvus abyssinicus</i> Abyssinian Ground-Hornbill	2	Least Concern
BUCEROTIDAE	418 - <i>Lophoceros fasciatus</i> African Pied Hornbill - F	1	Least Concern
COLLIIDAE	369 - <i>Colius striatus</i> Speckled Mousebird -	1	Least Concern
COLUMBIDAE	270 - <i>Turtur tympanistria</i> Tambourine Dove - F	11	Least Concern
COLUMBIDAE	283 - <i>Streptopelia semitorquata</i> Red-Eyed Dove - f	7	Least Concern
COLUMBIDAE	284 - <i>Streptopelia decipiens</i> African Mourning Dove -	11	Least Concern
CUCULIDAE	309 - <i>Cuculus solitarius</i> Red-Chested Cuckoo - AF	3	Least Concern
CUCULIDAE	323 - <i>Centropus superciliosus</i> White-Browed Coucal -	3	Least Concern
ESTRILIDIDAE	974 - <i>Uraeginthus bengalus</i> Red-Checked Cordon-Bleu	1	Least Concern
ESTRILIDIDAE	981 - <i>Spermestes bicolor</i> Black-and-White Mannikin - f	28	Least Concern

MALACONOTIDAE	843 - <i>Laniarius erythrogaster</i> Black-Headed Gonolek - f	2	Least Concern
MUSOPHAGIDAE	305 - <i>Crinifer zonurus</i> Eastern Grey Plantain-Eater	7	Least Concern
NECTARINIIDAE	790 - <i>Nectarinia kilimensis</i> Bronze Sunbird - f	1	Least Concern
NUMIDIDAE	142 - <i>Numida meleagris</i> Helmeted Guineafowl - G	2	Least Concern
PASSERIDAE	881 - <i>Passer griseus</i> Northern Grey-Headed Sparrow -	11	Least Concern
PLOCEIDAE	908 - <i>Ploceus cucullatus</i> Black-Headed Weaver -	116	Least Concern
PYCNONOTIDAE	732 - <i>Pycnonotus barbatus</i> Common Bulbul	6	Least Concern
THRESKIORNITHIDAE	39 - <i>Bostrychia hagedash</i> Hadada Ibis - w	7	Least Concern
TURDIDAE	612 - <i>Turdus pelios</i> African Thrush - f	1	Least Concern

16.13.1.10 MAKUUTU MINING PIT EA

Family	Species Scientific and common Name	No. Recorded	Red List Status
ACCIPITRIDAE	73 - <i>Elanus caeruleus</i> Black-Shouldered Kite - G	1	Least Concern
ALCEDINIDAE	375 - <i>Halcyon senegalensis</i> Woodland Kingfisher - A	2	Least Concern
ARDEIDAE	26 - <i>Ardea melanocephala</i> Black-Headed Heron - w	1	Least Concern
BUCEROTIDAE	418 - <i>Lophoceros fasciatus</i> African Pied Hornbill - F	1	Least Concern
COLUMBIDAE	283 - <i>Streptopelia semitorquata</i> Red-Eyed Dove - f	1	Least Concern
COLUMBIDAE	284 - <i>Streptopelia decipiens</i> African Mourning Dove -	2	Least Concern
CUCULIDAE	309 - <i>Cuculus solitarius</i> Red-Chested Cuckoo - AF	4	Least Concern
ESTRILIDIDAE	963 - <i>Lagonosticta rubricata</i> African Firefinch -	3	Least Concern
ESTRILIDIDAE	981 - <i>Spermestes bicolor</i> Black-and-White Mannikin - f	6	Least Concern
MALACONOTIDAE	843 - <i>Laniarius erythrogaster</i> Black-Headed Gonolek - f	4	Least Concern
MUSOPHAGIDAE	305 - <i>Crinifer zonurus</i> Eastern Grey Plantain-Eater	1	Least Concern
PASSERIDAE	881 - <i>Passer griseus</i> Northern Grey-Headed Sparrow -	3	Least Concern
PLOCEIDAE	908 - <i>Ploceus cucullatus</i> Black-Headed Weaver -	7	Least Concern
PSITTACIDAE	292 - <i>Poicephalus meyeri</i> Brown Parrot -	1	Least Concern
PYCNONOTIDAE	732 - <i>Pycnonotus barbatus</i> Common Bulbul	6	Least Concern
THRESKIORNITHIDAE	39 - <i>Bostrychia hagedash</i> Hadada Ibis - w	5	Least Concern

16.13.1.11 MAKUUTU MINING PIT CD

Family	Species Scientific and common Name	No. Recorded	Red List Status
ALCEDINIDAE	375 - <i>Halcyon senegalensis</i> Woodland Kingfisher - A	1	Least Concern
ARDEIDAE	26 - <i>Ardea melanocephala</i> Black-Headed Heron - w	1	Least Concern
COLUMBIDAE	284 - <i>Streptopelia decipiens</i> African Mourning Dove -	4	Least Concern
CUCULIDAE	309 - <i>Cuculus solitarius</i> Red-Chested Cuckoo - AF	1	Least Concern



ESTRILIDIDAE	981 - <i>Spermestes bicolor</i> Black-and-White Mannikin - f	11	Least Concern
MALACONOTIDAE	843 - <i>Laniarius erythrogaster</i> Black-Headed Gonolek - f	2	Least Concern
MUSOPHAGIDAE	305 - <i>Crinifer zonurus</i> Eastern Grey Plantain-Eater	4	Least Concern
NECTARINIIDAE	787 - <i>Chalcomitra senegalensis</i> Scarlet-Chested Sunbird - f	2	Least Concern
NECTARINIIDAE	790 - <i>Nectarinia kilimensis</i> Bronze Sunbird - f	2	Least Concern
PYCNONOTIDAE	732 - <i>Pycnonotus barbatus</i> Common Bulbul	2	Least Concern
THRESKIORNITHIDAE	39 - <i>Bostrychia hagedash</i> Hadada Ibis - w	5	Least Concern

16.13.1.12 OVERALL / COMBINED CHECKLIST

	No. of Families	No. of Genera	No. of Species
Road	19	25	25
Processing Plant site	22	29	31
Mining PIT CA	10	13	13
Mining PIT CB	22	30	31
Mining PIT CC	19	23	24
Mining PIT CD	10	11	11
Mining PIT EA	14	15	16
Mining PIT EB1 and EB2	17	22	23
Mining PIT EC	19	29	31
Mining PIT WB	19	27	27
Mining PIT WA	16	19	20

## 16.14 Mammals

### 16.14.1 Site by site mammal analysis

#### 16.14.1.1 PROPOSED ACCESS ROAD

GPS Coordinates	Fauna Encountered / Recorded	No. Counted	IUCN Red List Status
Connecting ROAD			
	Mammal		
Pteropodidae	<i>Epomophorus minimus</i> East African epauletted fruit bat	Reported	Least Concern
Muridae	<i>Rattus rattus</i> Black Rat	Reported	Least Concern
Cercopithecidae	<i>Chlorocebus pygerythrus</i> Vervet monkey	Reported	Least Concern
Sciuridae	<i>Xerus rutilus</i> Unstriped ground squirrel	2	Least Concern
Vespertilionidae	<i>Scotophilus leucogaster</i> White-bellied House Bat	3	Least Concern

#### 16.14.1.2 PROCESSING PLANT AREA – PROJECT SITE

GPS Coordinates	Fauna Encountered / Recorded	No. Counted	IUCN Red List Status
	Mammals		
Canidae	<i>Canis mesomelas</i> Black-Backed Jackal	9	LC
Muridae	<i>Rattus rattus</i> Black Rat	2	Least Concern
Herpestidae	<i>Atilex paludinosus</i> Marsh Mongoose	1	Least Concern
Sciuridae	<i>Xerus rutilus</i> Unstriped ground squirrel	2	Least Concern
Thryonomyidae	<i>Thryonomys swinderianus</i> Greater cane rat	4	Least Concern

#### 16.14.1.3 MAKUUTU MINING PIT CC

GPS Coordinates	Fauna Encountered / Recorded	No. Counted	IUCN Red List Status
	Mammals		
Canidae	<i>Canis mesomelas</i> Black-Backed Jackal	reported	LC
Thryonomyidae	<i>Thryonomys swinderianus</i> Greater cane rat	4	Least Concern

#### 16.14.1.4 MAKUUTU MINING PIT CB

GPS Coordinates	Fauna Encountered / Recorded	No. Counted	IUCN Red List Status
Canidae	<i>Canis mesomelas</i> Black-Backed Jackal	Reportedly many	LC

Pteropodidae	<i>Epomophorus minimus</i> East African epauletted fruit bat	4	Least Concern
Vespertilionidae	<i>Scotophilus leucogaster</i> White-bellied House Bat	2	Least Concern

16.14.1.5 MAKUUTU MINING PIT WB

GPS Coordinates	Fauna Encountered / Recorded	No. Counted	IUCN Red List Status
Canidae	<i>Canis mesomelas</i> Black-Backed Jackal	Reportedly hides in Sugarcane	Least Concern
Muridae	<i>Rattus rattus</i> Black Rat	1	Least Concern
Sciuridae	<i>Xerus rutilus</i> Unstriped ground squirrel	2	Least Concern

16.14.1.6 MAKUUTU MINING PIT WA

GPS Coordinates	Fauna Encountered / Recorded	No. Counted	IUCN Red List Status
Canidae	<i>Canis mesomelas</i> Black-Backed Jackal	Reportedly seen in Sugarcane	Least Concern
Cercopithecidae	<i>Chlorocebus pygerythrus</i> Vervet monkey	Reportedly come around	Least Concern

16.14.1.7 MAKUUTU MINING PIT CA

GPS Coordinates	Fauna Encountered / Recorded	No. Counted	IUCN Red List Status
Canidae	<i>Canis mesomelas</i> Black-Backed Jackal	Reportedly hides in Sugarcane gardens	LC

16.14.1.8 MAKUUTU MINING PIT EC

GPS Coordinates	Fauna Encountered / Recorded	No. Counted	IUCN Red List Status
Muridae	<i>Rattus rattus</i> Black Rat	1	Least Concern
Cercopithecidae	<i>Chlorocebus pygerythrus</i> Vervet monkey	Reportedly come around	Least Concern
Thryonomyidae	<i>Thryonomys swinderianus</i> Greater cane rat	4	Least Concern

16.14.1.9 MAKUUTU MINING PIT EB1 and EB2

GPS Coordinates	Fauna Encountered / Recorded	No. Counted	IUCN Red List Status
Muridae	<i>Rattus rattus</i> Black Rat	Reported	Least Concern

16.14.1.10 MAKUUTU MINING PIT EA

None recorded

*16.14.1.11 MAKUUTU MINING PIT CD*

None recorded

*16.14.1.12 Overall Mammals Species List*

Summary of mammal representation in the project sites

	<b>No. of Families</b>	<b>No. of Genera</b>	<b>No. of Species</b>
Road	2	2	2
Processing Plant site	5	5	5
Mining PIT CA	0	0	0
Mining PIT CB	2	2	2
Mining PIT CC	1	1	1
Mining PIT CD			
Mining PIT EA			
Mining PIT EB1 and EB2	0	0	0
Mining PIT EC	2	2	2
Mining PIT WB	2	2	2
Mining PIT WA	0	0	0

## 17 ANNEX IV: WATER QUALITY BASELINE REPORT

### 17.1 Water Quality

Baseline surface and groundwater samples were collected across the Project area. Surface water samples were collected from flowing streams downstream of future mining areas and the process plant. Groundwater samples were taken from existing bores within orebodies in Mayuge, Bugweri and Bugiri Districts.

### 17.2 Locations

Fifteen surface water and 10 ground water samples were collected across the Project site to assess the baseline conditions. They were collected from Central, Eastern and Western areas of the Project. The samples were shipped to South Africa for laboratory analysis.

Table 147: Water sampling locations

Sample Code	Source
CSW1	450m downstream Nahidadala-Kitumbezi Confluence
ESW1	Upstream R. Kitumbezi
EGW1	DWD 77237, Katooko Village
ESW2	R. Bupala
ESW3	R. Kaboma
ESW4	Wandegeile Seasonal Stream
EGW2	Borehole in Buffer EB <sub>1</sub> & EB <sub>2</sub>
ESW5	R. Nakamini
CSW2	Discharge from processing plant area
CGW1	Borehole Butenkaile Village
CSW3	All year unprotected spring at processing plant
CSW4	R. Naigombwa before confluence with R. Kitumbezi
CSW5	R. Kitumbezi Before confluence with R. Naigombwa
CSW6	Protected spring at Kigulamo Village
CGW2	Borehole at Mawololo Village
CGW3	Borehole at Buswiriri Village Mosque
CGW4	Borehole at Makuutu S/C
CSW7	Upstream Naigombwa
CGW5	DWD 37181, Borehole at Makandwa Village
CGW6	Borehole in Nawanvubu Village
CSW8	Kitumbezi along Makuutu S/C and Igombe S/C border
WGW1	Borehole at Isikiro Village
WGW2	Borehole at Magada Village
WSW 1	R Walugogo
WSW 2	R. Magoola





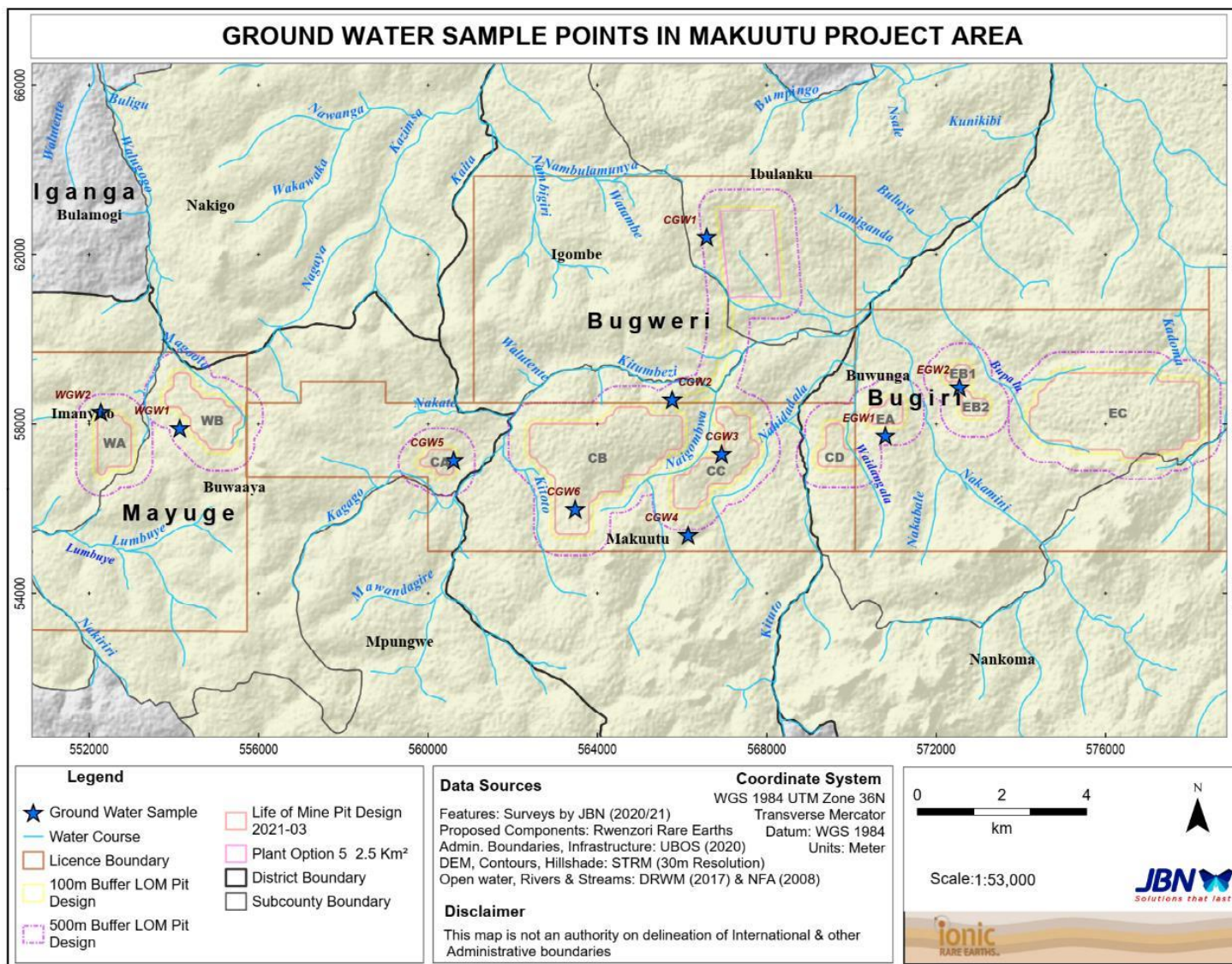


Figure 175: Map of Sampled Ground Water Sources



### 17.3 Parameters

Baseline investigations considered the following parameters for both surface and groundwater samples relevant to potability and potential pollution: Anions, Cations, Colour, Turbidity, Alkalinity, Total Dissolved Solids, Metals (Aluminum, Arsenic, Barium, Calcium, Cadmium, Chromium, Copper, Iron, Potassium, Magnesium, Manganese, Sodium, Nickel, Lead, Antimony, Selenium, Strontium, Uranium, Vanadium, Zinc, Mercury), Chloride, Fluoride, Nitrite, Nitrate, Sulphate, pH, Ammonia and bacteria (E.coli, faecal coliforms, total coliforms and total plate count). Thorium and a full suite of REE were analysed separately in both surface and groundwater.

### 17.4 Standards

While it is understood that local people source their drinking water from wells, springs and bores as opposed to rivers and streams the assessed quality of both surface water and groundwater has been compared to WHO Drinking Water Standards. The Ugandan Ministry of Health website also refers to the World Health Organisation (WHO) Standards for Drinking Water.

### 17.5 Results

Baseline surface water quality met the WHO standards for drinking water with the exception of elevated turbidity in some surface water samples which were collected following wet season rain and high levels of coliform bacteria in all surface water samples (refer Tables 148-150). The presence of coliform bacteria indicates that surface water is contaminated with sewage. Concentrations of REE and Thorium were very low and mostly undetectable in all samples (refer Table 154).

Groundwater quality was similar to the surface water quality but with much lower turbidity and coliform bacteria (refer Tables 151-153). Turbidity and coliform bacteria levels were undetectable in most groundwater samples as would be expected.

Levels of Uranium and Thorium in both surface and groundwater were very low and mostly below very low limits of detection (refer Tables 148-154).

Table 148: Surface Water Quality in streams draining the Central Makuutu ore-body and future Processing Plant area

		Reporting Limit	CSW1	CSW2	CSW3	CSW4	CSW5	CSW6	CSW7	CSW8	WHO Gu
Sum of Anion Milliequivalents	meq/l	-	1.76	1.74	1.33	1.21	1.46	1.78	1.95	1.3	
Sum of Cation Milliequivalents	meq/l	-	1.69	1.57	1.2	1.2	1.53	1.7	1.87	1.25	
Anion-Cation Balance	%	-100	-2.09	-4.92	-4.93	-0.59	2.26	-2.08	-2.27	-1.78	
Colour (True)	Hazen/l	1	26	42	5.3	37	33	5.7	33	74	
Turbidity	NTU	0.4	330	190	29	330	210	37	90	180	2
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	65	70	45	35	45	45	70	40	
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12	<12	<12	<12	<12	<12	<12	
Total Alkalinity as CaCO <sub>3</sub>	mg/l	12	65	70	45	35	45	45	70	40	
Conductivity in mS/m @ 25°C	mS/m	2	18	17	14	14	17	20	20	13	
TDS (0.7µm) @ 105°C	mg/l	21	130	120	95	100	110	140	140	95	300
Aluminium	mg/l	0.02	0.58	0.62	0.05	1.2	3	0.15	0.47	4.8	
Arsenic	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Boron	mg/l	0.005	0.008	0.009	<0.005	0.01	<0.005	0.007	0.009	<0.005	0.5
Barium	mg/l	0.002	0.024	0.02	0.05	0.027	0.025	0.086	0.036	0.029	
Calcium	mg/l	0.5	9.8	11	7.3	5.3	7.9	4.9	13	5.8	
Cadmium	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003
Chromium	mg/l	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	
Copper	mg/l	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	2
Iron	mg/l	0.05	0.37	0.48	<0.05	0.61	1.4	0.08	0.52	2.2	
Potassium	mg/l	0.2	4.1	2.1	3.6	3.6	3.2	2.6	3.7	3.9	
Magnesium	mg/l	0.01	3.8	4.1	3.6	2	3.3	2.6	4.6	2.3	
Manganese	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.4
Sodium	mg/l	0.5	18	14	10	15	17	27	17	14	
Nickel	mg/l	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.07
Lead	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Antimony	mg/l	0.008	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Selenium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Strontium	mg/l	0.001	0.09	0.13	0.092	0.058	0.09	0.063	0.13	0.067	
Uranium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.015
Vanadium	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	0.004	
Zinc	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Chloride	mg/l	0.05	7.4	2.2	2	7	6.9	11	7.6	7.8	
Fluoride	mg/l	0.05	0.23	0.16	<0.05	0.15	0.18	<0.05	0.16	0.1	1.5
Nitrite	mg/l	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Nitrate	mg/l	0.1	1.9	1	12	3.4	3.6	14	1.5	1.5	50
Sulphate	mg/l	0.05	11	13	8.9	13	15	17	15	12	
pH in water at 25°C	-	1	7.3	7.2	7	7	6.8	6.8	6.7	6.8	
Mercury	µg/l	0.001	0.007	0.005	0.001	0.003	0.002	0.003	0.002	0.001	0.006
Ammonia	mg/l	0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	
Ammonia as N	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
E. Coli	CFU/100ml	-	1	1	2	1	1	138	Not Detected	1	
Faecal Coliforms	CFU/100ml	-	365	387	Not Detected	276	276	14	146	165	
Total Coliforms	CFU/100ml	-	50	17	51	201	41	1203	50	17	
Total Plate Count	CFU/ml	-	483	534	365	>2420	>2420	376	>2420	>2420	

Table 149: Surface Water Quality in streams draining the Eastern Makuutu Ore-body

		Reporting Limit	ESW1	ESW2	ESW3	ESW4	ESW5	WHO G
Sum of Anion Milliequivalents	meq/l	-	1.99	0.941	1.16	0.814	1.97	
Sum of Cation Milliequivalents	meq/l	-	2.42	1.11	1.16	0.745	2.14	
Anion-Cation Balance	%	-100	9.95	8.08	-0.01	-4.4	4.14	
Colour (True)	Hazen/l	1	28	24	11	1.5	30	
Turbidity	NTU	0.4	130	290	400	24	140	2
Bicarbonate Alkalinity as CaCO3	mg/l	12	75	40	20	30	75	
Carbonate Alkalinity as CaCO3	mg/l	12	<12	<12	<12	<12	<12	
Methyl Orange (M) Alkalinity as CaCO3	mg/l	12	75	40	20	30	75	
Phenolphthalein (P) Alkalinity as CaCO3	mg/l	12	<12	<12	<12	<12	<12	
Total Alkalinity as CaCO3	mg/l	12	75	40	20	30	75	
Conductivity in mS/m @ 25°C	mS/m	2	21	8.3	14	11	22	300
TDS (0.7µm) @ 105°C	mg/l	21	150	60	100	85	160	
Aluminium	mg/l	0.02	1.6	0.21	1.2	0.02	0.41	
Arsenic	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Boron	mg/l	0.005	<0.005	0.011	0.01	0.006	0.009	0.5
Barium	mg/l	0.002	0.026	0.014	0.022	0.016	0.023	
Calcium	mg/l	0.5	14	5.7	4.9	6.2	12	
Cadmium	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003
Chromium	mg/l	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Copper	mg/l	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	2
Iron	mg/l	0.05	0.9	0.12	0.54	<0.05	0.32	
Potassium	mg/l	0.2	4.4	2.1	6.6	1.1	3.9	
Magnesium	mg/l	0.01	6.4	2.9	2.1	2.4	5	
Manganese	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.4
Sodium	mg/l	0.5	24	12	13	4.9	23	
Nickel	mg/l	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.07
Lead	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Antimony	mg/l	0.008	<0.01	<0.01	<0.01	<0.01	<0.01	
Selenium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Strontium	mg/l	0.001	0.14	0.047	0.049	0.037	0.12	
Uranium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.015
Vanadium	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Zinc	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Chloride	mg/l	0.05	4.4	1.9	14	2	9.7	
Fluoride	mg/l	0.05	0.23	0.09	0.25	<0.05	0.2	1.5
Nitrite	mg/l	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Nitrate	mg/l	0.1	0.9	1.4	4.6	4	1.1	50
Sulphate	mg/l	0.05	17	3.2	14	4.5	8.8	
pH in water at 25°C	-	1	6.8	6.9	6.9	6.6	6.7	
Mercury	µg/l	0.001	0.001	0.001	0.001	0.009	0.006	0.006
Ammonia	mg/l	0.012	<0.012	<0.012	<0.012	<0.012	<0.012	
Ammonia as N	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
E. Coli	CFU/100ml	-	Not Detected	Not Detected	3	11	Not Detected	
Faecal Coliforms	CFU/100ml	-	179	345	308	4	345	
Total Coliforms	CFU/100ml	-	35	40	52	517	9	
Total Plate Count	CFU/ml	-	>2420	1986	2420	96	>2420	



Table 150: Surface Water Quality in Streams draining the Western Makuutu Ore-body

					WGWI	WGII	WHO G
6							
7							
8	JBX21-8950	Calculation of Anion-Cation Balance	Sum of Anion Milliequivalents	meq/l	-	3.13	0.929
9	JBX21-8950	Calculation of Anion-Cation Balance	Sum of Cation Milliequivalents	meq/l	-	3.21	0.848
0	JBX21-8950	Calculation of Anion-Cation Balance	Anion-Cation Balance	%	-100	1.16	-4.58
1	JBX21-8950	Colour Analysis by Discrete Analyser	Colour (True)	Hazen/l	1	<1.0	<1.0
2	JBX21-8950	Turbidity	Turbidity	NTU	0.4	<0.4	28
3	JBX21-8950	Alkalinity on waters by titration	Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	110	25
4	JBX21-8950	Alkalinity on waters by titration	Carbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12
5	JBX21-8950	Alkalinity on waters by titration	Methyl Orange (M) Alkalinity as CaCO <sub>3</sub>	mg/l	12	110	25
6	JBX21-8950	Alkalinity on waters by titration	Phenolphthalein (P) Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12
7	JBX21-8950	Alkalinity on waters by titration	Total Alkalinity as CaCO <sub>3</sub>	mg/l	12	110	25
8	JBX21-8950	Conductivity on waters	Conductivity in mS/m @ 25°C	mS/m	2	32	10
9	JBX21-8950	Total Dissolved Solids (TDS) in water at 105 deg	TDS (0.7µm) @ 105°C	mg/l	21	230	75
0	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Aluminium	mg/l	0.02	<0.02	<0.02
1	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Arsenic	mg/l	0.01	<0.01	<0.01
2	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Boron	mg/l	0.005	0.007	<0.005
3	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Barium	mg/l	0.002	0.026	0.044
4	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Calcium	mg/l	0.5	27	7.6
5	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Cadmium	mg/l	0.001	<0.001	<0.001
6	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Chromium	mg/l	0.002	<0.002	<0.002
7	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Copper	mg/l	0.02	<0.02	<0.02
8	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Iron	mg/l	0.05	<0.05	<0.05
9	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Potassium	mg/l	0.2	3.9	2.5
0	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Magnesium	mg/l	0.01	14	1.3
1	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Manganese	mg/l	0.01	<0.01	0.12
2	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Sodium	mg/l	0.5	13	6.8
3	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Nickel	mg/l	0.005	<0.005	<0.005
4	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Lead	mg/l	0.01	<0.01	<0.01
5	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Antimony	mg/l	0.008	<0.01	<0.01
6	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Selenium	mg/l	0.01	<0.01	<0.01
7	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Strontium	mg/l	0.001	0.22	0.046
8	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Uranium	mg/l	0.01	<0.01	<0.01
9	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Vanadium	mg/l	0.001	<0.001	<0.001
0	JBX21-8950	ICP-OES Metals on waters (Dissolved)	Zinc	mg/l	0.01	<0.01	0.04
1	JBX21-8950	Anions on Waters by Ion Chromatography	Chloride	mg/l	0.05	16	6.1
2	JBX21-8950	Anions on Waters by Ion Chromatography	Fluoride	mg/l	0.05	<0.05	<0.05
3	JBX21-8950	Anions on Waters by Ion Chromatography	Nitrite	mg/l	0.5	<0.5	<0.5
4	JBX21-8950	Anions on Waters by Ion Chromatography	Nitrate	mg/l	0.1	19	7.9
5	JBX21-8950	Anions on Waters by Ion Chromatography	Sulphate	mg/l	0.05	8.9	6.2
6	JBX21-8950	pH in water	pH in water at 25°C	-	1	6.7	6.3
7	JBX21-8950	Dissolved Hg on waters by ICP-MS	Mercury	µg/l	0.001	0.004	0.006
8	JBX21-8950	Ammonia on waters by Discrete Analyser	Ammonia	mg/l	0.012	<0.012	0.026
9	JBX21-8950	Ammonia on waters by Discrete Analyser	Ammonia as N	mg/l	0.01	<0.01	0.02
0	JBX21-8950	Microbiological parameters in Water	E. Coli	CFU/100ml	-	1	Not Detected
1	JBX21-8950	Microbiological parameters in Water	Faecal Coliforms	CFU/100ml	-	Not Detected	Not Detected
2	JBX21-8950	Microbiological parameters in Water	Total Coliforms	CFU/100ml	-	2	Not Detected
3	JBX21-8950	Microbiological parameters in Water	Total Plate Count	CFU/ml	-	46	108

Table 151: Groundwater Quality in the Eastern Makuutu Ore-body

					EGW1	EGW2	WHO G
JBX21-8951	Calculation of Anion-Cation Balance	Sum of Anion Milliequivalents	meq/l	-	2.3	2.18	
JBX21-8951	Calculation of Anion-Cation Balance	Sum of Cation Milliequivalents	meq/l	-	2.14	2.11	
JBX21-8951	Calculation of Anion-Cation Balance	Anion-Cation Balance	%	-100	-3.63	-1.59	
JBX21-8951	Colour Analysis by Discrete Analyser	Colour (True)	Hazen/l	1	<1.0	<1.0	
JBX21-8951	Turbidity	Turbidity	NTU	0.4	<0.4	<0.4	2
JBX21-8951	Alkalinity on waters by titration	Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	75	85	
JBX21-8951	Alkalinity on waters by titration	Carbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12	
JBX21-8951	Alkalinity on waters by titration	Methyl Orange (M) Alkalinity as CaCO <sub>3</sub>	mg/l	12	75	85	
JBX21-8951	Alkalinity on waters by titration	Phenolphthalein (P) Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12	
JBX21-8951	Alkalinity on waters by titration	Total Alkalinity as CaCO <sub>3</sub>	mg/l	12	75	85	
JBX21-8951	Conductivity on waters	Conductivity in mS/m @ 25°C	mS/m	2	23	22	300
JBX21-8951	Total Dissolved Solids (TDS) in water at 105 deg	TDS (0.7µm) @ 105°C	mg/l	21	200	200	
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Aluminium	mg/l	0.02	<0.02	<0.02	
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Arsenic	mg/l	0.01	<0.01	<0.01	
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Boron	mg/l	0.005	<0.005	0.005	0.5
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Barium	mg/l	0.002	0.081	0.048	
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Calcium	mg/l	0.5	12	7	
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Cadmium	mg/l	0.001	<0.001	<0.001	0.003
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Chromium	mg/l	0.002	<0.002	<0.002	
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Copper	mg/l	0.02	<0.02	<0.02	2
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Iron	mg/l	0.05	<0.05	<0.05	
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Potassium	mg/l	0.2	3.6	3.8	
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Magnesium	mg/l	0.01	6.1	3.3	
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Manganese	mg/l	0.01	<0.01	0.05	0.4
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Sodium	mg/l	0.5	22	32	
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Nickel	mg/l	0.005	<0.005	<0.005	0.07
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Lead	mg/l	0.01	<0.01	<0.01	0.01
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Antimony	mg/l	0.008	<0.01	<0.01	
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Selenium	mg/l	0.01	<0.01	<0.01	
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Strontium	mg/l	0.001	0.19	0.082	
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Uranium	mg/l	0.01	<0.01	<0.01	0.015
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Vanadium	mg/l	0.001	0.002	0.002	
JBX21-8951	ICP-OES Metals on waters (Dissolved)	Zinc	mg/l	0.01	0.01	0.05	
JBX21-8951	Anions on Waters by Ion Chromatography	Chloride	mg/l	0.05	3.6	2.5	
JBX21-8951	Anions on Waters by Ion Chromatography	Fluoride	mg/l	0.05	<0.05	<0.05	1.5
JBX21-8951	Anions on Waters by Ion Chromatography	Nitrite	mg/l	0.5	<0.5	<0.5	
JBX21-8951	Anions on Waters by Ion Chromatography	Nitrate	mg/l	0.1	9.4	13	50
JBX21-8951	Anions on Waters by Ion Chromatography	Sulphate	mg/l	0.05	27	9.3	
JBX21-8951	pH in water	pH in water at 25°C	-	1	6.5	6.5	
JBX21-8951	Dissolved Hg on waters by ICP-MS	Mercury	µg/l	0.001	0.003	0.002	0.006
JBX21-8951	Ammonia on waters by Discrete Analyser	Ammonia	mg/l	0.012	<0.012	<0.012	
JBX21-8951	Ammonia on waters by Discrete Analyser	Ammonia as N	mg/l	0.01	<0.01	<0.01	
JBX21-8951	Microbiological parameters in Water	E. Coli	CFU/100ml	-	Not Detected	Not Detected	
JBX21-8951	Microbiological parameters in Water	Faecal Coliforms	CFU/100ml	-	Not Detected	Not Detected	
JBX21-8951	Microbiological parameters in Water	Total Coliforms	CFU/100ml	-	12	Not Detected	
JBX21-8951	Microbiological parameters in Water	Total Plate Count	CFU/ml	-	32	50	

Table 152: Groundwater Quality in the Central Makuutu Ore-body

				CGW1	CGW2	CGW3	CGW4	CGW5	CGW6	WHO Guideline
Calculation of Anion-Cation Balance	Sum of Anion Milliequivalents	meq/l	-	1.51	2.15	1.49	1.64	0.864	1.36	
Calculation of Anion-Cation Balance	Sum of Cation Milliequivalents	meq/l	-	1.45	1.93	1.41	1.51	0.908	1.29	
Calculation of Anion-Cation Balance	Anion-Cation Balance	%	-100	-2.03	-5.52	-2.86	-4.04	2.49	-2.75	
Colour Analysis by Discrete Analyser	Colour (True)	Hazen/l	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Turbidity	Turbidity	NTU	0.4	<0.4	140	340	<0.4	<0.4	3.6	2
Alkalinity on waters by titration	Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	40	70	65	50	35	50	
Alkalinity on waters by titration	Carbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12	<12	<12	<12	<12	
Alkalinity on waters by titration	Methyl Orange (M) Alkalinity as CaCO <sub>3</sub>	mg/l	12	40	70	65	50	35	50	
Alkalinity on waters by titration	Phenolphthalein (P) Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12	<12	<12	<12	<12	
Alkalinity on waters by titration	Total Alkalinity as CaCO <sub>3</sub>	mg/l	12	40	70	65	50	35	50	
Conductivity on waters	Conductivity in mS/m @ 25°C	mS/m	2	17	23	15	17	9.7	15	300
Total Dissolved Solids (TDS) in water at 105 deg	TDS (0.7µm) @ 105°C	mg/l	21	120	170	80	120	60	100	
ICP-OES Metals on waters (Dissolved)	Aluminium	mg/l	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
ICP-OES Metals on waters (Dissolved)	Arsenic	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
ICP-OES Metals on waters (Dissolved)	Boron	mg/l	0.005	<0.005	0.007	0.005	<0.005	<0.005	0.01	0.5
ICP-OES Metals on waters (Dissolved)	Barium	mg/l	0.002	0.027	0.12	0.051	0.087	0.056	0.032	
ICP-OES Metals on waters (Dissolved)	Calcium	mg/l	0.5	8.7	19	11	9.3	7.1	6.6	
ICP-OES Metals on waters (Dissolved)	Cadmium	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003
ICP-OES Metals on waters (Dissolved)	Chromium	mg/l	0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	
ICP-OES Metals on waters (Dissolved)	Copper	mg/l	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	2
ICP-OES Metals on waters (Dissolved)	Iron	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
ICP-OES Metals on waters (Dissolved)	Potassium	mg/l	0.2	5.1	10	7.1	5.7	3.3	3.5	
ICP-OES Metals on waters (Dissolved)	Magnesium	mg/l	0.01	2.6	4.1	1.8	3.1	1.6	1.5	
ICP-OES Metals on waters (Dissolved)	Manganese	mg/l	0.01	<0.01	0.35	0.51	<0.01	<0.01	0.04	0.4
ICP-OES Metals on waters (Dissolved)	Sodium	mg/l	0.5	15	8.4	12	15	7.8	17	
ICP-OES Metals on waters (Dissolved)	Nickel	mg/l	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.07
ICP-OES Metals on waters (Dissolved)	Lead	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
ICP-OES Metals on waters (Dissolved)	Antimony	mg/l	0.008	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
ICP-OES Metals on waters (Dissolved)	Selenium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
ICP-OES Metals on waters (Dissolved)	Strontium	mg/l	0.001	0.066	0.084	0.05	0.11	0.075	0.044	
ICP-OES Metals on waters (Dissolved)	Uranium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.015
ICP-OES Metals on waters (Dissolved)	Vanadium	mg/l	0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.002	
ICP-OES Metals on waters (Dissolved)	Zinc	mg/l	0.01	<0.01	3.8	0.06	<0.01	<0.01	0.03	
Anions on Waters by Ion Chromatography	Chloride	mg/l	0.05	2.4	14	4.1	5.3	1.7	2.9	
Anions on Waters by Ion Chromatography	Fluoride	mg/l	0.05	<0.05	0.1	0.08	0.1	<0.05	<0.05	1.5
Anions on Waters by Ion Chromatography	Nitrite	mg/l	0.5	<0.5	1.8	<0.5	<0.5	<0.5	<0.5	
Anions on Waters by Ion Chromatography	Nitrate	mg/l	0.1	14	3.2	0.7	20	3.9	10	50
Anions on Waters by Ion Chromatography	Sulphate	mg/l	0.05	20	14	3	7.6	2.6	5.2	
pH in water	pH in water at 25°C	-	1	6.3	5.9	6.1	6.3	6.3	6.2	
Dissolved Hg on waters by ICP-MS	Mercury	µg/l	0.001	0.003	0.006	0.003	0.002	0.003	0.001	0.006
Ammonia on waters by Discrete Analyser	Ammonia	mg/l	0.012	<0.012	0.33	0.9	<0.012	<0.012	<0.012	
Ammonia on waters by Discrete Analyser	Ammonia as N	mg/l	0.01	<0.01	0.27	0.74	<0.01	<0.01	<0.01	
Microbiological parameters in Water	E. Coli	CFU/100ml	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	
Microbiological parameters in Water	Faecal Coliforms	CFU/100ml	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	
Microbiological parameters in Water	Total Coliforms	CFU/100ml	-	Not Detected	Not Detected	>2420	2	Not Detected	3	
Microbiological parameters in Water	Total Plate Count	CFU/ml	-	40	31	26	36	27	225	

Table 153: Groundwater Quality in the Western Makuutu Ore-body

				WSW1	WSW2	IO Guide
Calculation of Anion-Cation Balance	Sum of Anion Millequivalents	meq/l	-	1.16	0.94	
Calculation of Anion-Cation Balance	Sum of Cation Millequivalents	meq/l	-	1.11	0.967	
Calculation of Anion-Cation Balance	Anion-Cation Balance	%	-100	-2.35	1.4	
Colour Analysis by Discrete Analyser	Colour (True)	Hazen/l	1	89	38	
Turbidity	Turbidity	NTU	0.4	90	70	2
Alkalinity on waters by titration	Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	35	40	
Alkalinity on waters by titration	Carbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12	
Alkalinity on waters by titration	Methyl Orange (M) Alkalinity as CaCO <sub>3</sub>	mg/l	12	35	40	
Alkalinity on waters by titration	Phenolphthalein (P) Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12	
Alkalinity on waters by titration	Total Alkalinity as CaCO <sub>3</sub>	mg/l	12	35	40	
Conductivity on waters	Conductivity in mS/m @ 25°C	mS/m	2	12	5.7	300
Total Dissolved Solids (TDS) in water at 105 deg	TDS (0.7µm) @ 105°C	mg/l	21	85	40	
ICP-OES Metals on waters (Dissolved)	Aluminium	mg/l	0.02	3.7	5	
ICP-OES Metals on waters (Dissolved)	Arsenic	mg/l	0.01	<0.01	<0.01	
ICP-OES Metals on waters (Dissolved)	Boron	mg/l	0.005	<0.005	<0.005	0.5
ICP-OES Metals on waters (Dissolved)	Barium	mg/l	0.002	0.023	0.03	
ICP-OES Metals on waters (Dissolved)	Calcium	mg/l	0.5	4.4	4.7	
ICP-OES Metals on waters (Dissolved)	Cadmium	mg/l	0.001	<0.001	<0.001	0.003
ICP-OES Metals on waters (Dissolved)	Chromium	mg/l	0.002	0.002	0.002	
ICP-OES Metals on waters (Dissolved)	Copper	mg/l	0.02	<0.02	<0.02	2
ICP-OES Metals on waters (Dissolved)	Iron	mg/l	0.05	1.9	1.9	
ICP-OES Metals on waters (Dissolved)	Potassium	mg/l	0.2	2.4	2.7	
ICP-OES Metals on waters (Dissolved)	Magnesium	mg/l	0.01	2.4	1.9	
ICP-OES Metals on waters (Dissolved)	Manganese	mg/l	0.01	<0.01	<0.01	0.4
ICP-OES Metals on waters (Dissolved)	Sodium	mg/l	0.5	13	10	
ICP-OES Metals on waters (Dissolved)	Nickel	mg/l	0.005	<0.005	<0.005	0.07
ICP-OES Metals on waters (Dissolved)	Lead	mg/l	0.01	<0.01	<0.01	0.01
ICP-OES Metals on waters (Dissolved)	Antimony	mg/l	0.008	<0.01	<0.01	
ICP-OES Metals on waters (Dissolved)	Selenium	mg/l	0.01	<0.01	<0.01	
ICP-OES Metals on waters (Dissolved)	Strontium	mg/l	0.001	0.05	0.055	
ICP-OES Metals on waters (Dissolved)	Uranium	mg/l	0.01	<0.01	<0.01	0.015
ICP-OES Metals on waters (Dissolved)	Vanadium	mg/l	0.001	0.003	0.003	
ICP-OES Metals on waters (Dissolved)	Zinc	mg/l	0.01	<0.01	<0.01	
Anions on Waters by Ion Chromatography	Chloride	mg/l	0.05	8	2.9	
Anions on Waters by Ion Chromatography	Fluoride	mg/l	0.05	0.17	0.09	1.5
Anions on Waters by Ion Chromatography	Nitrite	mg/l	0.5	<0.5	<0.5	
Anions on Waters by Ion Chromatography	Nitrate	mg/l	0.1	0.6	0.3	50
Anions on Waters by Ion Chromatography	Sulphate	mg/l	0.05	11	2.7	
pH in water	pH in water at 25°C	-	1	6.3	6.3	
Dissolved Hg on waters by ICP-MS	Mercury	µg/l	0.001	0.009	0.004	0.006
Ammonia on waters by Discrete Analyser	Ammonia	mg/l	0.012	<0.012	<0.012	
Ammonia on waters by Discrete Analyser	Ammonia as N	mg/l	0.01	<0.01	<0.01	
Microbiological parameters in Water	E. Coli	CFU/100ml	-	Not Detected	Not Detected	
Microbiological parameters in Water	Faecal Coliforms	CFU/100ml	-	261	6	
Microbiological parameters in Water	Total Coliforms	CFU/100ml	-	5	6	
Microbiological parameters in Water	Total Plate Count	CFU/ml	-	1553	344	



Table 154: Rare Earth Element and Thorium Concentration in surface and groundwater across the Makuutu Ore-body.

IONIC RATIO	Ce	Dy	Er	Eu	Gd	Ho	La	Lu	Nd	Pr	Sc	Sm	Tb	Th	Tm	Y	Yb
METHOD	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B
LDetective	0.4	0.2	0.2	0.2	0.2	0.2	0.4	0.2	0.4	0.2	0.5	0.4	0.2	0.5	0.2	2	0.4
UDetective	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UNITS	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
CSW1	9	0.6	0.3	<0.2	0.7	<0.2	6.3	<0.2	4.8	1.3	17.3	0.8	<0.2	2	<0.2	3	<0.4
CSW2	4.8	0.5	0.2	<0.2	0.4	<0.2	3.6	<0.2	2.6	0.8	14.3	0.5	<0.2	1.2	<0.2	2	<0.4
CSW3	0.7	<0.2	<0.2	<0.2	<0.2	<0.2	0.6	<0.2	0.4	<0.2	12.3	<0.4	<0.2	<0.5	<0.2	<2	<0.4
CSW4	18.2	1.1	0.5	0.2	1.3	<0.2	11.4	<0.2	8.4	2.4	28.1	1.4	<0.2	3.8	<0.2	6	0.5
CSW5	5.7	0.5	0.2	<0.2	0.5	<0.2	4.1	<0.2	3	0.8	16.8	0.6	<0.2	1.5	<0.2	3	<0.4
CSW6	4.6	0.5	0.2	<0.2	0.6	<0.2	3.2	<0.2	3.2	0.9	16.8	0.7	<0.2	0.8	<0.2	2	<0.4
CSW7	4.2	0.2	<0.2	<0.2	0.3	<0.2	2.8	<0.2	2.2	0.6	10.7	<0.4	<0.2	0.7	<0.2	<2	<0.4
CSW8	9.7	0.6	0.3	<0.2	0.7	<0.2	6.1	<0.2	4.1	1.2	21.1	0.7	<0.2	2.3	<0.2	3	<0.4
CGW1	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4	<0.2	<0.4	<0.2	15.6	<0.4	<0.2	<0.5	<0.2	<2	<0.4
CGW2	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4	<0.2	<0.4	<0.2	6	<0.4	<0.2	<0.5	<0.2	<2	<0.4
CGW3	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4	<0.2	<0.4	<0.2	5.6	<0.4	<0.2	<0.5	<0.2	<2	<0.4
CGW4	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4	<0.2	<0.4	<0.2	16.5	<0.4	<0.2	<0.5	<0.2	<2	<0.4
CGW5	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4	<0.2	<0.4	<0.2	14.1	<0.4	<0.2	<0.5	<0.2	<2	<0.4
CGW6	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4	<0.2	<0.4	<0.2	15.6	<0.4	<0.2	<0.5	<0.2	<2	<0.4
EGW1	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4	<0.2	<0.4	<0.2	19.4	<0.4	<0.2	<0.5	<0.2	<2	<0.4
EGW2	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4	<0.2	<0.4	<0.2	17	<0.4	<0.2	<0.5	<0.2	<2	<0.4
ESW1	2.5	<0.2	<0.2	<0.2	0.2	<0.2	1.7	<0.2	1.3	0.4	10.4	<0.4	<0.2	0.8	<0.2	<2	<0.4
ESW2	9.5	0.7	0.4	<0.2	0.9	<0.2	6.7	<0.2	4.9	1.4	17.7	0.9	<0.2	2.1	<0.2	4	<0.4
ESW3	17.8	0.8	0.4	<0.2	1	<0.2	8.4	<0.2	6.4	1.8	17.1	1.1	<0.2	2.9	<0.2	4	0.4
ESW4	0.5	<0.2	<0.2	<0.2	<0.2	<0.2	0.4	<0.2	<0.4	<0.2	8.3	<0.4	<0.2	<0.5	<0.2	<2	<0.4
ESW5	3.5	0.3	<0.2	<0.2	0.3	<0.2	2.5	<0.2	1.9	0.5	9.6	<0.4	<0.2	0.7	<0.2	<2	<0.4
WGW1	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4	<0.2	<0.4	<0.2	15.2	<0.4	<0.2	<0.5	<0.2	<2	<0.4
WGW2	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4	<0.2	<0.4	<0.2	6.9	<0.4	<0.2	<0.5	<0.2	<2	<0.4
WSW1	6.2	0.4	0.2	<0.2	0.4	<0.2	4.4	<0.2	2.6	0.7	14.9	0.5	<0.2	1.5	<0.2	2	<0.4
WSW2	4.1	0.3	<0.2	<0.2	0.3	<0.2	2.8	<0.2	1.7	0.5	11.4	<0.4	<0.2	1.1	<0.2	<2	<0.4
*REP-CSW	5.8	0.4	0.3	<0.2	0.5	<0.2	4.2	<0.2	3	0.8	16.6	0.5	<0.2	1.4	<0.2	2	<0.4
*STD-20PF	19.5	19.5	19.5	19.6	19.5	19.5	19.5	19.5	19.4	19.5	19.6	19.5	19.5	19.5	19.5	20	19.5
*BLK-BLANK	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4	<0.2	<0.4	<0.2	<0.5	<0.4	<0.2	<0.5	<0.2	<2	<0.4



## 17.6 Discussion

### 17.6.1 Surface water samples

- Surface water was in general fresh (ie. average TDS of 116 mg/L in the Central Project area and similar in other areas) and with close to neutral acidity (ie. pH 7). The neutral pH would be expected from the moderate alkalinity of about 50 mg CaCO<sub>3</sub>/L which will neutralise or "buffer," the carbon dioxide and other acids in the water.
- All surface water samples from the central, eastern and western areas meet WHO drinking water standards for all metals with the exception of mercury which was slightly above the WHO guideline of 0.006 ug/L in a few samples. Uranium, which is a recognised challenge for many hard rock REE Projects was undetectable (ie. <0.01 mg/L) in all samples vs WHO drinking water guideline of 0.015 mg/L. Thorium was undetectable (<0.5 ppb) or very low in all samples with the highest result of 3.8 ppb in the Central Surface Water number 4 sample which had a high turbidity of 330 NTU from suspended clay. Most REE were undetectable (ie. <0.2 ppb) or close to detection with the exception of Scandium which was typically in the 10-20 ppb range which is still low. Scandium has no known human health impacts (refer Table 6).
- The surface waters were fairly turbid (average NTU 175 in the Central area). This is well above the WHO drinking water guideline of 2 and it could generally be considered to be equivalent to about 50 mg/L Total Suspended Solids (TSS) based on the rule of thumb 3 NTU per 1 mg/L (TSS). The elevated turbidity is thought to be a consequence of recent rainfall prior to the collection of the surface water samples.
- Ammonia was not detected in surface water. This is significant because the lixiviant proposed for the Process Plant is Ammonium Sulphate.
- The presence of E.coli, faecal coliforms and total coliform bacteria in high numbers is an indication that the surface waters could be contaminated with raw sewage or the presence of livestock.

### 17.6.2 Groundwater samples

The water quality of the groundwater in the central area was similar to the surface water quality with a similar low TDS of 108 mg/L and it was also low in metals including Uranium which, like the surface water, was undetectable (ie. <0.01 mg/L) in all samples. The average total alkalinity of about 50 mg/L CaCO<sub>3</sub> was similar to that of the surface water but the pH of about 6.2 was lower than the neutral pH surface water.

Some samples had levels of manganese slightly above WHO Drinking Water Standards. The average pH of 6.2 was more acidic than the surface water. There were some coliform bacteria in some groundwater samples that is potentially a result of sample contamination as no bacteria would be expected in groundwater within a clay orebody.

The presence of coliforms including extreme variability from none detected to >2,420 CFU/100mL in CGW3 raises questions about potential sample contamination. There should be no coliforms in the groundwater.

### 17.6.3 Potential Impacts

The ore-body containing REE oxides is hosted in a 20m band of oxidized regolith with minimal risk of Acid Mine Drainage from the oxidation of sulphides. The undetectable or extremely low levels of

Uranium and Thorium in both surface and groundwater confirms the very low levels of radionuclides in the Makuutu ore-body.

The absence of the ammonia in both surface and groundwater is not unexpected and presents a low baseline against which any future Project emissions of Ammonium sulphate can be measured. The Project does, however, expect to have very good systems to prevent such emissions.

The high turbidity of surface water following rain underscores the challenges that the Project will face in controlling erosion from large areas of disturbed land. This reinforces the importance of installing robust drainage systems and of quickly stabilizing and regrassing any disturbed areas and temporary stockpiles to minimize erosion. Clean stormwater will be diverted away from unstable areas where it could become contaminated with sediment. Turbid stormwater will be pumped to stormwater storage ponds to enable suspended sediment to settle prior to discharge to watercourses.

## 18 Annex V: Laboratory Analysis Results



### TEST REPORT

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Bennie Nell	Laboratory	X-Lab Earth Science
Client	SGS Randfontein	Address	259 Kent Avenue Ferndale, 2194
Address		Telephone	+27 (0) 11 590 3000
Telephone	011 100 2170	Laboratory Manager	Mrs Tasneem Tagari
Facsimile		Lab Reference	JBX21-B948
Email	bennie.nell@sgs.com	Report Number	0000027279
Order Number	QU1316	Date Received	15/06/2021 13:03
Samples	8	Date Started	17/06/2021 8:18
Sample matrix	WATER	Date Reported	23/06/2021 16:06

The document is issued in accordance with SANAS's accreditation requirements.  
Accredited for compliance with ISO/IEC 17025. SANAS accredited laboratory T0107.

Samples received at ambient temp good condition.



T0775

#### SIGNATORIES


Tasneem Tagari
General Manager/Technical Signatory



JBX21-8948

Report number 0000027279

Client reference:

QU1316

## TEST REPORT

Parameter	Units	LOR	Sample Number	JBX21-8948.001	JBX21-8948.002	JBX21-8948.003	JBX21-8948.004
			Sample Name	CSW1	CSW2	CSW3	CSW4

### Calculation of Anion-Cation Balance

Anion-Cation Balance	%	-100	-2.09	-4.92	-4.93	-0.59
Sum of Anion Milliequivalents	meq/l	-	1.76	1.74	1.33	1.21
Sum of Cation Milliequivalents	meq/l	-	1.69	1.57	1.20	1.20

### Colour Analysis by Discrete Analyser Method: ME-AN-039

Colour (True)	Hazen/l	1	26	42	5.3	37
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### Turbidity Method: ME-AN-008

Turbidity *	NTU	0.4	330	190	29	330
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### Alkalinity on waters by titration Method: ME-AN-001

Total Alkalinity as CaCO <sub>3</sub>	mg/l	12	65	70	45	35
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	65	70	45	35
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12	<12	<12

### Conductivity on waters Method: ME-AN-007

## TEST REPORT

Sample Number  
Sample Name

JBX21-8948.001 CSW1	JBX21-8948.002 CSW2	JBX21-8948.003 CSW3	JBX21-8948.004 CSW4

Parameter

Units

LOR

### Conductivity on waters Method: ME-AN-007 (continued)

Conductivity in mS/m @ 25°C	mS/m	2	18	17	14	14
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### Total Dissolved Solids (TDS) in water at 105 deg Method: ME-AN-011

TDS (0.7µm) @ 105°C	mg/l	21	130	120	95	100
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### ICP-OES Metals on waters (Dissolved) Method: ME-AN-027

Aluminium	mg/l	0.02	0.58	0.62	0.05	1.2
Antimony	mg/l	0.008	<0.01	<0.01	<0.01	<0.01
Arsenic	mg/l	0.01	<0.01	<0.01	<0.01	<0.01
Barium	mg/l	0.002	0.024	0.020	0.050	0.027
Boron	mg/l	0.005	0.008	0.009	<0.005	0.010
Cadmium	mg/l	0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/l	0.5	9.8	11	7.3	5.3
Chromium	mg/l	0.002	<0.002	<0.002	<0.002	<0.002
Copper	mg/l	0.02	<0.02	<0.02	<0.02	<0.02
Iron	mg/l	0.05	0.37	0.48	<0.05	0.61
Lead	mg/l	0.01	<0.01	<0.01	<0.01	<0.01
Magnesium	mg/l	0.01	3.8	4.1	3.6	2.0
Manganese	mg/l	0.01	<0.01	<0.01	<0.01	<0.01





JBX21-8948

Report number 0000027279

Client reference:

QU1316

## TEST REPORT

Parameter	Units	LOR	Sample Number	JBX21-8948.001	JBX21-8948.002	JBX21-8948.003	JBX21-8948.004
			Sample Name	CSW1	CSW2	CSW3	CSW4

### ICP-OES Metals on waters (Dissolved) Method: ME-AN-027 (continued)

Nickel	mg/l	0.005	<0.005	<0.005	<0.005	<0.005
Potassium	mg/l	0.2	4.1	2.1	3.6	3.6
Selenium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01
Sodium	mg/l	0.5	18	14	10	15
Strontium	mg/l	0.001	0.090	0.13	0.092	0.058
Uranium *	mg/l	0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	mg/l	0.001	<0.001	<0.001	<0.001	<0.001
Zinc	mg/l	0.01	<0.01	<0.01	<0.01	<0.01

### Anions on Waters by Ion Chromatography Method: ME-AN-014

Chloride	mg/l	0.05	7.4	2.2	2.0	7.0
Fluoride	mg/l	0.05	0.23	0.16	<0.05	0.15
Nitrate	mg/l	0.1	1.9	1.0	12	3.4
Nitrite	mg/l	0.5	<0.5	<0.5	<0.5	<0.5
Sulphate	mg/l	0.05	11	13	8.9	13

### pH in water Method: ME-AN-016

pH in water at 25°C	-	1	7.3	7.2	7.0	7.0
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### Dissolved Hg on waters by ICP-MS Method: ME-AN-026



JBX21-8948

Report number 0000027279

Client reference:

QU1316

## TEST REPORT

Parameter	Units	LOR	Sample Number Sample Name	JBX21-8948.001 CSW1	JBX21-8948.002 CSW2	JBX21-8948.003 CSW3	JBX21-8948.004 CSW4

### Dissolved Hg on waters by ICP-MS Method: ME-AN-026 (continued)

Mercury	µg/l	0.001	0.007	0.005	0.001	0.003
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### Ammonia on waters by Discrete Analyser Method: ME-AN-041

Ammonia	mg/l	0.012	<0.012	<0.012	<0.012	<0.012
Ammonia as N	mg/l	0.01	<0.01	<0.01	<0.01	<0.01

### Microbiological parameters in Water Method: IDEXX

E. Coli *	CFU/100ml	-	1	1	2	1
Faecal Coliforms *	CFU/100ml	-	365	387	Not Detected	276
Total Coliforms *	CFU/100ml	-	50	17	51	201
Total Plate Count *	CFU/ml	-	483	534	365	>2420



JBX21-8948

Report number 0000027279

Client reference:

QU1316

## TEST REPORT

Parameter	Units	LOR	Sample Number	JBX21-8948.005	JBX21-8948.006	JBX21-8948.007	JBX21-8948.008
			Sample Name	CSWs	CSWs	CSW7	CSWs

### Calculation of Anion-Cation Balance

Anion-Cation Balance	%	-100	2.26	-2.08	-2.27	-1.78
Sum of Anion Milliequivalents	meq/l	-	1.46	1.78	1.95	1.30
Sum of Cation Milliequivalents	meq/l	-	1.53	1.70	1.87	1.25

### Colour Analysis by Discrete Analyser Method: ME-AN-039

Colour (True)	Hazen/l	1	33	5.7	33	74
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### Turbidity Method: ME-AN-008

Turbidity *	NTU	0.4	210	37	90	180
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### Alkalinity on waters by titration Method: ME-AN-001

Total Alkalinity as CaCO <sub>3</sub>	mg/l	12	45	45	70	40
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	45	45	70	40
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12	<12	<12

### Conductivity on waters Method: ME-AN-007



JBX21-8948

Report number 0000027279  
Client reference:  
QU1316

## TEST REPORT

Parameter	Units	LOR	Sample Number	Sample Name	JBX21-8948.005	JBX21-8948.006	JBX21-8948.007	JBX21-8948.008
					CSW5	CSW6	CSW7	CSW8

### Conductivity on waters Method: ME-AN-007 (continued)

Conductivity in mS/m @ 25°C	mS/m	2	17	20	20	13
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### Total Dissolved Solids (TDS) in water at 105 deg Method: ME-AN-011

TDS (0.7µm) @ 105°C	mg/l	21	110	140	140	95
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### ICP-OES Metals on waters (Dissolved) Method: ME-AN-027

Aluminium	mg/l	0.02	3.0	0.15	0.47	4.8
Antimony	mg/l	0.008	<0.01	<0.01	<0.01	<0.01
Arsenic	mg/l	0.01	<0.01	<0.01	<0.01	<0.01
Barium	mg/l	0.002	0.025	0.086	0.036	0.029
Boron	mg/l	0.005	<0.005	0.007	0.009	<0.005
Cadmium	mg/l	0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/l	0.5	7.9	4.9	13	5.8
Chromium	mg/l	0.002	<0.002	<0.002	<0.002	0.003
Copper	mg/l	0.02	<0.02	<0.02	<0.02	<0.02
Iron	mg/l	0.05	1.4	0.08	0.52	2.2
Lead	mg/l	0.01	<0.01	<0.01	<0.01	<0.01
Magnesium	mg/l	0.01	3.3	2.6	4.6	2.3
Manganese	mg/l	0.01	<0.01	<0.01	<0.01	0.01

### TEST REPORT

Parameter	Units	LOR	Sample Number	JBX21-8948.005	JBX21-8948.006	JBX21-8948.007	JBX21-8948.008
			Sample Name	CSW5	CSW6	CSW7	CSW8

#### ICP-OES Metals on waters (Dissolved) Method: ME-AN-027 (continued)

Nickel	mg/l	0.005	<0.005	<0.005	<0.005	<0.005
Potassium	mg/l	0.2	3.2	2.6	3.7	3.9
Selenium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01
Sodium	mg/l	0.5	17	27	17	14
Strontium	mg/l	0.001	0.090	0.063	0.13	0.067
Uranium *	mg/l	0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	mg/l	0.001	0.003	<0.001	<0.001	0.004
Zinc	mg/l	0.01	<0.01	<0.01	<0.01	<0.01

#### Anions on Waters by Ion Chromatography Method: ME-AN-014

Chloride	mg/l	0.05	6.9	11	7.6	7.8
Fluoride	mg/l	0.05	0.18	<0.05	0.16	0.10
Nitrate	mg/l	0.1	3.6	14	1.5	1.5
Nitrite	mg/l	0.5	<0.5	<0.5	<0.5	<0.5
Sulphate	mg/l	0.05	15	17	15	12

#### pH in water Method: ME-AN-016

pH in water at 25°C	-	1	6.8	6.8	6.7	6.8
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#### Dissolved Hg on waters by ICP-MS Method: ME-AN-026





JBX21-8948

Report number 0000027279

Client reference:

QU1316

## TEST REPORT

Parameter	Units	LOR	Sample Number	Sample Name	JBX21-8948.005	JBX21-8948.006	JBX21-8948.007	JBX21-8948.008
					CSW5	CSW6	CSW7	CSW8

### Dissolved Hg on waters by ICP-MS Method: ME-AN-026 (continued)

Mercury	µg/l	0.001	0.002	0.003	0.002	0.001
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### Ammonia on waters by Discrete Analyser Method: ME-AN-041

Ammonia	mg/l	0.012	<0.012	<0.012	<0.012	<0.012
Ammonia as N	mg/l	0.01	<0.01	<0.01	<0.01	<0.01

### Microbiological parameters in Water Method: IDEXX

E. Coli *	CFU/100ml	-	1	138	Not Detected	1
Faecal Coliforms *	CFU/100ml	-	276	14	146	165
Total Coliforms *	CFU/100ml	-	41	1203	50	17
Total Plate Count *	CFU/ml	-	>2420	376	>2420	>2420

## METHOD SUMMARY

METHOD	METHOD SUMMARY
ME-AN-016	The pH of an aliquot of aqueous sample is measured electrometrically using an electrode connected to a calibrated meter with automated temperature correction. This method is based on APHA 4500-H B.
ME-AN-007	The conductivity of an aliquot of aqueous sample is measured electrometrically using a standard cell connected to a calibrated meter with automated temperature correction. This method is based on APHA 2510.
ME-AN-011	Total dissolved solids (TDS) is determined gravimetrically on a filtered aliquot of aqueous sample by evaporating the sample to dryness in a pre-weighed container at 105 deg C. The method is based on APHA 2540 C.
ME-AN-001	An aliquot of aqueous sample is titrated first to pH 8.3 and then to 4.3 using standardised acid. The volumes of acid titrated are used to calculate total alkalinity and/or alkaline species. The method is based on EPA 310.2 and APHA 2320 B.
Calculation of Anion-Cation Balance	Calculation of the cation/anion balance
ME-AN-014	Inorganic anions (Br, Cl, F, NO <sub>3</sub> , NO <sub>2</sub> , SO <sub>4</sub> ) are determined on aqueous samples by ion chromatography. The method is based on EPA 300.1 and APHA 4110 B.
ME-AN-041	
ME-AN-008	Turbidity is measured on an aliquot of aqueous sample using a calibrated turbidity meter. The method is based on APHA 2130.
ME-AN-027	Dissolved metals are determined on a filtered and acidified (to 1% HNO <sub>3</sub> ) portion of aqueous sample by Inductively coupled plasma optical emission spectrometry (ICP-OES). The method is based on EPA 200.7 and APHA 3120.
ME-AN-026	Dissolved Hg on waters by ICP-MS
ME-AN-039	This method is based on: Standard methods for the examination of water and wastewater, 18th edition, 1992. Colour 2120 C. Spectrophotometric method. The sample is filtered through a 0.45 µm filter and the true colour is determined spectrophotometrically at a wavelength of 575 nm
IDEXX	Microbiological parameters by IDEXX.

#### FOOTNOTES

IS Insufficient sample for analysis.  
LNR Sample listed, but not received.  
^ Performed by outside laboratory.  
LOR Limit of Reporting

QFH QC result is above the upper tolerance  
QFL QC result is below the lower tolerance  
- The sample was not analysed for this analyte  
\* Results marked "Not SANAS Accredited" in this report are not included in the SANAS Schedule of Accreditation for this laboratory / certification body / inspection body".

Samples analysed as received.  
Solid samples expressed on a dry weight basis.

Unless otherwise indicated, samples were received in containers fit for purpose.

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LAB-QLT-REP-001

CLIENT DETAILS		LABORATORY DETAILS	
Contact	<b>Bennie Nell</b>	Laboratory	<b>X-Lab Earth Science</b>
Client	<b>SGS Randfontein</b>	Address	<b>259 Kent Avenue Ferndale, 2194</b>
Address		Telephone	<b>+27 (0)11 590 3000</b>
Telephone	<b>011 100 2170</b>	Laboratory Manager	<b>Mrs Tasneem Tagari</b>
Facsimile		Lab Reference	<b>JBX21-8949</b>
Email	<b>bennie.nell@sgs.com</b>	Report Number	<b>0000027407</b>
Order Number	<b>QU1316</b>	Date Received	<b>15/06/2021 14:48</b>
Samples	<b>5</b>	Date Started	<b>17/06/2021 8:18</b>
Sample matrix	<b>WATER</b>	Date Reported	<b>28/06/2021 12:32</b>

The document is issued in accordance with SANAS's accreditation requirements.  
Accredited for compliance with ISO/IEC 17025. SANAS accredited laboratory T0107.

Samples recieved at ambient temp good condition.



T0775

#### SIGNATORIES



Tasneem Tagari

General Manager/Technical Signatory

## TEST REPORT

Parameter	Units	LOR	Sample Number	JBX21-8949.001	JBX21-8949.002	JBX21-8949.003	JBX21-8949.004
			Sample Name	ESW1	ESW2	ESW3	ESW4

### Calculation of Anion-Cation Balance

Anion-Cation Balance	%	-100	9.95	8.08	-0.01	-4.40
Sum of Anion Milliequivalents	meq/l	-	1.99	0.941	1.16	0.814
Sum of Cation Milliequivalents	meq/l	-	2.42	1.11	1.16	0.745

### Colour Analysis by Discrete Analyser Method: ME-AN-039

Colour (True)	Hazen/l	1	28	24	11	1.5
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### Turbidity Method: ME-AN-008

Turbidity *	NTU	0.4	130	290	400	24
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### Alkalinity on waters by titration Method: ME-AN-001

Total Alkalinity as CaCO <sub>3</sub>	mg/l	12	75	40	20	30
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	75	40	20	30
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12	<12	<12
Methyl Orange (M) Alkalinity as CaCO <sub>3</sub>	mg/l	12	75	40	20	30
Phenolphthalein (P) Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12	<12	<12

### Conductivity on waters Method: ME-AN-007





JBX21-8949

Report number 0000027407

Client reference:

QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8949.001 ESW1	JBX21-8949.002 ESW2	JBX21-8949.003 ESW3	JBX21-8949.004 ESW4
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Parameter

Units

LOR

### Conductivity on waters Method: ME-AN-007 (continued)

Conductivity in mS/m @ 25°C	mS/m	2	21	8.3	14	11
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### Total Dissolved Solids (TDS) in water at 105 deg Method: ME-AN-011

TDS (0.7µm) @ 105°C	mg/l	21	150	60	100	85
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### ICP-OES Metals on waters (Dissolved) Method: ME-AN-027

Aluminium	mg/l	0.02	1.6	0.21	1.2	0.02
Antimony	mg/l	0.008	<0.01	<0.01	<0.01	<0.01
Arsenic	mg/l	0.01	<0.01	<0.01	<0.01	<0.01
Barium	mg/l	0.002	0.026	0.014	0.022	0.016
Boron	mg/l	0.005	<0.005	0.011	0.010	0.006
Cadmium	mg/l	0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/l	0.5	14	5.7	4.9	6.2
Chromium	mg/l	0.002	<0.002	<0.002	<0.002	<0.002
Copper	mg/l	0.02	<0.02	<0.02	<0.02	<0.02
Iron	mg/l	0.05	0.90	0.12	0.54	<0.05
Lead	mg/l	0.01	<0.01	<0.01	<0.01	<0.01
Magnesium	mg/l	0.01	6.4	2.9	2.1	2.4
Manganese	mg/l	0.01	<0.01	<0.01	<0.01	<0.01

## TEST REPORT

Sample Number  
Sample Name

JBX21-8949.001 ESW1	JBX21-8949.002 ESW2	JBX21-8949.003 ESW3	JBX21-8949.004 ESW4
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Parameter

Units

LOR

### ICP-OES Metals on waters (Dissolved) Method: ME-AN-027 (continued)

Nickel	mg/l	0.005	<0.005	<0.005	<0.005	<0.005
Potassium	mg/l	0.2	4.4	2.1	6.6	1.1
Selenium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01
Sodium	mg/l	0.5	24	12	13	4.9
Strontium	mg/l	0.001	0.14	0.047	0.049	0.037
Uranium *	mg/l	0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	mg/l	0.001	<0.001	<0.001	<0.001	<0.001
Zinc	mg/l	0.01	<0.01	<0.01	<0.01	<0.01

### Anions on Waters by Ion Chromatography Method: ME-AN-014

Chloride	mg/l	0.05	4.4	1.9	14	2.0
Fluoride	mg/l	0.05	0.23	0.09	0.25	<0.05
Nitrate	mg/l	0.1	0.9	1.4	4.6	4.0
Nitrite	mg/l	0.5	<0.5	<0.5	<0.5	<0.5
Sulphate	mg/l	0.05	17	3.2	14	4.5

### pH in water Method: ME-AN-016

pH in water at 25°C	-	1	6.8	6.9	6.9	6.6
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### Dissolved Hg on waters by ICP-MS Method: ME-AN-026



JBX21-8949

Report number 0000027407

Client reference:

QU1316

## TEST REPORT

Parameter	Units	LOR	Sample Number	JBX21-8949.001	JBX21-8949.002	JBX21-8949.003	JBX21-8949.004
			Sample Name	ESW1	ESW2	ESW3	ESW4

### Dissolved Hg on waters by ICP-MS Method: ME-AN-026 (continued)

Mercury	µg/l	0.001	0.001	0.001	0.001	0.009
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### Ammonia on waters by Discrete Analyser Method: ME-AN-041

Ammonia	mg/l	0.012	<0.012	<0.012	<0.012	<0.012
Ammonia as N	mg/l	0.01	<0.01	<0.01	<0.01	<0.01

### Microbiological parameters in Water Method: IDEXX

E. Coli *	CFU/100ml	-	Not Detected	Not Detected	3	11
Faecal Coliforms *	CFU/100ml	-	179	345	308	4
Total Coliforms *	CFU/100ml	-	35	40	52	517
Total Plate Count *	CFU/ml	-	>2420	1986	2420	96



JBX21-8949

Report number 0000027407

Client reference:

QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8949.005  
ESWs

Parameter

Units

LOR

### Calculation of Anion-Cation Balance

Anion-Cation Balance	%	-100	4.14
Sum of Anion Milliequivalents	meq/l	-	1.97
Sum of Cation Milliequivalents	meq/l	-	2.14

### Colour Analysis by Discrete Analyser Method: ME-AN-039

Colour (True)	Hazen/l	1	30
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### Turbidity Method: ME-AN-008

Turbidity *	NTU	0.4	140
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### Alkalinity on waters by titration Method: ME-AN-001

Total Alkalinity as CaCO <sub>3</sub>	mg/l	12	75
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	75
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12
Methyl Orange (M) Alkalinity as CaCO <sub>3</sub>	mg/l	12	75
Phenolphthalein (P) Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12

### Conductivity on waters Method: ME-AN-007



JBX21-8949

Report number 0000027407

Client reference:

QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8949.005  
ESWs

Parameter

Units

LOR

### Conductivity on waters Method: ME-AN-007 (continued)

Conductivity in mS/m @ 25°C	mS/m	2	22
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### Total Dissolved Solids (TDS) in water at 105 deg Method: ME-AN-011

TDS (0.7µm) @ 105°C	mg/l	21	160
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### ICP-OES Metals on waters (Dissolved) Method: ME-AN-027

Aluminium	mg/l	0.02	0.41
Antimony	mg/l	0.008	<0.01
Arsenic	mg/l	0.01	<0.01
Barium	mg/l	0.002	0.023
Boron	mg/l	0.005	0.009
Cadmium	mg/l	0.001	<0.001
Calcium	mg/l	0.5	12
Chromium	mg/l	0.002	<0.002
Copper	mg/l	0.02	<0.02
Iron	mg/l	0.05	0.32
Lead	mg/l	0.01	<0.01
Magnesium	mg/l	0.01	5.0
Manganese	mg/l	0.01	<0.01





JBX21-8

Report number 0000027407

Client reference:

QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8949.005  
ESWs

Parameter

Units

LOR

### CP-OES Metals on waters (Dissolved) Method: ME-AN-027 (continued)

Nickel	mg/l	0.005	<0.005
Potassium	mg/l	0.2	3.9
Selenium	mg/l	0.01	<0.01
Sodium	mg/l	0.5	23
Strontium	mg/l	0.001	0.12
Titanium *	mg/l	0.01	<0.01
Vanadium	mg/l	0.001	<0.001
Zinc	mg/l	0.01	<0.01

### Anions on Waters by Ion Chromatography Method: ME-AN-014

Chloride	mg/l	0.05	9.7
Fluoride	mg/l	0.05	0.20
Nitrate	mg/l	0.1	1.1
Nitrite	mg/l	0.5	<0.5
Sulphate	mg/l	0.05	8.8

### pH In water Method: ME-AN-016

pH In water at 25°C	-	1	6.7
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### Dissolved Hg on waters by ICP-MS Method: ME-AN-026



JBX21-8949

Report number 0000027407

Client reference:

QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8949.005  
ESWs

Parameter

Units

LOR

### Dissolved Hg on waters by ICP-MS Method: ME-AN-026 (continued)

Mercury	µg/l	0.001	0.006
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### Ammonia on waters by Discrete Analyser Method: ME-AN-041

Ammonia	mg/l	0.012	<0.012
Ammonia as N	mg/l	0.01	<0.01

### Microbiological parameters In Water Method: IDEXX

E. Coli *	CFU/100ml	-	Not Detected
Faecal Coliforms *	CFU/100ml	-	345
Total Coliforms *	CFU/100ml	-	9
Total Plate Count *	CFU/ml	-	> 2420

## METHOD SUMMARY

METHOD	METHOD SUMMARY
ME-AN-007	The conductivity of an aliquot of aqueous sample is measured electrometrically using a standard cell connected to a calibrated meter with automated temperature correction. This method is based on APHA 2510.
ME-AN-014	Inorganic anions (Br, Cl, F, NO <sub>3</sub> , NO <sub>2</sub> , SO <sub>4</sub> ) are determined on aqueous samples by ion chromatography. The method is based on EPA 300.1 and APHA 4110 B.
ME-AN-008	Turbidity is measured on an aliquot of aqueous sample using a calibrated turbidity meter. The method is based on APHA 2130.
ME-AN-039	This method is based on: Standard methods for the examination of water and wastewater, 18th edition, 1992. Colour 2120 C. Spectrophotometric method. The sample is filtered through a 0.45 µm filter and the true colour is determined spectrophotometrically at a wavelength of 575 nm
ME-AN-026	Dissolved Hg on waters by ICP-MS
ME-AN-041	
Calculation of Anion-Cation	Calculation of the cation/anion balance
ME-AN-001	An aliquot of aqueous sample is titrated first to pH 8.3 and then to 4.3 using standardised acid. The volumes of acid titrated are used to calculate total alkalinity and/or alkaline species. The method is based on EPA 310.2 and APHA 2320 B.
ME-AN-016	The pH of an aliquot of aqueous sample is measured electrometrically using an electrode connected to a calibrated meter with automated temperature correction. This method is based on APHA 4500-H B.
IDEXX	Microbiological parameters by IDEXX.
ME-AN-027	Dissolved metals are determined on a filtered and acidified (to 1% HNO <sub>3</sub> ) portion of aqueous sample by inductively coupled plasma optical emission spectrometry (ICP-OES). The method is based on EPA 200.7 and APHA 3120.
ME-AN-011	Total dissolved solids (TDS) is determined gravimetrically on a filtered aliquot of aqueous sample by evaporating the sample to dryness in a pre-weighed container at 105 deg C. The method is based on APHA 2540 C.

#### FOOTNOTES

IS Insufficient sample for analysis.  
LNR Sample listed, but not received.  
^ Performed by outside laboratory.  
LOR Limit of Reporting

QFH QC result is above the upper tolerance  
QFL QC result is below the lower tolerance  
- The sample was not analysed for this analyte  
\* Results marked "Not SANAS Accredited" in this report are not included in the SANAS Schedule of Accreditation for this laboratory / certification body / Inspection body".

Samples analysed as received.  
Solid samples expressed on a dry weight basis.

Unless otherwise indicated, samples were received in containers fit for purpose.

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Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

**WARNING:** The sample(s) to which the findings recorded herein (the "Findings") relate was(were) draw and / or provided by the Client or by a third party acting at the Client's direction. The Findings constitute no warranty of the sample's representativity of all goods and strictly relate to the sample(s). The Company accepts no liability with regard to the origin or source from which the sample(s) is/are said to be extracted.

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LAB-QLT-REP-001

CLIENT DETAILS		LABORATORY DETAILS	
Contact	<b>Bennie Neil</b>	Laboratory	<b>X-Lab Earth Science</b>
Client	<b>SGS Randfontein</b>	Address	<b>259 Kent Avenue Ferndale, 2194</b>
Address		Telephone	<b>+27 (0)11 590 3000</b>
Telephone	<b>011 100 2170</b>	Laboratory Manager	<b>Mrs Tasneem Tagari</b>
Facsimile		Lab Reference	<b>JBX21-8950</b>
Email	<b>bennie.neil@sgs.com</b>	Report Number	<b>0000027409</b>
Order Number	<b>QU1316</b>	Date Received	<b>15/06/2021 14:54</b>
Samples	<b>2</b>	Date Started	<b>17/06/2021 8:18</b>
Sample matrix	<b>WATER</b>	Date Reported	<b>28/06/2021 12:33</b>

The document is issued in accordance with SANAS's accreditation requirements.  
Accredited for compliance with ISO/IEC 17025. SANAS accredited laboratory T0107.

Samples received at ambient temp good condition.



T0775

#### SIGNATORIES



Tasneem Tagari

General Manager/Technical Signatory



JBX21-8950

Report number 0000027409  
Client reference:  
QU1316

## TEST REPORT

Parameter	Units	LOR	Sample Number Sample Name	
			JBX21-8950.001 WGW1	JBX21-8950.002 WGW2

### Calculation of Anion-Cation Balance

Anion-Cation Balance	%	-100	1.16	-4.58
Sum of Anion Milliequivalents	meq/l	-	3.13	0.929
Sum of Cation Milliequivalents	meq/l	-	3.21	0.848

### Colour Analysis by Discrete Analyser Method: ME-AN-039

Colour (True)	Hazen/l	1	<1.0	<1.0
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### Turbidity Method: ME-AN-008

Turbidity *	NTU	0.4	<0.4	28
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### Alkalinity on waters by titration Method: ME-AN-001

Total Alkalinity as CaCO <sub>3</sub>	mg/l	12	110	25
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	110	25
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12
Methyl Orange (M) Alkalinity as CaCO <sub>3</sub>	mg/l	12	110	25
Phenolphthalein (P) Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12

### Conductivity on waters Method: ME-AN-007



## TEST REPORT

Sample Number  
Sample Name

JBX21-8950.001 WGW1	JBX21-8950.002 WGW2
------------------------	------------------------

Parameter

Units

LOR

### Conductivity on waters Method: ME-AN-007 (continued)

Conductivity in mS/m @ 25°C	mS/m	2	32	10
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### Total Dissolved Solids (TDS) In water at 105 deg Method: ME-AN-011

TDS (0.7µm) @ 105°C	mg/l	21	230	75
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### ICP-OES Metals on waters (Dissolved) Method: ME-AN-027

Aluminium	mg/l	0.02	<0.02	<0.02
Antimony	mg/l	0.008	<0.01	<0.01
Arsenic	mg/l	0.01	<0.01	<0.01
Barium	mg/l	0.002	0.026	0.044
Boron	mg/l	0.005	0.007	<0.005
Cadmium	mg/l	0.001	<0.001	<0.001
Calcium	mg/l	0.5	27	7.6
Chromium	mg/l	0.002	<0.002	<0.002
Copper	mg/l	0.02	<0.02	<0.02
Iron	mg/l	0.05	<0.05	<0.05
Lead	mg/l	0.01	<0.01	<0.01
Magnesium	mg/l	0.01	14	1.3
Manganese	mg/l	0.01	<0.01	0.12



JBX21-8950

Report number 0000027409  
Client reference:  
QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8950.001 WGW1	JBX21-8950.002 WGW2
------------------------	------------------------

Parameter

Units

LOR

### ICP-OES Metals on waters (Dissolved) Method: ME-AN-027 (continued)

Nickel	mg/l	0.005	<0.005	<0.005
Potassium	mg/l	0.2	3.9	2.5
Selenium	mg/l	0.01	<0.01	<0.01
Sodium	mg/l	0.5	13	6.8
Strontium	mg/l	0.001	0.22	0.046
Uranium *	mg/l	0.01	<0.01	<0.01
Vanadium	mg/l	0.001	<0.001	<0.001
Zinc	mg/l	0.01	<0.01	0.04

### Anions on Waters by Ion Chromatography Method: ME-AN-014

Chloride	mg/l	0.05	16	6.1
Fluoride	mg/l	0.05	<0.05	<0.05
Nitrate	mg/l	0.1	19	7.9
Nitrite	mg/l	0.5	<0.5	<0.5
Sulphate	mg/l	0.05	8.9	6.2

### pH in water Method: ME-AN-016

pH in water at 25°C	-	1	6.7	6.3
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### Dissolved Hg on waters by ICP-MS Method: ME-AN-026



JBX21-8950

Report number 0000027409

Client reference:

QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8950.001 WGW1	JBX21-8950.002 WGW2
------------------------	------------------------

Parameter

Units

LOR

Dissolved Hg on waters by ICP-MS Method: ME-AN-026 (continued)

Mercury	µg/l	0.001	0.004	0.006
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Ammonia on waters by Discrete Analyser Method: ME-AN-041

Ammonia	mg/l	0.012	<0.012	0.026
Ammonia as N	mg/l	0.01	<0.01	0.02

Microbiological parameters In Water Method: IDEXX

E. Coli *	CFU/100ml	-	1	Not Detected
Faecal Coliforms *	CFU/100ml	-	Not Detected	Not Detected
Total Coliforms *	CFU/100ml	-	2	Not Detected
Total Plate Count *	CFU/ml	-	46	108

## METHOD SUMMARY

METHOD	METHOD SUMMARY
ME-AN-039	This method is based on: Standard methods for the examination of water and wastewater, 18th edition, 1992. Colour 2120 C. Spectrophotometric method. The sample is filtered through a 0.45 µm filter and the true colour is determined spectrophotometrically at a wavelength of 575 nm
ME-AN-026	Dissolved Hg on waters by ICP-MS
ME-AN-007	The conductivity of an aliquot of aqueous sample is measured electrometrically using a standard cell connected to a calibrated meter with automated temperature correction. This method is based on APHA 2510.
ME-AN-001	An aliquot of aqueous sample is titrated first to pH 8.3 and then to 4.3 using standardised acid. The volumes of acid titrated are used to calculate total alkalinity and/or alkaline species. The method is based on EPA 310.2 and APHA 2320 B.
Calculation of Anion-Cation Balance	Calculation of the cation/anion balance
ME-AN-014	Inorganic anions (Br, Cl, F, NO <sub>3</sub> , NO <sub>2</sub> , SO <sub>4</sub> ) are determined on aqueous samples by ion chromatography. The method is based on EPA 300.1 and APHA 4110 B.
ME-AN-016	The pH of an aliquot of aqueous sample is measured electrometrically using an electrode connected to a calibrated meter with automated temperature correction. This method is based on APHA 4500-H B.
ME-AN-011	Total dissolved solids (TDS) is determined gravimetrically on a filtered aliquot of aqueous sample by evaporating the sample to dryness in a pre-weighed container at 105 deg C. The method is based on APHA 2540 C.
IDEXX	Microbiological parameters by IDEXX.
ME-AN-008	Turbidity is measured on an aliquot of aqueous sample using a calibrated turbidity meter. The method is based on APHA 2130.
ME-AN-041	
ME-AN-027	Dissolved metals are determined on a filtered and acidified (to 1% HNO <sub>3</sub> ) portion of aqueous sample by inductively coupled plasma optical emission spectrometry (ICP-OES). The method is based on EPA 200.7 and APHA 3120.

**FOOTNOTES**

IS Insufficient sample for analysis.  
 LNR Sample listed, but not received.  
 ^ Performed by outside laboratory.  
 LOR Limit of Reporting

QFH QC result is above the upper tolerance  
 QFL QC result is below the lower tolerance  
 - The sample was not analysed for this analyte  
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Samples analysed as received.  
 Solid samples expressed on a dry weight basis.

Unless otherwise indicated, samples were received in containers fit for purpose.

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**LAB-QLT-REP-001**



## TEST REPORT

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Bennie Nell	Laboratory	X-Lab Earth Science
Client	SGS Randfontein	Address	259 Kent Avenue Ferndale, 2194
Address		Telephone	+27 (0)11 590 3000
Telephone	011 100 2170	Laboratory Manager	Mrs Tasneem Tagari
Facsimile		Lab Reference	JBX21-8951
Email	bennie.nell@sgs.com	Report Number	0000027411
Order Number	QU1316	Date Received	15/06/2021 14:56
Samples	2	Date Started	17/06/2021 8:18
Sample matrix	WATER	Date Reported	28/06/2021 12:34

The document is issued in accordance with SANAS's accreditation requirements.  
Accredited for compliance with ISO/IEC 17025. SANAS accredited laboratory T0107.

Samples received at ambient temp good condition.



T0775

### SIGNATORIES

Tasneem Tagari

General Manager/Technical Signatory





JBX21-8951

Report number 0000027411

Client reference:

QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8951.001 EGW1	JBX21-8951.002 EGW2
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Parameter Units LOR

### Calculation of Anion-Cation Balance

Anion-Cation Balance	%	-100	-3.63	-1.59
Sum of Anion Milliequivalents	meq/l	-	2.30	2.18
Sum of Cation Milliequivalents	meq/l	-	2.14	2.11

### Colour Analysis by Discrete Analyser Method: ME-AN-039

Colour (True)	Hazen/l	1	<1.0	<1.0
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### Turbidity Method: ME-AN-008

Turbidity *	NTU	0.4	<0.4	<0.4
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### Alkalinity on waters by titration Method: ME-AN-001

Total Alkalinity as CaCO <sub>3</sub>	mg/l	12	75	85
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	75	85
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12
Methyl Orange (M) Alkalinity as CaCO <sub>3</sub>	mg/l	12	75	85
Phenolphthalein (P) Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12

### Conductivity on waters Method: ME-AN-007



JBX21-8951

Report number 0000027411

Client reference:

QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8951.001 EGW1	JBX21-8951.002 EGW2
------------------------	------------------------

Parameter

Units

LOR

Conductivity on waters Method: ME-AN-007 (continued)

Conductivity in mS/m @ 25°C	mS/m	2	23	22
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Total Dissolved Solids (TDS) in water at 105 deg Method: ME-AN-011

TDS (0.7µm) @ 105°C	mg/l	21	200	200
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ICP-OES Metals on waters (Dissolved) Method: ME-AN-027

Aluminium	mg/l	0.02	<0.02	<0.02
Antimony	mg/l	0.008	<0.01	<0.01
Arsenic	mg/l	0.01	<0.01	<0.01
Barium	mg/l	0.002	0.081	0.048
Boron	mg/l	0.005	<0.005	0.005
Cadmium	mg/l	0.001	<0.001	<0.001
Calcium	mg/l	0.5	12	7.0
Chromium	mg/l	0.002	<0.002	<0.002
Copper	mg/l	0.02	<0.02	<0.02
Iron	mg/l	0.05	<0.05	<0.05
Lead	mg/l	0.01	<0.01	<0.01
Magnesium	mg/l	0.01	6.1	3.3
Manganese	mg/l	0.01	<0.01	0.05

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QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8951.001 EGW1	JBX21-8951.002 EGW2
------------------------	------------------------

Parameter

Units

LOR

### ICP-OES Metals on waters (Dissolved) Method: ME-AN-027 (continued)

Nickel	mg/l	0.005	<0.005	<0.005
Potassium	mg/l	0.2	3.6	3.8
Selenium	mg/l	0.01	<0.01	<0.01
Sodium	mg/l	0.5	22	32
Strontium	mg/l	0.001	0.19	0.082
Uranium *	mg/l	0.01	<0.01	<0.01
Vanadium	mg/l	0.001	0.002	0.002
Zinc	mg/l	0.01	0.01	0.05

### Anions on Waters by Ion Chromatography Method: ME-AN-014

Chloride	mg/l	0.05	3.6	2.5
Fluoride	mg/l	0.05	<0.05	<0.05
Nitrate	mg/l	0.1	9.4	13
Nitrite	mg/l	0.5	<0.5	<0.5
Sulphate	mg/l	0.05	27	9.3

### pH in water Method: ME-AN-016

pH in water at 25°C	-	1	6.5	6.5
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### Dissolved Hg on waters by ICP-MS Method: ME-AN-026



JBX21-8951

Report number 0000027411

Client reference:

QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8951.001 EGW1	JBX21-8951.002 EGW2
------------------------	------------------------

Parameter

Units

LOR

## Dissolved Hg on waters by ICP-MS Method: ME-AN-026 (continued)

Mercury	µg/l	0.001	0.003	0.002
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## Ammonia on waters by Discrete Analyser Method: ME-AN-041

Ammonia	mg/l	0.012	<0.012	<0.012
Ammonia as N	mg/l	0.01	<0.01	<0.01

## Microbiological parameters in Water Method: IDEXX

E. Coli *	CFU/100ml	-	Not Detected	Not Detected
Faecal Coliforms *	CFU/100ml	-	Not Detected	Not Detected
Total Coliforms *	CFU/100ml	-	12	Not Detected
Total Plate Count *	CFU/ml	-	32	50

## METHOD SUMMARY

METHOD	METHOD SUMMARY
ME-AN-016	The pH of an aliquot of aqueous sample is measured electrometrically using an electrode connected to a calibrated meter with automated temperature correction. This method is based on APHA 4500-H B.
ME-AN-008	Turbidity is measured on an aliquot of aqueous sample using a calibrated turbidity meter. The method is based on APHA 2130.
ME-AN-027	Dissolved metals are determined on a filtered and acidified (to 1% HNO <sub>3</sub> ) portion of aqueous sample by inductively coupled plasma optical emission spectrometry (ICP-OES). The method is based on EPA 200.7 and APHA 3120.
ME-AN-041	
ME-AN-026	Dissolved Hg on waters by ICP-MS
IDEXX	Microbiological parameters by IDEXX.
ME-AN-039	This method is based on: Standard methods for the examination of water and wastewater, 18th edition, 1992. Colour 2120 C. Spectrophotometric method. The sample is filtered through a 0.45 µm filter and the true colour is determined spectrophotometrically at a wavelength of 575 nm.
ME-AN-001	An aliquot of aqueous sample is titrated first to pH 8.3 and then to 4.3 using standardised acid. The volumes of acid titrated are used to calculate total alkalinity and/or alkaline species. The method is based on EPA 310.2 and APHA 2320 B.
ME-AN-014	Inorganic anions (Br, Cl, F, NO <sub>3</sub> , NO <sub>2</sub> , SO <sub>4</sub> ) are determined on aqueous samples by ion chromatography. The method is based on EPA 300.1 and APHA 4110 B.
ME-AN-007	The conductivity of an aliquot of aqueous sample is measured electrometrically using a standard cell connected to a calibrated meter with automated temperature correction. This method is based on APHA 2510.
Calculation of Anion-Cation Balance	Calculation of the cation/anion balance
ME-AN-011	Total dissolved solids (TDS) is determined gravimetrically on a filtered aliquot of aqueous sample by evaporating the sample to dryness in a pre-weighed container at 105 deg C. The method is based on APHA 2540 C.

#### FOOTNOTES

IS Insufficient sample for analysis.  
LNR Sample listed, but not received.  
^ Performed by outside laboratory.  
LOR Limit of Reporting

QFH QC result is above the upper tolerance  
QFL QC result is below the lower tolerance  
- The sample was not analysed for this analyte  
\* Results marked "Not SANAS Accredited" in this report are not included in the SANAS Schedule of Accreditation for this laboratory / certification body / Inspection body".

Samples analysed as received.  
Solid samples expressed on a dry weight basis.

Unless otherwise indicated, samples were received in containers fit for purpose.

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LAB-QLT-REP-001





## TEST REPORT

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Bennie Nell	Laboratory	X-Lab Earth Science
Client	SGS Randfontein	Address	259 Kent Avenue Ferndale, 2194
Address		Telephone	+27 (0)11 590 3000
Telephone	011 100 2170	Laboratory Manager	Mrs Tasneem Tagari
Facsimile		Lab Reference	JBX21-8952
Email	bennie.nell@sgs.com	Report Number	0000027413
Order Number	QU1316	Date Received	15/06/2021 14:58
Samples	6	Date Started	17/06/2021 8:18
Sample matrix	WATER	Date Reported	28/06/2021 12:35

The document is issued in accordance with SANAS's accreditation requirements.  
Accredited for compliance with ISO/IEC 17025. SANAS accredited laboratory T0107.

Samples recieved at ambient temp good condition.



T0775

### SIGNATORIES

Tasneem Tagari  
General Manager/Technical Signatory

## TEST REPORT

Parameter	Units	LOR	Sample Number	JBX21-8952.001	JBX21-8952.002	JBX21-8952.003	JBX21-8952.004
			Sample Name	CGW1	CGW2	CGW3	CGW4

### Calculation of Anion-Cation Balance

Anion-Cation Balance	%	-100	-2.03	-5.52	-2.86	-4.04
Sum of Anion Milliequivalents	meq/l	-	1.51	2.15	1.49	1.64
Sum of Cation Milliequivalents	meq/l	-	1.45	1.93	1.41	1.51

### Colour Analysis by Discrete Analyser Method: ME-AN-039

Colour (True)	Hazen/l	1	<1.0	<1.0	<1.0	<1.0
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### Turbidity Method: ME-AN-008

Turbidity *	NTU	0.4	<0.4	140	340	<0.4
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### Alkalinity on waters by titration Method: ME-AN-001

Total Alkalinity as CaCO <sub>3</sub>	mg/l	12	40	70	65	50
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	40	70	65	50
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12	<12	<12
Methyl Orange (M) Alkalinity as CaCO <sub>3</sub>	mg/l	12	40	70	65	50
Phenolphthalein (P) Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12	<12	<12

### Conductivity on waters Method: ME-AN-007



JBX21-8952

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QU1316

## TEST REPORT

Parameter	Units	LOR	Sample Number	JBX21-8952.001	JBX21-8952.002	JBX21-8952.003	JBX21-8952.004
			Sample Name	CGW1	CGW2	CGW3	CGW4

### Conductivity on waters Method: ME-AN-007 (continued)

Conductivity in mS/m @ 25°C	mS/m	2	17	23	15	17
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### Total Dissolved Solids (TDS) in water at 105 deg Method: ME-AN-011

TDS (0.7µm) @ 105°C	mg/l	21	120	170	80	120
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### ICP-OES Metals on waters (Dissolved) Method: ME-AN-027

Aluminium	mg/l	0.02	<0.02	<0.02	<0.02	<0.02
Antimony	mg/l	0.008	<0.01	<0.01	<0.01	<0.01
Arsenic	mg/l	0.01	<0.01	<0.01	<0.01	<0.01
Barium	mg/l	0.002	0.027	0.12	0.051	0.087
Boron	mg/l	0.005	<0.005	0.007	0.005	<0.005
Cadmium	mg/l	0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/l	0.5	8.7	19	11	9.3
Chromium	mg/l	0.002	<0.002	<0.002	<0.002	0.002
Copper	mg/l	0.02	<0.02	<0.02	<0.02	<0.02
Iron	mg/l	0.05	<0.05	<0.05	<0.05	<0.05
Lead	mg/l	0.01	<0.01	<0.01	<0.01	<0.01
Magnesium	mg/l	0.01	2.6	4.1	1.8	3.1
Manganese	mg/l	0.01	<0.01	0.35	0.51	<0.01



JBX21-8952

Report number 0000027413

Client reference:

QU1316

## TEST REPORT

Parameter	Units	LOR	Sample Number Sample Name	JBX21-8952.001 CGW1	JBX21-8952.002 CGW2	JBX21-8952.003 CGW3	JBX21-8952.004 CGW4
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### ICP-OES Metals on waters (Dissolved) Method: ME-AN-027 (continued)

Nickel	mg/l	0.005	<0.005	<0.005	<0.005	<0.005
Potassium	mg/l	0.2	5.1	10	7.1	5.7
Selenium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01
Sodium	mg/l	0.5	15	8.4	12	15
Strontium	mg/l	0.001	0.066	0.084	0.050	0.11
Uranium *	mg/l	0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	mg/l	0.001	<0.001	<0.001	<0.001	0.002
Zinc	mg/l	0.01	<0.01	3.8	0.06	<0.01

### Anions on Waters by Ion Chromatography Method: ME-AN-014

Chloride	mg/l	0.05	2.4	14	4.1	5.3
Fluoride	mg/l	0.05	<0.05	0.10	0.08	0.10
Nitrate	mg/l	0.1	14	3.2	0.7	20
Nitrite	mg/l	0.5	<0.5	1.8	<0.5	<0.5
Sulphate	mg/l	0.05	20	14	3.0	7.6

### pH in water Method: ME-AN-016

pH in water at 25°C	-	1	6.3	5.9	6.1	6.3
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### Dissolved Hg on waters by ICP-MS Method: ME-AN-026



JBX21-8952

Report number 0000027413

Client reference:

QU1316

## TEST REPORT

Parameter	Units	LOR	Sample Number	JBX21-8952.001	JBX21-8952.002	JBX21-8952.003	JBX21-8952.004
			Sample Name	CGW1	CGW2	CGW3	CGW4

### Dissoived Hg on waters by ICP-MS Method: ME-AN-026 (continued)

Mercury	µg/l	0.001	0.003	0.006	0.003	0.002
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### Ammonia on waters by Discrete Analyser Method: ME-AN-041

Ammonia	mg/l	0.012	<0.012	0.33	0.90	<0.012
Ammonia as N	mg/l	0.01	<0.01	0.27	0.74	<0.01

### Microbiological parameters in Water Method: IDEXX

E. Coll *	CFU/100ml	-	Not Detected	Not Detected	Not Detected	Not Detected
Faecal Coliforms *	CFU/100ml	-	Not Detected	Not Detected	Not Detected	Not Detected
Total Coliforms *	CFU/100ml	-	Not Detected	Not Detected	>2420	2
Total Plate Count *	CFU/ml	-	40	31	26	36



JBX21-8952

Report number 0000027413  
Client reference:  
QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8952.005 CGW5	JBX21-8952.006 CGW6
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Parameter Units LOR

### Calculation of Anion-Cation Balance

Anion-Cation Balance	%	-100	2.49	-2.75
Sum of Anion Milliequivalents	meq/l	-	0.864	1.36
Sum of Cation Milliequivalents	meq/l	-	0.908	1.29

### Colour Analysis by Discrete Analyser Method: ME-AN-039

Colour (True)	Hazen/l	1	<1.0	<1.0
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### Turbidity Method: ME-AN-008

Turbidity *	NTU	0.4	<0.4	3.6
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### Alkalinity on waters by titration Method: ME-AN-001

Total Alkalinity as CaCO <sub>3</sub>	mg/l	12	35	50
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	35	50
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12
Methyl Orange (M) Alkalinity as CaCO <sub>3</sub>	mg/l	12	35	50
Phenolphthalein (P) Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12

### Conductivity on waters Method: ME-AN-007



### TEST REPORT

Sample Number  
Sample Name

JBX21-8952.005 CGW5	JBX21-8952.006 CGW6
------------------------	------------------------

Parameter

Units

LOR

#### ICP-OES Metals on waters (Dissolved) Method: ME-AN-027 (continued)

Nickel	mg/l	0.005	<0.005	<0.005
Potassium	mg/l	0.2	3.3	3.5
Selenium	mg/l	0.01	<0.01	<0.01
Sodium	mg/l	0.5	7.8	17
Strontium	mg/l	0.001	0.075	0.044
Uranium *	mg/l	0.01	<0.01	<0.01
Vanadium	mg/l	0.001	<0.001	0.002
Zinc	mg/l	0.01	<0.01	0.03

#### Anions on Waters by Ion Chromatography Method: ME-AN-014

Chloride	mg/l	0.05	1.7	2.9
Fluoride	mg/l	0.05	<0.05	<0.05
Nitrate	mg/l	0.1	3.9	10
Nitrite	mg/l	0.5	<0.5	<0.5
Sulphate	mg/l	0.05	2.6	5.2

#### pH in water Method: ME-AN-016

pH in water at 25°C	-	1	6.3	6.2
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#### Dissolved Hg on waters by ICP-MS Method: ME-AN-026



JBX21-8952

Report number 0000027413

Client reference:

QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8952.005 CGW5	JBX21-8952.006 CGW6
------------------------	------------------------

Parameter Units LOR

### Conductivity on waters Method: ME-AN-007 (continued)

Conductivity in mS/m @ 25°C	mS/m	2	9.7	15
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### Total Dissolved Solids (TDS) In water at 105 deg Method: ME-AN-011

TDS (0.7µm) @ 105°C	mg/l	21	60	100
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### ICP-OES Metals on waters (Dissolved) Method: ME-AN-027

Aluminium	mg/l	0.02	<0.02	<0.02
Antimony	mg/l	0.008	<0.01	<0.01
Arsenic	mg/l	0.01	<0.01	<0.01
Barium	mg/l	0.002	0.056	0.032
Boron	mg/l	0.005	<0.005	0.010
Cadmium	mg/l	0.001	<0.001	<0.001
Calcium	mg/l	0.5	7.1	6.6
Chromium	mg/l	0.002	<0.002	<0.002
Copper	mg/l	0.02	<0.02	<0.02
Iron	mg/l	0.05	<0.05	<0.05
Lead	mg/l	0.01	<0.01	<0.01
Magnesium	mg/l	0.01	1.6	1.5
Manganese	mg/l	0.01	<0.01	0.04

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JBX21-8952

Report number 0000027413  
Client reference:  
QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8952.005 CGW5	JBX21-8952.006 CGW6
------------------------	------------------------

Parameter Units LOR

### Dissolved Hg on waters by ICP-MS Method: ME-AN-026 (continued)

Mercury	µg/l	0.001	0.003	0.001
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### Ammonia on waters by Discrete Analyser Method: ME-AN-041

Ammonia	mg/l	0.012	<0.012	<0.012
Ammonia as N	mg/l	0.01	<0.01	<0.01

### Microbiological parameters in Water Method: IDEXX

E. Coll *	CFU/100ml	-	Not Detected	Not Detected
Faecal Coliforms *	CFU/100ml	-	Not Detected	Not Detected
Total Coliforms *	CFU/100ml	-	Not Detected	3
Total Plate Count *	CFU/ml	-	27	225

## METHOD SUMMARY

METHOD	METHOD SUMMARY
ME-AN-007	The conductivity of an aliquot of aqueous sample is measured electrometrically using a standard cell connected to a calibrated meter with automated temperature correction. This method is based on APHA 2510.
ME-AN-014	Inorganic anions (Br, Cl, F, NO <sub>3</sub> , NO <sub>2</sub> , SO <sub>4</sub> ) are determined on aqueous samples by ion chromatography. The method is based on EPA 300.1 and APHA 4110 B.
ME-AN-008	Turbidity is measured on an aliquot of aqueous sample using a calibrated turbidity meter. The method is based on APHA 2130.
ME-AN-039	This method is based on: Standard methods for the examination of water and wastewater, 18th edition, 1992. Colour 2120 C. Spectrophotometric method. The sample is filtered through a 0.45 µm filter and the true colour is determined spectrophotometrically at a wavelength of 575 nm
ME-AN-026	Dissolved Hg on waters by ICP-MS
ME-AN-041	
Calculation of Anion-Cation	Calculation of the cation/anion balance
ME-AN-001	An aliquot of aqueous sample is titrated first to pH 8.3 and then to 4.3 using standardised acid. The volumes of acid titrated are used to calculate total alkalinity and/or alkaline species. The method is based on EPA 310.2 and APHA 2320 B.
ME-AN-016	The pH of an aliquot of aqueous sample is measured electrometrically using an electrode connected to a calibrated meter with automated temperature correction. This method is based on APHA 4500-H B.
IDEXX	Microbiological parameters by IDEXX.
ME-AN-027	Dissolved metals are determined on a filtered and acidified (to 1% HNO <sub>3</sub> ) portion of aqueous sample by inductively coupled plasma optical emission spectrometry (ICP-OES). The method is based on EPA 200.7 and APHA 3120.
ME-AN-011	Total dissolved solids (TDS) is determined gravimetrically on a filtered aliquot of aqueous sample by evaporating the sample to dryness in a pre-weighed container at 105 deg C. The method is based on APHA 2540 C.

#### FOOTNOTES

IS Insufficient sample for analysis.  
LNR Sample listed, but not received.  
^ Performed by outside laboratory.  
LOR Limit of Reporting

QFH QC result is above the upper tolerance  
QFL QC result is below the lower tolerance  
- The sample was not analysed for this analyte  
\* Results marked "Not SANAS Accredited" in this report are not included in the SANAS Schedule of Accreditation for this laboratory / certification body / Inspection body".

Samples analysed as received.  
Solid samples expressed on a dry weight basis.

Unless otherwise indicated, samples were received in containers fit for purpose.

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LAB-QLT-REP-001



## TEST REPORT

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Bennie Nell	Laboratory	X-Lab Earth Science
Client	SGS Randfontein	Address	259 Kent Avenue Ferndale, 2194
Address		Telephone	+27 (0)11 590 3000
Telephone	011 100 2170	Laboratory Manager	Mrs Tasneem Tagari
Facsimile		Lab Reference	JBX21-8953
Email	bennie.nell@sgs.com	Report Number	0000027415
Order Number	QU1316	Date Received	15/06/2021 15:01
Samples	2	Date Started	17/06/2021 9:13
Sample matrix	WATER	Date Reported	28/06/2021 12:36

The document is issued in accordance with SANAS's accreditation requirements.  
Accredited for compliance with ISO/IEC 17025. SANAS accredited laboratory T0107.

Samples received at ambient temp good condition.



T0775

### SIGNATORIES

Tasneem Tagari

General Manager/Technical Signatory





JBX21-8953

Report number 0000027415

Client reference:

QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8953.001 WSW1	JBX21-8953.002 WSW2
------------------------	------------------------

Parameter

Units

LOR

### Calculation of Anion-Cation Balance

Anion-Cation Balance	%	-100	-2.35	1.40
Sum of Anion Milliequivalents	meq/l	-	1.16	0.940
Sum of Cation Milliequivalents	meq/l	-	1.11	0.967

### Colour Analysis by Discrete Analyser Method: ME-AN-039

Colour (True)	Hazen/l	1	89	38
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### Turbidity Method: ME-AN-008

Turbidity *	NTU	0.4	90	70
-------------	-----	-----	----	----

### Alkalinity on waters by titration Method: ME-AN-001

Total Alkalinity as CaCO <sub>3</sub>	mg/l	12	35	40
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	35	40
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12
Methyl Orange (M) Alkalinity as CaCO <sub>3</sub>	mg/l	12	35	40
Phenolphthalein (P) Alkalinity as CaCO <sub>3</sub>	mg/l	12	<12	<12

### Conductivity on waters Method: ME-AN-007



JBX21-8953

Report number 0000027415  
Client reference:  
QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8953.001 WSW1	JBX21-8953.002 WSW2
------------------------	------------------------

Parameter Units LOR

### Conductivity on waters Method: ME-AN-007 (continued)

Conductivity in mS/m @ 25°C	mS/m	2	12	5.7
-----------------------------	------	---	----	-----

### Total Dissolved Solids (TDS) in water at 105 deg Method: ME-AN-011

TDS (0.7µm) @ 105°C	mg/l	21	85	40
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### ICP-OES Metals on waters (Dissolved) Method: ME-AN-027

Aluminium	mg/l	0.02	3.7	5.0
Antimony	mg/l	0.008	<0.01	<0.01
Arsenic	mg/l	0.01	<0.01	<0.01
Barium	mg/l	0.002	0.023	0.030
Boron	mg/l	0.005	<0.005	<0.005
Cadmium	mg/l	0.001	<0.001	<0.001
Calcium	mg/l	0.5	4.4	4.7
Chromium	mg/l	0.002	0.002	0.002
Copper	mg/l	0.02	<0.02	<0.02
Iron	mg/l	0.05	1.9	1.9
Lead	mg/l	0.01	<0.01	<0.01
Magnesium	mg/l	0.01	2.4	1.9
Manganese	mg/l	0.01	<0.01	<0.01

6/28/21

Page 3 of 7



JBX21-8953

Report number 0000027415  
Client reference:  
QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8953.001 WSW1	JBX21-8953.002 WSW2
------------------------	------------------------

Parameter Units LOR

### ICP-OES Metals on waters (Dissolved) Method: ME-AN-027 (continued)

Nickel	mg/l	0.005	<0.005	<0.005
Potassium	mg/l	0.2	2.4	2.7
Selenium	mg/l	0.01	<0.01	<0.01
Sodium	mg/l	0.5	13	10
Strontium	mg/l	0.001	0.050	0.055
Uranium *	mg/l	0.01	<0.01	<0.01
Vanadium	mg/l	0.001	0.003	0.003
Zinc	mg/l	0.01	<0.01	<0.01

### Anions on Waters by Ion Chromatography Method: ME-AN-014

Chloride	mg/l	0.05	8.0	2.9
Fluoride	mg/l	0.05	0.17	0.09
Nitrate	mg/l	0.1	0.6	0.3
Nitrite	mg/l	0.5	<0.5	<0.5
Sulphate	mg/l	0.05	11	2.7

### pH in water Method: ME-AN-016

pH in water at 25°C	-	1	6.3	6.3
---------------------	---	---	-----	-----

### Dissolved Hg on waters by ICP-MS Method: ME-AN-026



JBX21-8953

Report number 0000027415

Client reference:

QU1316

## TEST REPORT

Sample Number  
Sample Name

JBX21-8953.001 WSW1	JBX21-8953.002 WSW2
------------------------	------------------------

Parameter

Units

LOR

Dissolved Hg on waters by ICP-MS Method: ME-AN-026 (continued)

Mercury	µg/l	0.001	0.009	0.004
---------	------	-------	-------	-------

Ammonia on waters by Discrete Analyser Method: ME-AN-041

Ammonia	mg/l	0.012	<0.012	<0.012
Ammonia as N	mg/l	0.01	<0.01	<0.01

Microbiological parameters in Water Method: IDEXX

E. Coli *	CFU/100ml	-	Not Detected	Not Detected
Faecal Coliforms *	CFU/100ml	-	261	6
Total Coliforms *	CFU/100ml	-	5	6
Total Plate Count *	CFU/ml	-	1553	344

## METHOD SUMMARY

METHOD	METHOD SUMMARY
ME-AN-016	The pH of an aliquot of aqueous sample is measured electrometrically using an electrode connected to a calibrated meter with automated temperature correction. This method is based on APHA 4500-H B.
ME-AN-008	Turbidity is measured on an aliquot of aqueous sample using a calibrated turbidity meter. The method is based on APHA 2130.
ME-AN-027	Dissolved metals are determined on a filtered and acidified (to 1% HNO <sub>3</sub> ) portion of aqueous sample by Inductively coupled plasma optical emission spectrometry (ICP-OES). The method is based on EPA 200.7 and APHA 3120.
ME-AN-041	
ME-AN-026	Dissolved Hg on waters by ICP-MS
IDEXX	Microbiological parameters by IDEXX.
ME-AN-039	This method is based on: Standard methods for the examination of water and wastewater, 18th edition, 1992. Colour 2120 C. Spectrophotometric method. The sample is filtered through a 0.45 µm filter and the true colour is determined spectrophotometrically at a wavelength of 575 nm
ME-AN-001	An aliquot of aqueous sample is titrated first to pH 8.3 and then to 4.3 using standardised acid. The volumes of acid titrated are used to calculate total alkalinity and/or alkaline species. The method is based on EPA 310.2 and APHA 2320 B.
ME-AN-011	Total dissolved solids (TDS) is determined gravimetrically on a filtered aliquot of aqueous sample by evaporating the sample to dryness in a pre-weighed container at 105 deg C. The method is based on APHA 2540 C.
ME-AN-014	Inorganic anions (Br, Cl, F, NO <sub>3</sub> , NO <sub>2</sub> , SO <sub>4</sub> ) are determined on aqueous samples by Ion chromatography. The method is based on EPA 300.1 and APHA 4110 B.
ME-AN-007	The conductivity of an aliquot of aqueous sample is measured electrometrically using a standard cell connected to a calibrated meter with automated temperature correction. This method is based on APHA 2510.
Calculation of Anion-Cation Balance	Calculation of the cation/anion balance

**FOOTNOTES**

IS    Insufficient sample for analysis.  
LNR   Sample listed, but not received.  
^    Performed by outside laboratory.  
LOR   Limit of Reporting

QFH   QC result is above the upper tolerance  
QFL   QC result is below the lower tolerance  
-    The sample was not analysed for this analyte  
\*    Results marked "Not SANAS Accredited" in this report are not included in the SANAS Schedule of Accreditation for this laboratory / certification body / inspection body".

Samples analysed as received.  
Solid samples expressed on a dry weight basis.

Unless otherwise indicated, samples were received in containers fit for purpose.

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Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

**WARNING:** The sample(s) to which the findings recorded herein (the "Findings") relate was(were) draw and / or provided by the Client or by a third party acting at the Client's direction. The Findings constitute no warranty of the sample's representativity of all goods and strictly relate to the sample(s). The Company accepts no liability with regard to the origin or source from which the sample(s) is/are said to be extracted.

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LAB-QLT-REP-001



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**Bennie Nel****METALLURGY**

METALLURGY

MET%

**TEST REPORT**

Lab Ref MT21-45481  
Client Ref **IONIC RARE EARTHS**  
Project IONIC RARE EARTHS  
Product Code SOLUTIONS  
Status Final  
Received 23/07/21  
Reported 28/07/21  
Samples 25  
First Sample CSW1  
Last Sample WSW2  
Pages Page 1 of 6

*Notes**Results Approved by: .....**Results Approved by:.....**Results Approved by: .....**Results Approved by:.....**Results Approved by: .....**Results Approved by:.....**Results Approved by: .....**Results Approved by:.....**On behalf of: SGS South Africa*

*The results in the following analytical report pertain to this laboratory for  
preparation and/or analysis as requested by METALLURGY.*

*The Analytical results reported herein refer to the samples on an as received basis, unless specified that samples to be assayed on a dry basis.*

**Please refer to Appendix A: Accredited methods & Appendix B: Non-accredited methods**



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Lab Ref MT21-45481  
Client Ref IONIC RARE EARTHS  
Project IONIC RARE EARTHS  
Reported 28/07/21  
Status Final  
Page Page 2 of 6

## TEST REPORT

	Ce	Dy	Er	Eu	Gd	Ho
Scheme	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B
Units	ppb	ppb	ppb	ppb	ppb	ppb
Reporting Limit	0.4	0.2	0.2	0.2	0.2	0.2
Test Completed	2021-07-27	2021-07-27	2021-07-27	2021-07-27	2021-07-27	2021-07-27
CSW1	9.0	0.6	0.3	<0.2	0.7	<0.2
CSW2	4.8	0.5	0.2	<0.2	0.4	<0.2
CSW3	0.7	<0.2	<0.2	<0.2	<0.2	<0.2
CSW4	18.2	1.1	0.5	0.2	1.3	<0.2
CSW5	5.7	0.5	0.2	<0.2	0.5	<0.2
CSW6	4.6	0.5	0.2	<0.2	0.6	<0.2
CSW7	4.2	0.2	<0.2	<0.2	0.3	<0.2
CSW8	9.7	0.6	0.3	<0.2	0.7	<0.2
CGW1	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2
CGW2	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2
CGW3	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2
CGW4	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2
CGW5	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2
CGW6	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2
EGW1	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2
EGW2	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2
ESW1	2.5	<0.2	<0.2	<0.2	0.2	<0.2
ESW2	9.5	0.7	0.4	<0.2	0.9	<0.2
ESW3	17.8	0.8	0.4	<0.2	1.0	<0.2
ESW4	0.5	<0.2	<0.2	<0.2	<0.2	<0.2
ESW5	3.5	0.3	<0.2	<0.2	0.3	<0.2
WGW1	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2
WGW2	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2
WSW1	6.2	0.4	0.2	<0.2	0.4	<0.2
WSW2	4.1	0.3	<0.2	<0.2	0.3	<0.2
REP-CSW5	5.8	0.4	0.3	<0.2	0.5	<0.2
STD-20PPB	19.5	19.5	19.5	19.6	19.5	19.5
BLK-BLANK	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2

- not analysed / -- element not determined / I.S. insufficient sample / L.N.R. listed not received / U.T.D. Unable To Determine

CONTAM - contaminated / D.I.P. - destroyed in prep / L.I.P. - lost in process / N.D. - not detected / NVL - not validated

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Lab Ref MT21-45481  
 Client Ref **IONIC RARE EARTHS**  
 Project IONIC RARE EARTHS  
 Reported 28/07/21  
 Status Final  
 Page Page 3 of 6

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## TEST REPORT

	La	Lu	Nd	Pr	Sc	Sm
Scheme	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B
Units	ppb	ppb	ppb	ppb	ppb	ppb
Reporting Limit	0.4	0.2	0.4	0.2	0.5	0.4
Test Completed	2021-07-27	2021-07-27	2021-07-27	2021-07-27	2021-07-27	2021-07-27
CSW1	6.3	<0.2	4.8	1.3	17.3	0.8
CSW2	3.6	<0.2	2.6	0.8	14.3	0.5
CSW3	0.6	<0.2	0.4	<0.2	12.3	<0.4
CSW4	11.4	<0.2	8.4	2.4	28.1	1.4
CSW5	4.1	<0.2	3.0	0.8	16.8	0.6
CSW6	3.2	<0.2	3.2	0.9	16.8	0.7
CSW7	2.8	<0.2	2.2	0.6	10.7	<0.4
CSW8	6.1	<0.2	4.1	1.2	21.1	0.7
CGW1	<0.4	<0.2	<0.4	<0.2	15.6	<0.4
CGW2	<0.4	<0.2	<0.4	<0.2	6.0	<0.4
CGW3	<0.4	<0.2	<0.4	<0.2	5.6	<0.4
CGW4	<0.4	<0.2	<0.4	<0.2	16.5	<0.4
CGW5	<0.4	<0.2	<0.4	<0.2	14.1	<0.4
CGW6	<0.4	<0.2	<0.4	<0.2	15.6	<0.4
EGW1	<0.4	<0.2	<0.4	<0.2	19.4	<0.4
EGW2	<0.4	<0.2	<0.4	<0.2	17.0	<0.4
ESW1	1.7	<0.2	1.3	0.4	10.4	<0.4
ESW2	6.7	<0.2	4.9	1.4	17.7	0.9
ESW3	8.4	<0.2	6.4	1.8	17.1	1.1
ESW4	0.4	<0.2	<0.4	<0.2	8.3	<0.4
ESW5	2.5	<0.2	1.9	0.5	9.6	<0.4
WGW1	<0.4	<0.2	<0.4	<0.2	15.2	<0.4
WGW2	<0.4	<0.2	<0.4	<0.2	6.9	<0.4
WSW1	4.4	<0.2	2.6	0.7	14.9	0.5
WSW2	2.8	<0.2	1.7	0.5	11.4	<0.4
REP-CSW5	4.2	<0.2	3.0	0.8	16.6	0.5
STD-20PPB	19.5	19.5	19.4	19.5	19.6	19.5
BLK-BLANK	<0.4	<0.2	<0.4	<0.2	<0.5	<0.4

- not analysed / -- element not determined / I.S. insufficient sample / L.N.R. listed not received / U.T.D. Unable To Determine

CONTAM - contaminated / D.I.P. - destroyed in prep / L.I.P. - lost in process / N.D. - not detected / NVL - not validated

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Lab Ref MT21-45481  
Client Ref IONIC RARE EARTHS  
Project IONIC RARE EARTHS  
Reported 28/07/21  
Status Final  
Page Page 4 of 6

## TEST REPORT

	Tb	Tb	Tm	Y	Yb
Scheme	IMS84B	IMS84B	IMS84B	IMS84B	IMS84B
Units	ppb	ppb	ppb	ppb	ppb
Reporting Limit	0.2	0.5	0.2	2	0.4
Test Completed	2021-07-27	2021-07-27	2021-07-27	2021-07-27	2021-07-27
CSW1	<0.2	2.0	<0.2	3	<0.4
CSW2	<0.2	1.2	<0.2	2	<0.4
CSW3	<0.2	<0.5	<0.2	<2	<0.4
CSW4	<0.2	3.8	<0.2	6	0.5
CSW5	<0.2	1.5	<0.2	3	<0.4
CSW6	<0.2	0.8	<0.2	2	<0.4
CSW7	<0.2	0.7	<0.2	<2	<0.4
CSW8	<0.2	2.3	<0.2	3	<0.4
CGW1	<0.2	<0.5	<0.2	<2	<0.4
CGW2	<0.2	<0.5	<0.2	<2	<0.4
CGW3	<0.2	<0.5	<0.2	<2	<0.4
CGW4	<0.2	<0.5	<0.2	<2	<0.4
CGW5	<0.2	<0.5	<0.2	<2	<0.4
CGW6	<0.2	<0.5	<0.2	<2	<0.4
EGW1	<0.2	<0.5	<0.2	<2	<0.4
EGW2	<0.2	<0.5	<0.2	<2	<0.4
ESW1	<0.2	0.8	<0.2	<2	<0.4
ESW2	<0.2	2.1	<0.2	4	<0.4
ESW3	<0.2	2.9	<0.2	4	0.4
ESW4	<0.2	<0.5	<0.2	<2	<0.4
ESW5	<0.2	0.7	<0.2	<2	<0.4
WGW1	<0.2	<0.5	<0.2	<2	<0.4
WGW2	<0.2	<0.5	<0.2	<2	<0.4
WSW1	<0.2	1.5	<0.2	2	<0.4
WSW2	<0.2	1.1	<0.2	<2	<0.4
REP-CSW5	<0.2	1.4	<0.2	2	<0.4
STD-20PPB	19.5	19.5	19.5	20	19.5
BLK-BLANK	<0.2	<0.5	<0.2	<2	<0.4

- not analysed / -- element not determined / I.S. insufficient sample / L.N.R. listed not received / U.T.D. Unable To Determine

CONTAM - contaminated / D.I.P. - destroyed in prep / L.I.P. - lost in process / N.D. - not detected / NVL - not validated

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Lab Ref MT21-45481  
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Page Page 5 of 6

**TEST REPORT****APPENDIX A - ACCREDITED METHODS****METHOD DESCRIPTION**

Au by Lead fusion followed by AAS finish  
Au by Lead fusion followed by Gravimetric Finish  
Au in Carbons by direct cupellation followed by Gravimetric finish  
Au, Pt, Pd by Lead fusion followed by ICP\_OES finish  
Uranium Oxide by pressed pellet analysis using XRF  
Major Element Oxides by Borate Fusion,  
XRF on Mn Ore, Bauxite Ore and Fe Ore  
Total Sulphur by Leco Combustion Infrared Detection  
Total Carbon by Leco Combustion Infrared Detection  
Graphite carbon by LECO  
Chromium (Cr) by Potentiometric Method  
Rare Earth Elements (REE) by Na<sub>2</sub>O<sub>2</sub> fusion, ICP-MS  
Sodium peroxide fusion, ICP-OES, ICP-MS finish (REE elements only)  
Major Element Oxides by Borate Fusion, XRF-PGM Ore  
Determination of Lithium by sodium peroxide fusion, followed by ICP-OES

**SCHEME CODE**

FAA303/FAA505/FAA35V  
FAG303/FAG505  
FAG01V  
FAI313  
XRF75G  
  
XRF78V  
CSA06V  
CSA01V  
CSA05V  
CON10B  
IMS90A  
ICM90A  
XRF79P  
ICP90A / ICM90A

**APPENDIX B - NON-ACCREDITED METHODS****METHOD DESCRIPTION****Sample Prep Methods**

Sample weight on receipt  
Sample screening (DRY)  
Bulk density  
Relative Density/Specific Gravity (by Helium pycnometer)  
Moisture (105 °C)  
LOI by TGA  
LOI by Furnace

**SCHEME CODE**

WGH79  
SCR32  
PHY04V  
PHY03V  
PHY08D  
PHY01K  
PHY02V

**Fire Assay Methods**

Gold (Au) by Lead fusion, Fire Assay, ICP-OES finish - Trace levels  
Silver (Ag) by Fire Assay, gravimetric finish  
Rh by Pd fusion by ICP-OES finish

FAI515  
FAG303  
FAI353

**XRF Methods**

Trace elements by pressed pellet, XRF  
Base Metals by Potassium Pyrosulphate Fusion XRF  
Major Element Oxides by Borate fusion, XRF

XRF75G  
XRF77R  
XRF79V

**Leco Methods**

Sulphide Sulphur (S<sub>2</sub>-) by Leco  
Elemental sulphur (S\*) by gravimetric finish  
Aqueous sulphate (SO<sub>4</sub>) by Dionex  
Sulphate (SO<sub>4</sub>) on solids by Dionex  
Carbonate (CO<sub>3</sub>) by LECO  
Organic carbon by LECO  
Sulphate after pyrolysis by LECO  
Carbonate Carbon after roasting by LECO

CSA08V  
CSA12V  
CLA31V  
CSA11V  
CSA02V  
CSA03V  
CSA13V  
CSA14V

- not analysed / -- element not determined / I.S. insufficient sample / L.N.R. listed not received / U.T.D. Unable To Determine

CONTAM - contaminated / D.I.P. - destroyed in prep / L.I.P. - lost in process / N.D. - not detected / NVL - not validated

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Lab Ref MT21-45481  
 Client Ref **IONIC RARE EARTHS**  
 Project IONIC RARE EARTHS  
 Reported 28/07/21  
 Status Final  
 Page Page 6 of 6

**TEST REPORT****APPENDIX B - NON-ACCREDITED METHODS (continuing)****METHOD DESCRIPTION****SCHEME CODE****Wet Chem Methods**

pH determination  
 Anions by IC (F, Cl, NO<sub>2</sub>, NO<sub>3</sub>, SO<sub>4</sub>)  
 Alkalinity by titration  
 Chloride (Cl) by titration (solutions)  
 Chloride (Cl) by titration (solids)  
 Fluoride (F) by ISE (solutions)  
 Fluoride (F) by ISE (solids)  
 Cyanide (CN) species - Free, WAD & Total  
 Thiocyanate (SCN) by IC  
 Free acid titration  
 Lime (CaO) by titration  
 Ferrous (Fe<sup>2+</sup>) Iron by titration (solids)  
 Ferrous (Fe<sup>2+</sup>) Iron by titration (solutions)  
 Ferric (Fe<sup>3+</sup>) Iron by diff (Incl. Fe total, Fe<sup>2+</sup>) - solutions  
 Iron (Fe) by titration (solids)  
 Tin (Sn) by titration (solids)  
 Manganese (Mn) by back titration  
 Vanadium (V) by titration

ISE06T  
 CLA31V  
 CLA28V  
 CLA27V  
 CLA04E  
 ISE07W  
 ISE07A  
 CLA25V  
 CLA31V  
 CLA15F  
 CLA07C  
 CLA01A  
 CLA34V  
 CLA35V  
 CON08V  
 CON14V  
 CON15V  
 CON16V

**AAS Methods**

Metals by AAS (solutions)  
 Gold (Au) in CN solutions by AAS  
 Silver (Ag) by acid digestion, AAS  
 Arsenic (As) by Aqua Regia digestion, AAS  
 Multi Acid digestion, AAS finish  
 Acid soluble Cu, Co by Sulphuric Acid leach, AAS  
 As by strong acid, AAS  
 Acid Soluble Cu and Ni by Acid digestion and analysis by AAS

AAS84T  
 SOL81X, SOL81T  
 AAS21E  
 AAS11C  
 AAS40D  
 AAS72Q  
 AAS42S  
 AAS13C

**ICP\_OES and ICP\_MS Methods**

Aqua Regia digestion, ICP-OES finish  
 Multi Acid digestion, ICP-OES finish  
 Gold (Au) in Carbon, ICP-OES finish  
 Sodium Peroxide fusion, ICP-OES finish  
 Semi quantitative ICP-OES +ICP-MS scan, Aqua Regia digestion  
 As, Hg, Se, Te by Aqua Regia digestion, ICP-MS finish  
 Multi Acid digestion, semi quantitative scan, ICP-OES + ICP-MS  
 Multi acid digestion, ICP-MS  
 Sodium peroxide fusion, ICP-OES, ICP-MS finish  
 Total & Dissolved metals by ICP-OES

ICP14B  
 ICP40B  
 ARS12D  
 ICP90A  
 ICM14B  
 IMS12Q  
 ICM40B  
 IMS40B  
 ICM90A  
 ICP84B

- not analysed / -- element not determined / I.S. insufficient sample / L.N.R. listed not received / U.T.D. Unable To Determine

CONTAM - contaminated / D.I.P. - destroyed in prep / L.I.P. - lost in process / N.D. - not detected / NVL - not validated

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## 19 Annex VI: Grievance Form and Grievance Log

Makuutu Rare Earths Project Grievance Form			
Complainant Details			
Reference Number	Date Received	How was Grievance Submitted	Received by
Name of Complainant	Address	Telephone Number	Email
Details of Grievance			
Person Responsible for Addressing Grievance	Description of Grievance		
Grievance Priority (critical, medium, low)	Evidence of the Issue		
Action Taken / Required			
Acknowledgement sent to Complainant (Yes / No)	Date of Acknowledgement	Date Set for Resolution of Grievance	
Description of Action Taken			
Person Responsible for Implementing Action		Date of Completion	
Communication of Action			
Method and Date of Feedback to Complainant		Complainant Response to Action	
Effectiveness Review			
Were Actions Effective in Resolving the Grievance (accepted or rejected)	Grievance Closed (Y/N)	Date	Signature of Complainant
Approved By	Date		

## 19.1 Grievance Log

Assigned Grievance Case No#	Complainant full name	Village/ Cell	Complainant Telephone no.	Municipality/ Division	Project Officer (CLO/Project manager) in charge	Status	Level of the resolution	Date of reception	Initial Feedback	Reception mode	Additional complainants/ witnesses (optional)	Location of the grievance	Grievance category	Grievance description	Department/ officer investigatin g the Grievance	Regular updates on investigations	Proposed Resolution	Date of Grievance Closure
<i>Used the grievance form Number</i>	<i>Full names of person reporting grievance</i>	<i>Village name</i>	<i>Complainant telephone number</i>	<i>Name of the Municipality/ Division</i>	<i>Name of the project officer in charge</i>	<i>Open/ closed</i>	<i>Level 1, 2 etc</i>	<i>DDMMYY</i>	<i>Initial feedback given to the complainant</i>	<i>Letter, verbal, meeting etc</i>	<i>Include the witnesses names (if any)</i>	<i>Along which project component (Transmissi on line )</i>	<i>Land related, dust etc</i>	<i>Issues reported by the compliant</i>	<i>Project manager/CLO, etc</i>	1 <sup>st</sup> update, DDMMYY	<i>Proposed action</i>	<i>DDMMYY</i>
																2 <sup>nd</sup> update, DDMMYY		
																3 <sup>rd</sup> update, DDMMYY		

## 19.2 Letter of Acknowledgement

***Insert complainant's address***

***Insert DDMMYY***

### **RE: GRIEVANCE/COMPLAINT ACKNOWLEDGEMENT**

Dear ***insert complainant's full names***

I am writing to let you know that we have received your grievance/complaint about ***insert outline of grievance/complaint.***

We are currently investigating the circumstances surrounding the problem and you will hear from us again no later than ***insert DDMMYY***

Thank you for letting us know of your concern and for your patience while we explore this matter.

If you have any questions concerning this letter, or would like to discuss the complaint further, please contact.

***Insert project staff name,***

***Insert position,***

***Insert contact number.***

Yours sincerely

***Insert staff name***

***Insert position***

## 20 ANNEX VII: AIR QUALITY BASELINE REPORT

### 20.1 Equipment and method

Air quality monitoring was undertaken using the Portable Aeroqual S500 Monitor to establish the baseline values for PM<sub>2.5</sub>, PM<sub>10</sub>, NO<sub>2</sub>, SO<sub>2</sub> and CO by simply swapping the PM sensor head for the gas sensor head of choice. The Aeroqual monitor was placed on a tripod stand 1.2m above the ground, switched on, allowed 3 minutes of zeroing and 7 minutes of stabilizing readings. The monitor was then set to start data logging at a frequency of five (5) minutes for 4-12 hours per site. Though in some areas the assessment was interrupted by changes in weather conditions like unpredictable down pour or rainfall. The data was then downloaded on a PC using Aeroqual Software and analysed.

### 20.2 RESULTS FOR PARTICULATE MATTER

Table 155: Results for Particulate Matter

Location	Date & Run time	PM 2.5 (mg/m3)				PM 10 (mg/m3)			
		Min	Ave	Max	WHO 24-hour AQG	Min	Ave	Max	WHO 24-hour AQG
Buniantole Primary School	07/04/2021-08/04/2021 07:00Am – 07:00Pm	0.003	0.006	0.020	0.025	0.003	0.015	0.171	0.05
Nakivumbi Trading Center	09/04/2021-10/04/2021 07:00Am – 07:00Pm	0.003	0.013	0.083	0.025	0.005	0.032	0.272	0.05
Mawololo Trading Center	11/04/2021-12/04/2021 07:00Am – 07:00Pm	0.002	0.007	0.070	0.025	0.004	0.013	0.083	0.05
Namaganda Trading Center	13/04/2021-14/04/2021 07:00Am – 07:00Pm	0.004	0.008	0.107	0.025	0.003	0.017	0.145	0.05
Mawanga Primary School/ HC III/ COU	15/04/2021-16/04/2021 07:00Am – 07:00Pm	0.003	0.005	0.028	0.025	0.004	0.009	0.042	0.05
Namavundu Trading Center	17/04/2021-18/04/2021 07:00Am – 07:00Pm	0.004	0.018	0.185	0.025	0.007	0.050	0.333	0.05

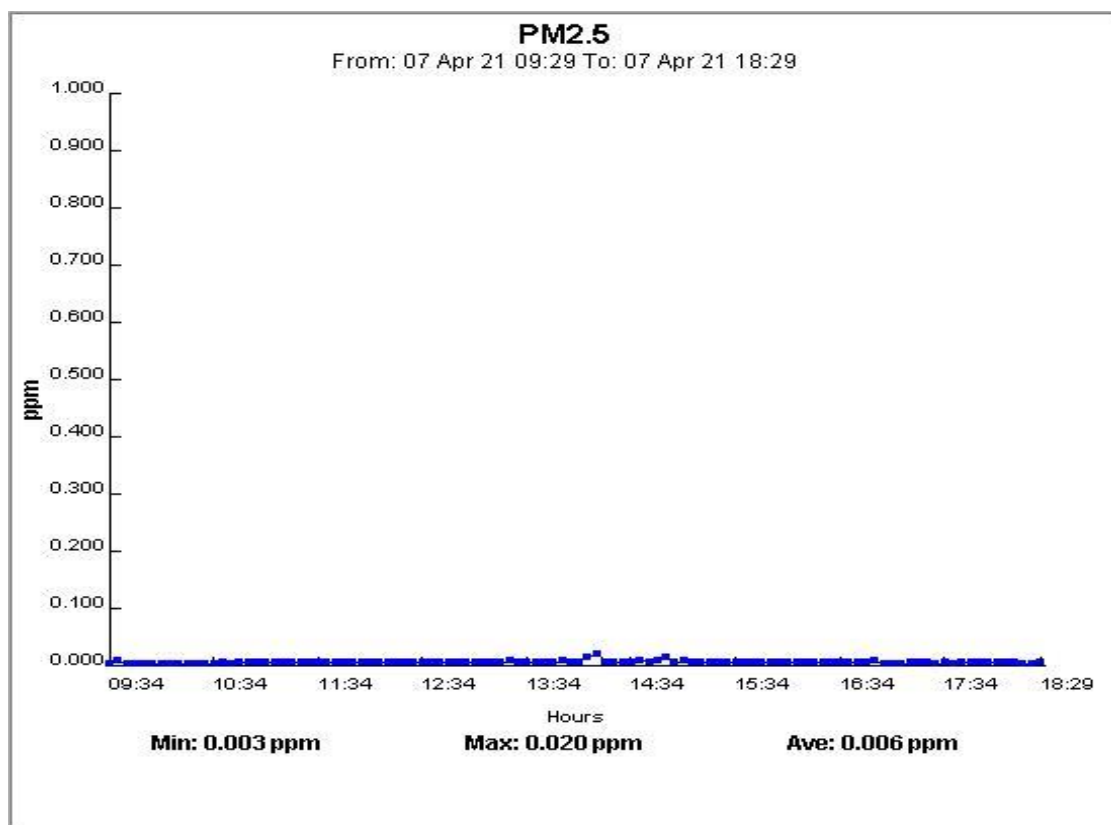


Figure 176: Graph showing concentration of PM2.5 at Buniantole Primary School

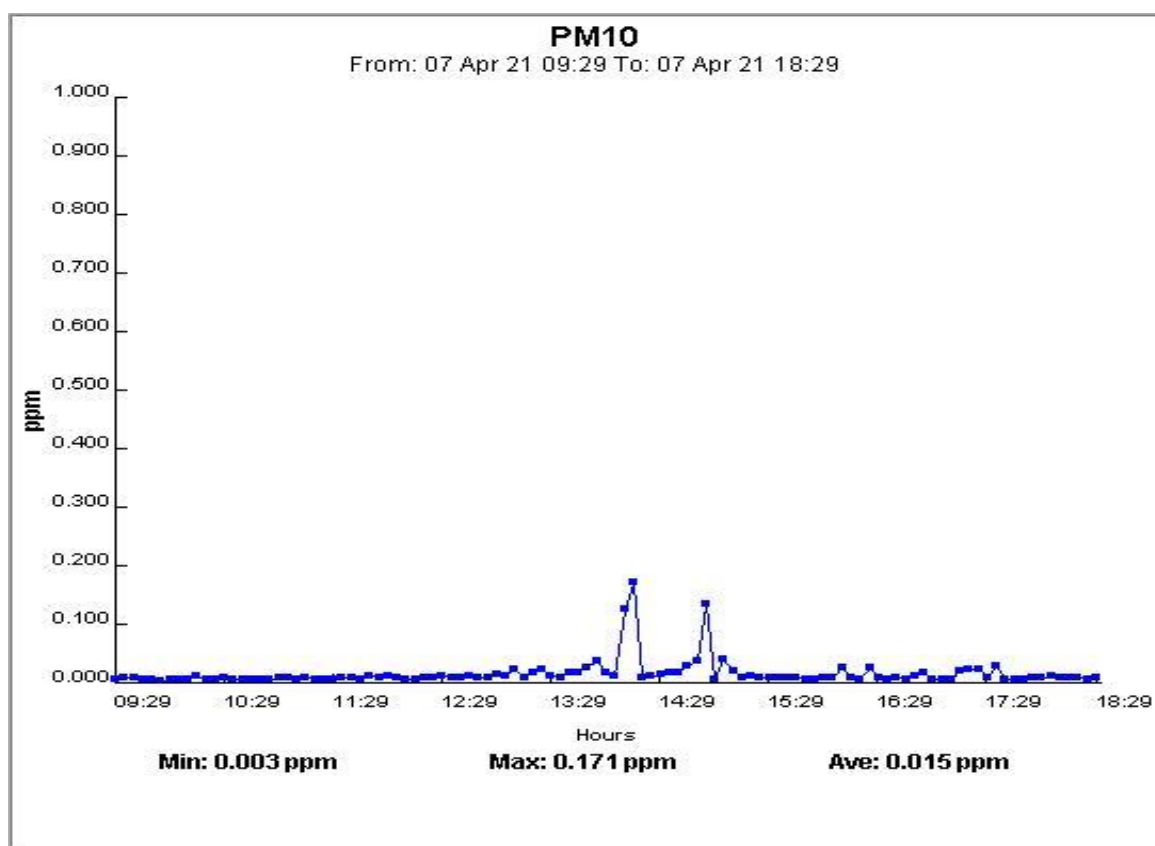


Figure 177: Graph showing concentration of PM 10 at Buniantole Primary School

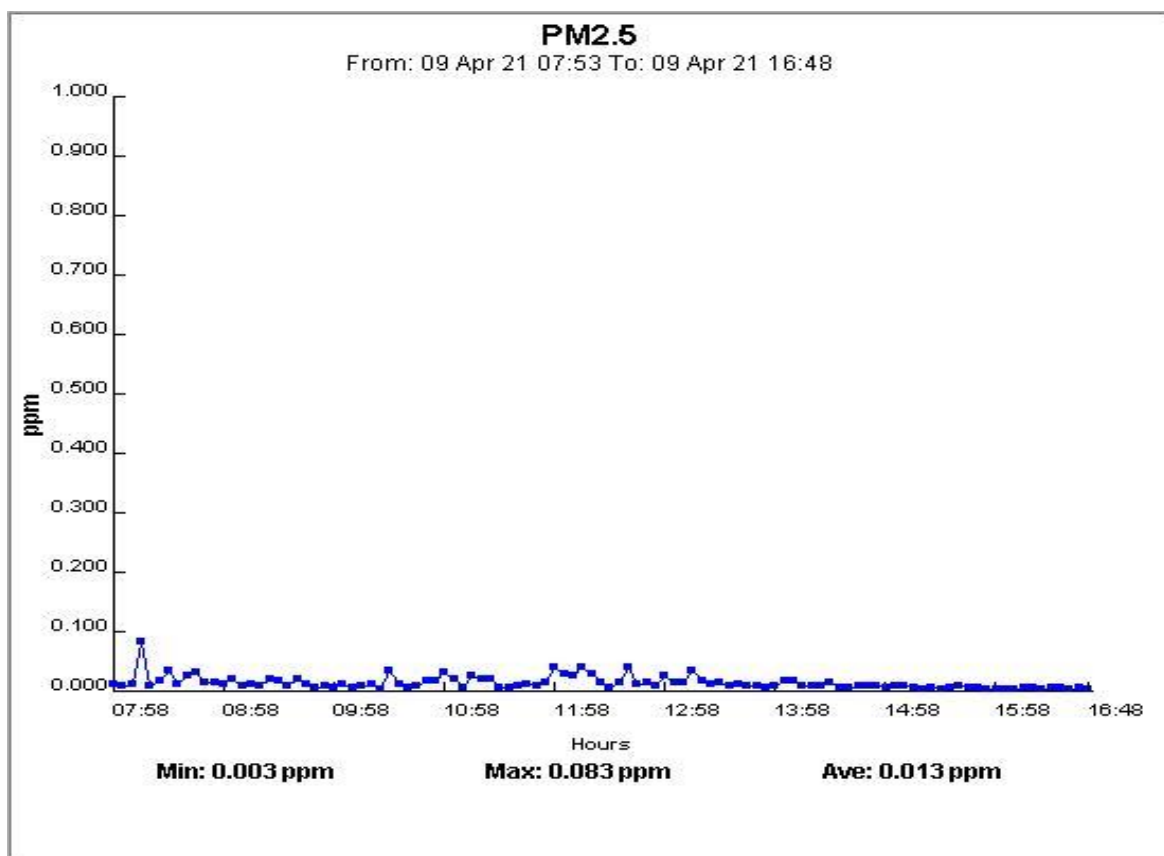


Figure 178: Graph showing concentration of PM2.5 at Nakivumbi Trading Centre

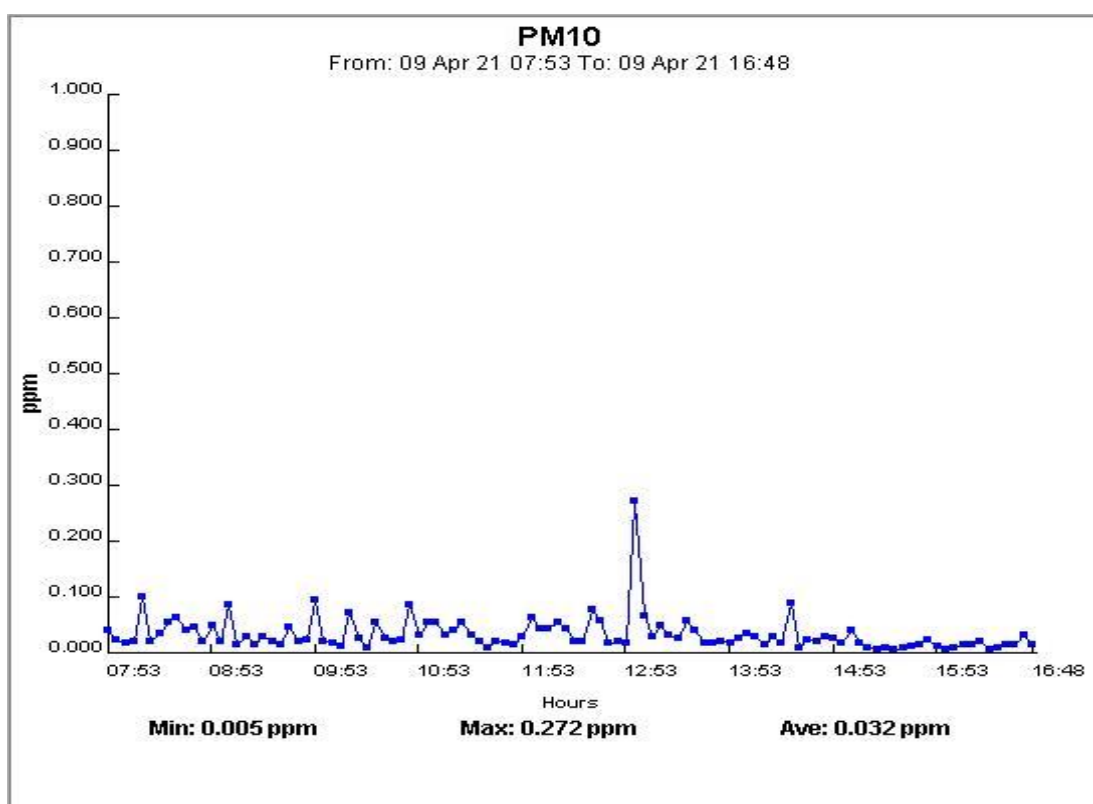


Figure 179: Graph showing concentration of PM 10 at Nakivumbi Trading Centre



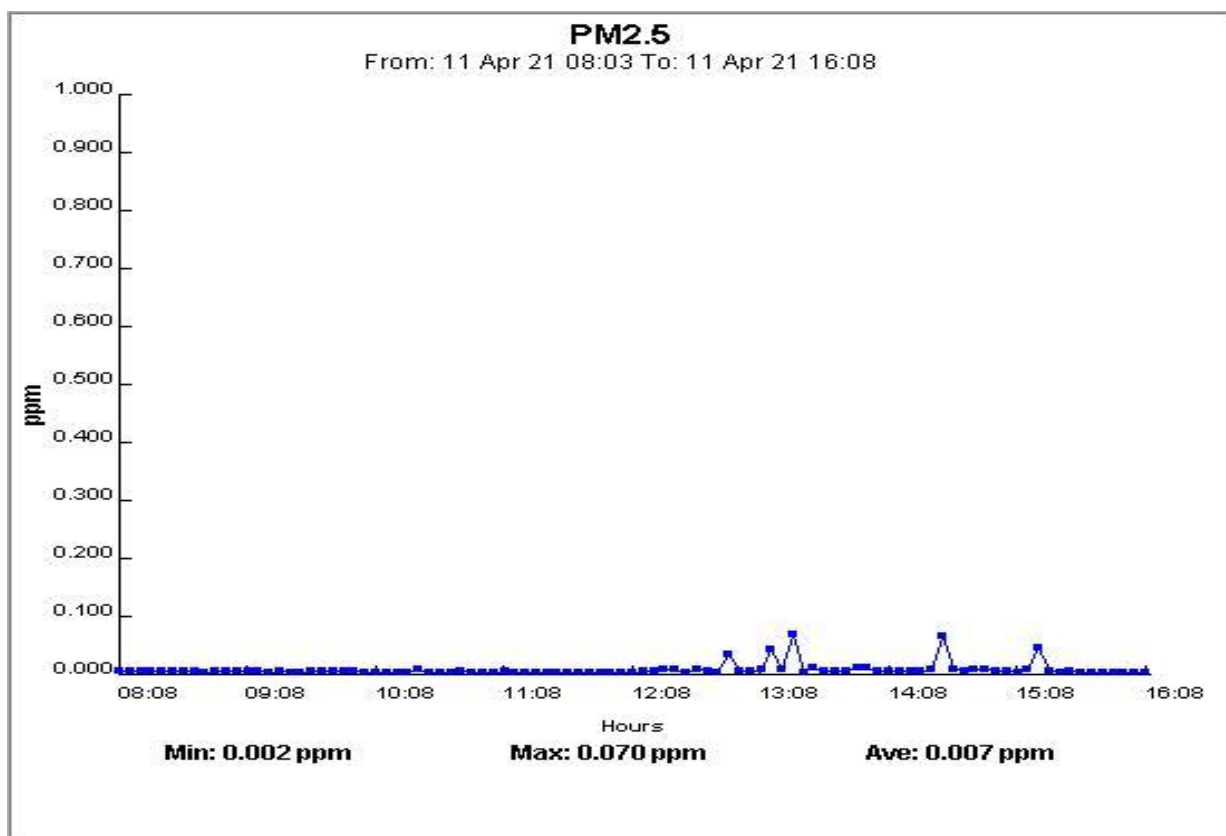


Figure 180: Graph showing concentration of PM 2.5 at Mawololo Trading Centre

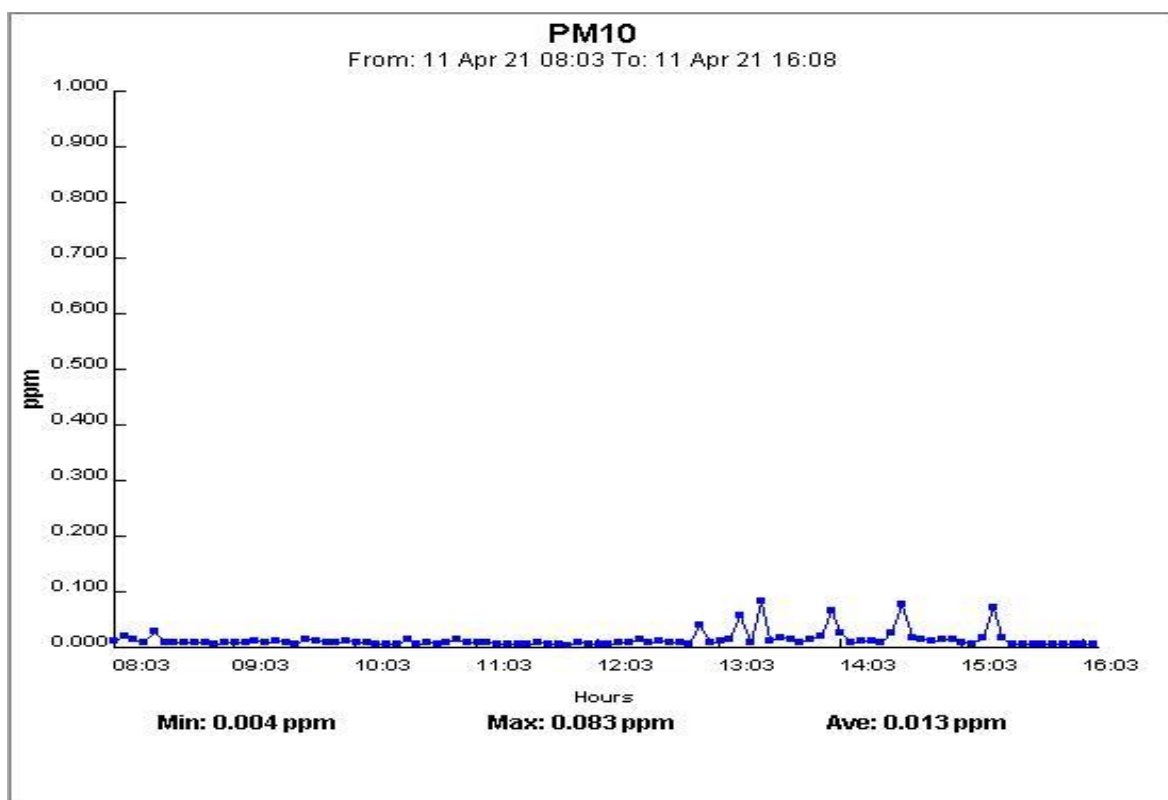


Figure 181: Graph showing concentration of PM 10 at Mawololo Trading Centre

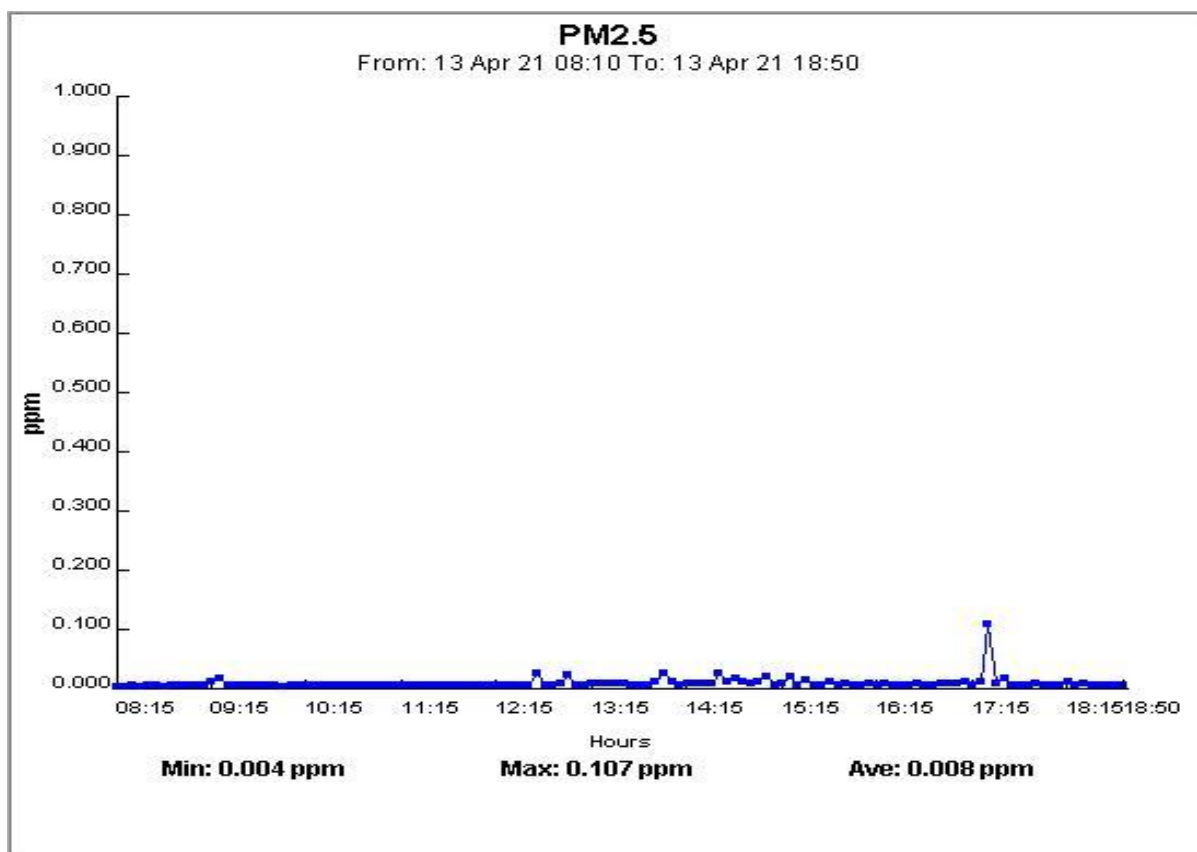


Figure 182: Graph showing concentration of PM 2.5 at Namaganda Trading Centre

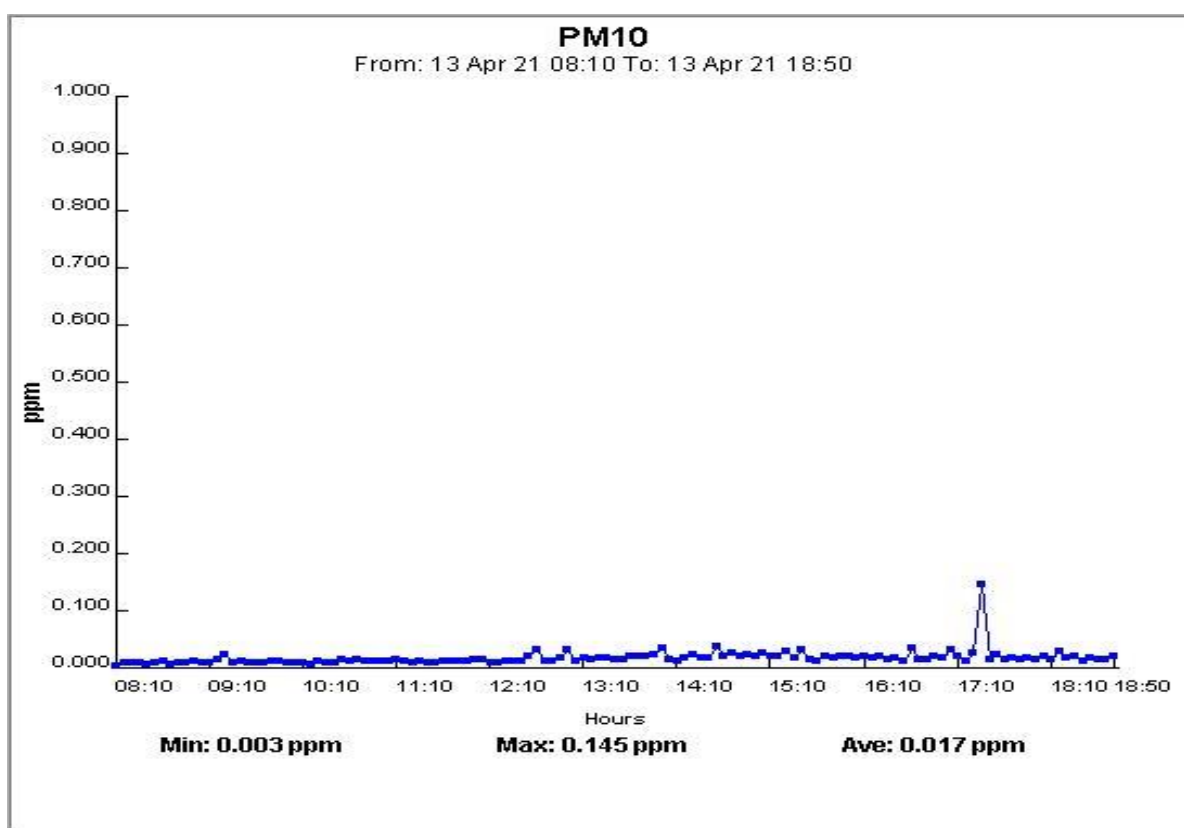


Figure 183: Graph showing concentration of PM 10 at Namaganda Trading Centre

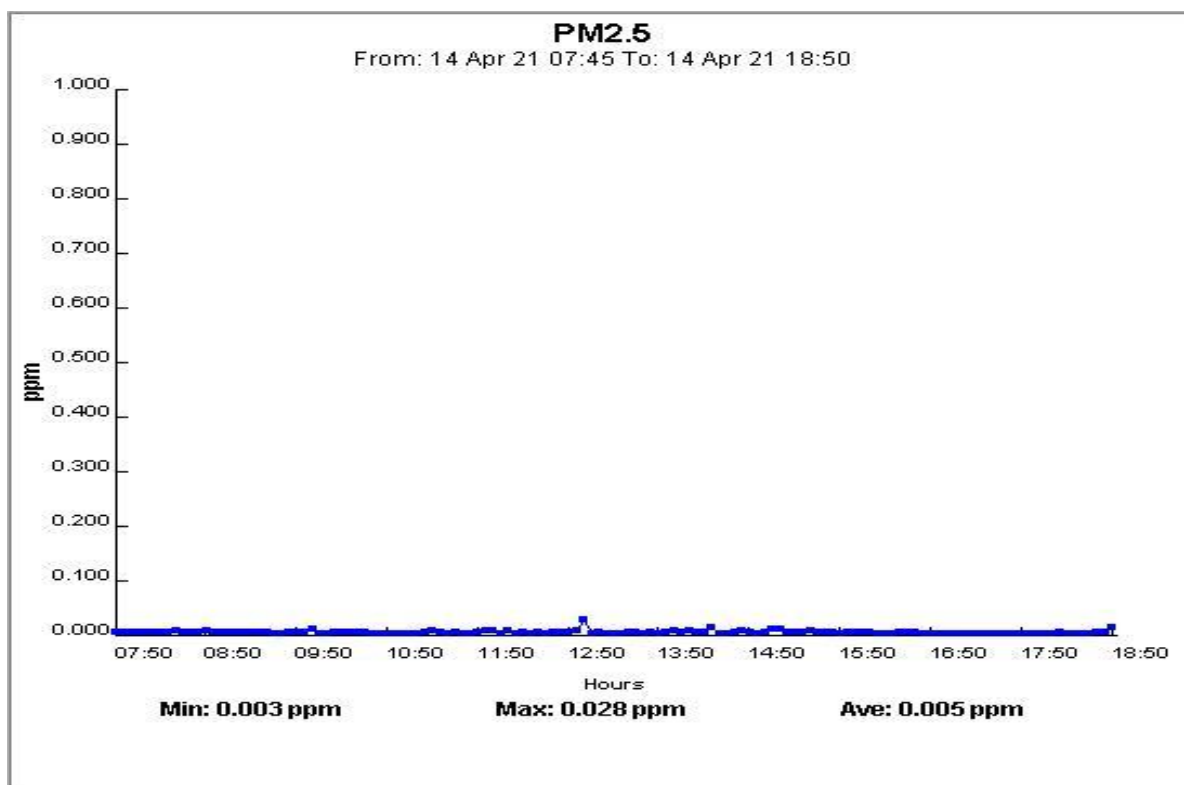


Figure 184: Graph showing concentration of PM 2.5 at Mawanga Trading Centre/Health Center III

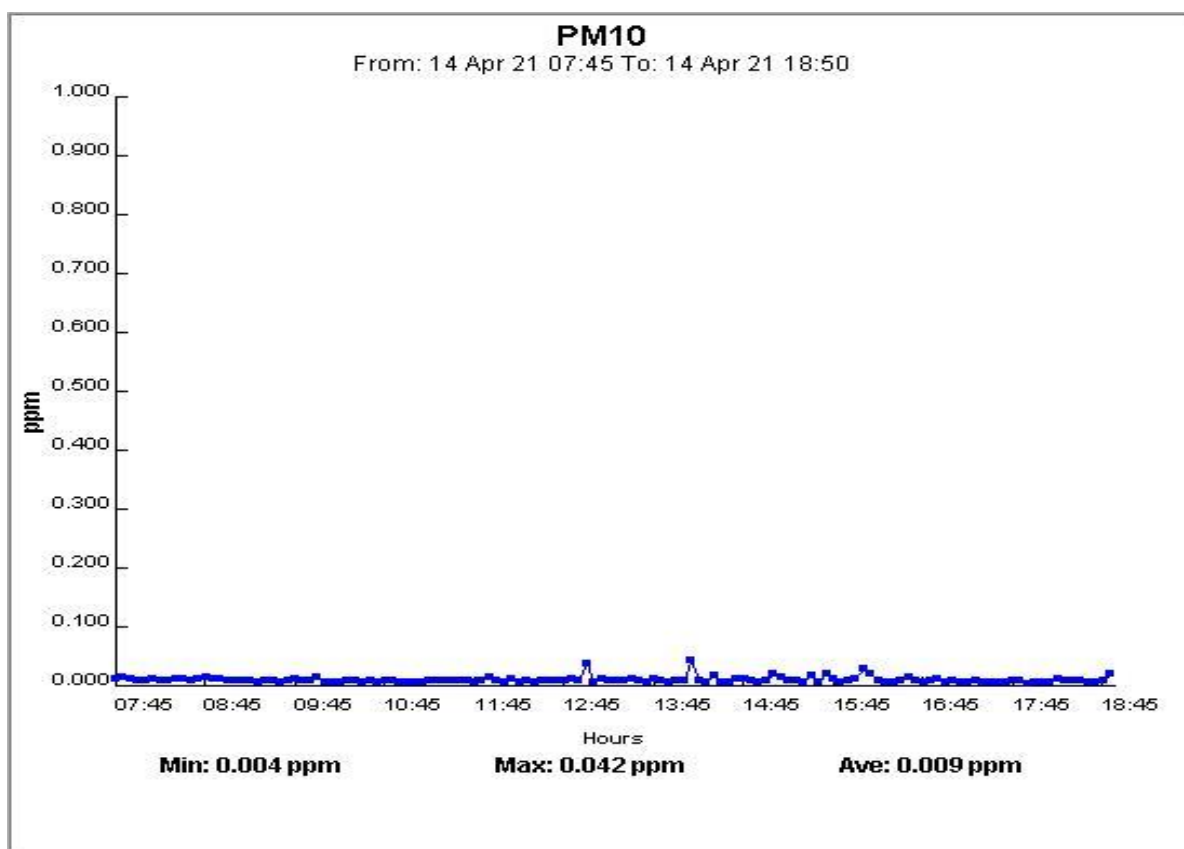


Figure 185: Graph showing concentration of PM 10 at Mawanga Trading Centre/Health Center III

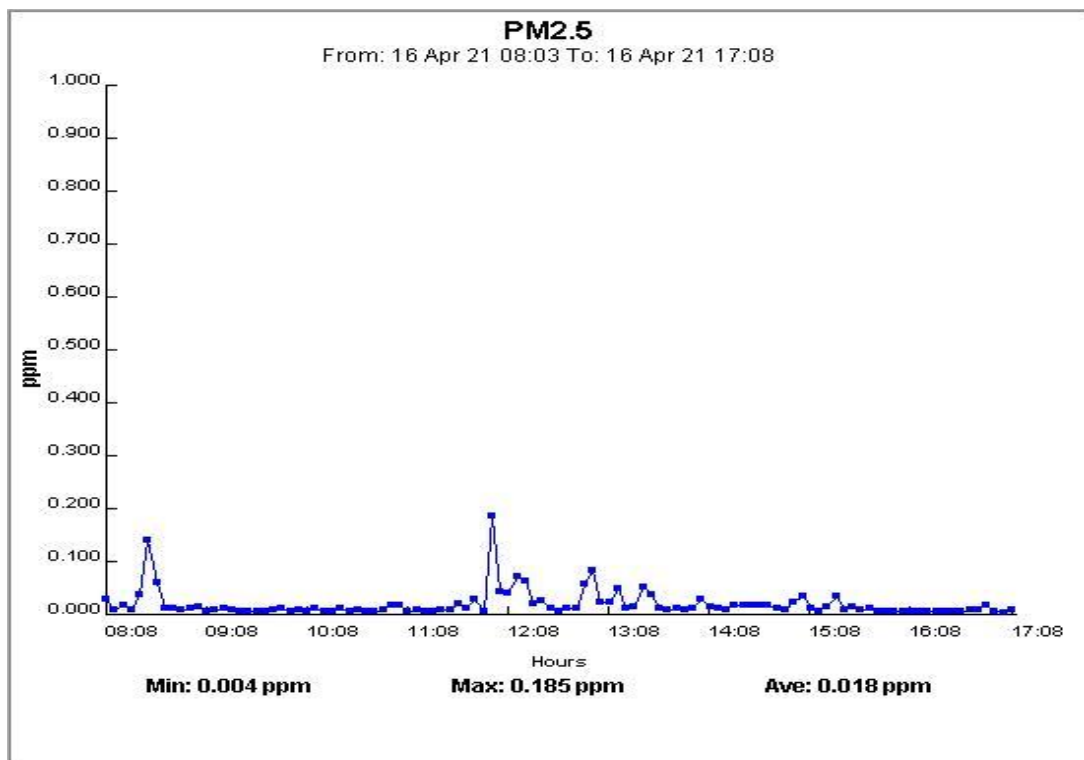


Figure 186: Graph showing concentration of PM 2.5 at Namavundu Trading Centre

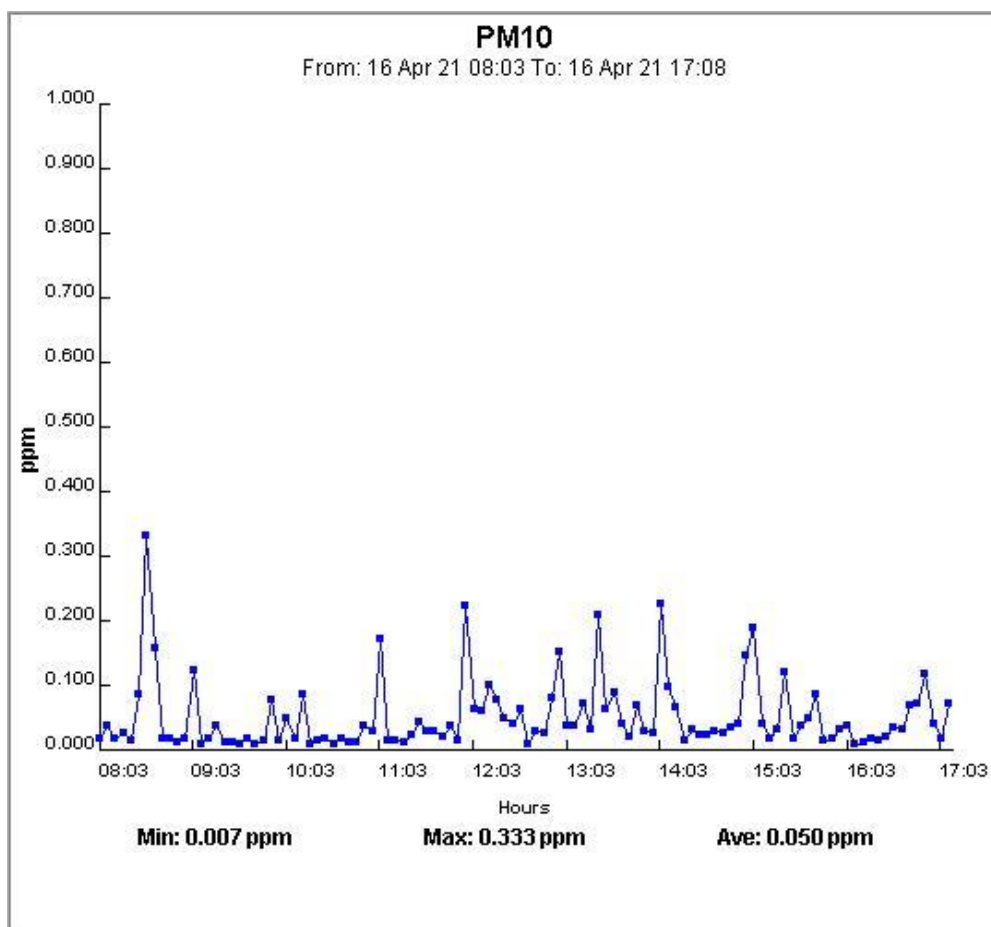


Figure 187: Graph showing concentration of PM 10 at Namavundu Trading Centre

## 20.3 RESULTS FOR GAS MONITORING

Table 156: Results for Gases

Location	Date & Run time	Readings		
Buniantole Primary School	07/04/2021- 08/04/2021 07:00Am – 07:00Pm	Min: 0.030 Ave: 0.077 Max: 0.103	Min: 0.00 Ave: 0.08 Max: 0.63	Min: 0.00 Ave: 0.58 Max: 8.73
Nakivumbi Trading Center	09/04/2021- 10/04/2021 07:00Am – 07:00Pm	Min: 0.061 Ave: 0.102 Max: 0.140	Min: 0.00 Ave: 0.02 Max: 0.21	Min: 0.00 Ave: 1.22 Max: 14.60
Mawololo Trading Center	11/04/2021- 12/04/2021 07:00Am – 07:00Pm	Min: 0.144 Ave: 0.189 Max: 0.257	Min: 0.00 Ave: 0.01 Max: 0.26	Min: 0.00 Ave: 0.01 Max: 0.26
Namaganda Trading Center	13/04/2021- 14/04/2021 07:00Am – 07:00Pm	Min: 0.030 Ave: 0.076 Max: 0.101	Min: 0.00 Ave: 0.04 Max: 0.08	Min: 0.00 Ave: 0.46 Max: 6.97
Mawanga Primary School/ HC III/ COU	15/04/2021- 16/04/2021 07:00Am – 07:00Pm	Min: 0.035 Ave: 0.093 Max: 0.155	Min: 0.00 Ave: 0.03 Max: 0.44	Min: 0.00 Ave: 0.02 Max: 0.38
Namavundu Trading Center	17/04/2021- 18/04/2021 07:00Am – 07:00Pm	Min: 0.148 Ave: 0.200 Max: 0.272	Min: 0.00 Ave: 0.04 Max: 0.08	Min: 0.00 Ave: 0.03 Max: 0.48

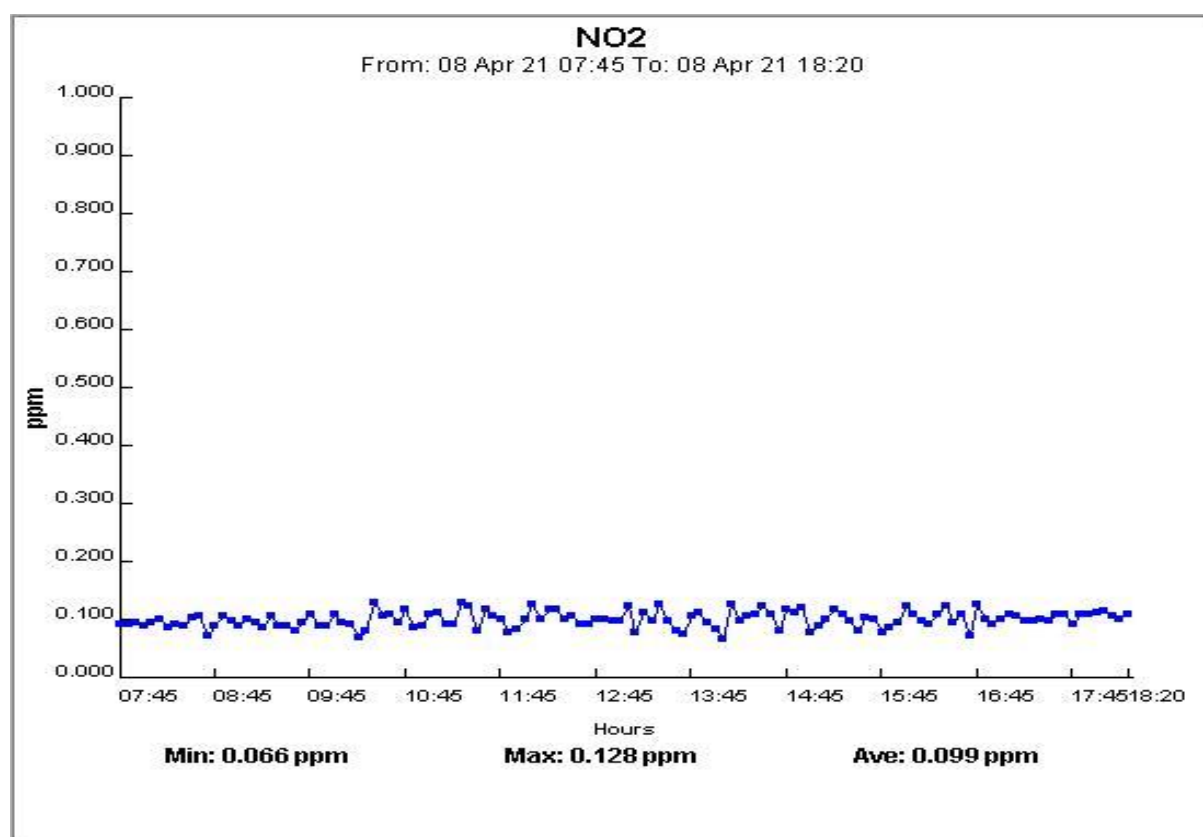


Figure 188: Graph showing concentration of NO2 at Buniantole Primary School

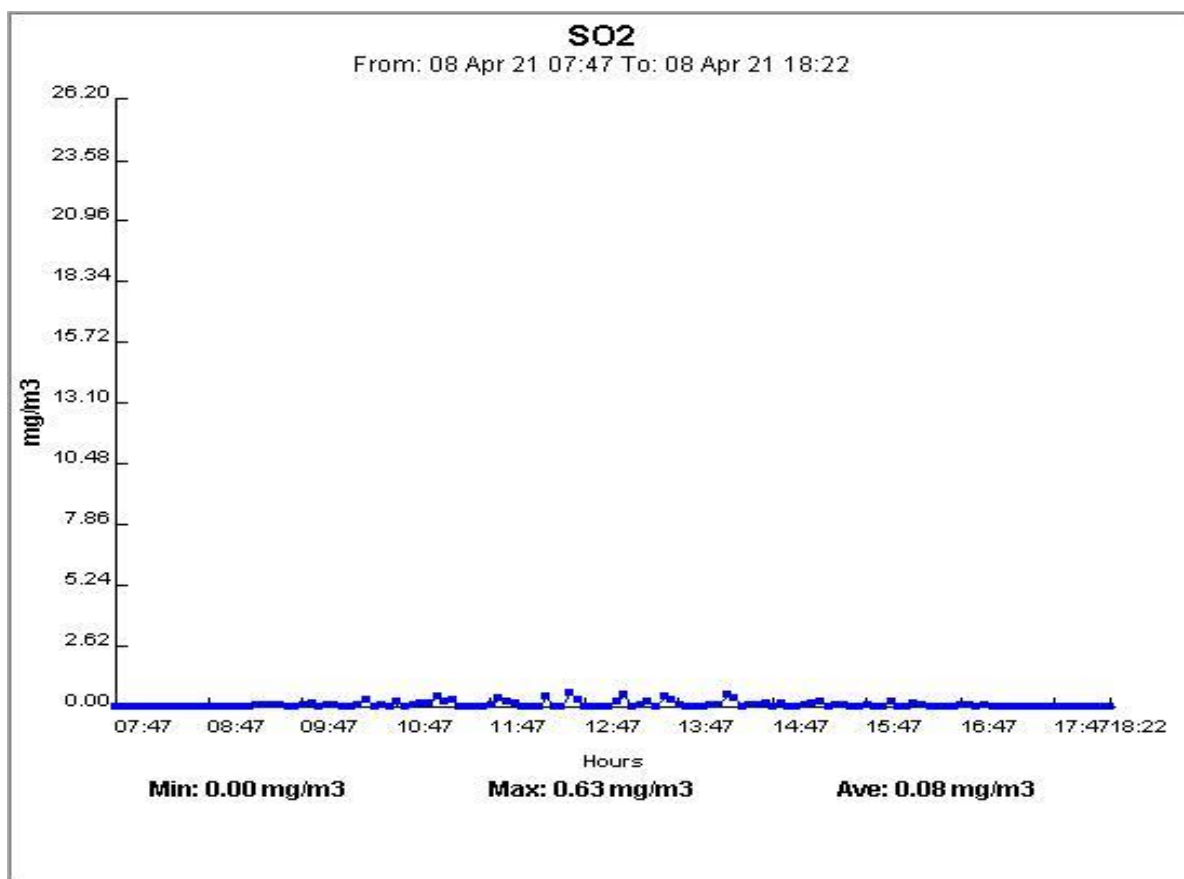


Figure 189: Graph showing concentration of SO<sub>2</sub> at Buniantole Primary School

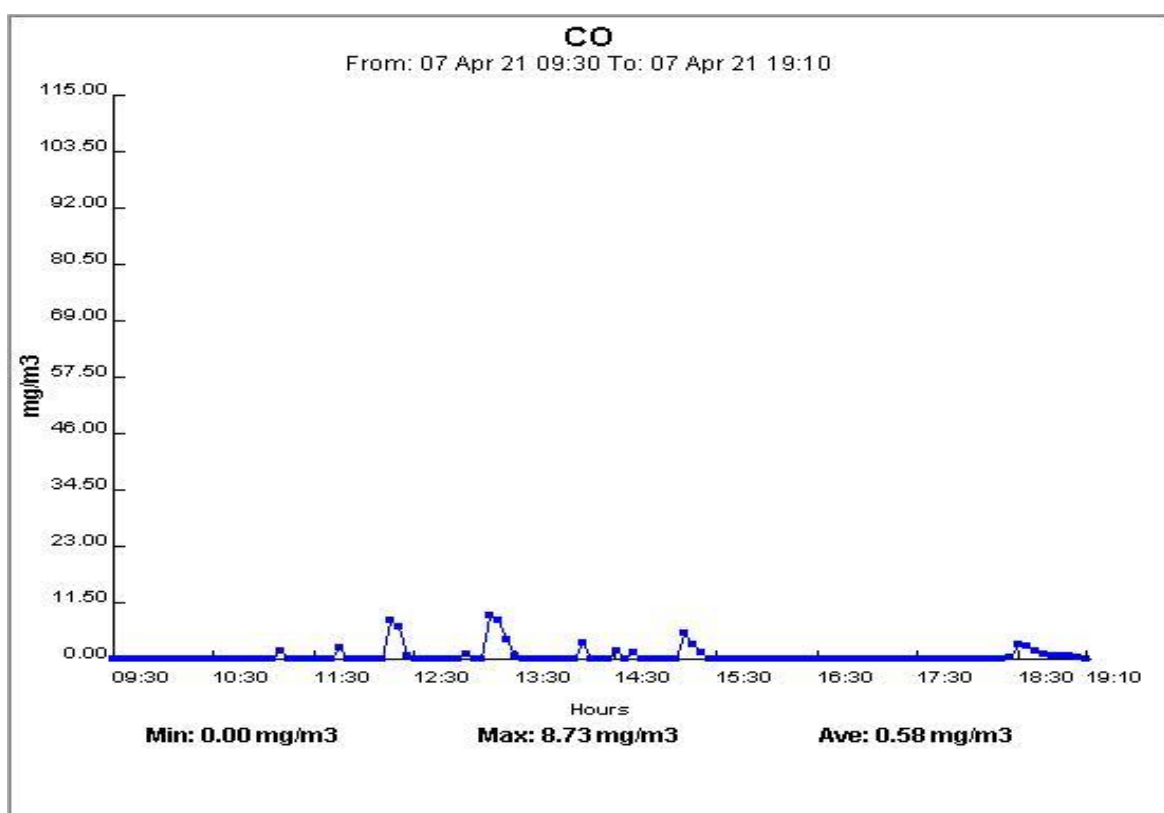


Figure 190: Graph showing Carbon Monoxide around Buniantole Primary School

Carbon Monoxide readings did exceed the national standard for the points monitored.



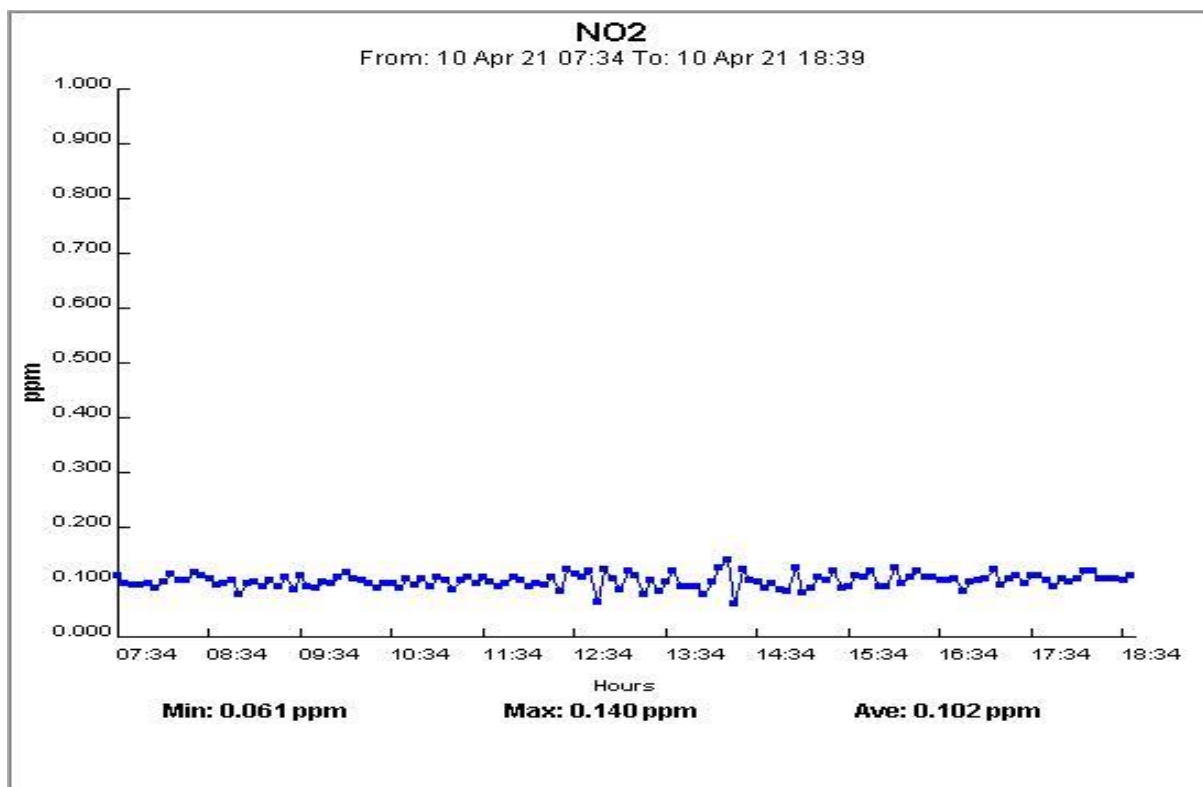


Figure 191: Graph showing concentration of Nitrogen oxide at Nakivumbi Trading Center

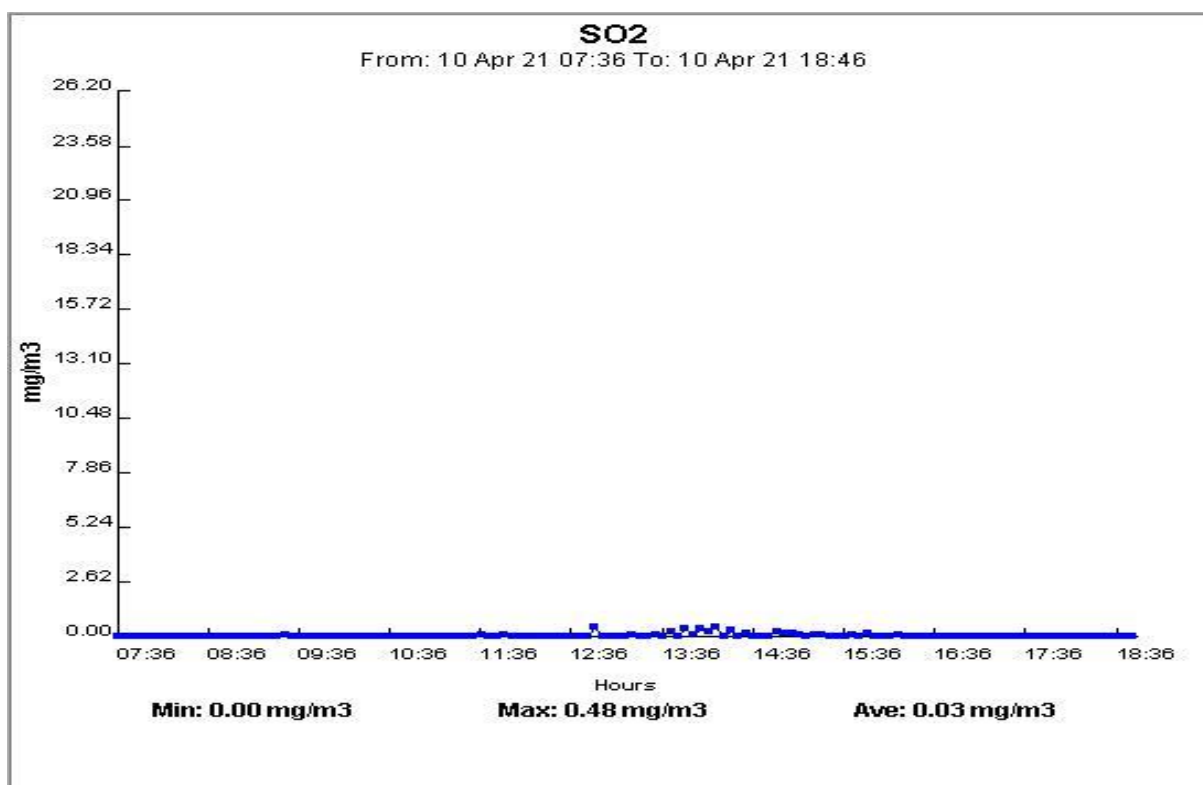


Figure 192: Graph showing concentration of SO2 at Nakivumbi Trading Center

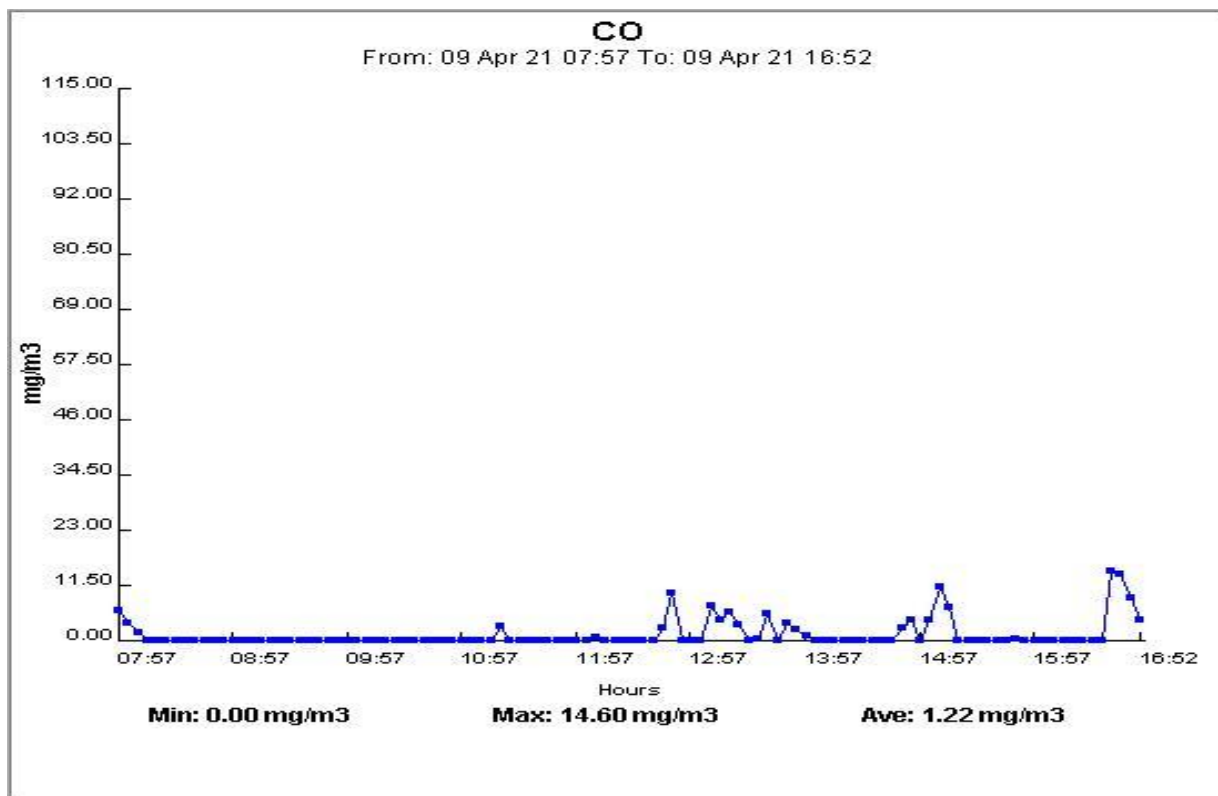


Figure 193: Graph showing concentration of CO at Nakivumbi Trading Center

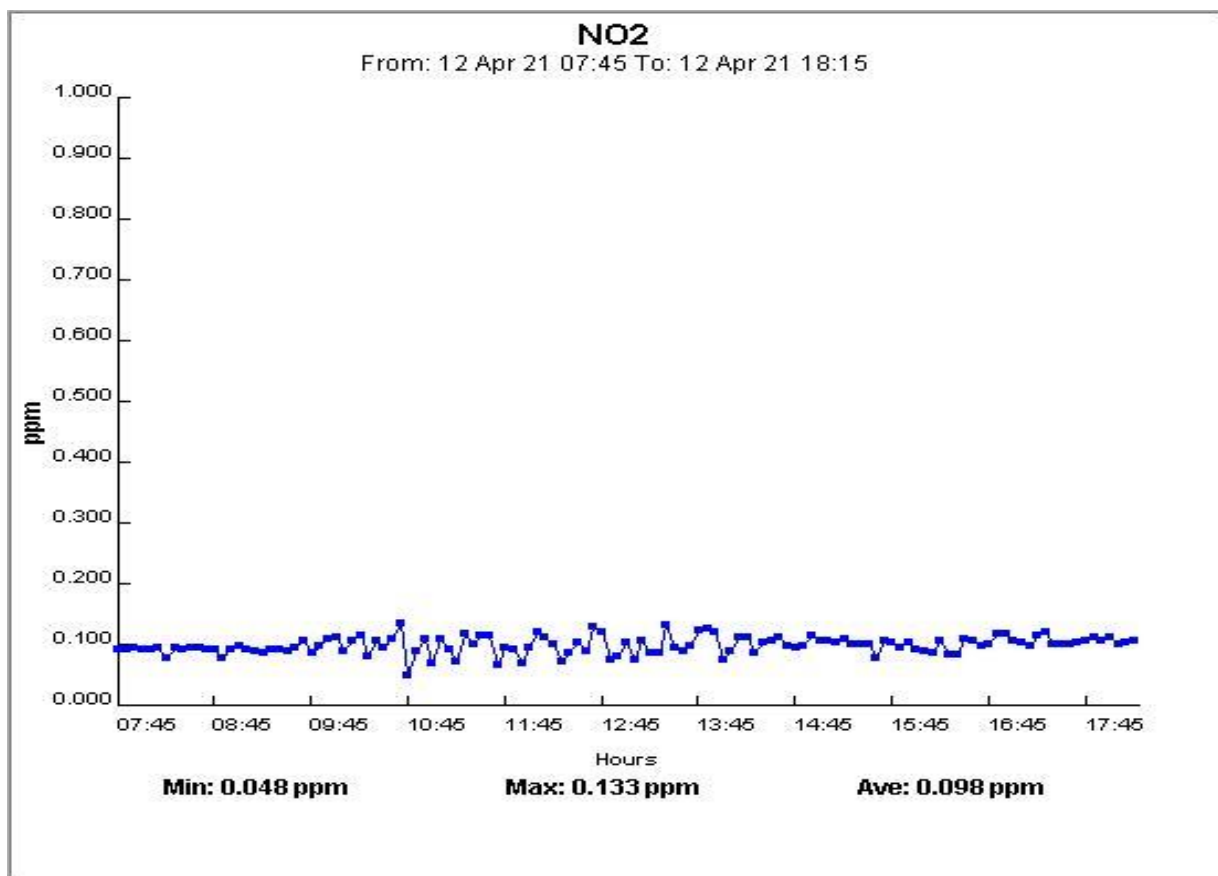


Figure 194: Graph showing concentration of NO2 at Mawololo Trading Centre

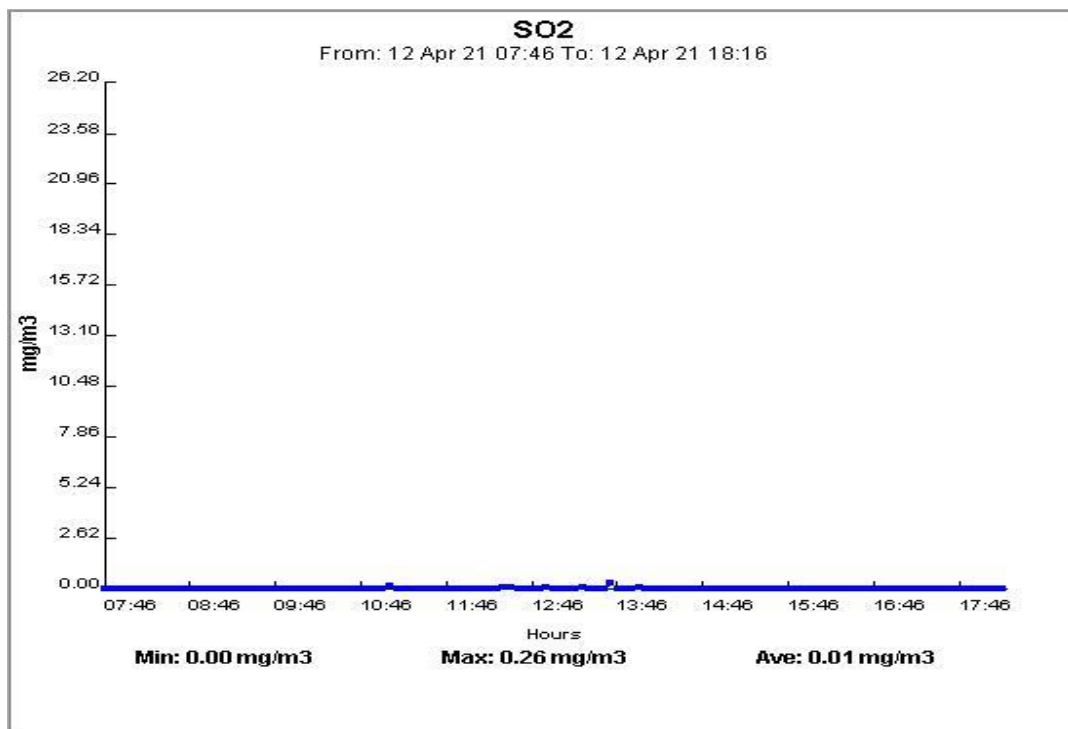


Figure 195: Graph showing concentration of SO<sub>2</sub> at Mawololo Trading Centre

As with sulphur dioxide, carbon monoxide and nitrogen dioxide the readings did not exceed the national standard, some high values were recorded in Mawololo and Nakivumbi Trading Centres where majority of on-road emissions occur from heavy-duty diesel engines that release NO<sub>2</sub> in the air.

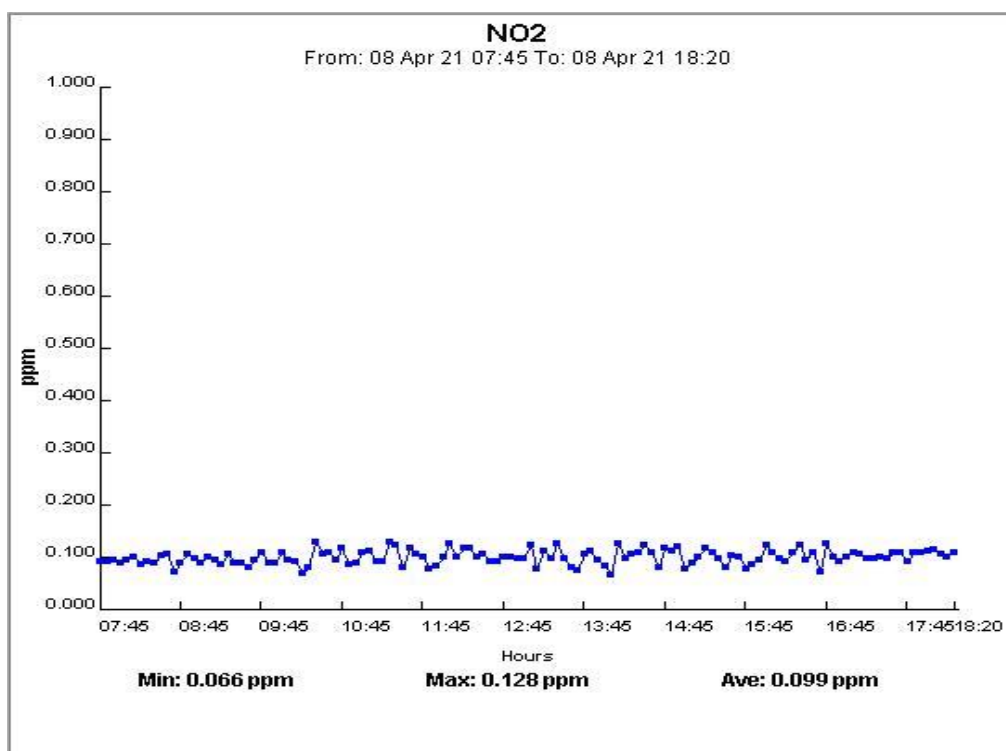


Figure 196: Graph showing concentration of Nitrogen Dioxide around Namaganda T/C

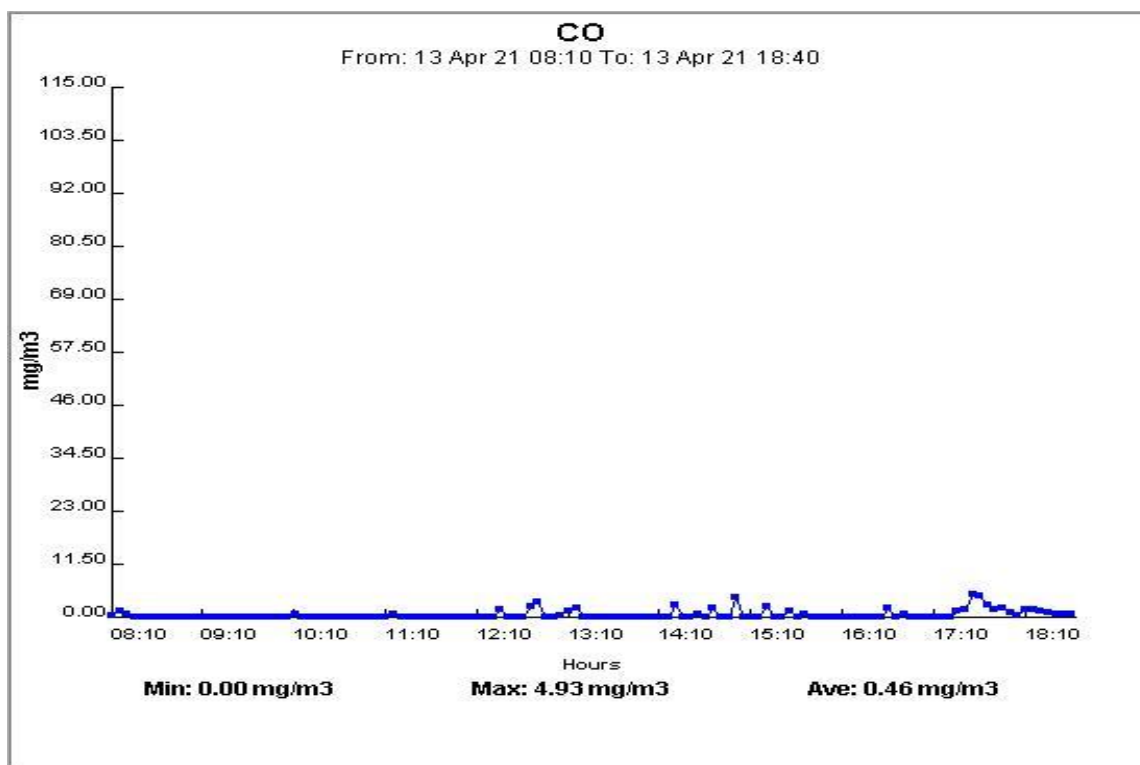


Figure 197: Graph showing concentration of Nitrogen Monoxide around Namaganda T/C

As with nitrogen dioxide, the readings did exceed the national standard, though the team recorded some high values in Namaganda trading Center where majority of on-road emissions occur from heavy-duty diesel engines that release  $\text{NO}_2$  in the air while transporting sugarcane.

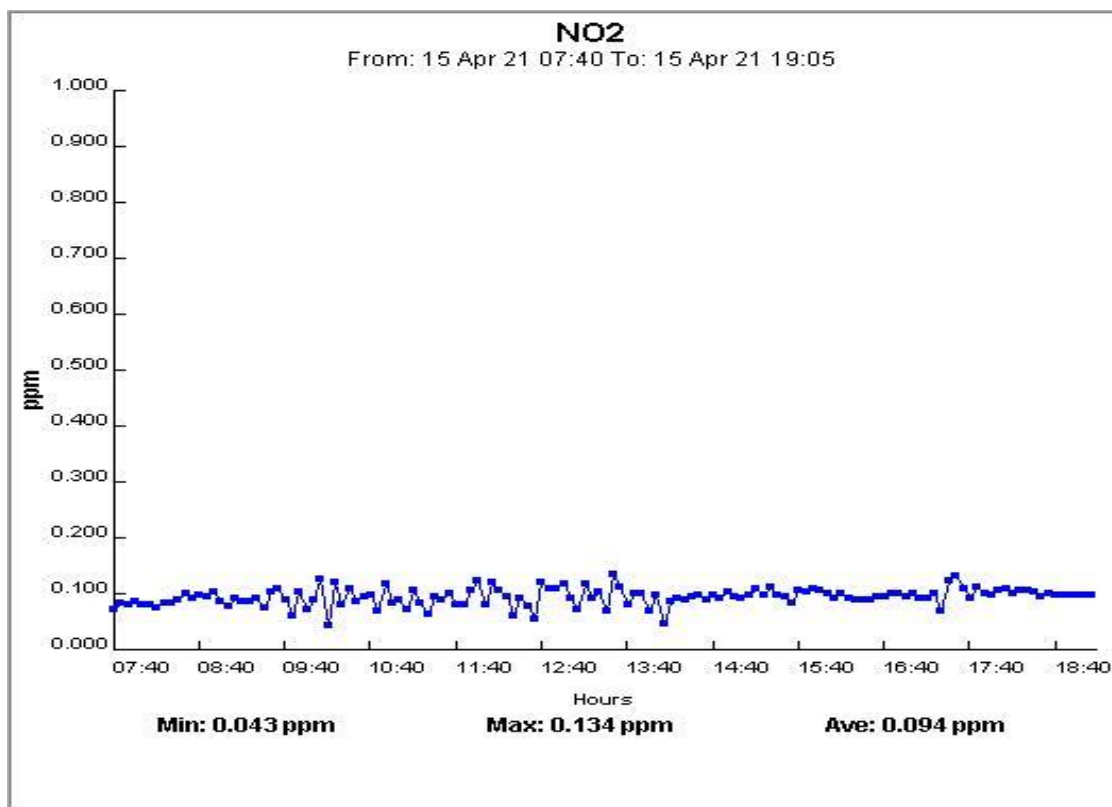


Figure 198: Graph showing concentration of Nitrogen Dioxide around Mawanga P/S & HC III

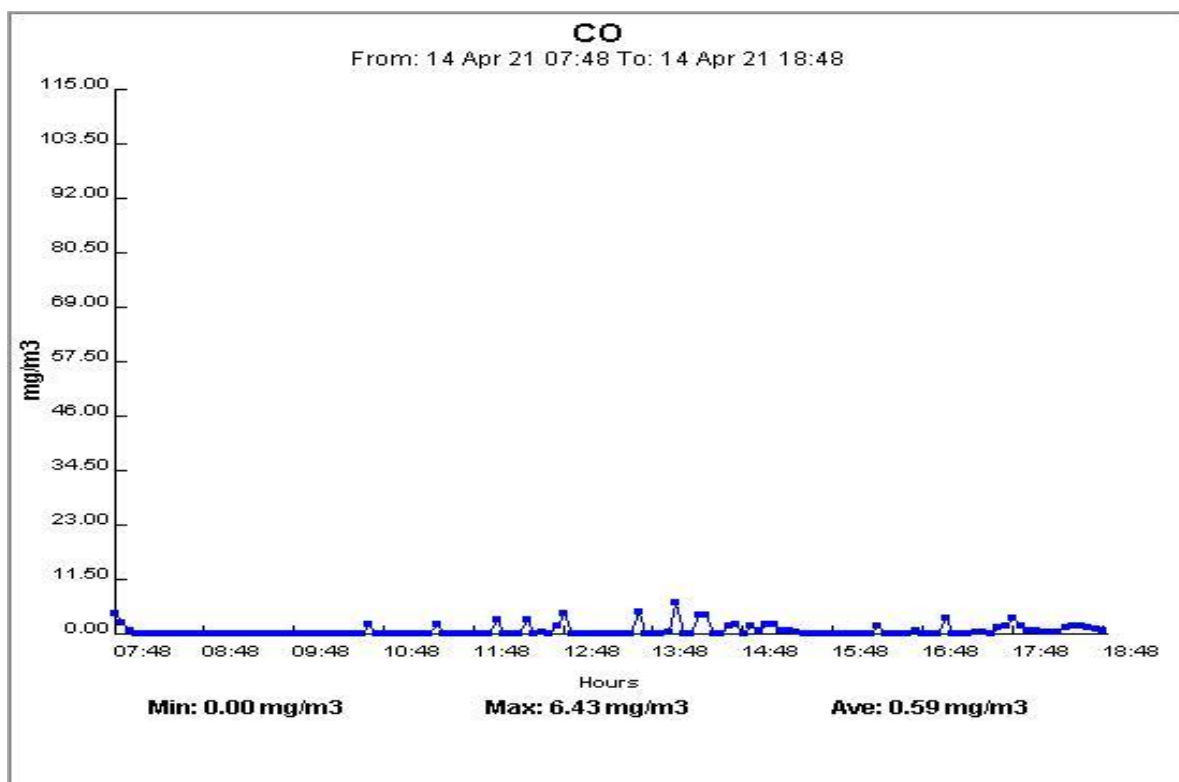


Figure 199: Graph showing concentration of Carbon Monoxide around Mawanga P/S & HC III

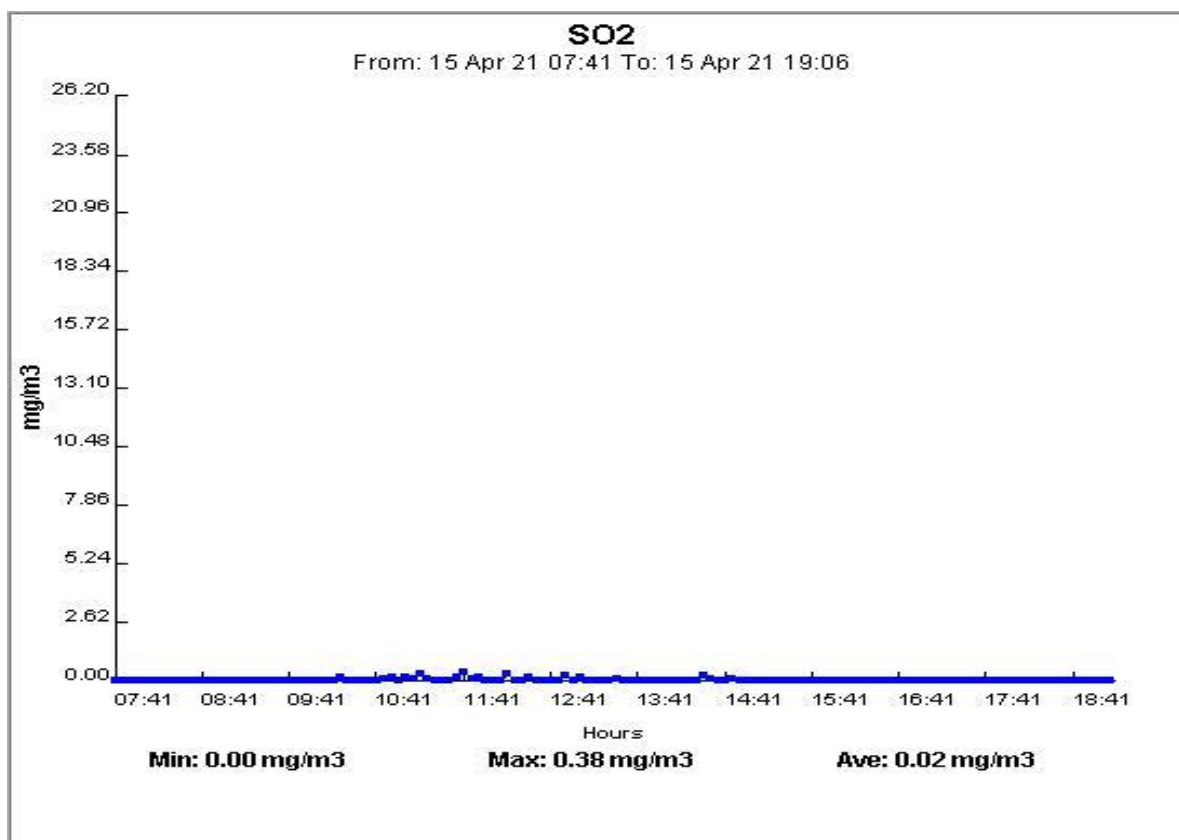


Figure 200: Graph showing concentration of Sulphur Dioxide around Mawanga P/S & HC III

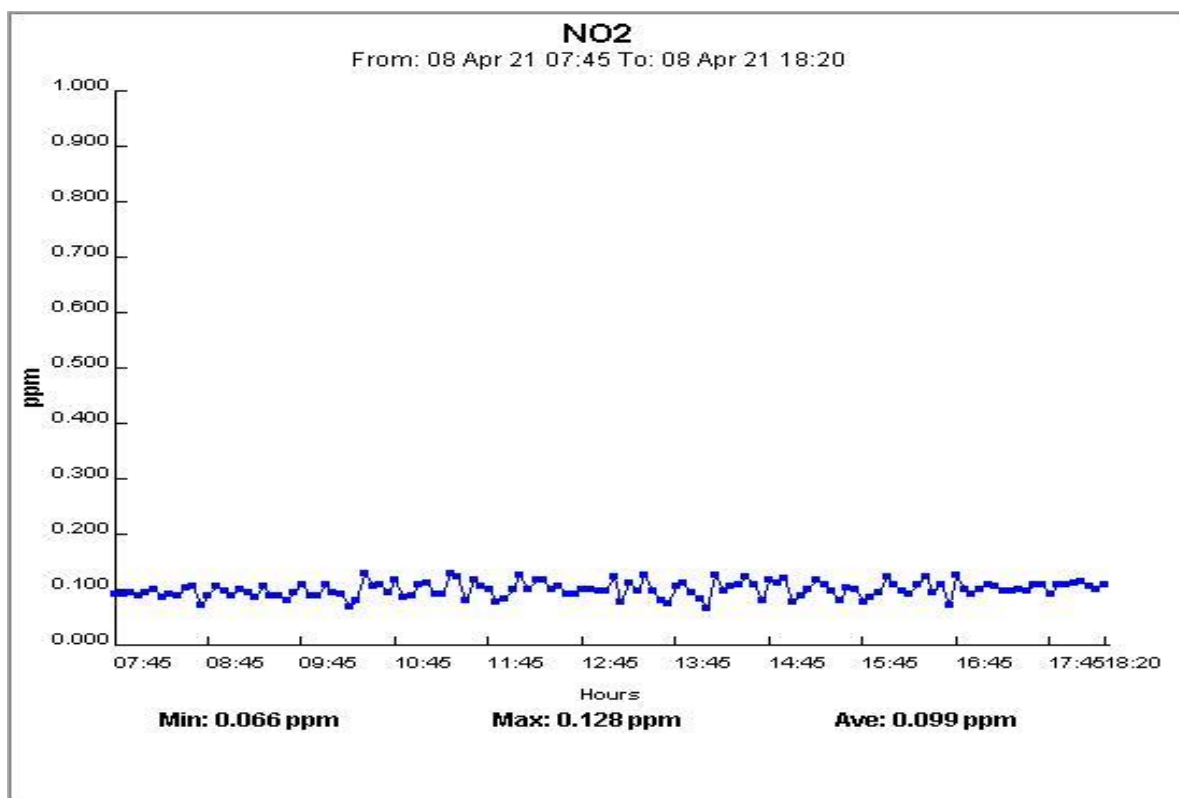


Figure 201: Graph showing concentration of Nitrogen Dioxide around Namavundu Trading Center

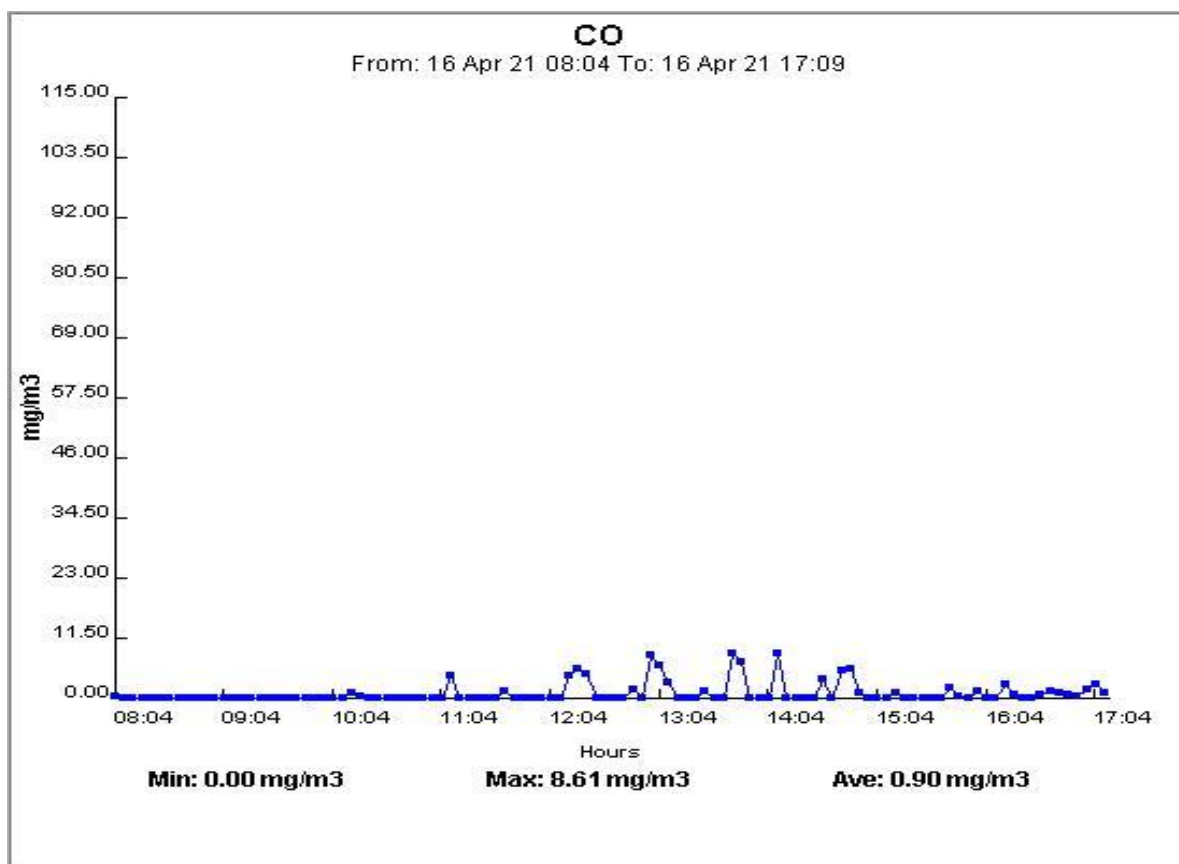


Figure 202: Graph showing concentration of Carbon Monoxide around Namavundu Trading Center



## 21 ANNEX VIII: NOISE BASELINE REPORT

### 21.1 Equipment and method

Noise was measured using the Casella CEL-633B sound level meter with the following specifications: Single large noise measurement range, 20 to 140 dB. Broadband, octave and third octave frequency measurements, Meets IEC 61672 / 60651 and ANSI S1.4 Class 1 or Class 2, Large internal memory for data logging. Statistical noise level measurement (Ln%) available, Audio recording and event triggering. The noise meter was first calibrated using a suitable calibrator with a nominal sound pressure level of 114dB. The calibration was done before and after each run to ensure maximum accuracy. The equipment was then placed on a tripod stand (1.2 m high) and run button is pressed for a measurement run. Monitoring cycles were set up for a minimum of 4 hours in the morning and 4 hours in the evening. Results were downloaded on a PC using the Casella Insight software.

### 21.2 RESULTS

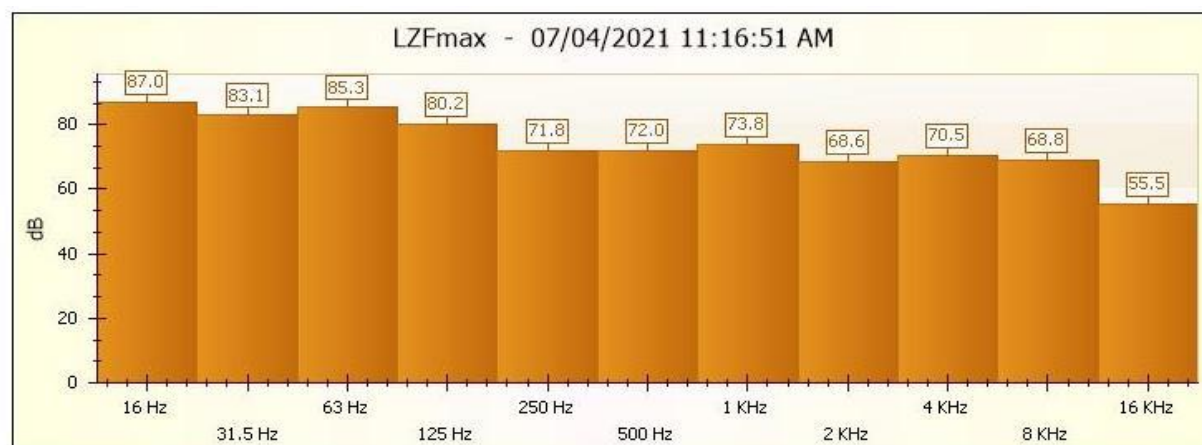
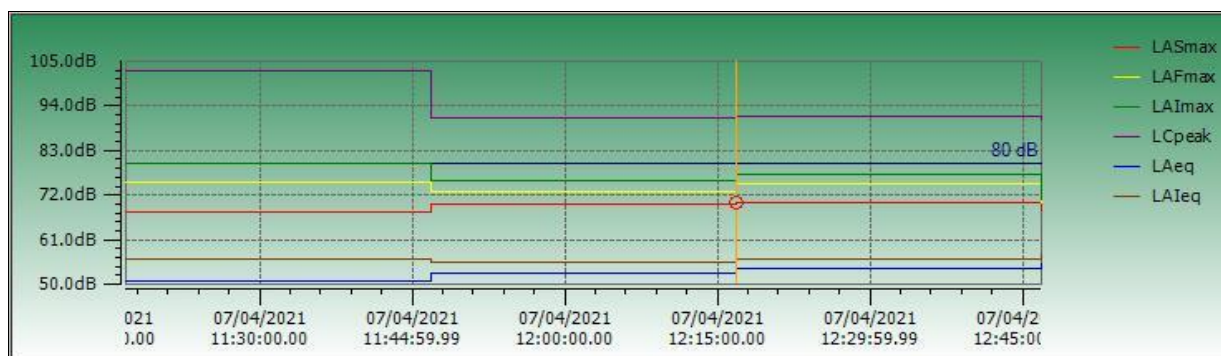
The equivalent continuous sound pressure level with A-weighting (LAeq) was 69.1dBA at Buniantole primary school, 62.3 dBA at Namaganda trading center, 60.1 dBA at Mawanga Primary School/ HC III/ Church and 67.4 dBA at Namavundu trading center were slightly higher than the acceptable limits for daytime. This common noise sources were attributed to school pupils playing, moving motorcycles, music playing, cinema halls, public noise and grading mills at the time of assessment.

Table 157: Noise results

Location	Run time	GPS Coordinates	LAeq (dBA)	NEMA day-time limit (dBA)	Activities observed
Buniantole Primary School	07/04/2021-08/04/2021 07:00Am – 07:00Pm	N 0060963 E 0567167	52.9 dB	60	Kids playing at school at the time of assessment
Nakivumbi Trading Center	09/04/2021- 10/04/2021 07:00Am – 07:00Pm	N 0060864 E 0567130	69.1 dB	60	Music playing and cinema halls at the time of assessment
Mawololo Trading Center	11/04/2021- 12/04/2021 07:00Am – 07:00Pm	N 0058024 E 0565398	53.8 dB	60	Kids playing and strong winds at the time of assessment
Namaganda Trading Center	13/04/2021- 14/04/2021 07:00Am – 07:00Pm	N 0062416 E 0569122	62.3 dB	60	Music playing within the trading center at the time of assessment
Mawanga Primary School/ HC III/ COU	15/04/2021- 16/04/2021 07:00Am – 07:00Pm	N 0057016 E 0569612	60.1 dB	60	Kids playing at school at the time of assessment
Namavundu Trading Center	17/04/2021- 18/04/2021 07:00Am – 07:00Pm	N 0053989 E 0562499	67.4 dB	60	Music playing, cinema halls and traffic at the time of assessment

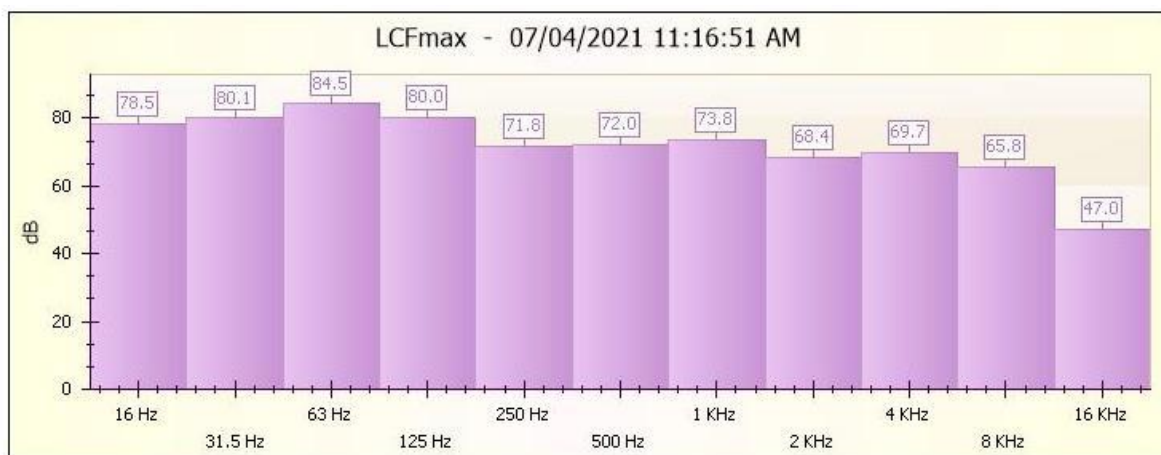
**Instrument Model** CEL-633B

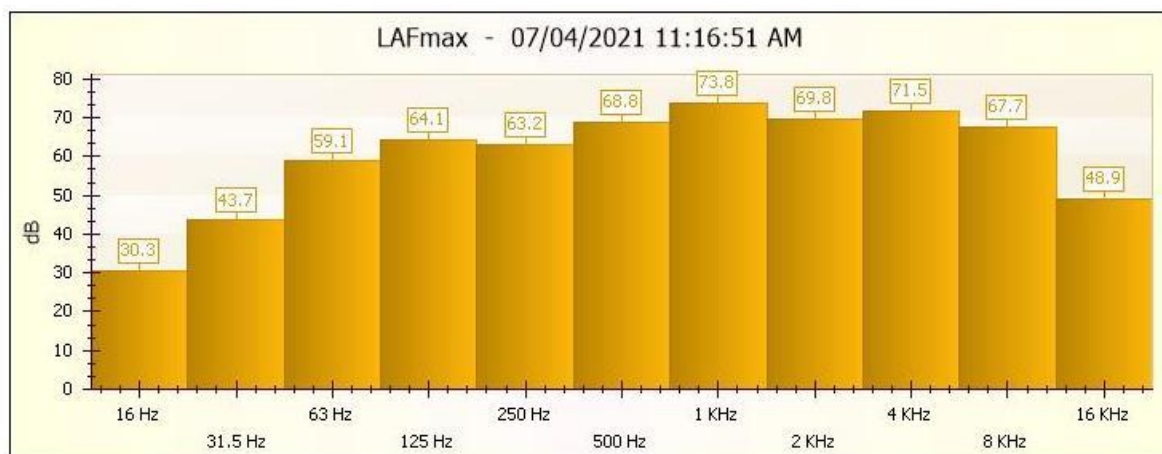
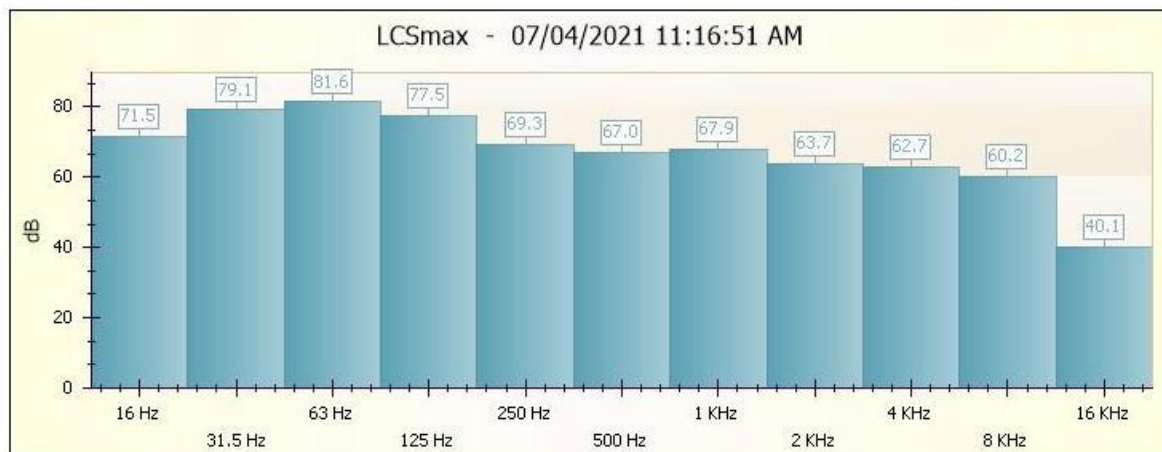
LAFmax	75 dB	LAE	90.7 dB
LAFmax with Time	75.0 dB (07/04/2021 11:17:39 AM)	Serial Number	2670936
LAFmin	29.1 dB	End Date & Time	07/04/2021 12:56:51 PM
LAFmin with Time	29.1 dB (07/04/2021 11:32:56 AM)	LCpeak with Time	102.7 dB (07/04/2021 11:17:39 AM)
LAImax	80 dB	LCpeak	102.7 dB
LAImax with Time	80.0 dB (07/04/2021 11:17:39 AM)	LAEq	56.1 dB
LAImin	30.8 dB	LCeq	64.5 dB
LAImin with Time	30.8 dB (07/04/2021 12:39:39 PM)	LAF 50%	45.5 dB
Calibration (Before) Date	24/01/2000 10:11:55 AM	LAF 10%	56 dB
Calibration Drift	0.1 dB	LAF 90%	36 dB
Calibration (After) Date	24/01/2000 10:13:39 AM	LAF 95%	34.5 dB
LAEq	52.9 dB		



## MAKUTU ESIA

BUNIANTOLE PRIMARY SCHOOL WITHIN THE PROJECT SITE 2





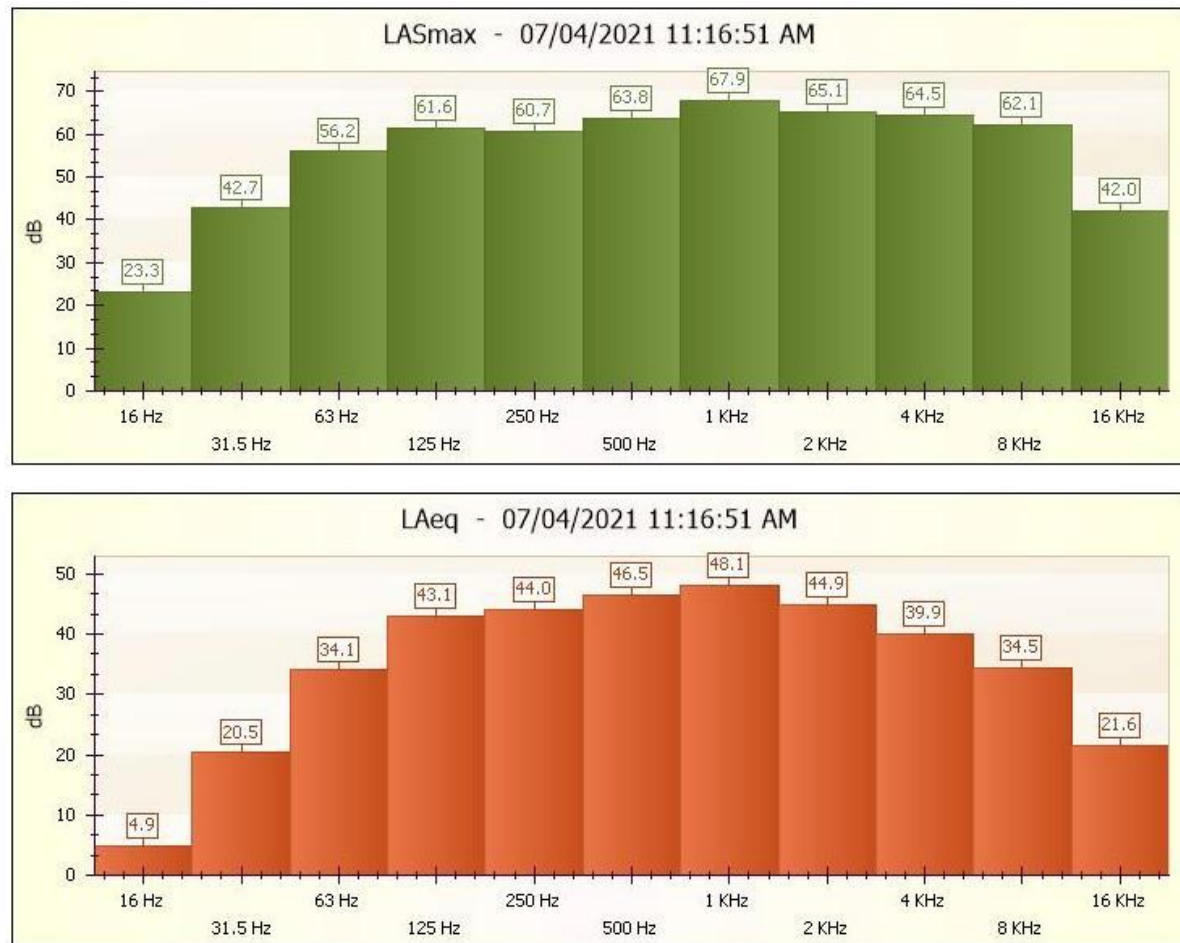
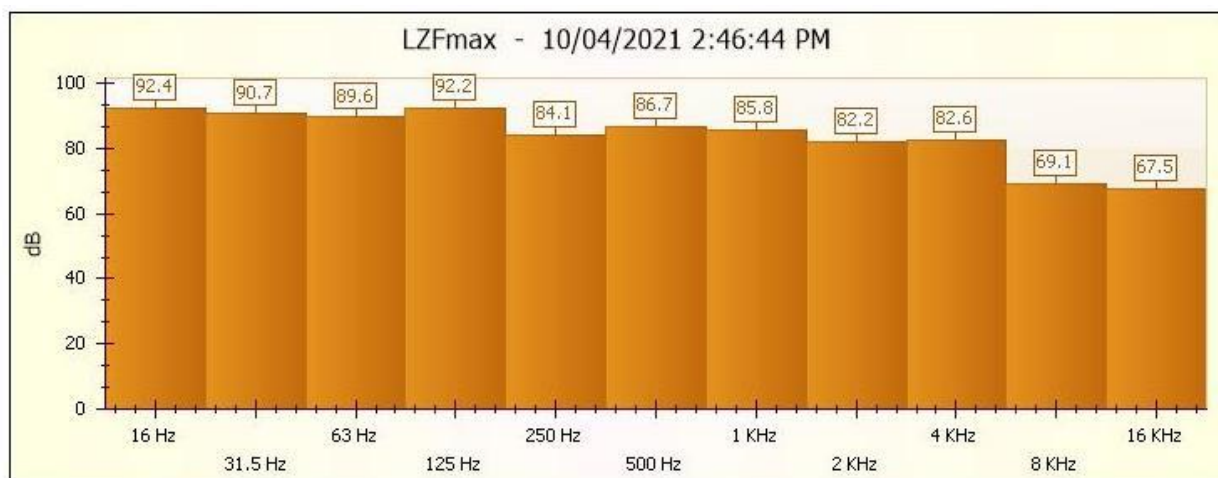
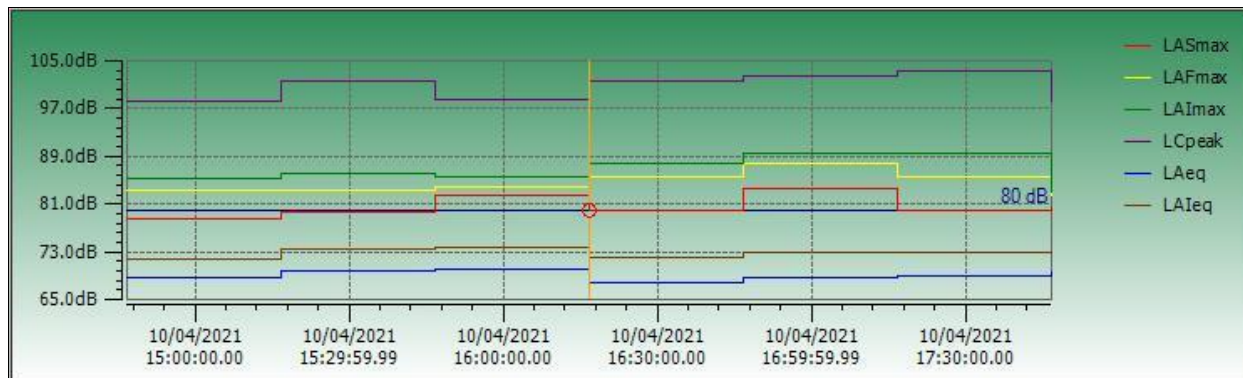


Figure 203: Noise Results at Buniantole Primary School within Project Site 2

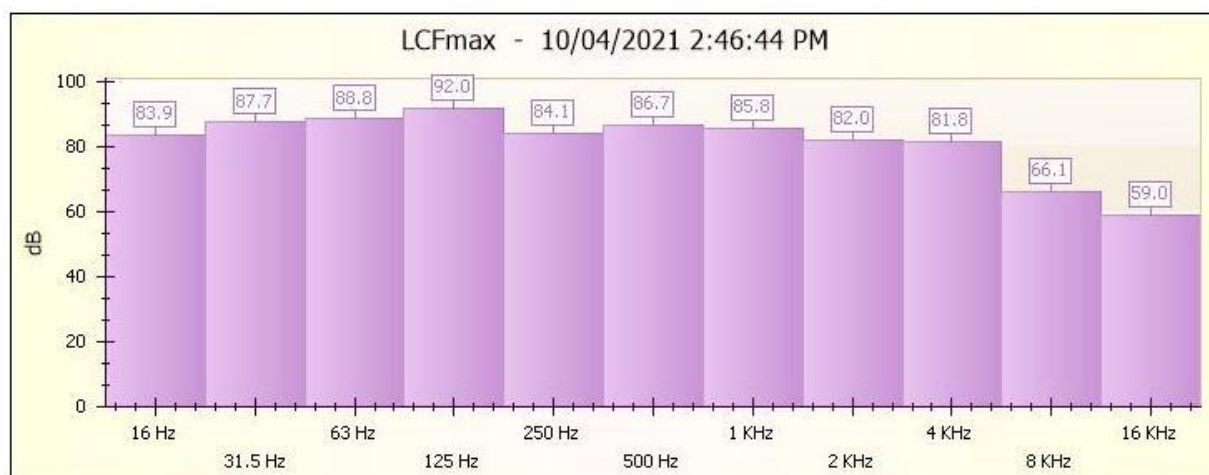
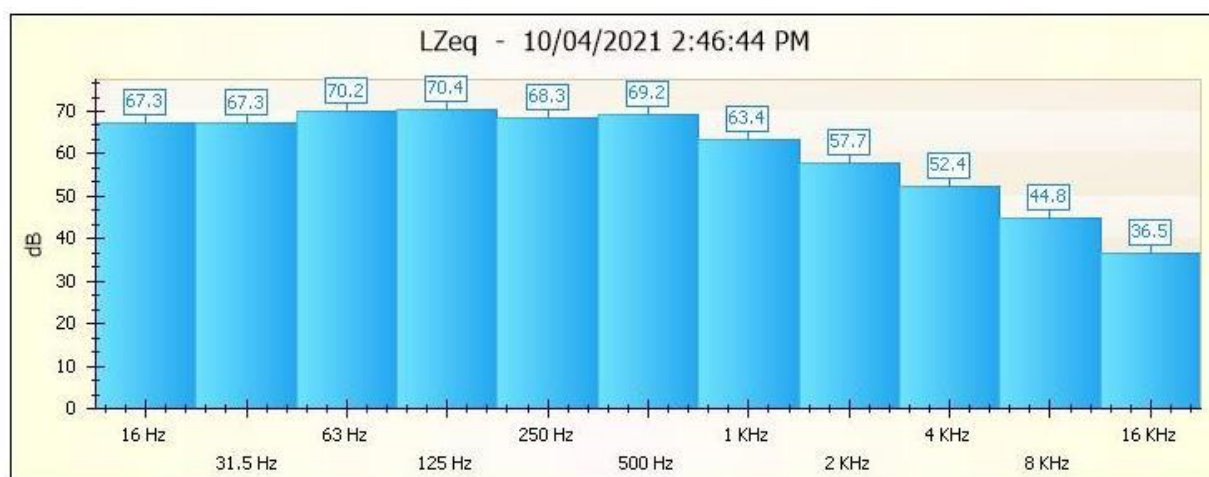
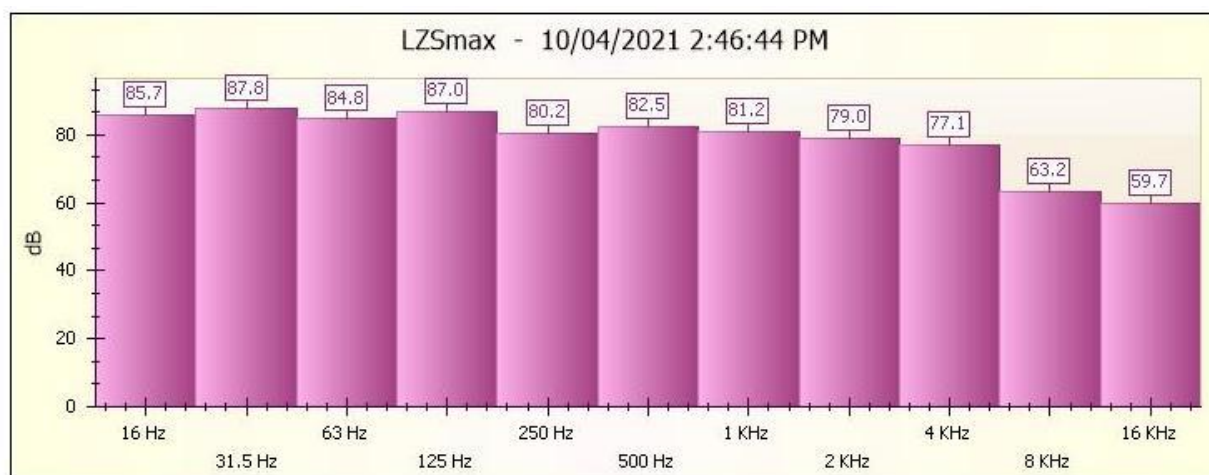


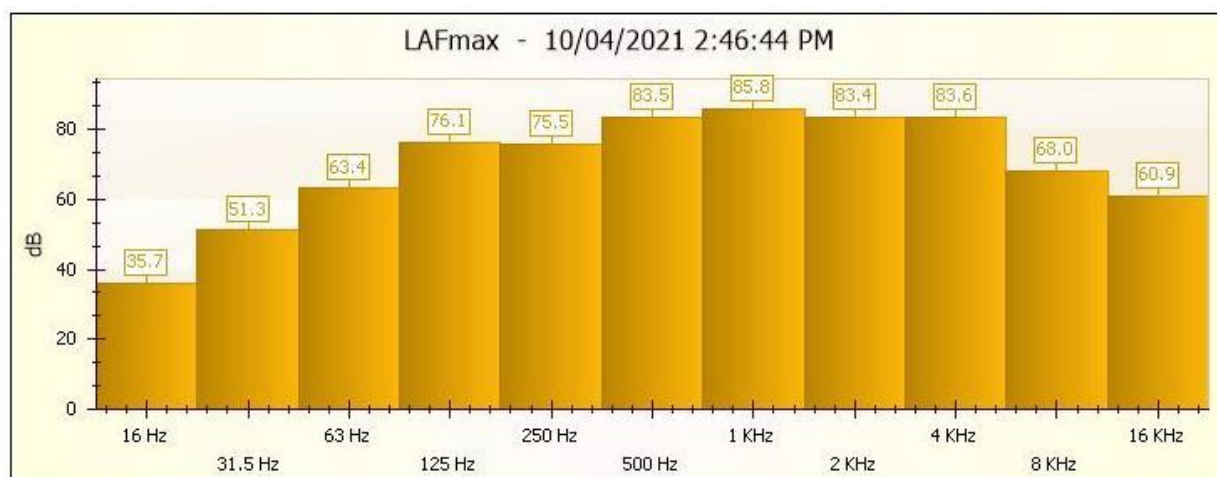
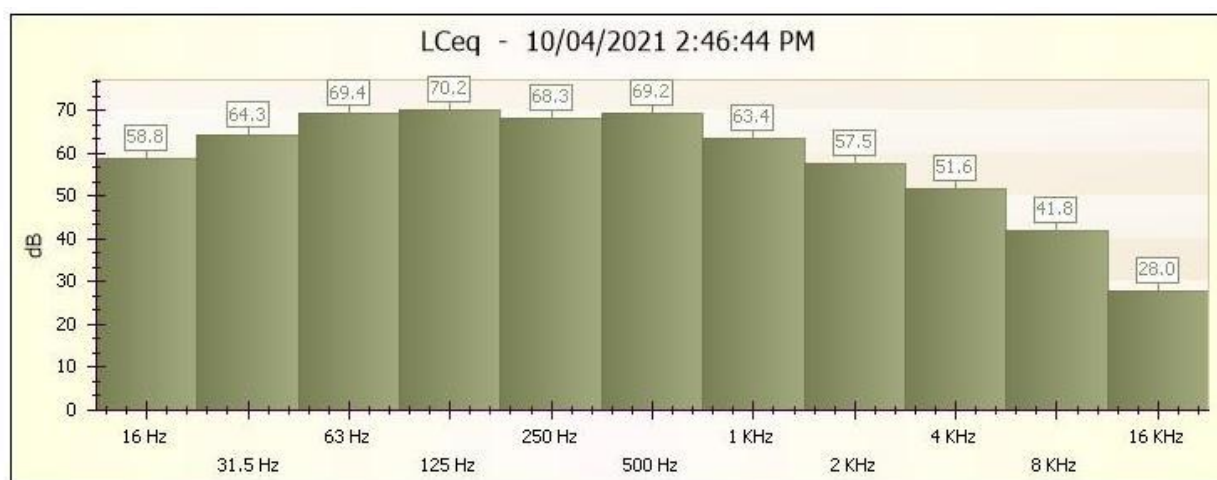
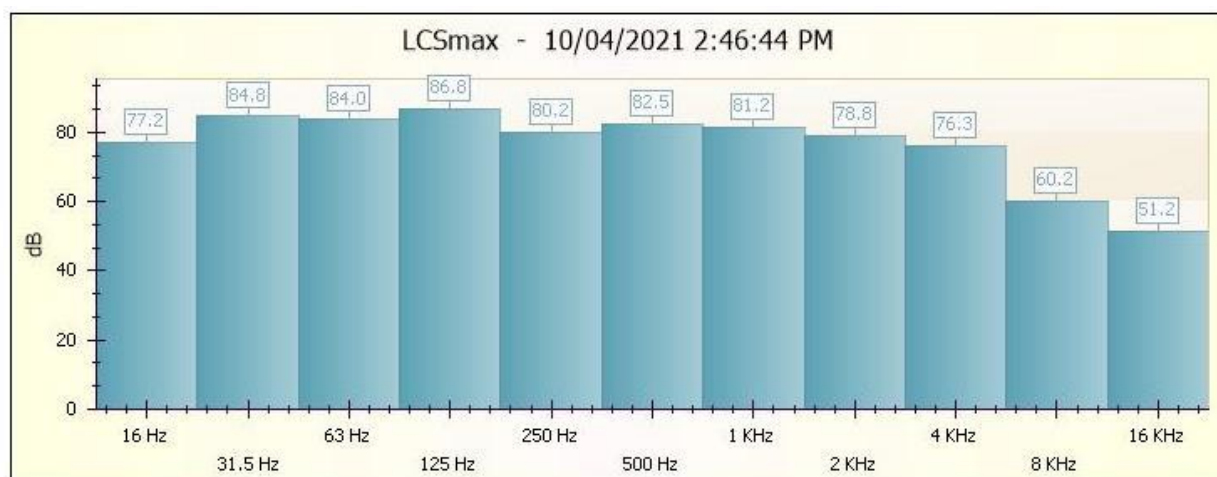
**Instrument Model** CEL-633B

LAFmax	87.7 dB	LAE	109.6 dB
LAFmax with Time	87.7 dB (10/04/2021 5:15:34 PM)	Serial Number	2670936
LAFmin	55 dB	End Date & Time	10/04/2021 5:53:44 PM
LAFmin with Time	55.0 dB (10/04/2021 4:25:21 PM)	LCpeak with Time	103.3 dB (10/04/2021 5:23:43 PM)
LAlmax	89.6 dB	LCpeak	103.3 dB
LAlmax with Time	89.6 dB (10/04/2021 5:44:30 PM)	LALeq	72.8 dB
LAlmin	56.4 dB	LCEq	76.2 dB
LAlmin with Time	56.4 dB (10/04/2021 4:03:02 PM)	LAF 50%	67.5 dB
Calibration (Before) Date	24/01/2000 10:11:55 AM	LAF 10%	71.5 dB
Calibration Drift	0.1 dB	LAF 90%	64 dB
Calibration (After) Date	24/01/2000 10:13:39 AM	LAF 95%	63 dB
LAEq	69.1 dB		









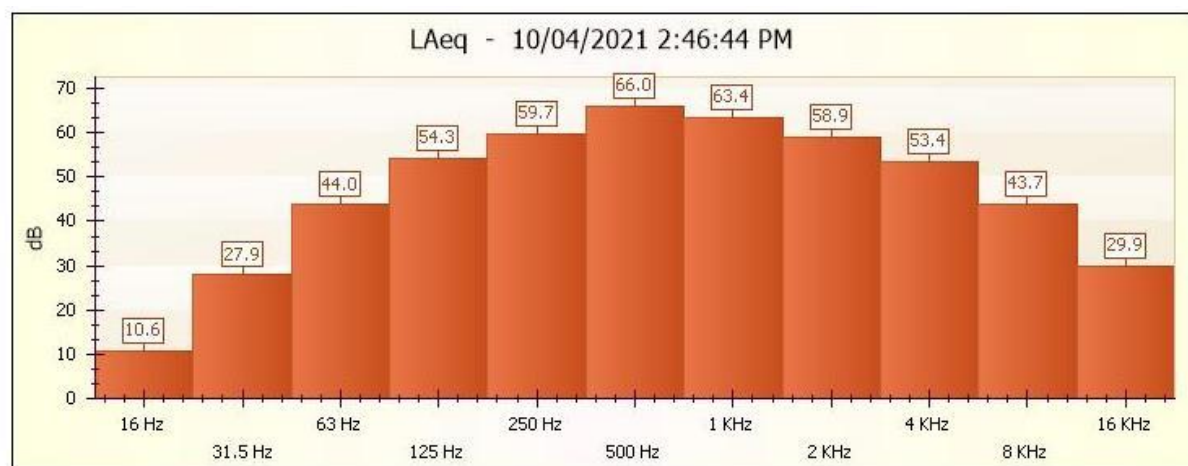
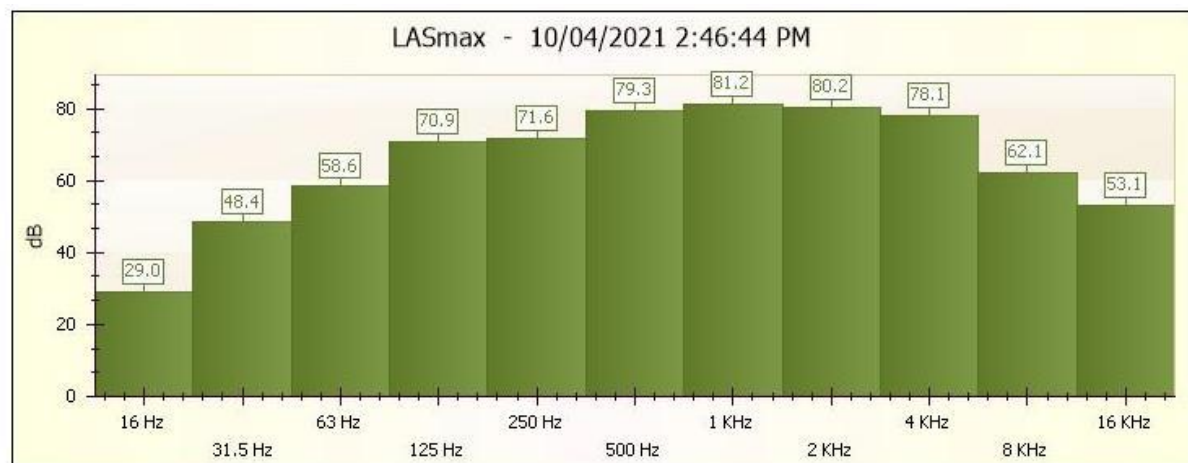
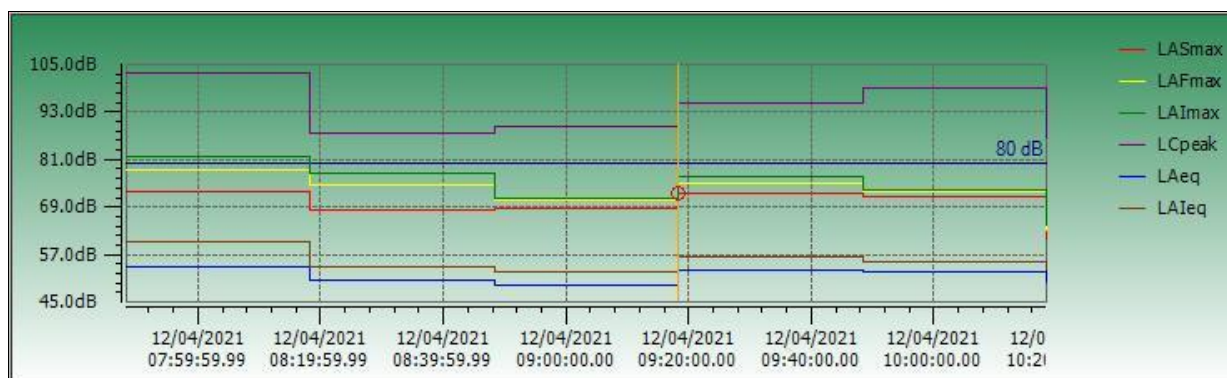
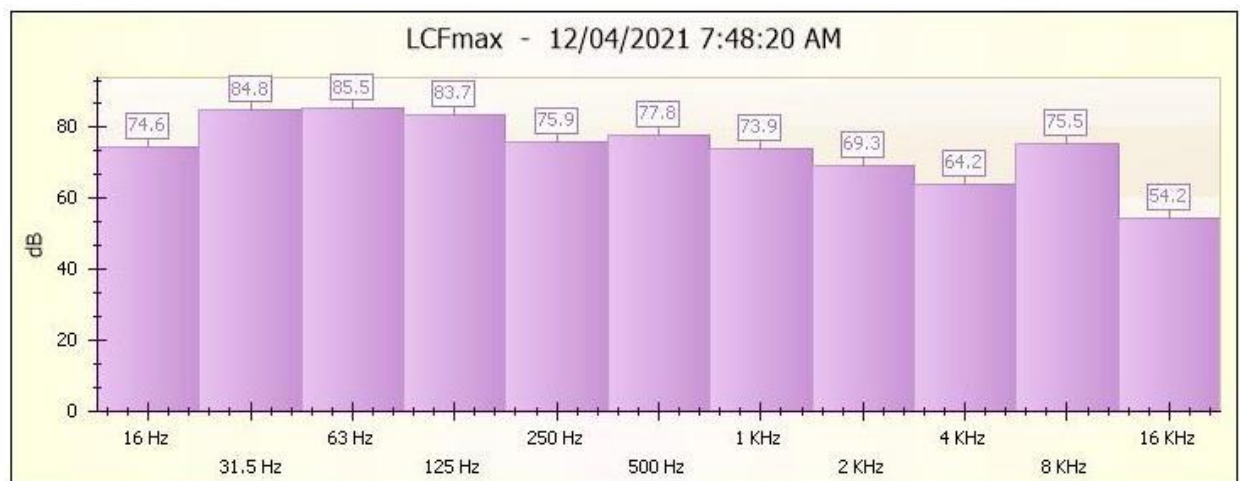
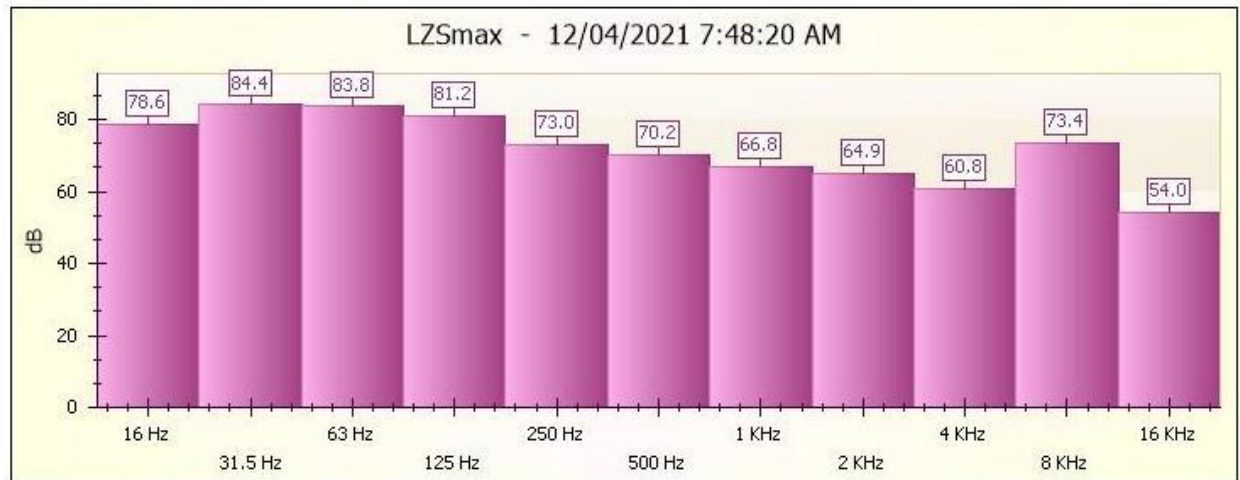


Figure 204: Noise Results at Nakivumbi Trading Centre on Day 2

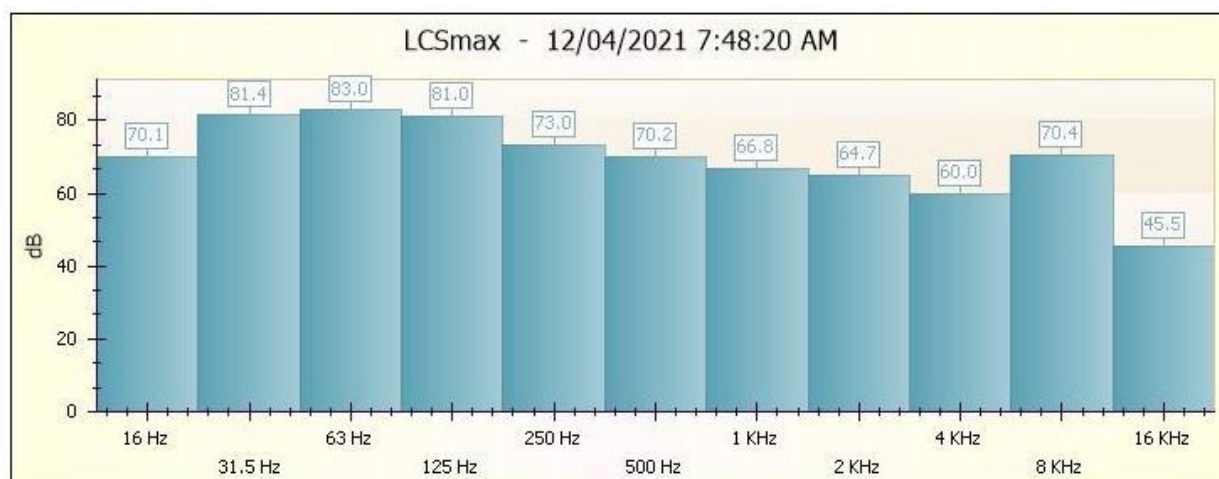
## Instrument Model CEL-633B

LAFmax	78.3 dB	LAE	91.8 dB
LAFmax with Time	78.3 dB (12/04/2021 7:48:56 AM)	Serial Number	2670936
LAFmin	37.3 dB	End Date & Time	12/04/2021 10:22:20 AM
LAFmin with Time	37.3 dB (12/04/2021 7:48:20 AM)	LCpeak with Time	103.0 dB (12/04/2021 7:48:56 AM)
LAlmax	81.9 dB	LCpeak	103 dB
LAlmax with Time	81.9 dB (12/04/2021 7:48:56 AM)	LAleq	56.4 dB
LAlmin	37.4 dB	LCeq	62.6 dB
LAlmin with Time	37.4 dB (12/04/2021 7:48:20 AM)	LAF 50%	47 dB
Calibration (Before) Date	24/01/2000 10:13:39 AM	LAF 10%	53 dB
Calibration Drift	0.0 dB	LAF 90%	45 dB
Calibration (After) Date	01/01/2015 12:00:59 AM	LAF 95%	44.5 dB
LAeq	52.1 dB		











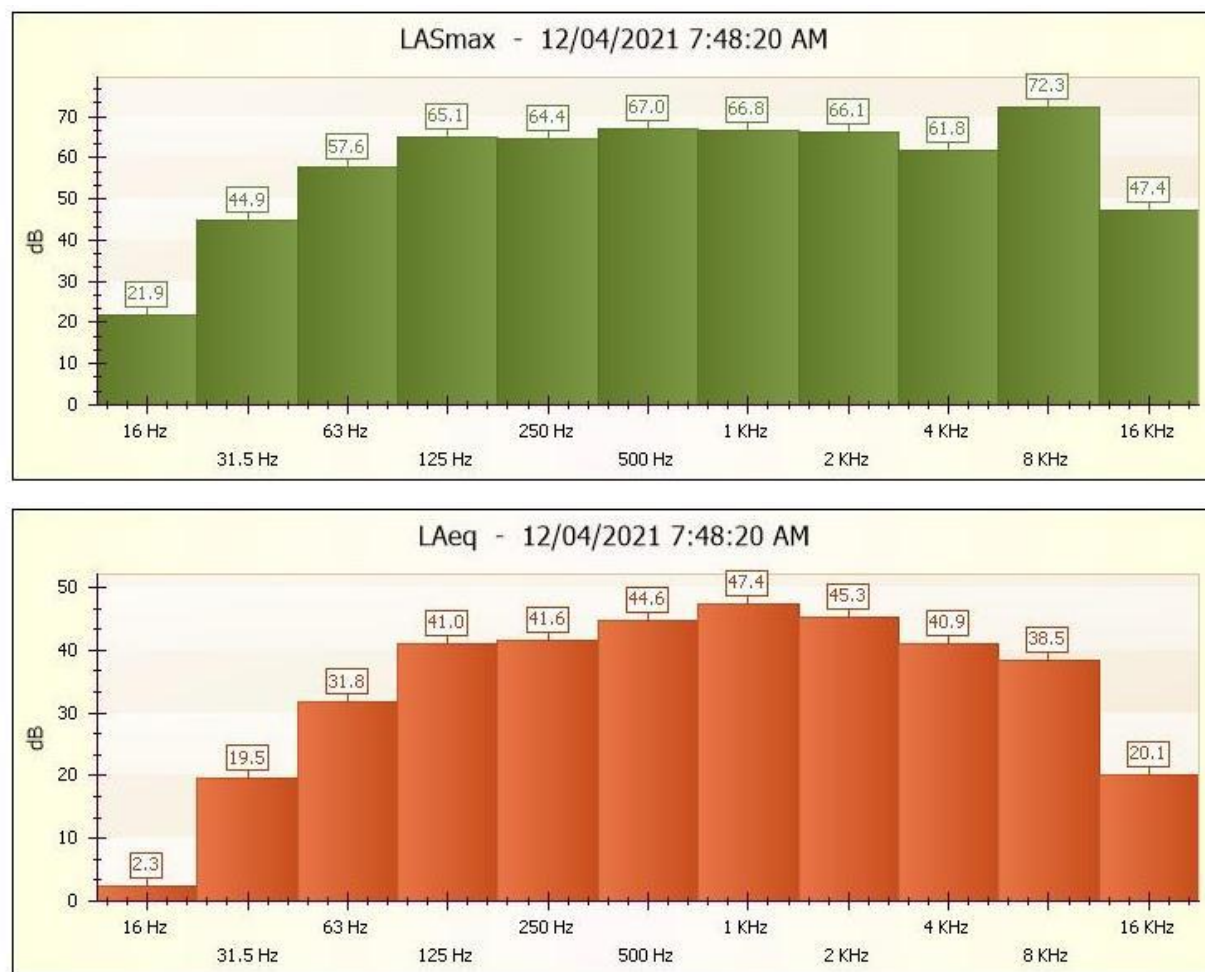
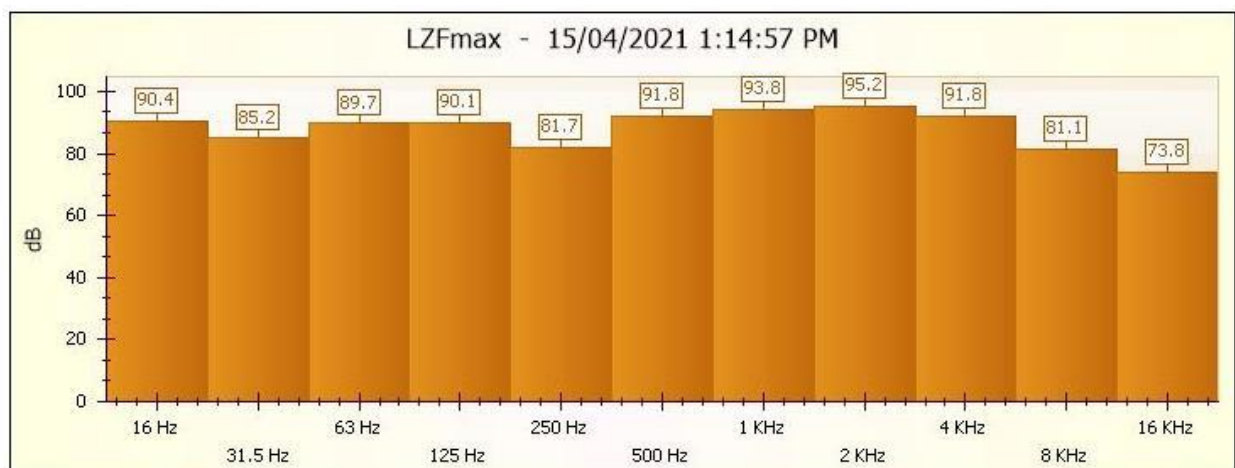
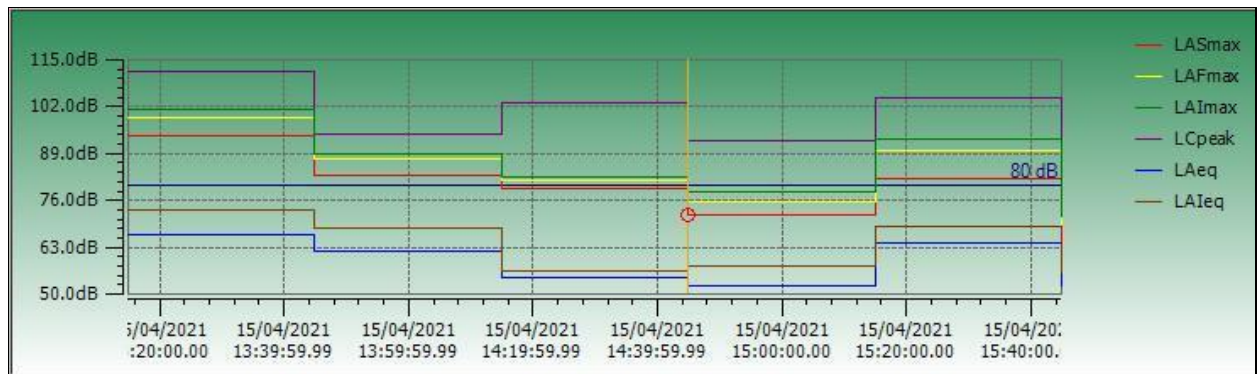
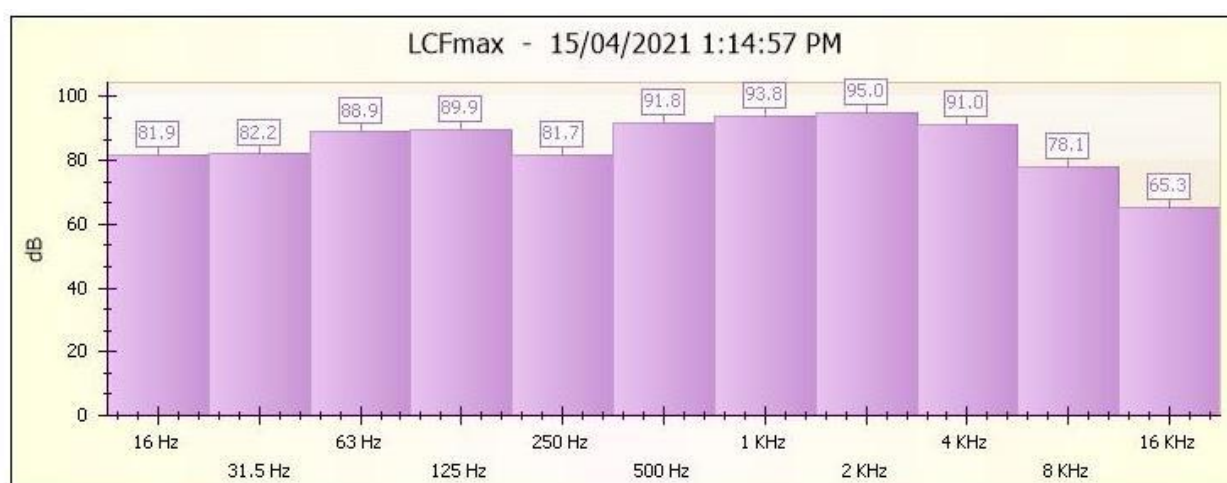
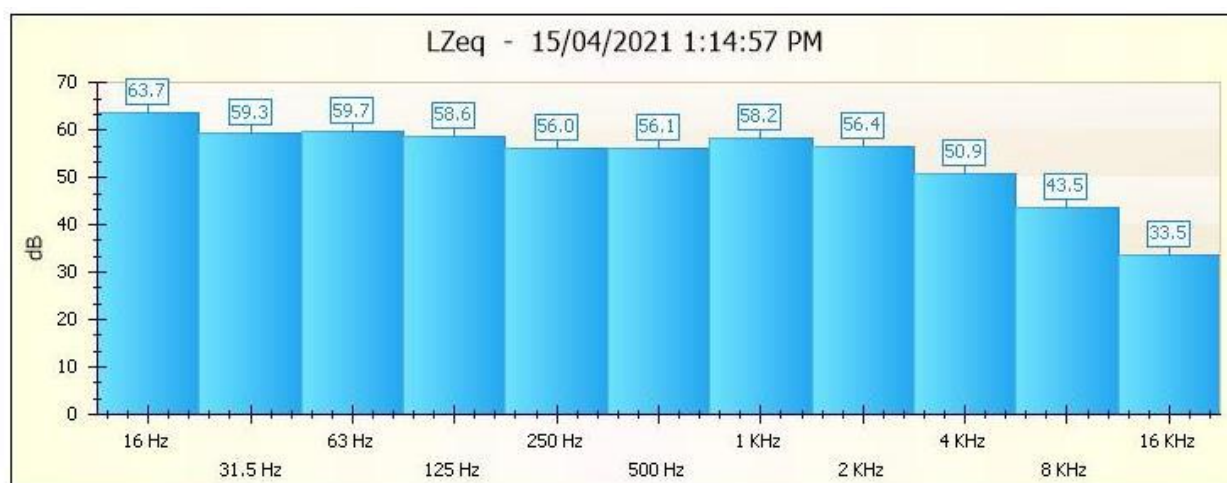
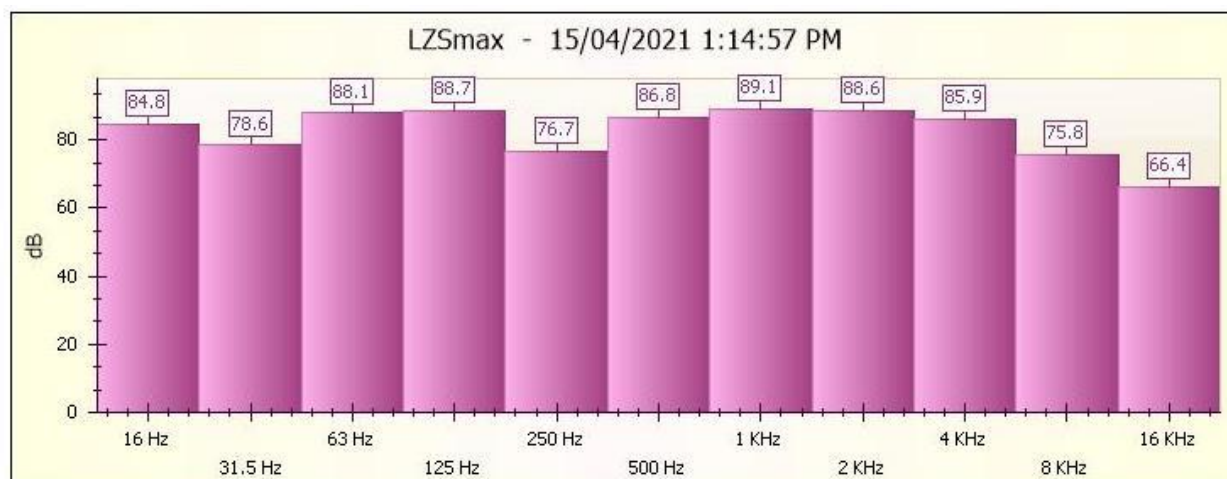


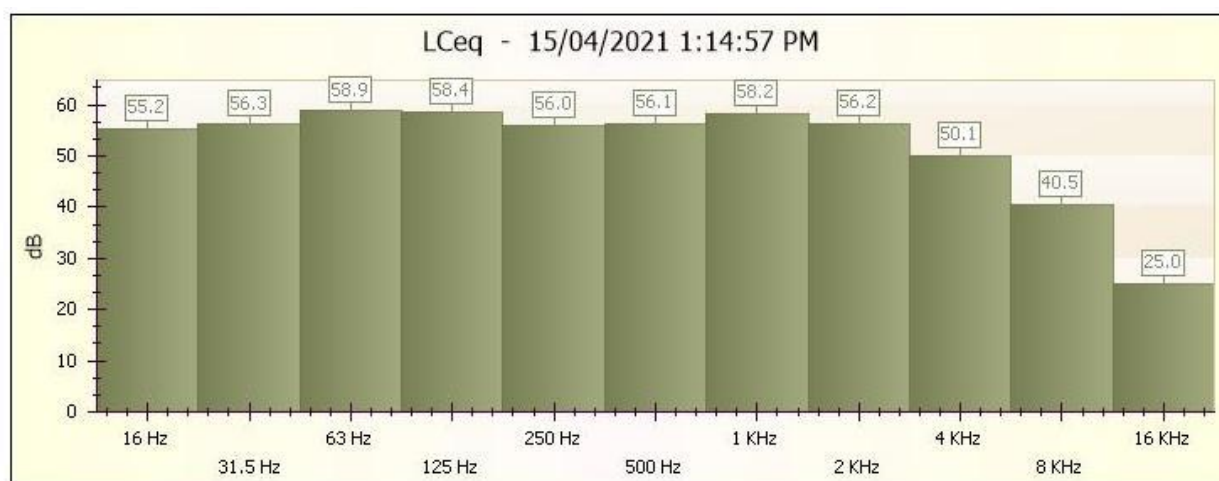
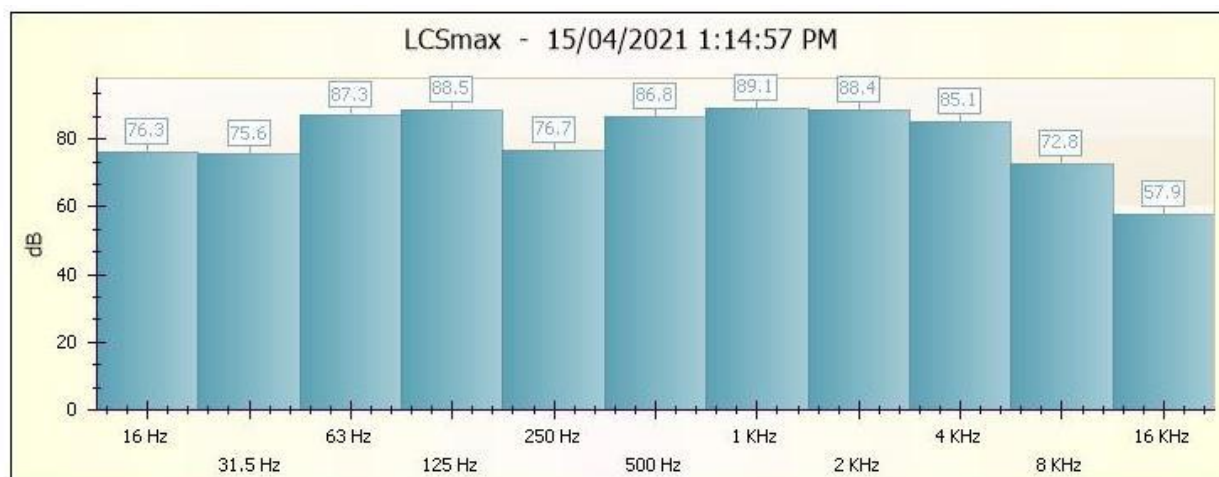
Figure 205: Noise Results at Mawololo Trading Centre on Day 2

**Instrument Model** CEL-633B

LAFmax	99 dB	LAE	102 dB
LAFmax with Time	99.0 dB (15/04/2021 1:29:46 PM)	Serial Number	2670936
LAFmin	41.5 dB	End Date & Time	15/04/2021 3:52:57 PM
LAFmin with Time	41.5 dB (15/04/2021 3:29:01 PM)	LCpeak with Time	112.0 dB (15/04/2021 1:29:46 PM)
LAlmax	101.3 dB	LCpeak	112 dB
LAlmax with Time	101.3 dB (15/04/2021 1:29:46 PM)	LAEq	68.5 dB
LAlmin	42.5 dB	LCeq	66.5 dB
LAlmin with Time	42.5 dB (15/04/2021 2:47:14 PM)	LAF 50%	51 dB
Calibration (Before) Date	01/01/2015 12:00:14 AM	LAF 10%	63.5 dB
Calibration Drift	-0.3 dB	LAF 90%	45.5 dB
Calibration (After) Date	01/01/2015 12:00:23 AM	LAF 95%	44.5 dB
LAEq	62.3 dB		







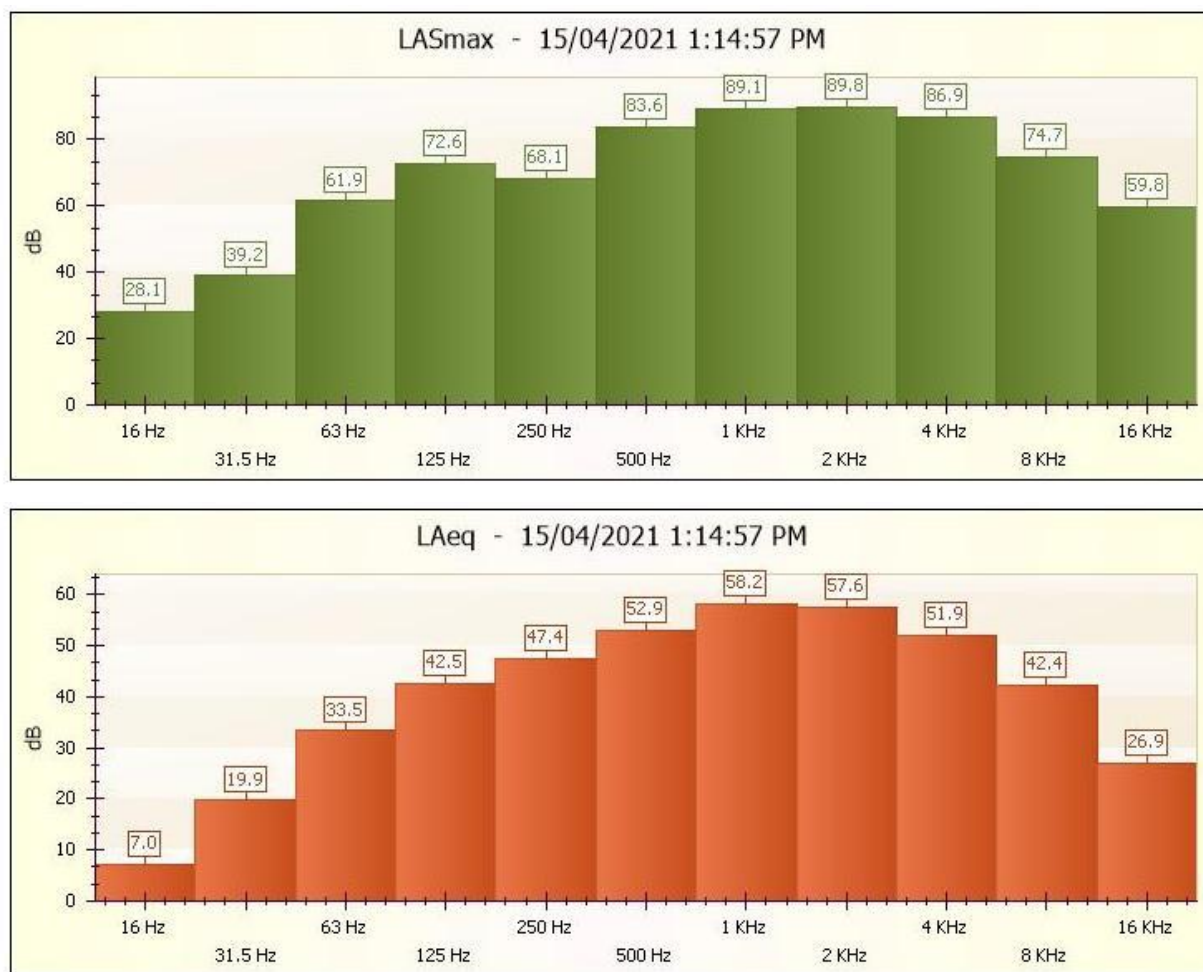
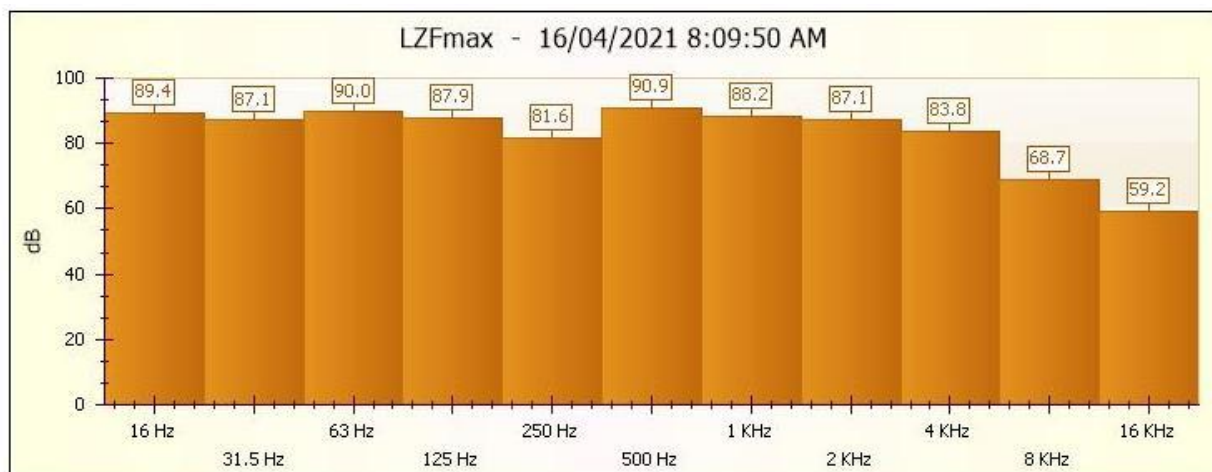
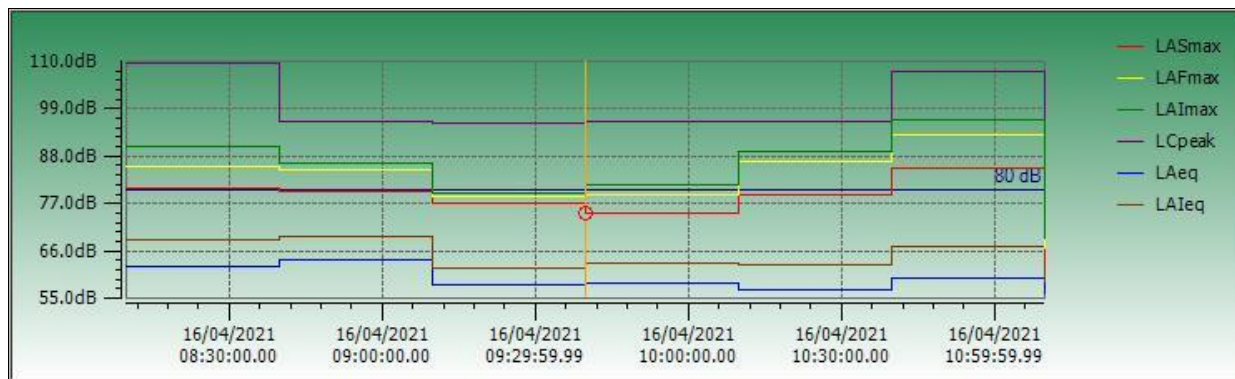


Figure 206: Noise Results at Namaganda Trading Centre on Day 2

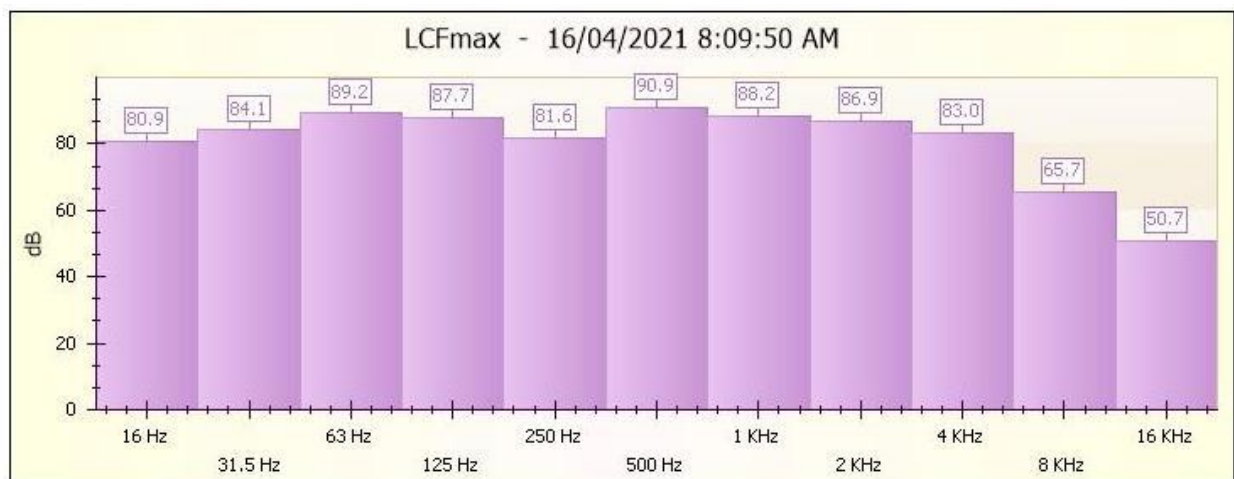
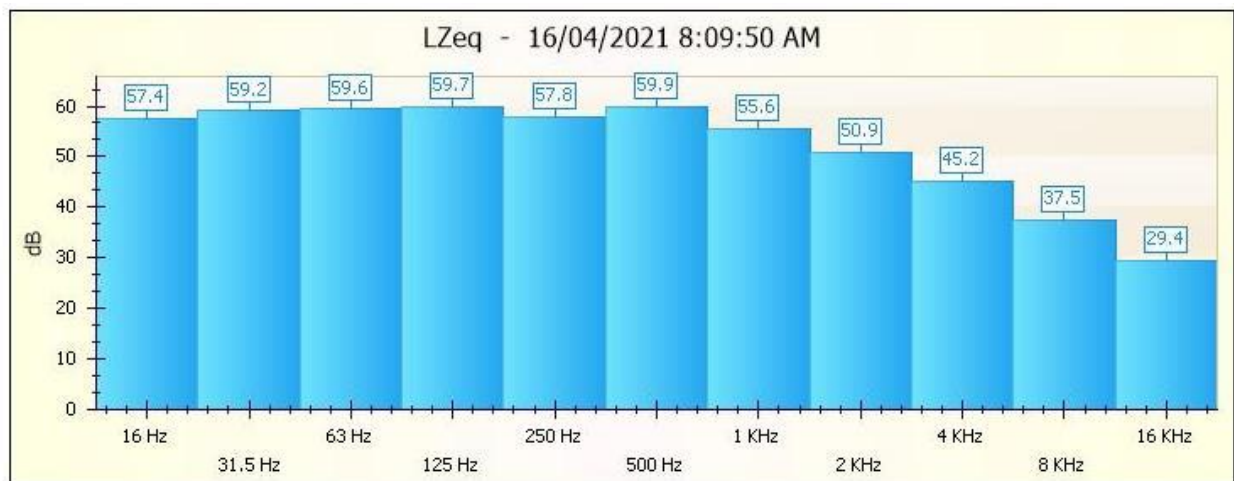
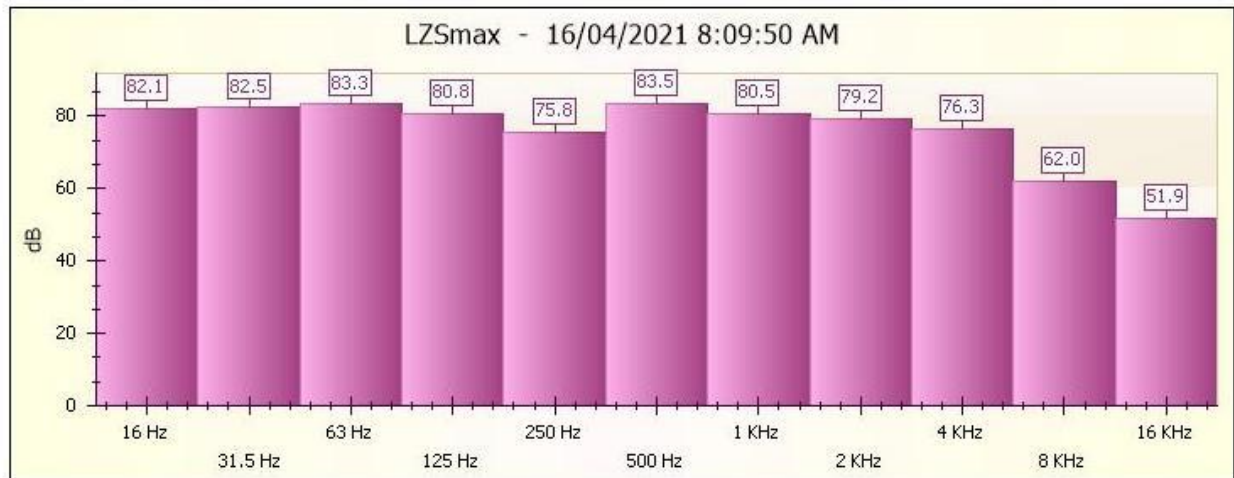


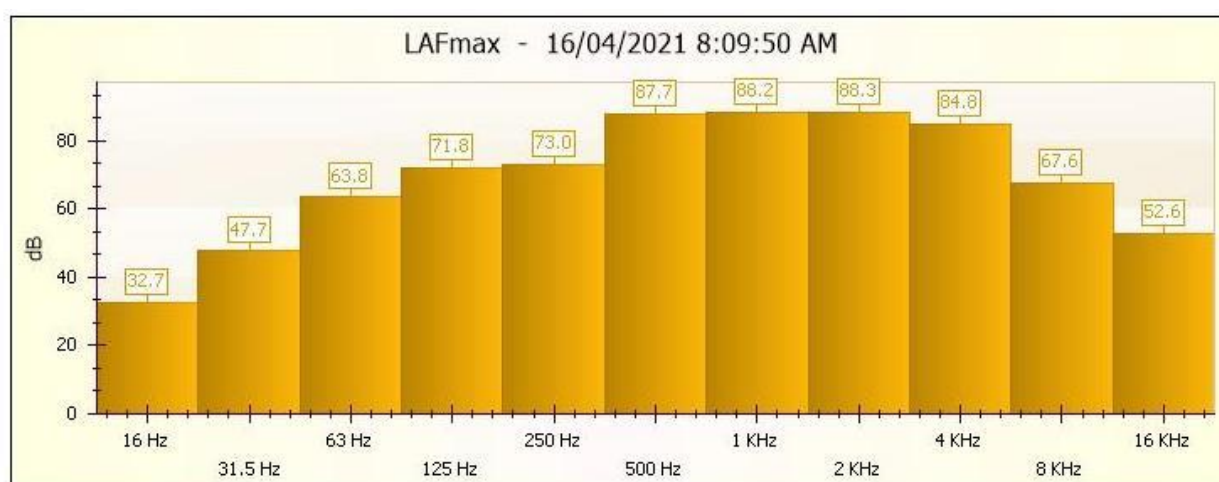
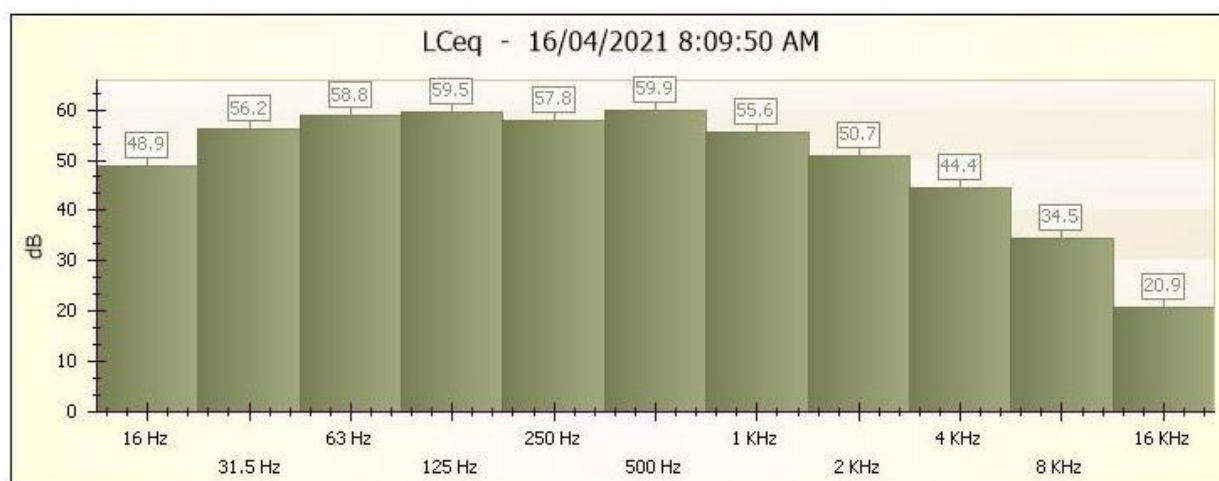
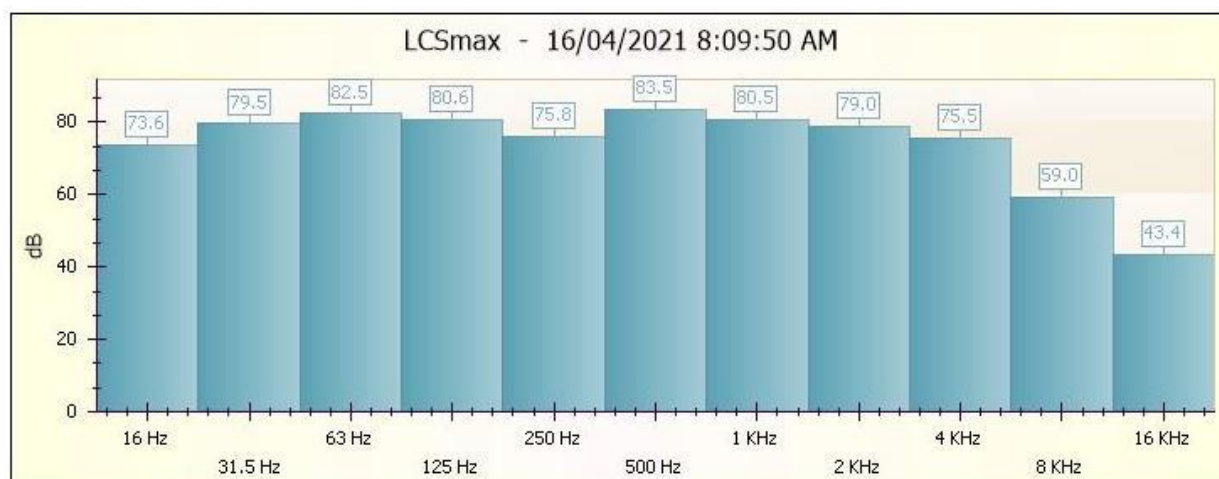
**Instrument Model** CEL-633B

LAFmax	92.9 dB	LAE	101 dB
LAFmax with Time	92.9 dB (16/04/2021 10:59:09 AM)	Serial Number	2670936
LAFmin	39.9 dB	End Date & Time	16/04/2021 11:10:50 AM
LAFmin with Time	39.9 dB (16/04/2021 9:10:25 AM)	LCpeak with Time	109.8 dB (16/04/2021 8:10:00 AM)
LAlmax	96.3 dB	LCpeak	109.8 dB
LAlmax with Time	96.3 dB (16/04/2021 10:59:09 AM)	LAeq	66.5 dB
LAlmin	42.7 dB	LCeq	66.3 dB
LAlmin with Time	42.7 dB (16/04/2021 9:02:02 AM)	LAF 50%	54.5 dB
Calibration (Before) Date	01/01/2015 12:00:23 AM	LAF 10%	62.5 dB
Calibration Drift	-10.7 dB	LAF 90%	49 dB
Calibration (After) Date		LAF 95%	47.5 dB
LAeq	60.6 dB		









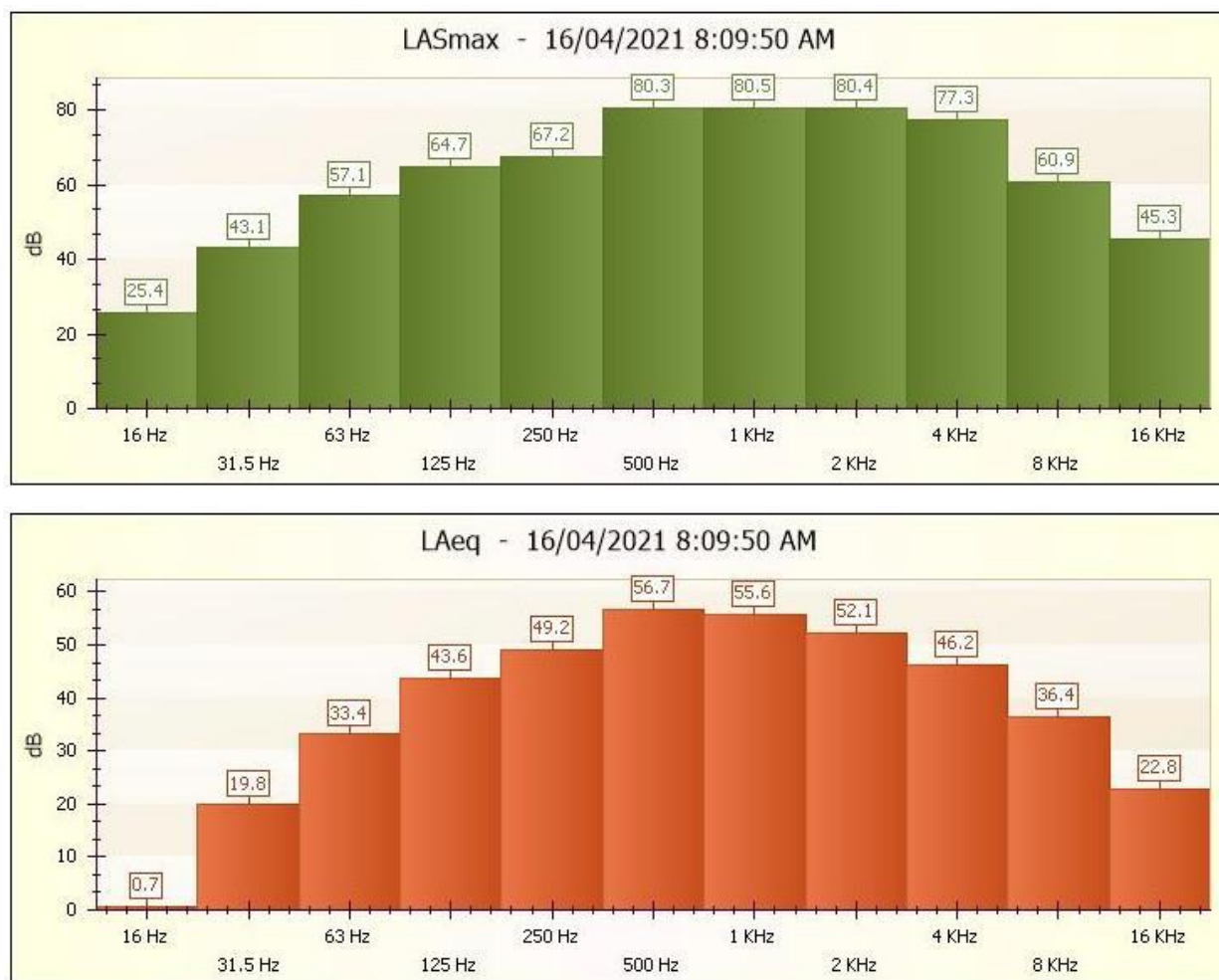
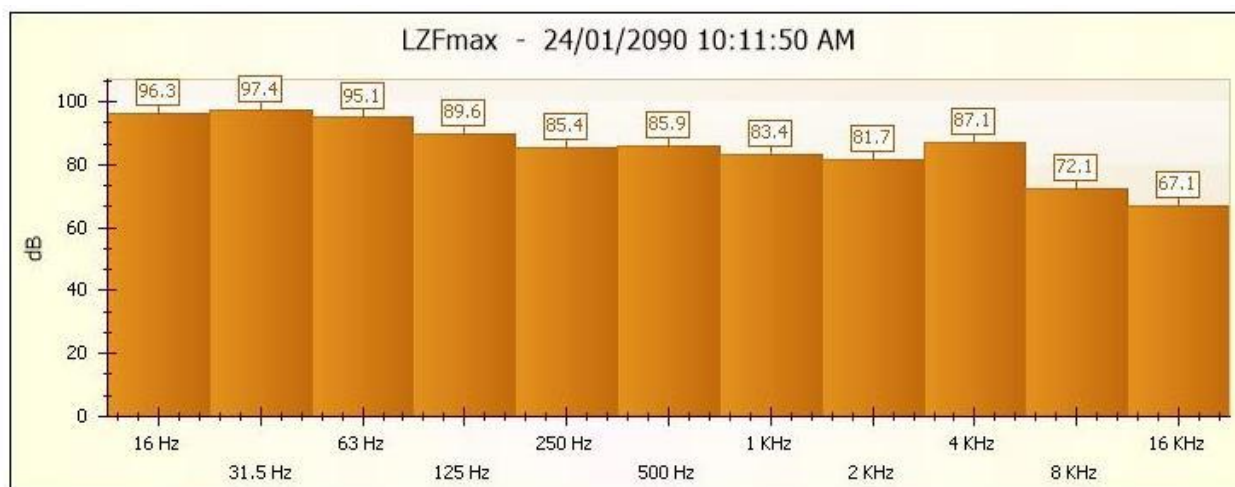
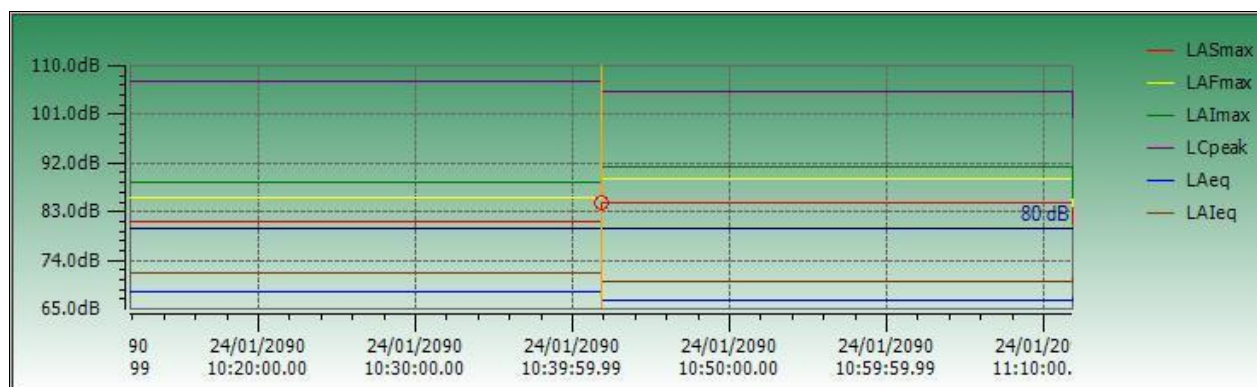
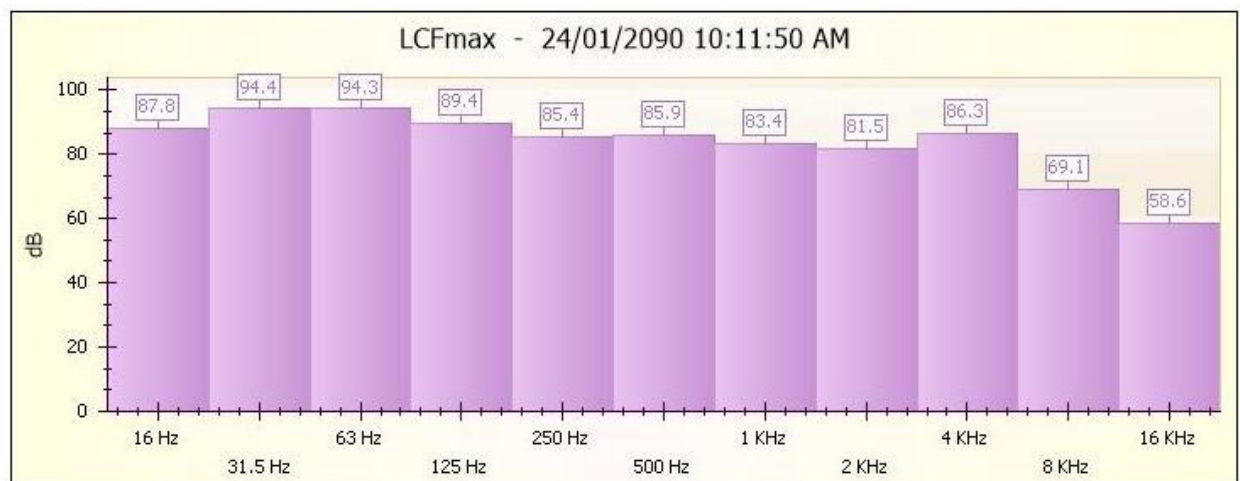
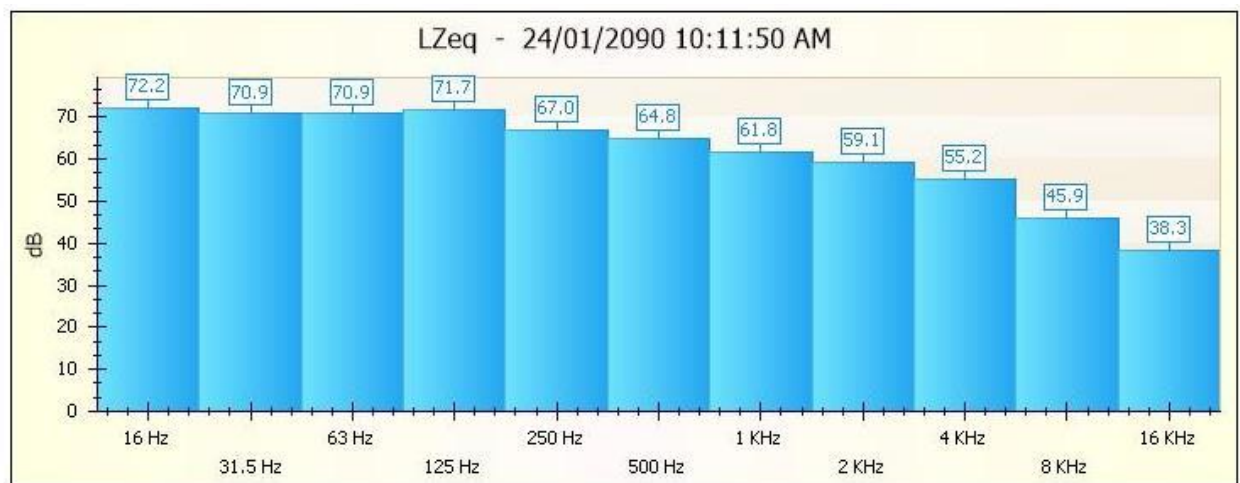
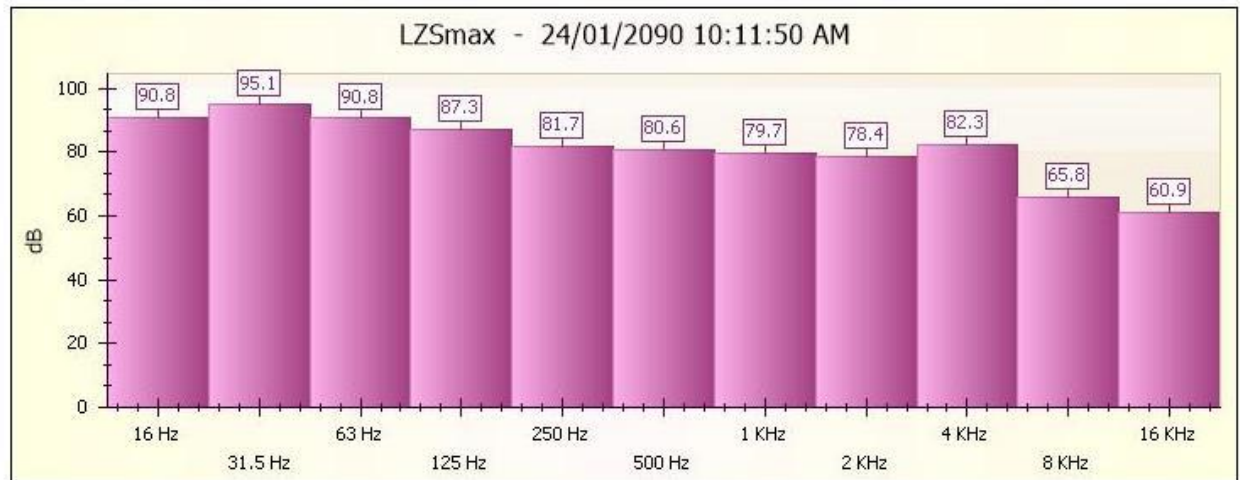


Figure 207: Noise results at Mawanga PS/HCIII and Church on Day 1

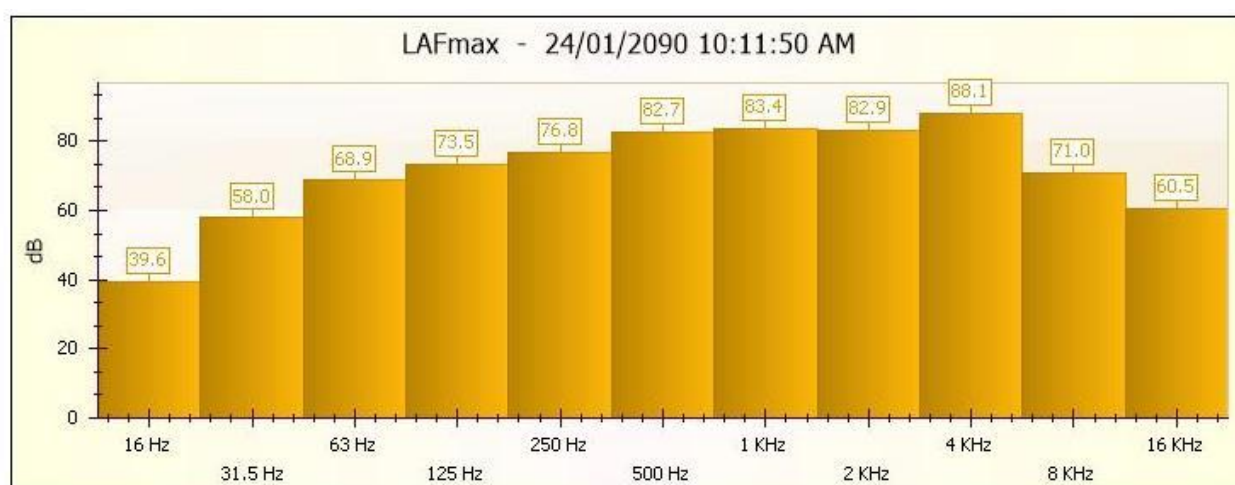
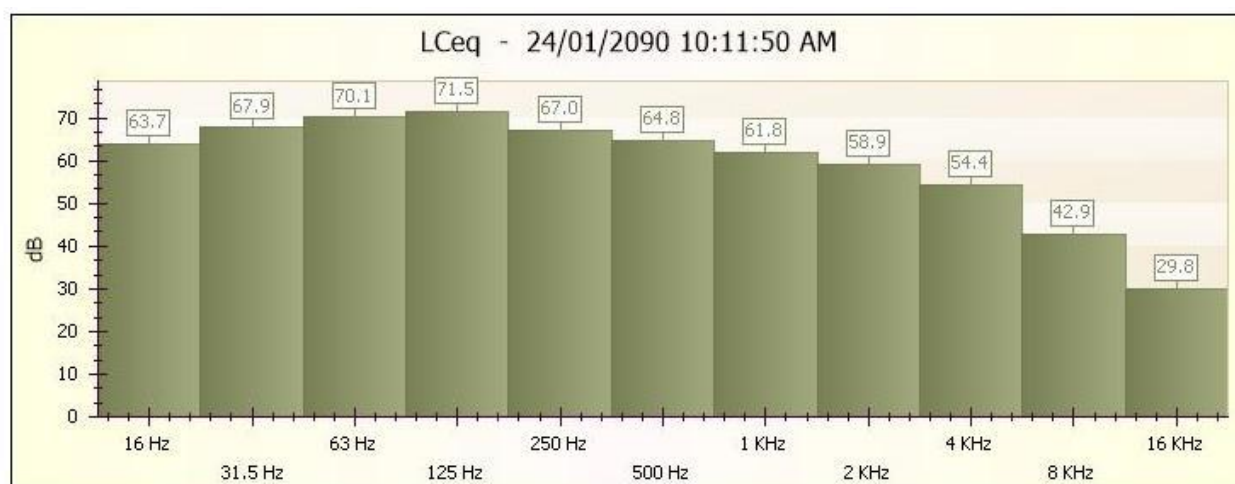
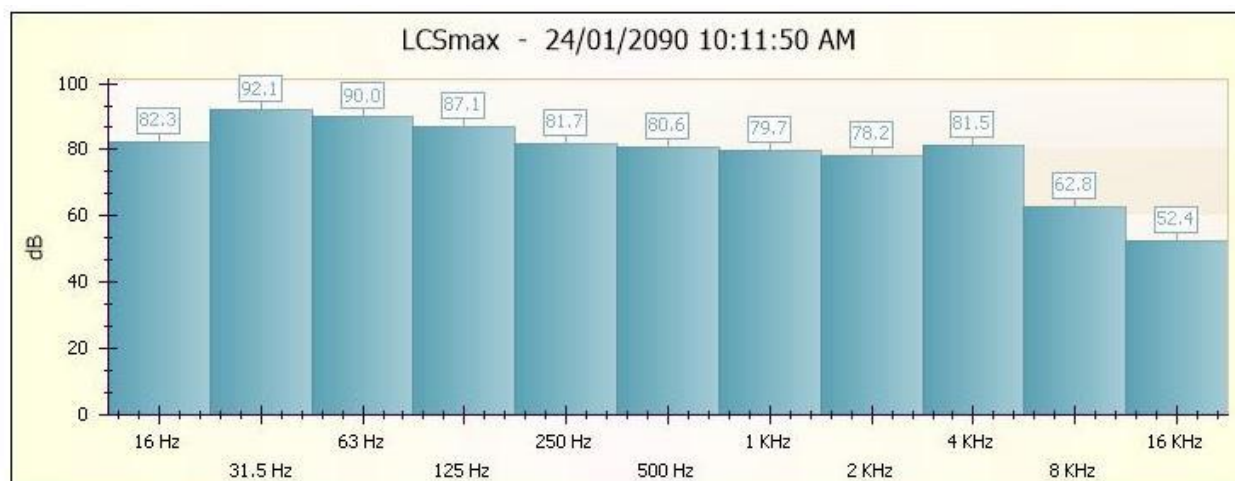
**Instrument Model**      **CEL-633B**

LAFmax	89 dB	LAE	103.3 dB
LAFmax with Time	89.0 dB (24/01/2090 11:09:48 AM)	Serial Number	2670936
LAFmin	53 dB	End Date & Time	24/01/2090 11:16:50 AM
LAFmin with Time	53.0 dB (24/01/2090 10:16:32 AM)	LCpeak with Time	107.1 dB (24/01/2090 10:20:33 AM)
LAlmax	91.3 dB	LCpeak	107.1 dB
LAlmax with Time	91.3 dB (24/01/2090 11:09:48 AM)	LAeq	70.8 dB
LAlmin	55.5 dB	LCeq	76.5 dB
LAlmin with Time	55.5 dB (24/01/2090 11:07:28 AM)	LAF 50%	65 dB
Calibration (Before) Date	24/01/2090 10:11:36 AM	LAF 10%	70 dB
Calibration Drift	0.2 dB	LAF 90%	59.5 dB
Calibration (After) Date	27/08/2020 11:05:49 AM	LAF 95%	58.5 dB
LAeq	67.4 dB		











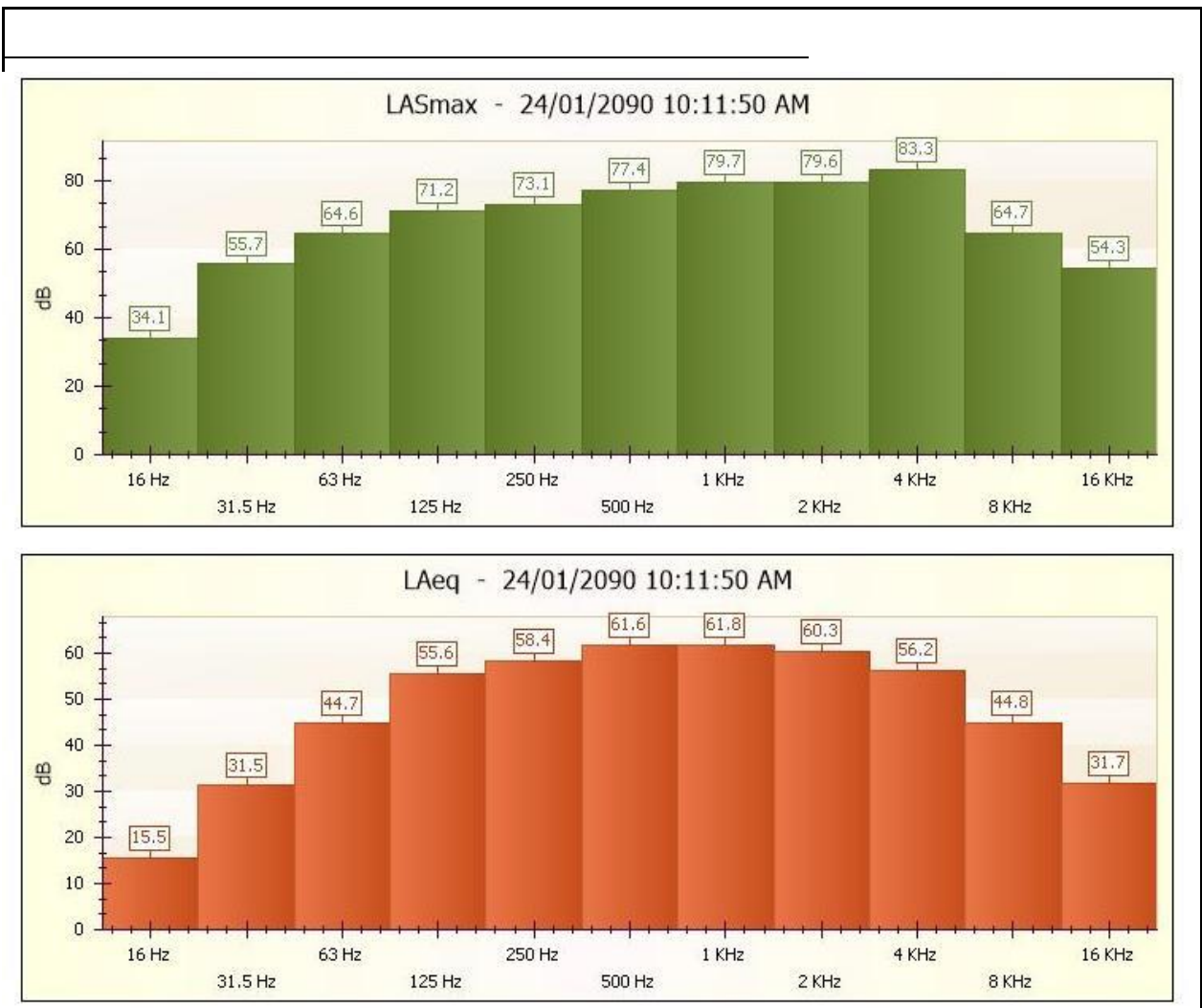


Figure 208: Noise Results at Namavundu Trading Centre on Day 1

## **22ANNEX IX: SOCIO-ECONOMIC (CULTURAL AND ARCHAEOLOGY) BASELINE REPORT**

### **22.1 Cultural Heritage and Archaeology**

Culture is the way in which a society preserves, identifies, organises, sustains, and expresses itself (GoU, 2006). As such, culture has the power to shape everyday behaviour and influences the decisions made in life. Cultural heritage, on the other hand, refers to properties and sites of archaeological, historical, cultural, artistic, and religious significance. It also encompasses the unique environmental features and cultural knowledge, as well as intangible forms of culture embodying traditional lifestyles that should be preserved for current and future generations (IFC PS 8, 2012).

#### **22.1.1 Cultural Context**

The area in which the proposed Project is situated was first inhabited by the hunter-gatherers people related to the pygmy of the Congo. Stone age tools found in some locations of Uganda like Paraa and Sango Bay are evidence of the presence of these people from as early as 50,000 B.C.

From around 1000 B.C, the area received new groups of people who were more advanced technologically than the hunter-gatherers. The first to arrive were the Bantu, who arrived from the west of the river Nile.

The Bantu introduced iron technology into the area and began practicing agriculture as well as animal husbandry. They The Bantu also established village communities headed by chiefs. They were later joined by Cushitic pastoralists who introduced long long-horned cattle in the area as opposed to the Zebu cows of the Bantu. The last wave of historic migrants were the Luo people, of whom the majority continued on to Kenya.

The mixing of the people resulted in the Basoga people as they are known today. Because the Bantu were the majority in the founding populations, the Lusoga language and culture of the area is Bantu while retaining Nilotic traces.

From 1000 A.D, there was a process of state formation, and the area became part of the Bunyoro-Kitara Kingdom. The first rulers of the Kingdom were the Batembuzi dynasty. There were nineteen Kings of the Batembuzi dynasty. Busoga (as it is known today) was placed under the rule of Chief Ntembe during this dynasty (Batembuzi). The next dynasty was of people called the Bachwezi. Under this dynasty, Bunyoro -Kitara kingdom was very strong and expanded rapidly. The era of the Bachwezi dynasty was also mysterious and is a subject of much folklore.

The rule of the Bachwezi collapsed at the beginning of the fifteenth century, and the ruling group migrated away from Bunyoro-Kitara Kingdom. The new rulers of the Bunyoro-Kitara Kingdom after the Bachwezi were the Babito dynasty which claimed ancestry from the Luo, a Nilotic speaking people. The Babito were secular as opposed to the previous dynasties, where the rulers were also priests to the population.

The remaining Bachwezi in Busoga were relegated to perform only religious tasks, and they still form the class of traditional priests called *Baswezi*. Oral tradition states that Busoga was given to Kiiza, a younger brother of the first king of the Babito dynasty. He then sent his sons to rule different areas of Busoga. By the time British colonialism was imposed on Busoga, there were fourteen chiefdoms whose rulers claimed that the founders of chiefdoms had got the authority to rule from the ruling house of Bunyoro Kingdom.

The British reorganized reorganised Busoga into eleven chiefdoms which still exist as cultural units. The Project area is a part of Bugweri Chiefdom under the Chief *Menha*. The population of the proposed Project area is composed of the Basoga people mainly. Other tribes present include the Jopadhola, Samia and Bagisu, among others that elaborates the population demographics in the study area.

According to KII with the LCI of Mawololo village, the population is equally divided between the Moslems and Christians that elaborates on the religious denominations in the study area. There is

also an African religious cult referred to as *Ngiri Nkabi* in the area – the cult seems opposed to forms of modernisation of government programmes such as immunisation.

### 22.1.2 Cultural Heritage Findings

There are a number of both tangible and intangible cultural resources documented in the proposed Project area (Refer Table 158) and Figure 158 for all the identified modern places of worship.

**Table 158: Cultural Resources Documented within the Study Area**

Waypoint	Easting	Northing	Findings	Description
146	563692.3421	56449.44005	Grave Yard	Five graves, one cemented and others marked with soil mounds
147	563670.0867	56451.64878	Grave Yard	Two cemented graves
149	563681.2106	56493.65333	Grave Yard	Four cemented graves
148	563658.955	56498.07278	Grave Yard	One cemented grave
143	563848.1217	56529.03965	Grave Yard	One cemented, three not cemented
144	563814.7377	56541.1956	Grave Yard	Three visible graves. One cemented, and others marked with soil mound
142	563970.5177	56615.26848	Grave Yard	One cemented, one marked with stones
139	564059.5371	56632.96219	Grave Yard	Seven graves, three of which are cemented
129	563836.9803	56682.6833	Grave Yard	Three graves, one cemented, and the two are not
134	563881.4759	56848.49087	Grave Yard	Four cemented, and one marked with soil mound
81	564415.5979	56888.332	Church	New life Missionary Church Makandwa Central
78	564727.1685	56920.41575	Grave Yard	Two graves in the bush
80	564615.8922	56920.40561	Grave Yard	Two cemented graves
79	564571.3813	56924.82299	Grave Yard	One grave cemented
71	564704.9072	56986.73524	Grave Yard	Two graves marked with stones.
74	564727.1623	56987.84263	Grave Yard	One grave marked with soil mound
70	564660.3945	57011.04907	Grave Yard	One cemented, one marked with baked bricks and others invisible.
103	563536.5024	57044.10805	Grave Yard	One grave was cemented
102	563491.9912	57052.9469	Shrine	Under <i>Mutuba</i> tree where spirits rest
68	564582.4929	57100.57599	Grave Yard	One grave cemented.
69	564582.492	57110.52422	Grave Yard	One grave marked with stones.
58	564126.2426	57298.39349	Church	Lord's Favour Church Makandwa
53	563903.689	57314.95363	Grave Yard	Two are cemented, and the rest are marked with soil mounds.
59	564126.237	57360.29352	Grave Yard	One grave of a child
953	565472.6536	57634.54676	Grave Yard	Three graves
32	563558.6998	57684.11155	Church	St. James Church Makandwa.
24	564048.3127	57700.73655	Grave Yard	Two graves, one cemented with tiles and the other are not.
173	563024.5739	57701.74895	Mosque	Nakavule Mosque
25	564059.4396	57708.47507	Grave Yard	One grave tiled
950	565450.3872	57753.92356	Grave Yard	Grave of Late Neriko Obeti at Mawololo Catholic Church
949	565405.8752	57770.4998	Church	Mawololo Catholic Church

Waypoint	Easting	Northing	Findings	Description
182	563146.9699	57784.66168	Grave Yard	Two cemented graves.
35	563380.6466	57813.4221	Mosque	Makandwa Mosque
156	562735.2437	57847.62984	Spiritual Tree	<i>Mugayire</i> Tree of Iseja spirit where people perform sacrifices and rituals
154	562724.1141	57869.73595	Grave Yard	Twelve cemented graves
979	564437.7624	57879.84033	Mosque	Fildausi Mosque Buyayu
927	565472.6278	57910.88677	Mosque	Masjid Hidaya, Mawololo
908	565327.9569	58035.77886	Grave Yard	Thirteen graves where four are Cemented, nine are not cemented.
898	565383.5927	58060.10201	Church	St Peter's Church of Uganda
899	565361.3366	58070.04815	Grave Yard	One uncemented grave
948	565361.326	58182.79486	Grave Yard	Two cemented graves
938	565483.7228	58256.86553	Grave Yard	About 26 graves not cemented
946	565405.8256	58297.75649	Grave Yard	8 cemented graves
189	563249	56465.00005	Grave Yard	Twelve cemented graves, Five are cemented and others marked with stones and soil mounds
198	563111	56631.00004	Grave Yard	Twenty-one graves, Two are marked with soil mounds, the rest are cemented
201	563235.0001	56801.99999	Grave Yard	Seven graves, three of which are cemented and others marked with soil mounds
208	562885	57187.99998	Grave Yard	Thirteen graves out of which two are cemented
207	563014	57270.00003	Shrine	For family and community-owned
227	565670	57469.00004	Grave Yard	Two cemented graves
217	562700	57630.00003	Grave Yard	Fourteen graves, five of which are cemented and others marked with soil mounds
216	562724	57630.99998	Shrine	Family Shrine
225	562836	57686.00002	Grave Yard	Three cemented graves; seven graves marked with soil mound.
218	562748	57714.99996	Shrine	Family Shrine
219	562697	57731.99995	Spiritual Tree	Has been in existence for over 100 years.
	563485	0062621	Historical Site	Embuga, home of the Chief of Bugweri Chiefdom
	565258	51628	Cultural site	Bukowe Hill
	564056	54063	Cultural site	Buwonge Hill
	566074	53245	Cultural site	Bunalweni Hill
	566794	52931	Cultural site	Kikalangufu Hill
	563485	62621	Historical Site	Kirubale Tree



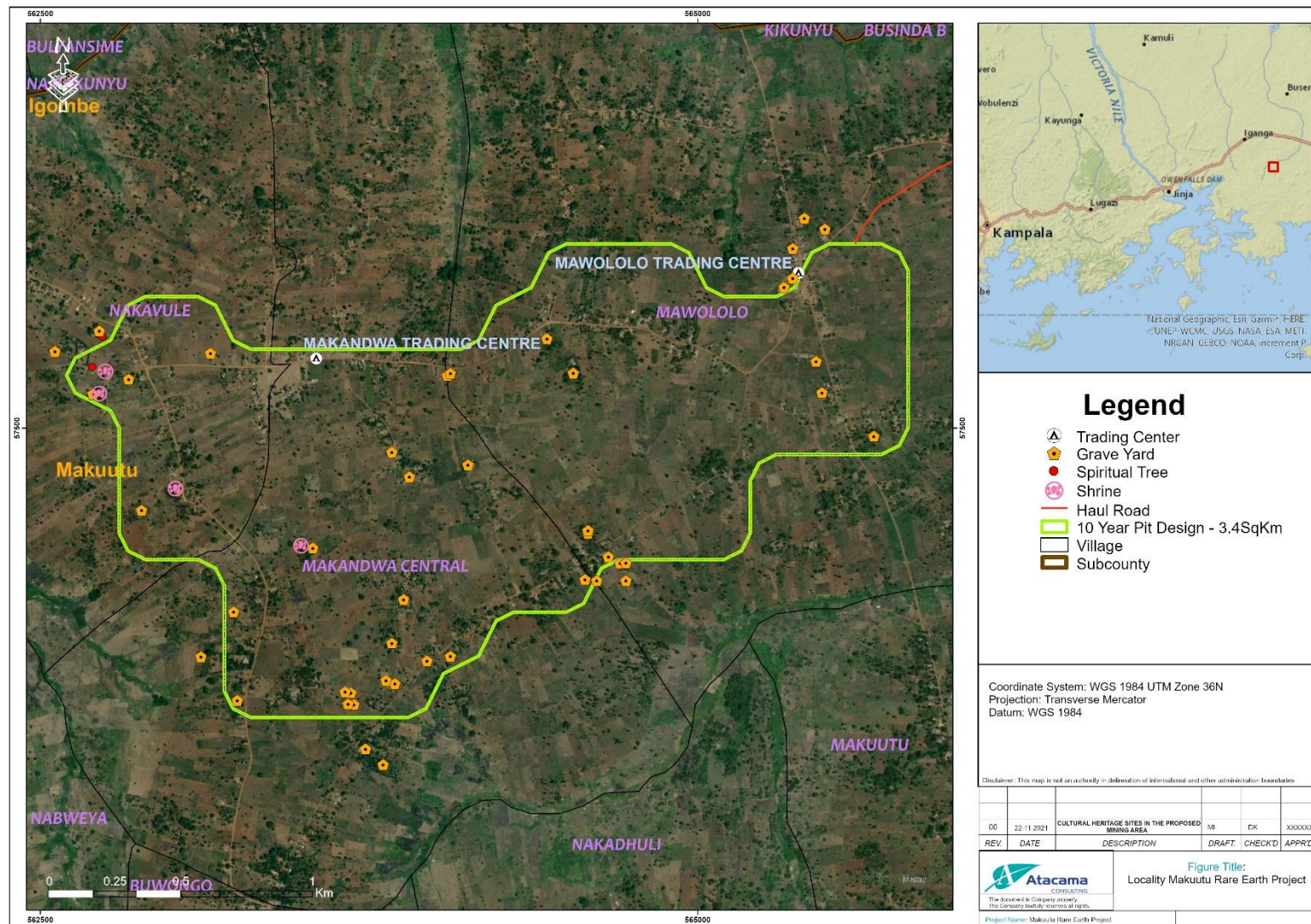


Figure 209: Location of Identified Cultural Heritage Sites within the Study Area

### 22.1.3 Historical Buildings

#### 22.1.3.1 *Embuga*

*Embuga* (refer Figure 210) is the historic home of the Chief of Bugweri, located in Igombe village, Igombe Sub-county. Located behind the *Embuga* is a royal cemetery. The house was built in 1930 by Chief Yokana Kibedi Zirabamuzale of Bugweri who is remembered as one of the people who negotiated Uganda's Independence in 1962. He was succeeded by his son, Kakaire Fred as the *Menha* who was also succeeded by the current chief, Samuel Kakaire. The house, as of 2021 housed three ruling chiefs of the Bugweri Chieftdom.



Figure 210: *Embuga*, the historic home of the Chief of Bugweri

#### 22.1.3.2 *Coronation Site Bukowe Hill*

The hill (refer Figure 211), located in Bukowe village Makuutut subcounty is recognised by Busoga Kingdom as the place where the Chiefs of Bugweri are coronated. Clan members of the *Baisemenha* royal clan of the chieftdom perform pilgrimage to the site every year starting 24<sup>th</sup> April for three days to get to know each other (like a get-together) as well as meet the Chief *Menha*, the Bugweri Chieftdom leader.

During the get-together meeting, songs to praise the chieftdom and the royal clan spirit are sung. The youth are educated on the clan customs and the importance of the hill as their ancestral home. Matters of the chieftdom are discussed, and representatives of the clan in different areas of Busoga are presented to the gathering. Additionally, clan members with problems consult the medium of the clan spirit and offer sacrifices of goats, sheep and chicken to resolve the misfortunes. While people carry along with them food for the event, a cow is slaughtered to feed the *Chief Menha* and his group/entourage during this period of pilgrimage.





Figure 211: Bukowe Hill (in the background)

### 22.1.3.3 *Clan Sites*

#### 22.1.3.3.1 *Buwonge Hill*

Buwonge Hill (refer Figure 212), located in in Buwonge village Makuutu subcounty is recognised by Busoga Kingdom as the cultural site of the Baisemukose clan (under Bugweri Chieftdom). Clan members of the Baisemukose clan gather at the hill every year in December for two days meeting to meet the clan head and get to know each other. The meeting dates are given by the clan leader.

At the gathering, matters of the clan are discussed, and representatives of the clan in different areas of Busoga are shown to the people present. The youth are particularly educated on the clan customs and the importance of the hill as their ancestral home while persons with the various life misfortunes consult the mediums of the clan spirit and offer sacrifices of goats, sheep and chicken, singing praises to the clan spirit to overcome/alleviate the misfortunes. The pilgrims carry along their food for the event, A cow is slaughtered to feed the clan chief and his group during this period of pilgrimage.



Figure 212: Buwonge Hill (in the background)

#### 22.1.3.3.2 Kikalangufu Hill

Kikalangufu Hill (Refer Figure 213), located in Bunalweni B village Makuutu subcounty is recognised by the Busoga Kingdom as the seat of the Baisemunana clan. of Bugweri chiefdom.





Figure 213: Kikalangufu Hill (left) and the Caretaker, Omuswezi Lukowe (right)

Clan members of the Baisemunana clan gather at the hill every year starting January 1 for two to three days. The Clansmen gather to know each other and to meet with the clan head.

At the pilgrimage, matters of the clan are discussed, and representatives of the clan in different areas of Busoga are shown to the people present. The youth are particularly educated on the clan customs and the importance of the hill as their ancestral home while persons with various life misfortunes consult the Baswezi mediums of the clan spirit and offer sacrifices of goats, sheep and chicken, singing praises to the clan spirit to overcome/alleviate the misfortunes. The pilgrims carry along their food for the event. A cow is slaughtered to feed the Chief and his group during this period of pilgrimage.

#### 22.1.3.4 *Bunalweni Hill*

The Banalweni Hill (refer Figure 214), located at 36N 0566074 0053245 in Bunalweni A village Makuutu subcounty is recognised by the Busoga Kingdom as the cultural site of Baisempiina clan. of Bugweri chiefdom



Figure 214: Caretakers of the Bunalweni Hill sitting at the Cultural Site

Clan members of the Baisempiima clan perform pilgrimage to the hill every year in December for two days to meet the clan head and get to know each other. At the gathering, matters of the clan are discussed, and representatives of the clan in different areas of Busoga are shown to the people present. The youth are particularly educated on the clan customs and the importance of the hill as their ancestral home while persons with the various life misfortunes consult the mediums of the clan spirit and offer sacrifices of goats, sheep and chicken, singing praises to the clan spirit to overcome/alleviate the misfortunes. The pilgrims carry along their food for the event. A cow is slaughtered to feed the Chief and his group during this period of pilgrimage.

#### 22.1.4 Cultural Sites for Traditional Prayers

##### 22.1.4.1 *Kirubale Tree*

The *Kirubale* tree (Refer Figure 215), located in Makandwa Central village, Makuutu Sub-county houses the Kirubale spirit. According to the caretaker, traditional prayers are performed by the community at this site. People pray to solve personal problems like lack of Jobs, sickness and to have children and marriage as well as praying for the land to produce good harvest.





Figure 215: The Kirubale Tree

### 22.1.5 Cultural Property at Household Level

#### 22.1.5.1 *Graves*

In simple terms, a grave is a location where dead people are buried. The study found both cemented and ordinary/un-cemented burial sites within the proposed Central Mining Pit area (refer Figure 216).



Figure 216: Ordinary stone-covered (in the foreground) and Cemented Graves (in the background) within the proposed Project Area (Central Mining Pit Area)

#### *22.1.5.2 Household Shrines*

Household shrines are personal properties owned by individuals or families. It is in these shrines that family spirits are consulted. The owners serve as the spirit mediums and diviners on occasions when the members gather, singing traditional songs and performing rituals. The family owners are then possessed by the spirits and speak on the spirits' behalf (refer Figures 217 and 218).





Figure 217: Family shrine for BaiseMwebya, Makandwa Central village, Makuutu Sub-county  
(0563198E, 0057390N)



Figure 218: Enkuni Family Shrine, Nakavule village village, Makuutu Sub-county  
(0562751E, 0057714N)

### 22.1.6 Archaeological Findings

Archaeology that studies the past through examining the material remains left and used by humans in examining the proposed Project area for the Makuutu Rare Earths Project identified, pottery, lithics, faunal and metal objects. Special consideration was also given to the medicinal plants and charcoal mounds that characterise human activities and are part of the cultural heritage as presented below. Three hundred forty (340) potsherds were identified and two hundred and seven (207) points were marked with pottery (Refer Figure 221).

#### 22.1.6.1 Pottery

The pottery identified ranged from whole pots (refer Figure 219) to potsherds (refer Figure 220).



Figure 219: Example of a whole pot



Figure 220: Example of a potsherd



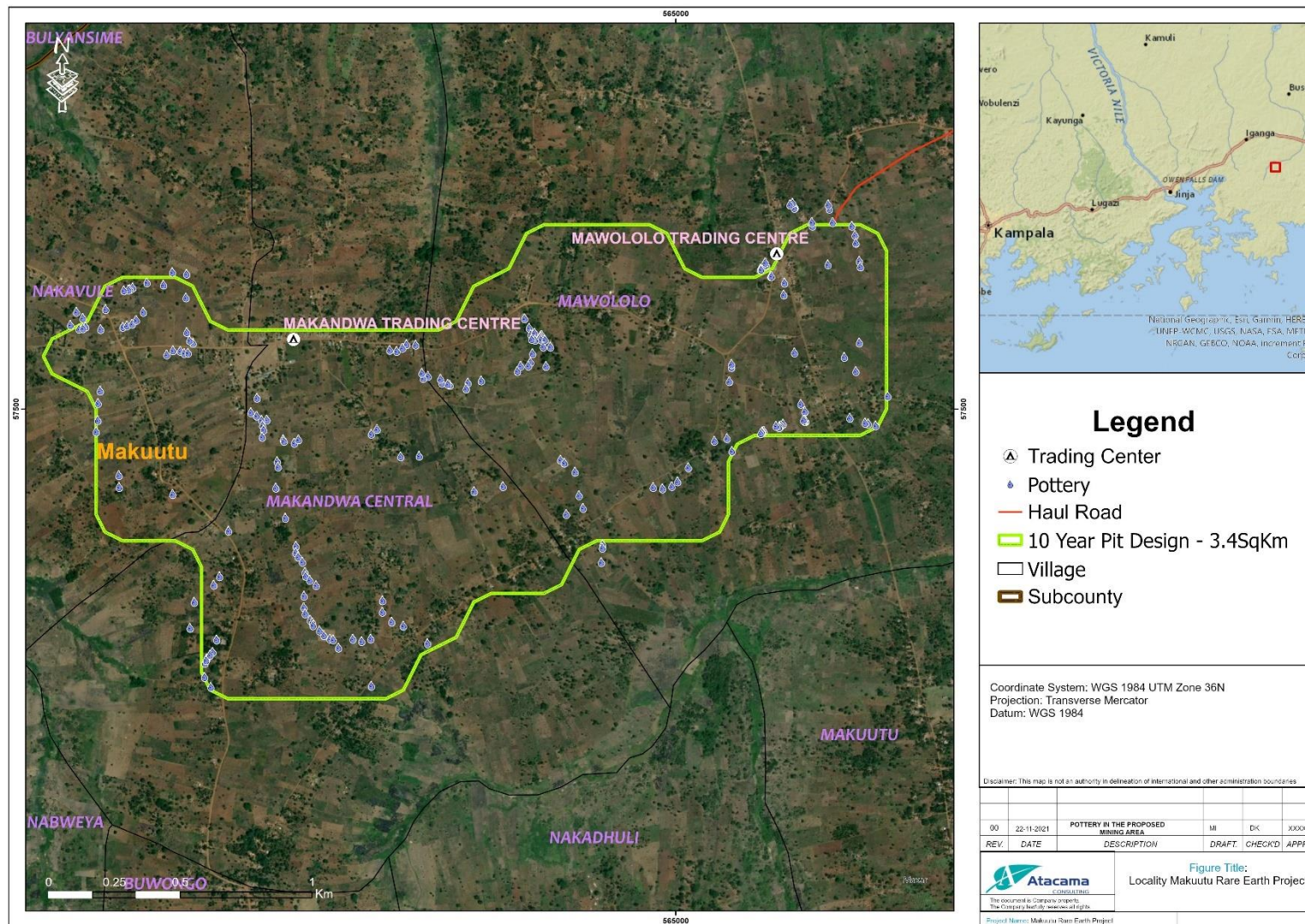


Figure 221: Pottery sites identified within the Surveyed Area of the proposed Central Mining Pit

Thirty-three (33) decoration motifs were identified from the three hundred forty potsherds that were analysed (refer Table 159).

**Table 159: Pottery Decoration Motifs**

S/N	Decoration motif	Number of Potsherds
1	Abraded bodies	13
2	Band of herringbone roulette	1
3	Band of horizontal punctates	3
4	Band of horizontal roulette	1
5	Band of knotted roulette	27
6	Band of punctates	2
7	Bevelled	3
8	Comb stamping roulette	11
9	Curve wooden roulette	12
10	Finger Impression roulette	1
11	Hatched roulette	19
12	Hatched horizontal roulette	3
13	Hatched band of herringbone roulette	1
14	Hatched band of roulette	1
15	Horizontal finger grooves	5
16	Horizontal hatched roulette	1
17	Horizontal incisions	2
18	Horizontal punctates	2
19	Incised horizontal lines	1
20	Incisions	1
21	Knotted horizontal roulette	2
22	Knotted strip roulette	106
23	Leaf like roulette	1
24	Mamillated roulette	3
25	Oblique finger impressions	1
26	Oblique grooves	2
27	Oblique incisions	2
28	Plain not decorated	107
29	Thickened bodies	1
30	Triangular punctates	1
31	Vertical grooves	1
32	Vertical incisions	2
33	Wavy lines	1
	<b>Total</b>	<b>340</b>

The decoration motifs identified in Table 159 suggest that the dominant decoration in the surveyed area of the proposed Central Mining Pit is the roulette, which was identified from 190 potsherds. Other decorations appeared in 43 potsherds, and those that were not decorated at all were 107.

Roulette has forms of decoration such as twisted string roulette, knotted grass roulette, and curved wooden roulette. It is a pottery-decorating tool that can be either rolled or impressed onto a wet surface of a clay vessel (Haour *et al*, 2010: 193). Roulette is also regarded as a Late Iron Age (LIA) pottery tradition for ceramics at the Early Iron Age (EIA) or Late Iron Age (LIA) juncture (c. A.D 800-1100) identified from the 11<sup>th</sup> century. Posnansky *et al.* (2005) regarded it as transitional Urewe (19<sup>th</sup> -13<sup>th</sup> century) or devolved Urewe, and it is the same type of Hieranaux, and Maquet in Rwanda also regarded as Middle Iron Age ceramics of Nyanza (Posnansky *et al.*, 2005, Lane *et al.*, 2007

and Robertshaw, 1991). Roulette is a decoration that is related to the Later Iron Age period of Uganda.

Other than roulette, the surveyed area of the proposed Central Mining Pit had other decoration motifs such as bevels, incisions and grooves that are attributed to the Early Iron Age (EIA) but with traces of Middle Iron Age (MIA) finger impressions as well. This, therefore, suggests that the site, in times of relative dates based on pottery, has a tradition from the Early Iron Age to the Late Iron Age (roulette) that is dominant. Some of the illustrations to show some of the decorations are as shown in Figure 222.

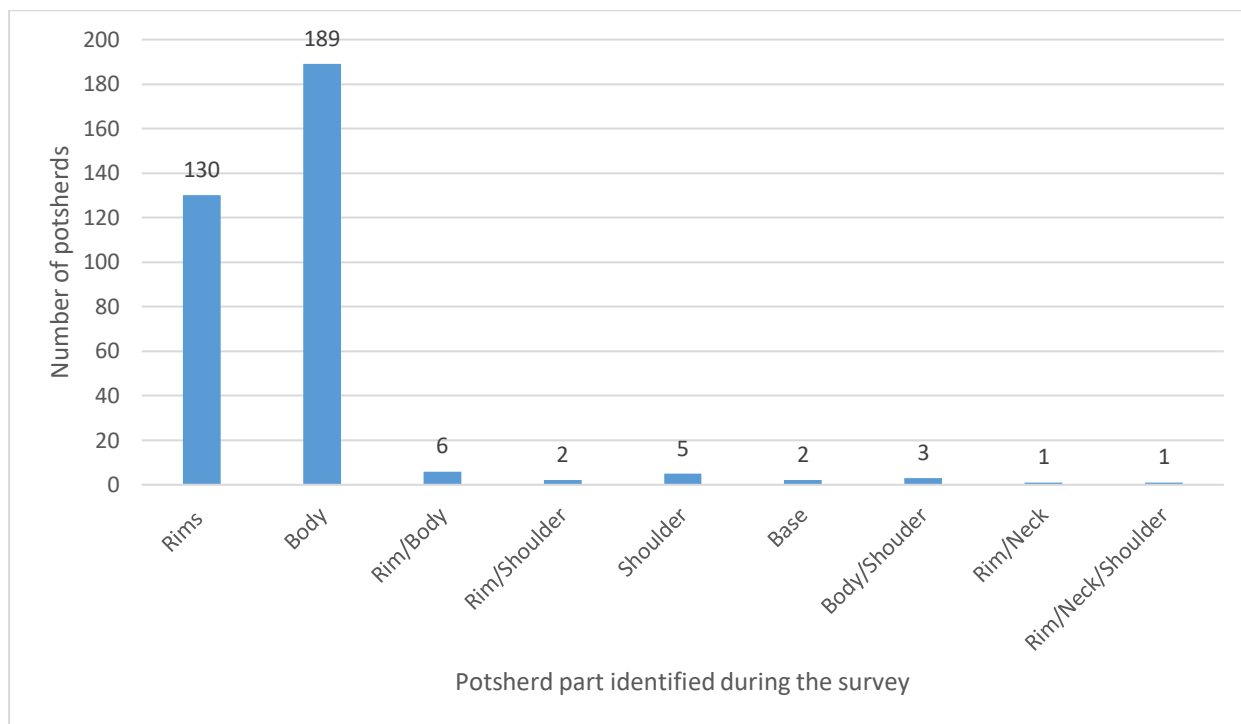


**Figure 222: Pottery Decorations identified within the Surveyed Area of the proposed Central Mining Pit**

#### 22.1.6.2 Pottery Parts

In terms of the pottery parts, emphasis was on the diagnostic parts that could be used to tell the pottery vessel. It is on this basis that rims, whether decorated or plain, were analysed. The 130 rim parts were analysed, and the results show that the rims were either out turning, upturning, everted, and only two were bevelled (refer Figure 223). The existence of bevelled rims is an indicator of Early Ironworking pottery that is also called Urewe. Despite the dominance of roulette, the pottery parts decoration suggested the site has signatures of Early Iron Age (EIA).





**Figure 223: Pottery Parts' Distribution**

### 22.1.7 Lithics

Lithics refer to any archaeological material that was made out of stone, and these represent the Stone Age Period in Archaeology. The Stone Age period was a prehistoric cultural period that involved the use of stone or rock for making tools that were utilised for performing varied tasks by humans in the past, especially hunting and gathering. Other than using stones, humans also used other materials made out of wood and bones. However, since bone and wood are perishable, they have low conservation potential, making them rare in the archaeological record in contrast with stone. Thus, stone material is the subject of discussion in this section of lithics.

Lithics were identified at forty-six sites within the four villages (Makandwa Central, Mawololo, Buyayu and Nakavule) of the proposed Central Mining Pit. A total of ninety-eight lithic artefacts were analysed and these were identified at thirty out of forty-six sites encountered with lithic sites or waypoints.



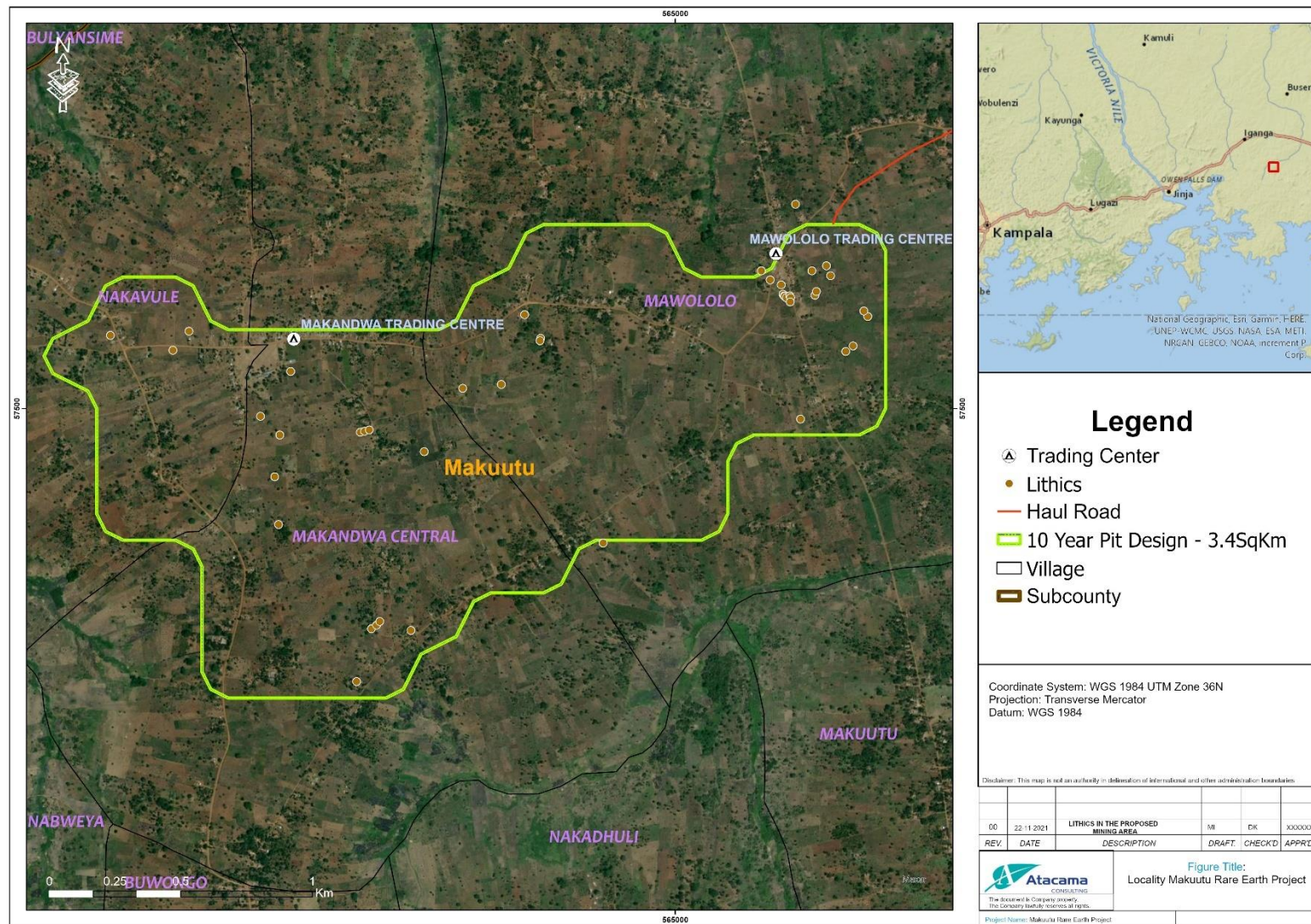


Figure 224: Location of Lithics within the Surveyed Area of the Proposed Central Mining Pit

### 22.1.7.1 Lithic Typology

Lithic typology is a result of classifying lithic artefacts based on the types. The types were analysed mainly based on the morphological characteristics, some of which give a clue to the functions of the stone tools. In terms of broad lithic types based on the ninety-eight analysed lithic artefacts, the Central Mining Pit proposed Project Area contained twenty cores, nineteen shaped tools, one non-flaked stone and fifty-eight debitage (refer Figure 225).

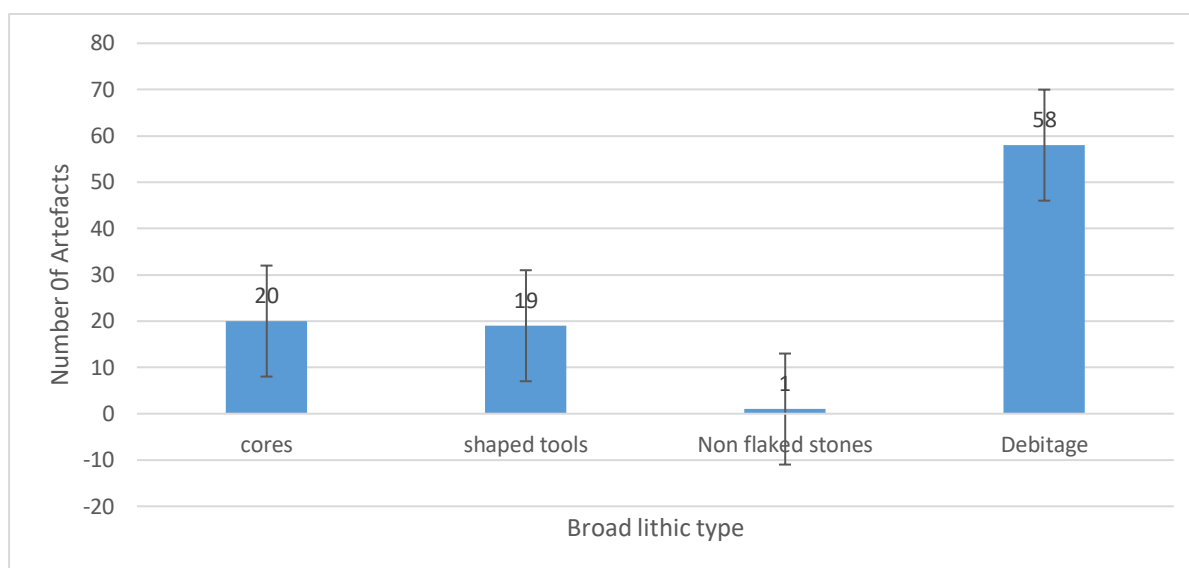


Figure 225: Broad Lithic Types

#### 22.1.7.1.1 Cores

Cores in archaeology refer to the main stone from which flakes are knapped before making the tools and other lithic artefacts. The twenty lithic cores were further subdivided into specific core categories, and these included; one amorphous core, twelve single platform cores and seven multi-platform cores. This means that all the core categories identified in the survey area belong to two subcategories of amorphous cores and patterned platform. The latter included the single and multi-platform cores.

#### 22.1.7.1.2 Shaped Tools

The shaped or retouched tools are the lithic artefacts that have been shaped either unifacially or bifacially. The nineteen shaped tools were classified into four categories as; discoids, core axes scrapers and points. The scrapers were further categorised into circular, convex double, notched, levallois circular, levallois end, side and end, single side and straight double side based on the scraping edge location, the nature of platform and orientation of the scraping edge (refer Table 160).

Table 160: Types of Shaped Tools Identified in the Surveyed Area of the Proposed Central Mining Pit

S/N	Shaped tools	
1.	Discoid	2
2.	Core axes	3
3.	Scrapers	
	Circular scraper	1
	Convex double scraper	1
	Nosed scraper	1
	Notched scraper	1
	Levallois circular scraper	1
	Levallois end scraper	1
	Side and end scraper	1
	Single side scraper	4



	Straight double side scraper	1
4.	Points	2
	<b>Total</b>	<b>19</b>

#### 22.1.7.1.3 Non Flaked Stone

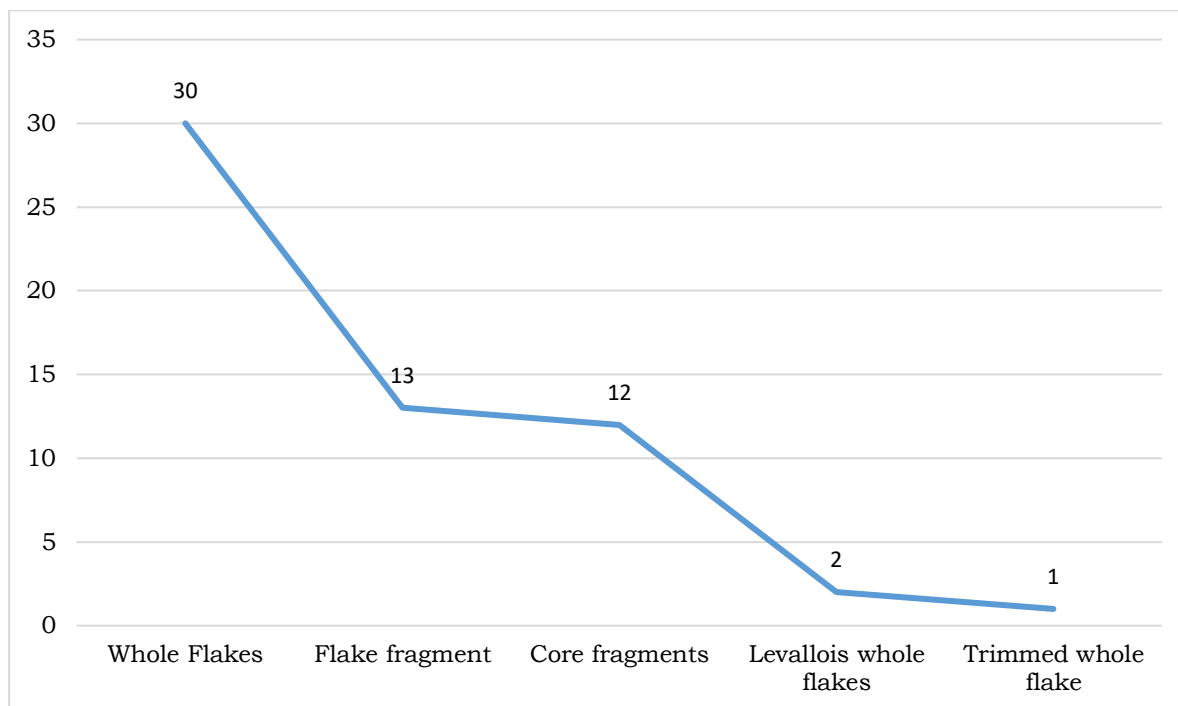
Two non flaked stones, which were grinding stones, were identified (refer Figure 227). Since this was not potable, it was photographed and left on site. These were located at Makandwa Central village. These definitely suggest the methods of food preparation which is also clear from the nature of pottery that is abraded.



Figure 226: Grinding Stones identified in the Surveyed Area of the proposed Central Mining Pit

#### 22.1.7.1.4 Debitage

Debitage, according to Adrefsky (2003), refers to all the “by-product flakes and chips from stone tool production, that are usually the most abundant artefact type in prehistoric archaeological sites. Though at timesdebitage is regarded as debris, they do provide information about the kinds of tools produced and the characteristics of the technology being employed. Debitage can even provide clues regarding human organisational systems such as settlement mobility and site functions”. 59% of the lithic artefacts analysed were classified asdebitage and included thirty whole flakes, thirteen flake fragments, twelve core fragments, two levallois whole flakes and one trimmed whole flake (refer Figure 228).



**Figure 227: Debitage Types identified in the Surveyed Area of the proposed Central Mining Pit**

#### 22.1.7.2 *Lithic Technology*

Evidence from the findings suggests that the stone tool makers used Levallois technology (the preparation of cores) which implies that the proposed Central Mining Pit location should have been used since the Middle Stone Age. This technology co-exists with the direct hammer percussion, as evidenced from the eraille scars on the bulbs of percussion. The Middle Stone Age is the period that started around 280,000 to about 50-25,000 years ago.

##### 22.1.7.2.1 *Lithic Raw Material*

Lithic raw materials refer to the type of rocks that were used by the lithic artefacts stone makers. Since all lithics are made of stone, the analysis centred on identifying the type of rock material used to make the artefacts. The results of the analysis of the ninety-eight lithic artefacts indicated that quartz (refer Figure 229) was preferred for the ninety-six lithic artefacts followed by basalt and quartzite with only one each (refer Figure 230). This is not strange since the rock types of the area are quartz-like, and the stone tool maker usually preferred to use the closest raw materials.



Figure 228: Quartz Lithics

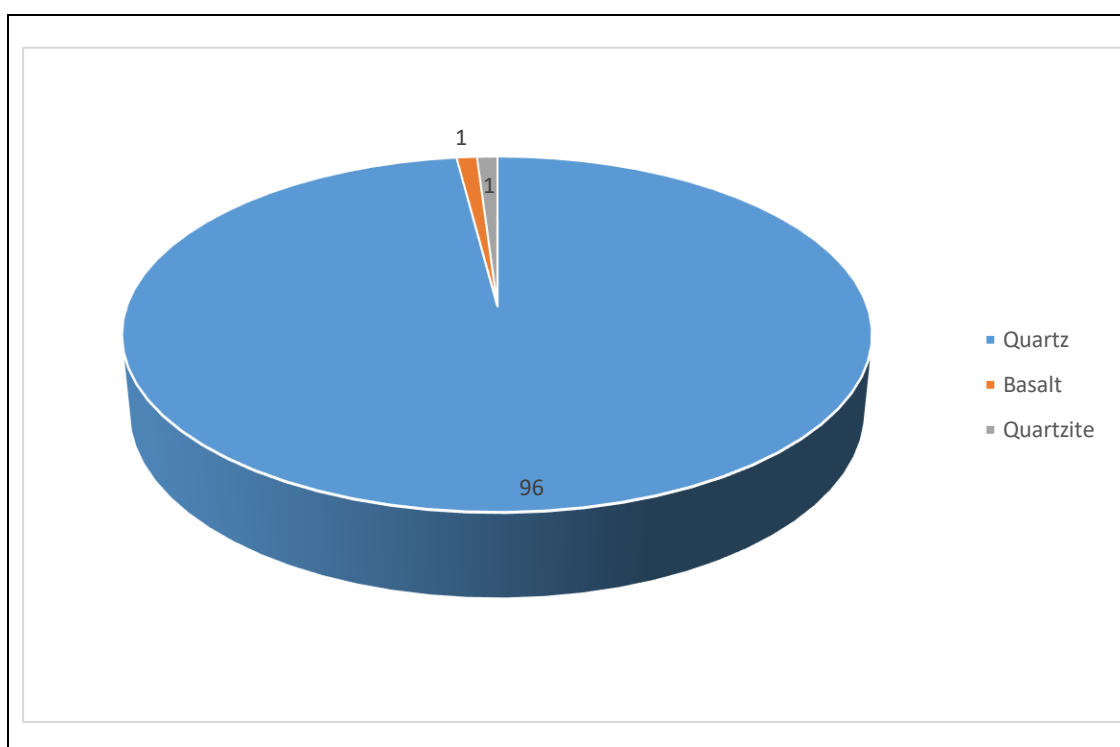


Figure 229: Lithic Raw Material Types

#### 22.1.7.3 Faunal Remains

Non-hominid faunal remains associated with cultural deposits have long been of interest to archaeologists. They are an indicator of the diet of the prehistoric people in the area under investigation. The faunal remains were identified at ten sites that were mapped as indicated in (refer Figure 231).



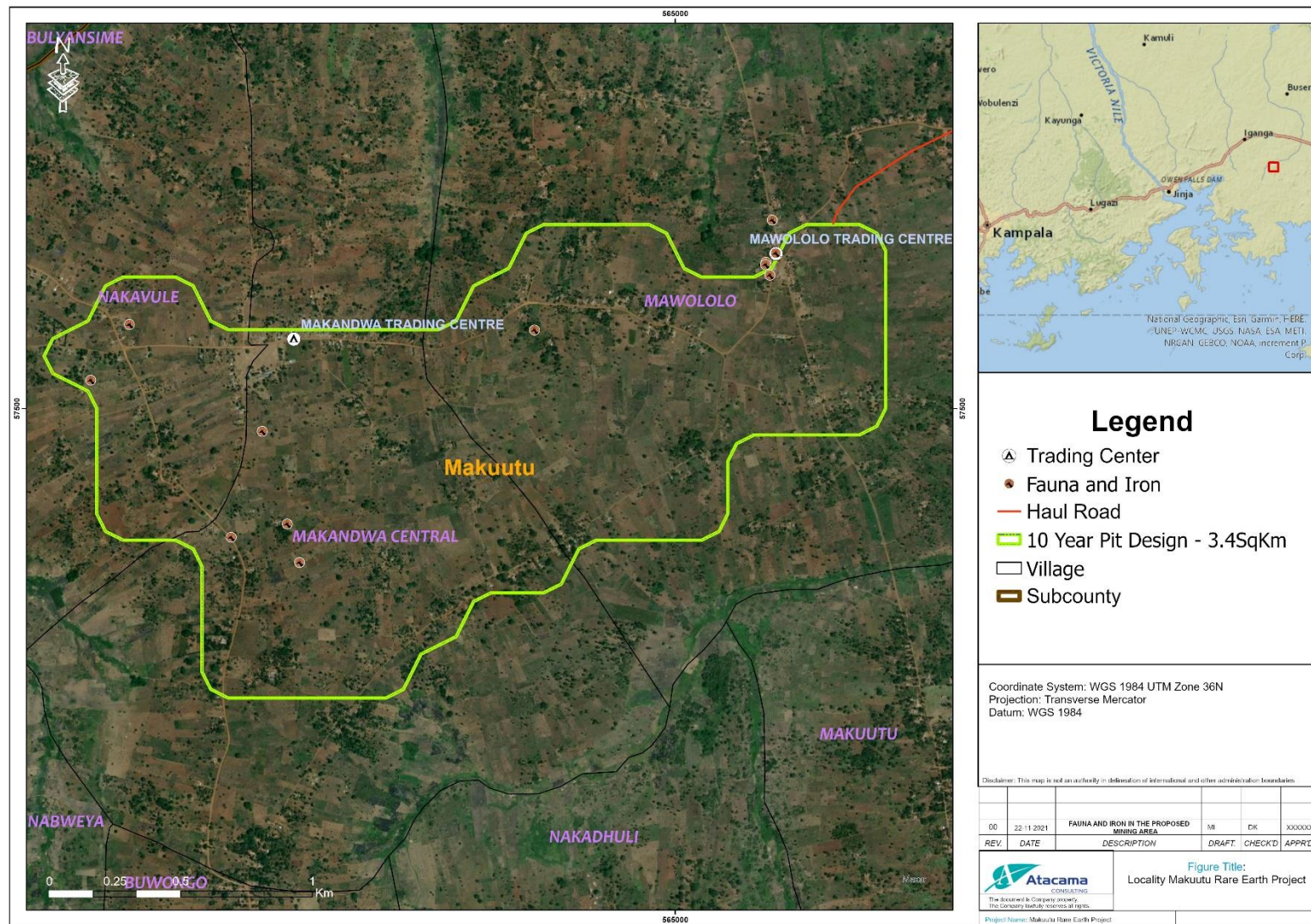


Figure 230: Location of identified Faunal Objects in the Surveyed Area of the proposed Central Mining Pit



The faunal objects were mainly bones that included animal and fish bones (refer Table 161). Some were analysed to establish the animal parts, such as skulls. The other faunal objects included snail shells.

**Table 161: Faunal Remains Identified in the Surveyed Area of the proposed Central Mining Pit**

Waypoint	Longitude	Latitude	Elevation	Description
204	563311	57011	1162	Faunal remains
911	33.5874	0.52478	1153	Animal Bone
947	33.5875	0.52668	1143	Animal bone
900	33.5873	0.52523	1151	Fish bone
901	33.5872	0.52515	1152	Animal bone
988	33.5793	0.5229	1164	Animal bone
93	33.57	0.51941	1172	Animal bone
107	33.5713	0.5149	1170	Land snail shell
163	33.5655	0.52309	1165	Animal teeth
215	562777	57608	1154	Skull

#### 22.1.7.4 Iron Object

One iron object (iron ore) was also identified within the surveyed area at 33.587588, 0.52554 in Mawololo village. Iron objects are one of the archaeological materials showing the evidence of human activities that archaeologists look out for to assess the archaeological potential of the area.

#### 22.1.7.5 Charcoal Mounds

Charcoal is essential for archaeology studies because it is used for radiocarbon dating. Charcoal mounds were identified and marked during the survey (refer Table 162 and Figure 232). Recent mounds do not qualify for dating, making their significance very low.

**Table 162: Charcoal Mound Sites**

Waypoint	Longitude	Latitude	Elevation	Village	Findings
952	33.588319	0.521478	1153	Mawololo	Charcoal mound
012	33.577919	0.520991	1169	Buyayu	Charcoal mound
044	33.572262	0.519414	1173	Makandwa Central	Charcoal mound
046	33.573483	0.519429	1172	Makandwa Central	Charcoal mound
052	33.574362	0.519135	1174	Makandwa Central	Charcoal mound
055	33.574953	0.518486	1175	Makandwa Central	Charcoal mound
076	33.581662	0.515347	1153	Makandwa Central	Charcoal mound
114	33.571314	0.5135	1164	Makandwa Central	Charcoal mound

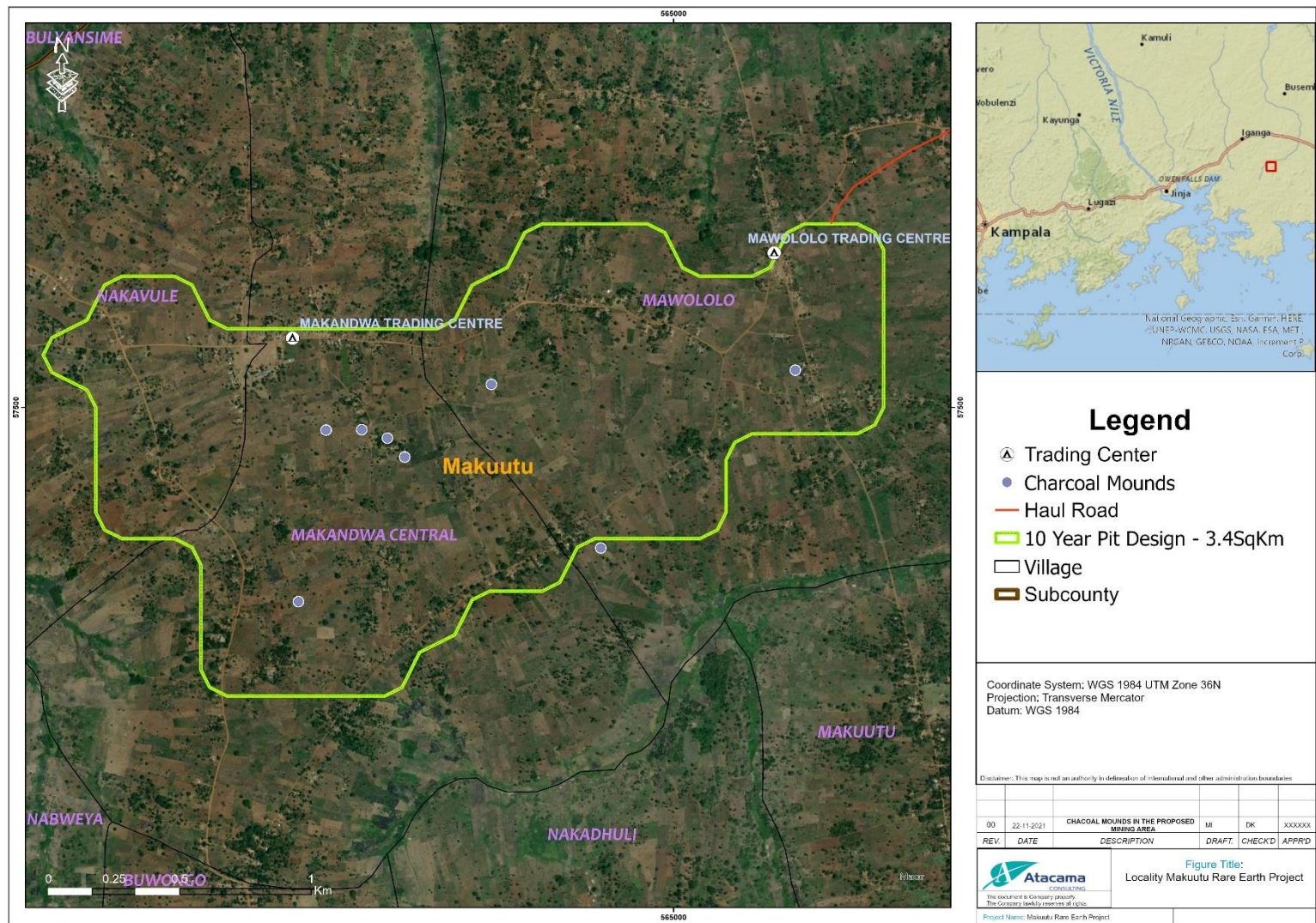


Figure 231: Location of Charcoal Mounds Within the Surveyed Area of the proposed Central Mining Pit



All the charcoal mounds identified were evidence of recent human activities (refer Figure 233).



Figure 232: Sample of recent Charcoal Mounds identified within the Surveyed Area of the proposed Central Mining Pit

#### 22.1.7.6 Medicinal Plants

Medicinal plants are those plants that are used as medicine by the people within the study area and are therefore regarded as part of indigenous knowledge, thus intangible heritage, which explains their importance and inclusion in this part of the report.

Fifteen sites were identified (refer Table 163 and Figure 234) and marked with some of the known plants regarded as medicinal plants in the proposed Central Mining Pit area. Among the common medicinal plants in the area include *Albizia coriaria* (Musita), *Aloe vera*, *Katosubisu*, *Alstonia boonei* (Mubajjanggalabi), *Tamarindus indica*, *Mulama* tree, *Musomba madhi* tree and *Mususira*.

**Table 163: Medicinal Plants used by Communities in the Surveyed Area of the proposed Central Mining Pit**

Waypoint	Longitude	Latitude	Elevation	Description
984	33.5792	0.52293	1164.82	<i>Albizia coriaria</i> , locally known as Musita; the bark and roots are it is used to treat headaches and syphilis.
998	33.5797	0.52242	1166.96	<i>Aloe vera</i> ( <i>Aloe barbadensis miller</i> ); used for several ailments such as malaria
999	33.5797	0.52239	1166.09	<i>Albizia coriaria</i> (Musita tree).
002	33.5797	0.52166	1167.11	Locally known as <i>Katosubisu</i> , its roots treat poisoning and snake bites.
004	33.5798	0.5221	1165.95	<i>Tamarind</i> ( <i>Tamarindus indica</i> ) tree for treating headache and stomach ache.
027	33.5751	0.52277	1162.09	<i>Alstonia boonei</i> , locally known as Mubajjanggalabi tree. Pregnant women use it.
033	33.5711	0.52161	1171.12	<i>Albizia coriaria</i> , locally known as Musita tree. it is used to treat headaches and syphilis.
036	33.5698	0.52079	1173.29	<i>Kirama</i> tree. It treats teeth problems.

135	33.5746	0.51373	1164.02	<i>Mulama</i> tree. It treats ulcers, blood pressure and syphilis.
141	33.5751	0.51234	1161.12	<i>Musomba madhi</i> tree. Treats ulcers, syphilis, stomach ache using its stem and bark.
153	33.5645	0.52337	1160.37	Tamarind ( <i>Tamarindus indica</i> ) tree used to heal stomach ache and headache.
159	33.5647	0.52277	1160.2	Aloe vera.
931	33.5888	0.52482	1151.16	<i>Musautilra</i> tree heals stomach and eye problems and is used as a preservative of local brew by using the leaves and stem barks.
939	33.5885	0.52703	1145.64	Tamarind ( <i>Tamarindus indica</i> ) tree used to heal stomach aches and headache.
247	565670	58185	1142	<i>Albizia coriaria</i> , locally known as Musita used to treat headaches and syphilis.



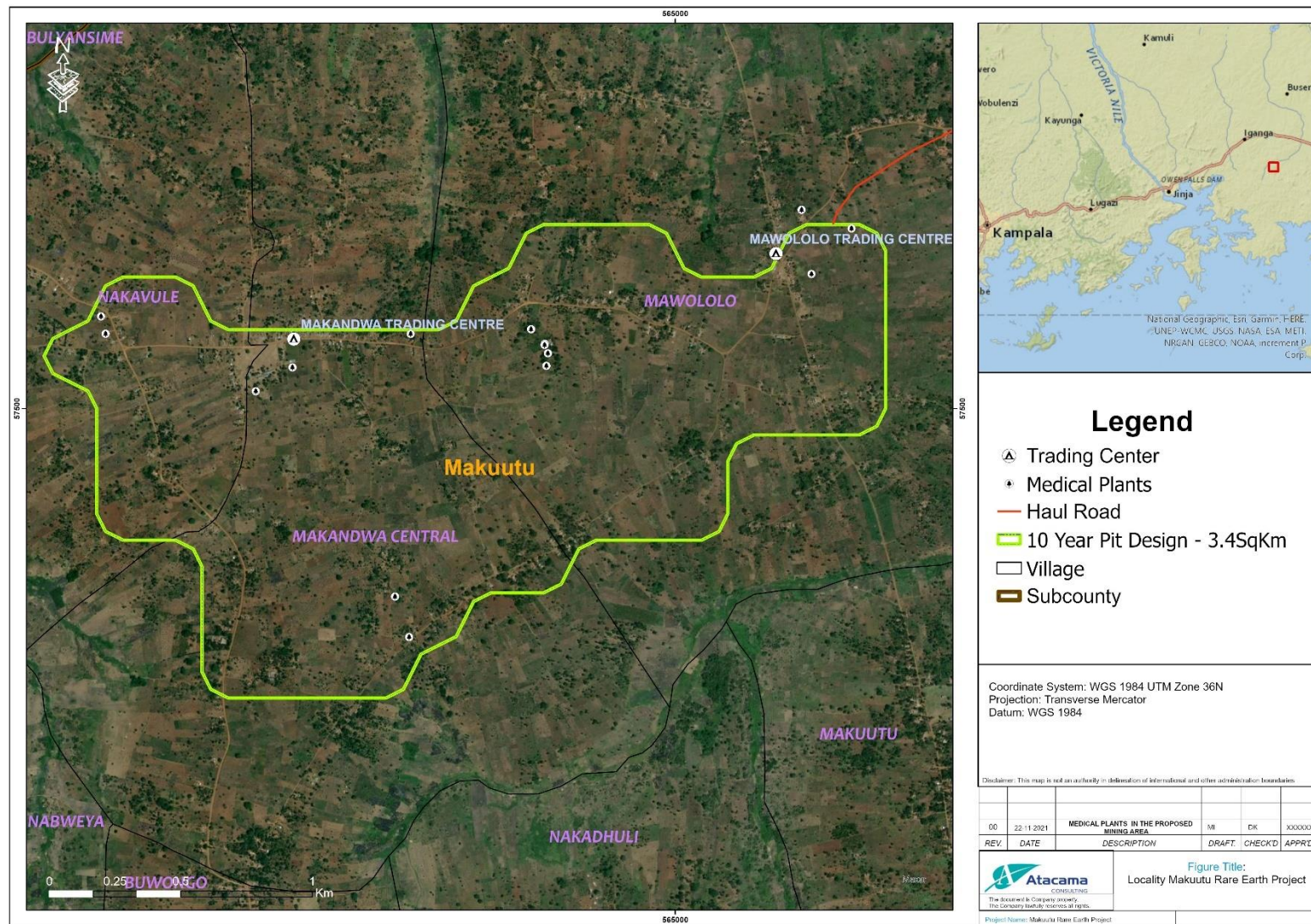


Figure 233: Location of Medicinal Plants within the Surveyed Area of the proposed Central mining Pit



## 22.2 Location of Archaeological Sites within the Study Area

Table 164: Location of Pottery sites identified within the Study Area

Way point	Longitude	Latitude	Elevation	Description
195	563233	56567	1156	The concentration of decorated and plain potsherds.
202	563247	56833	1157	Concentration of potsherds (excavation proposed)
255	5655503	58169	1143	Decorated and non-decorated potsherds.
203	563269	56865	1160	Decorated Body
224	562761	57813	1157	Decorated body
190	563236	56445	1157	Decorated body
191	563212	56483	1156	Decorated body with grooves.
252	565579	58277	1143	Decorated body with roulette
192	563213	56536	1156	Decorated body with roulette.
193	563218	56547	1156	Decorated body with roulette.
253	565517	58210	1143	Decorated body.
210	562887	57249	1153	Decorated neck
214	562816	57570	1156	Decorated with grooves
212	562807	57458	1155	Decorated, Rim
213	562808	57523	1155	Decorated, Rim
206	563091	57177	1162	Plain
209	562888	57204	1154	Plain
211	562801	57415	1156	Plain
223	562751	57807	1158	Plain
228	565719	57448	1141	Plain
241	565701	58041	1145	Plain
226	565661	57467	1144	Plain bodies
231	565805	57550	1143	Plain body
232	565684	57644	1147	Plain body
233	565640	57698	1149	Plain body
250	565596	58210	1144	Plain body and decorated one
902	33.587	0.525	1151	Charcoal stove
903	33.587	0.525	1150	Roulette
904	33.587	0.525	1150	Pottery (Abraided, well fired with coarse temper of neck part)
907	33.587	0.525	1150	Pottery (Rim, Plain)
909	33.587	0.525	1151	Pottery (Plain, well fired and tempered)
910	33.587	0.525	1152	Decorated with roulette.
912	33.587	0.525	1151	Decorated with pronounced grooves, well fired, sound
913	33.587	0.525	1153	Decorated with pronounced grooves, probably neck part
914	33.587	0.525	1153	Decorated with roulette design, well fired, Sand temper
917	33.588	0.525	1154	Plain, well fired.

919	33.588	0.524	1155	plain, well fired, Sand, Grog, tempered.
934	33.589	0.525	1150	Rim, Plain
940	33.588	0.527	1145	Decorated with roulette
941	33.588	0.527	1147	Rim, Decorated
942	33.588	0.527	1147	Decorated with different design
944	33.588	0.527	1147	Rim decorated with Roulette
945	33.588	0.527	1149	Plain
951	33.588	0.522	1158	Plain, abraded body
954	33.588	0.52	1150	Decorated with grooves
957	33.589	0.52	1150	Rim, Plain.
958	33.589	0.52	1148	Plain body
959	33.589	0.52	1148	Rim, Plain.
960	33.589	0.52	1149	Well decorated with roulette.
961	33.589	0.52	1149	Well decorated with roulette.
963	33.588	0.52	1147	Three plain pieces.
964	33.588	0.52	1146	Rim decorated with roulette
965	33.588	0.52	1147	Decorated body with roulette
966	33.588	0.52	1150	Plain body
967	33.588	0.52	1149	Scatter of decorated materials punctated with roulette and plain pieces
968	33.587	0.519	1148	Decorated body with roulette
969	33.587	0.519	1149	Decorated bodies with roulette (2 pieces)
970	33.587	0.519	1149	Decorated body with parallel grooves.
971	33.587	0.519	1149	Scatter of decorated and none decorated pieces.
973	33.586	0.519	1153	Scatter, decorated bodies with roulette and none decorated ones.
974	33.586	0.519	1149	Plain body
975	33.586	0.519	1154	Scattered pieces of plain bodies and decorated rim
976	33.586	0.521	1156	Rim
977	33.586	0.522	1155	Decorated bodies.
978	33.586	0.522	1154	Decorated rim.
981	33.579	0.523	1165	Rim, Plain
983	33.579	0.523	1164	Rim pottery decorated with roulette
985	33.579	0.523	1164	Decorated and none decorated pieces. (2 pieces)
986	33.579	0.523	1166	Plain and abraded
987	33.579	0.523	1164	High concentration of very abraded and none decorated potsherd (Excavation)
989	33.58	0.523	1167	Rim, Decorated body
990	33.58	0.523	1166	Decorated with punctations
991	33.58	0.523	1166	Rim, Partly decorated.
993	33.58	0.523	1164	Plain, Rim and Body abraded
995	33.579	0.523	1165	decorated with punctates
996	33.579	0.523	1164	Decorated, Rim

997	33.58	0.523	1164	Concentration of Potsherd of both decorated and non decorated ones, abraided in all sides
1000	33.58	0.522	1168	Vessel in use with different roulette design in Mr. Gunayaka Tomasi's home
3	33.58	0.522	1166	Decorated with roulette
5	33.58	0.522	1168	Rim, Decorated
6	33.579	0.522	1167	Concentration of Pottery with decorated and non decorated pieces.
7	33.579	0.522	1168	Semi complete big rim with decorations.
8	33.579	0.522	1168	High concentration of potsherd with different decorations. (Excavation proposed)
9	33.579	0.522	1169	High concentration of potsherd with decorated and non decorated in form of rims, bodies necks. (Excavation proposed)
10	33.579	0.522	1171	Concentration of potsherd with different forms (Excavation proposed)
13	33.578	0.521	1171	scatter of potsherds with different decorated and non decorated bodies
14	33.577	0.521	1172	scatter of non decorated potsherds with abraided surfaces.
15	33.577	0.521	1172	Scatter of potsherds non decorated pieces
17	33.577	0.521	1174	Scatter of decorated and non decorated potsherds
18	33.576	0.521	1174	Scatter of potsherds.
19	33.576	0.521	1172	Rim, Plain
20	33.576	0.521	1171	Scatter of potsherds with decorated and non decorated pieces
21	33.576	0.521	1172	Plain body
22	33.576	0.521	1173	Decorated body
23	33.576	0.521	1170	Scatter of decorated and non decorated bodies
26	33.575	0.522	1165	Scatter decorated with roulette
28	33.575	0.522	1162	Rim, Plain
29	33.575	0.522	1166	Scatter of decorated bodies and a plain Rim.
30	33.575	0.522	1167	Scatter of decorated and non decorated potsherds (Excavation proposed)
31	33.574	0.522	1167	Scatter of Potsherd, Rims, bodies of plain and decorated ones.
37	33.57	0.521	1172	Plain, Rim
38	33.57	0.52	1172	Plain body
40	33.571	0.519	1171	Plain body
41	33.571	0.519	1172	Scatter of decorated and non decorated pieces
42	33.571	0.519	1174	Scatter of decorated and non decorated potsherds
43	33.571	0.519	1172	Scatter of decorated body with punctates. (Excavation proposed)
50	33.574	0.519	1172	Scatter of plain pieces of potsherds, decorated and non decorated.
51	33.574	0.52	1172	Scatter of plain pieces of potsherds.
54	33.575	0.519	1175	Plain, very abraided body.
56	33.575	0.519	1175	Scatter of decorated and non decorated pieces
60	33.577	0.517	1169	Scatter of potsherds

61	33.578	0.518	1167	Rim, decorated.
62	33.58	0.519	1166	Plain, abraded body.
63	33.58	0.518	1161	Scatter of decorated and non decorated potsherds.
64	33.581	0.518	1160	Scatter of very abraded potsherds. (Excavation proposed)
65	33.581	0.517	1160	Decorated body and rim with roulette.
66	33.581	0.517	1157	Full pot still in use at Mr. Omali Charles' home.
67	33.58	0.517	1160	Plain, Rim.
72	33.582	0.516	1148	Scattered, decorated and none decorated bodies.
75	33.582	0.515	1151	Rim, Plain.
77	33.582	0.515	1146	Scatter of potsherds. (Excavation Possible)
82	33.583	0.518	1150	Scatter of decorated and non decorated bodies.
83	33.584	0.518	1151	Scatter of Plain bodies.
84	33.584	0.518	1150	Plain bodies
85	33.584	0.518	1149	High concentration of potsherds. (Excavation possible)
86	33.585	0.518	1151	Scatter of Decorated and non decorated potsherds.
87	33.57	0.52	1171	Rim, decorated with roulette.
88	33.57	0.52	1172	Plain pieces abraded on both surfaces
90	33.57	0.52	1170	Plain body.
91	33.57	0.52	1171	Rim, decorated with punctates.
92	33.57	0.52	1171	Plain body.
94	33.57	0.519	1171	Rim
95	33.571	0.518	1170	Decorated with roulette designs
96	33.571	0.518	1171	Scatter of decorated and non decorated bodies.
98	33.571	0.518	1168	Rim, Plain.
99	33.571	0.517	1168	Rim and body very abraded.
104	33.571	0.516	1168	Scattered potsherds with abraded surfaces.
105	33.571	0.515	1168	Concentration of decorated and non decorated potsherds. (Excavation Proposed)
106	33.571	0.515	1170	Concentration of decorated and non decorated potsherds.
108	33.571	0.515	1167	Decorated bodies.
109	33.572	0.515	1166	Decorated body with roulette.
110	33.572	0.515	1165	Scatter of decorated bodies. (Excavation proposed)
111	33.572	0.514	1168	Concentration of rims, decorated and non decorated bodies. (Excavation proposed)
112	33.572	0.514	1166	Concentration of different parts of the pot such as rim, base and bodies with decorated and non decorated surfaces.
113	33.572	0.514	1163	Decorated body with roulette.
115	33.572	0.513	1163	Scatter of different potsherds
116	33.572	0.513	1162	Decorated body with punctates.
117	33.572	0.513	1162	Plain bodies.
118	33.572	0.513	1161	Scattered rims, with punctates.

119	33.572	0.513	1161	Scatter of decorated bodies with different designs.
120	33.572	0.513	1161	Rim, Plain
121	33.572	0.512	1160	High concentration of decorated and non decorated bodies, Rims. (Excavation proposed)
122	33.572	0.512	1161	Scattered potsherds with abraded surfaces.
123	33.573	0.512	1161	Decorated bodies with roulette.
124	33.573	0.512	1158	Decorated body with roulette.
125	33.573	0.512	1161	Rim, Plain
126	33.573	0.512	1159	Rim, Plain
127	33.574	0.512	1159	Decorated body with grooves.
132	33.574	0.513	1160	Concentration of decorated and non decorated potsherds
133	33.574	0.514	1162	Rim.
136	33.575	0.513	1157	Rim
137	33.575	0.513	1160	Rim
140	33.576	0.512	1156	Decorated body
145	33.574	0.511	1147	Modern ceramics (tiles)
155	33.564	0.524	1156	Rim, Plain
157	33.564	0.523	1158	Decorate body
158	33.565	0.523	1160	Rim, Plain
161	33.565	0.523	1162	Plain body.
162	33.565	0.523	1165	Scattered decorated and non decorated potsherds
164	33.566	0.523	1163	Scatter of decorated and non decorated bodies. (Excavation proposed)
165	33.566	0.523	1165	Potsherds of decorated and non decorated bodies
166	33.566	0.524	1164	High concentration of decorated and non decorated Potsherds.(Excavation proposed)
167	33.566	0.525	1165	Rim, Decorated body
168	33.566	0.524	1165	Rim, Plain
169	33.566	0.524	1164	Plain body.
170	33.566	0.524	1164	Scatter of potsherds
171	33.565	0.524	1159	High concentration of potsherds. (Excavation proposed)
172	33.565	0.524	1160	Decorated body with horizontal parallel grooves
174	33.567	0.522	1164	Decorated body with punctates.
176	33.567	0.522	1165	Rim, Plain
177	33.567	0.522	1167	Plain potsherds, (Excavation proposed)
178	33.567	0.522	1167	Concentration of Decorated and non decorated bodies (Excavation proposed)
179	33.568	0.522	1168	Scatter of Decorated and non decorated potsherds.
180	33.568	0.523	1169	Plain body.
181	33.568	0.523	1165	Decorated potsherds
183	33.568	0.523	1167	Decorated and non decorated potsherds
185	33.568	0.524	1167	Plain



186	33.568	0.525	1166	Scatter of very abraded potsherds of both decorated and non decorated ones (Excavation)
187	33.567	0.525	1164	Scatter of decorated and non decorated potsherds in Situ.
188	33.567	0.525	1164	Decorated body
194	563221	56554	1156	Rim with panctates
246	565681	58161	1143	Rim, Decorated
205	563303	57038	1163	Rim, Plain
229	565731	57445	1143	Rim, Plain
236	565697	57753	1150	Rim, Plain
254	565519	58196	1142	Rim, Plain
242	565697	58063	1144	Rims, spread plain, very abraded
197	563258	56625	1155	Scatter of decorated and non decorated bodies on the surface.
199	563157	56669	1153	Scatter of decorated and non decorated potsherds.
200	563173	56768	1154	Scatter of decorated and non decorated potsherds.
245	565684	58131	1144	Scatter of decorated and non decorated potsherds.
196	563243	56578	1155	Scatter of decorated rims and bodies.
251	565583	58261	1146	Scatter of different decorated and non decorated potsherds
248	565669	58196	1142	Scatter of potsherds.
230	565759	57438	1141	Scattered decorated and non decorated bodies.
221	562703	57820	1156	Scattered potsherd
222	562736	57805	1158	Scattered potsherd, Excavation proposed

**Table 165: Location of Lithic Sites within the Study Area**

Waypoint	Longitude	Latitude	Elevation	Description
237	565732	57850	1150	Core fragment.
234	565648	57717	1151	Core Quartz
238	565717	57871	1146	Flakes of core fragments
235	565676	57738	1149	Flakes of Quartz
915	33.587095	0.524931	1154	Core, Small in size
916	33.587394	0.524618	0	Quartz
918	33.587772	0.524446	1155	Quartz
920	33.587832	0.524126	1156	Flake of clear quartz
921	33.587874	0.524066	1155	Flake of clear quartz
922	33.587886	0.524055	1155	Two clear fragments of quartz
923	33.587951	0.524004	1156	Flake with some retouches of quartzite.
924	33.588061	0.524073	1156	Granite flake
925	33.588093	0.524009	1154	Flake clear quartz
926	33.588077	0.523859	1154	Flake of quartz
929	33.588927	0.52409	1144	Flake
930	33.588977	0.524219		Broken blade
932	33.588822	0.52493	1151	Core
933	33.589318	0.525103	1149	Fragment
936	33.58946	0.524762	1151	Flakes with retouches.
943	33.588261	0.527219	1147	Core
962	33.588431	0.519831	1148	Flake work retouches of clear quartz
980	33.579004	0.523424	1164	Fragments of Quartz

Waypoint	Longitude	Latitude	Elevation	Description
992	33.57955	0.522609	1165	Discoid, Quartz
994	33.579528	0.522527	1165	Flake of quartz
011	33.578205	0.521024	1171	Flake of clear quartz
016	33.576887	0.52089	1172	Flake of clear quartz
034	33.571008	0.521471	1172	Flake of quartz
039	33.570636	0.519286	1171	Flake of clear quartz
045	33.57339	0.519379	1172	Scatter of microlithic artifacts
047	33.573535	0.519414	1172	Two cores and flake
048	33.573695	0.51946	1174	Scatter of flake fragments of quartz
073	33.581685	0.515566	1148	Grinding stone in the middle of a banana plantation.
089	33.569976	0.519928	1171	Flake fragments.
097	33.570465	0.51785	1169	Flake of clear quartz
101	33.570593	0.516204	1171	Grinding stone
128	33.573769	0.512622	1160	Sharpening Stone.
130	33.573945	0.512745	1162	Grinding stone.
131	33.57405	0.512871	1158	Core of quartz
138	33.575117	0.512563	1159	Grinding stone.
150	33.57326	0.510806	1155	Grinding stone.
160	33.564848	0.522711	1161	Core fragments
175	33.566983	0.5222	1166	Fragments of Quartz
057	33.575571	0.518711	1175	Flakes of quartz
184	33.567532	0.522855	1167	Core of quartz

Table 166: Analysis of Lithic Artefacts

Waypoint	Longitude	Latitude	Elevation	Village	Tool Types	Raw material
920	33.587832	0.52413	1156.0387	Mawololo	Straight Double-Sided Scraper	Quartz
921	33.587874	0.52407	1155.2657	Mawololo	Whole Flake	Quartz
923	33.587951	0.524	1156.3488	Mawololo	Multi-Platform Core	Quartz
923	33.587951	0.524	1156.3488	Mawololo	Multi-Platform Core	Quartz
923	33.587951	0.524	1156.3488	Mawololo	Multi-Platform Core	Quartz
924	33.588061	0.52407	1156.0219	Mawololo	Whole Flake	Basalt
925	33.588093	0.52401	1153.7904	Mawololo	Whole Flake	Quartz
926	33.588077	0.52386	1154.3562	Mawololo	Levallois Whole Flake	Quartz
929	33.588927	0.52409	1144.0291	Mawololo	Hafted Point	Quartz
930	33.588977	0.52422	0	Mawololo	Trimmed Whole Flake	Quartz
932	33.588822	0.52493	1150.8438	Mawololo	Multi-Platform Core	Quartz
936	33.58946	0.52476	1150.8201	Mawololo	Whole Flake	Quartz
936	33.58946	0.52476	1150.8201	Mawololo	Levallois End Scraper	Quartz
962	33.588431	0.51983	1148.0125	Mawololo	Whole Flake	Quartz
987	33.579342	0.52282	1164.3483	Buyayu	Single Platform Core	Quartzite
992	33.57955	0.52261	1164.8372	Buyayu	Core Axe	Quartz
994	33.579528	0.52253	1165.0736	Buyayu	Nosed Scraper	Quartz
011	33.578205	0.52102	1171.2754	Buyayu	Whole Flake	Quartz
016	33.576887	0.52089	1171.9324	Buyayu	Double Sided Scraper	Quartz

034	33.571008	0.52147	1171.7808	Makandwa Central	Levallois Circular Scraper	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Point	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Whole Flake	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Whole Flake	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Side And End Scraper	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Whole Flake	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Whole Flake	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Side Scraper	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Whole Flake	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Whole Flake	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Whole Flake	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Whole Flake	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Whole Flake	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Whole Flake	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Whole Flake	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Flake Fragment	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Single Platform Core	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Single Platform Core	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Single Platform Core	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Single Platform Core	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Single Platform Core	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Core Fragment	Quartz
045	33.57339	0.51938	1172.4701	Makandwa Central	Core Fragment	Quartz
046	33.573483	0.51943	1171.7546	Makandwa Central	Core Fragment	Quartz
047	33.573535	0.51941	1172.0039	Makandwa Central	Levallois Flake	Basalt
047	33.573535	0.51941	1172.0039	Makandwa Central	Amorphous Core	Quartz
047	33.573535	0.51941	1172.0039	Makandwa Central	Whole Flake	Quartz
047	33.573535	0.51941	1172.0039	Makandwa Central	Discoid	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Single Platform Core	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Single Platform Core	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Single Platform Core	Quartz

048	33.573695	0.51946	1174.1318	Makandwa Central	Single Core Platform	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Single Core Platform	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Single Core Platform	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Core Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Core Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Core Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Core Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Core Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Core Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Core Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Core Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Whole Flake	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Whole Flake	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Whole Flake	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Whole Flake	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Whole Flake	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Whole Flake	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Whole Flake	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Whole Flake	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Core Axe	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Discoïd	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Flake Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Flake Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Flake Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Flake Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Flake Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Flake Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Flake Fragment	Quartz

048	33.573695	0.51946	1174.1318	Makandwa Central	Flake Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Flake Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Flake Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Flake Fragment	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Single Sided Scraper	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Single Sided Scraper	Quartz
048	33.573695	0.51946	1174.1318	Makandwa Central	Single Sided Scraper	Quartz
057	33.575571	0.51871	1174.8391	Makandwa Central	Whole Flake	Quartz
057	33.575571	0.51871	1174.8391	Makandwa Central	Convex Double Sided and Notched Scraper	Quartz
073	33.581685	0.51557	1148.0503	Makandwa Central	Grinding Stone	Quartz
089	33.569976	0.51993	1170.7814	Makandwa Central	Single Platform Core	Quartz
097	33.570465	0.51785	1169.4382	Makandwa Central	Whole Flake	Quartz
097	33.570465	0.51785	1169.4382	Makandwa Central	Whole Flake	Quartz
131	33.57405	0.51287	1157.6302	Makandwa Central	Core Axe	Quartz
160	33.564848	0.52271	1160.6521	Nakavule	Multi-Platform Core	Quartz
160	33.564848	0.52271	1160.6521	Nakavule	Circular Scraper	Quartz
184	33.567532	0.52286	1167.319	Nakavule	Multi-Platform Core	Quartz
235	565676	57738	1149	Mawololo	Core Fragment	Quartz
235	565676	57738	1149	Mawololo	Core Fragment	Quartz
235	565676	57738	1149	Mawololo	Multi-Platform Core	Quartz
235	565676	57738	1149	Mawololo	Notched Scraper	Quartz



## 23 ANNEX X: PROJECT BACKGROUND INFORMATION PRESENTATION IN ENGLISH AND LUSOGA.

### 23.1 English Version



## MAKUUTU RARE EARTHS PROJECT - CENTRAL MINING PIT ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

## INTRODUCTION

Australian based Ionic Rare Earths Limited (“IonicRE”) made the decision to acquire and develop the Makuutu Rare Earths Project (“Makuutu” or “Project”) stretching 30 km across four districts of Eastern Uganda namely, Bugweri, Iganga, Mayuge and Bugiri after a careful consideration of the risks and opportunities.

The Makuutu deposit is one of a few economically sized and undeveloped ionic adsorption clay (IAC) based rare earth element (REE) deposits outside of southern China. Makuutu will mine 500 million tonnes of ore and waste material over its 27-year life to produce 79,213 tonnes of mixed Rare Earth Oxide (REO) with a value of US\$7.6 billion. It will be a significant financial contributor to Uganda, with estimated gross royalty payments of US\$380M plus corporate tax contributions of US\$965M over the life of the project.

The Project will additionally ensure that the livelihoods, food security and social connections of Project Affected Persons are secured and that significant investment in community development will deliver improved education, community health and financial outcomes for local communities and Uganda more broadly.

Makuutu will be a globally significant enabler of the necessary transition from fossil-fuel power to renewable energy. It will supply sufficient heavy rare earth element resources to produce approximately 90 GW of gearless direct drive offshore wind turbines by 2050. This will globally displace 300 million tonnes a year of coal-fired carbon dioxide emissions to positively mitigate the magnitude of climate change and its negative effects on countries like Uganda. The Project covers five (5) exploration areas that are registered under five (5) licences (Retention Licence 1693, Retention Licence 00007, Exploration Licence 1766, Exploration Licence EL00147 and Exploration Licence EL00148).

Makuutu is an advanced-stage, ionic adsorption clay-hosted project highlighted by near-surface mineralisation, significant exploration upside, excellent metallurgical characteristics and access to tier-one infrastructure.

## DESCRIPTION OF THE MAKUUTU RARE EARTHS PROJECT

### a) The Project

The Project will process the minerals prior to exportation. This is consistent with the Uganda Vision 2040 that states, “To promote local beneficiation, the country will ensure value addition on the minerals and provide manufacturing feedstock.”

The Project plans to produce a mixed rare earth carbonate, which by industry standards is very much a value-added product with the following characteristics:

- a) It is a chemical precipitate, not a mineral concentrate; and
- b) It is free of many impurities that would compromise the downstream process of splitting the rare earths into the various individual rare earth oxides at a capital-intensive, technically complex separation plant.

The advantage for the Makuutu clays is that rare earths extracted from clays do not require further milling, crushing or cracking but purely separation and refining – a genuine rare earth chemical concentrate.

Once the residue has been heaped, leached and washed, the heap will be allowed to drain all free moisture, and the residue will then be back-filled into the mining pits to allow the ground to be rehabilitated.

In summary, ore will be extracted, processed, washed, and rinsed, then returned to the mining pit – following which the land will be topsoiled and restored to productive agricultural land (see Figure 1 below).

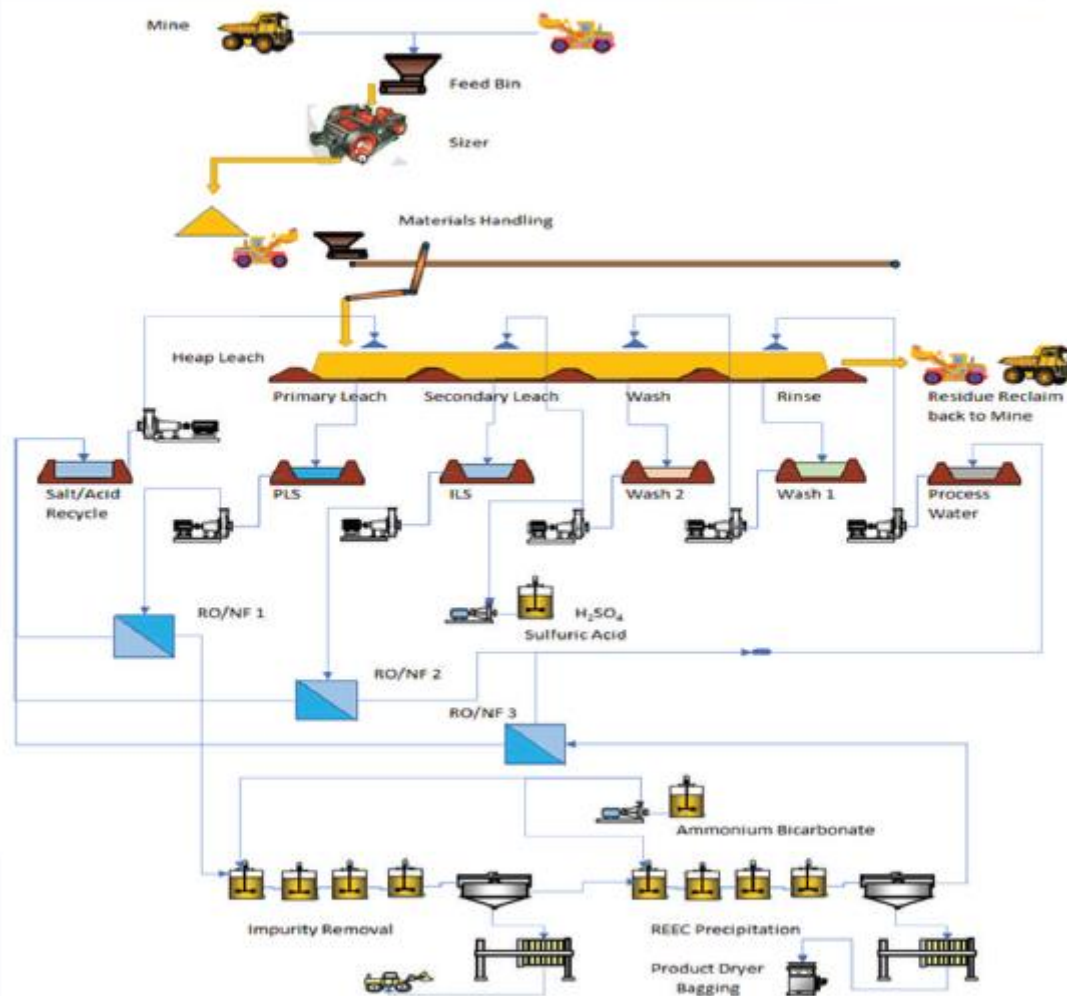


Figure 1: Process Flow for the Makuutu REE Project



**b) Mining Process**

One metre of topsoil will be stripped and stockpiled followed by truck and shovel removal of the overburden and clay-ore (refer Figure 2). The clay-ore will be transported 4km to the Process Plant on a dedicated haul road separate from public roads. The REE then will be desorbed from the clay in a heap leach process. The overburden and spent ore will be returned to the mining pit and capped with the stored topsoil to return the land to productive agricultural land.



Figure 2: Truck and Shovel Operation



### c) Heap Leaching Process

Transported ore will be directly placed on an impermeable plastic liner (Figure 3) and irrigated with an ammonium sulfate (Amsul) desorption / leach solution to desorb / dissolve the rare earths (refer Figure 4). The REE will then be precipitated as a REE carbonate product which will be filtered, dried and bagged for export. It will take about 3 months to desorb all REE from the ore which will then be washed prior to back-filling the mining void along with the overburden. The Project will therefore have no mining voids, waste-dumps or tailings dams at the end of mine life. This process, in combination with no requirement for energy intensive grinding, gives the Makuutu Project an exceptionally small environmental footprint for its scale.



Figure 3: Heap leach construction, showing the plastic liner being laid on the left. On the right, the base is applied on top of the liner and the ore is stacked on top within the heap leach cells



Figure 4: Heap leach under operation with drip irrigation spreading desorption/leach solution across the heap in the foreground, and solution collection ponds in the background

#### d) Additional Project Details

The Project will initially employ 546 people which will rise to 1,200 at peak production by Year 10 and provide significant economic stimulus to local communities through the purchase of local goods and services. The Project aspires to its employees being 100% Ugandan by Year 7 onwards. The Project is additionally developing plans to minimise social impacts.

#### Of particular relevance to this are:

- The processing facility will sit on 200 ha of land in an area with minimal social and environmental impacts.
- Implementing a staged life of mine mining and rehabilitation plan that allows agricultural land required for mining to be acquired on short-term leases, and be rehabilitated back to productive agriculture land prior to return to the land-owner. This minimises the disturbance footprint and the scale of relocation in addition to leaving no legacy issues at the end of mining.
- Robust Compensation and Resettlement Action Plan to prevent hardship for temporarily displaced people.
- Collaborative infrastructure development programmes with local town planners aligned with the life of mine mining and rehabilitation plan to minimise impacts on local towns.

#### LOCATION AND EXTENT OF THE PROJECT

Figure 5 below indicates the location of Makuutu Rare Earths Project.

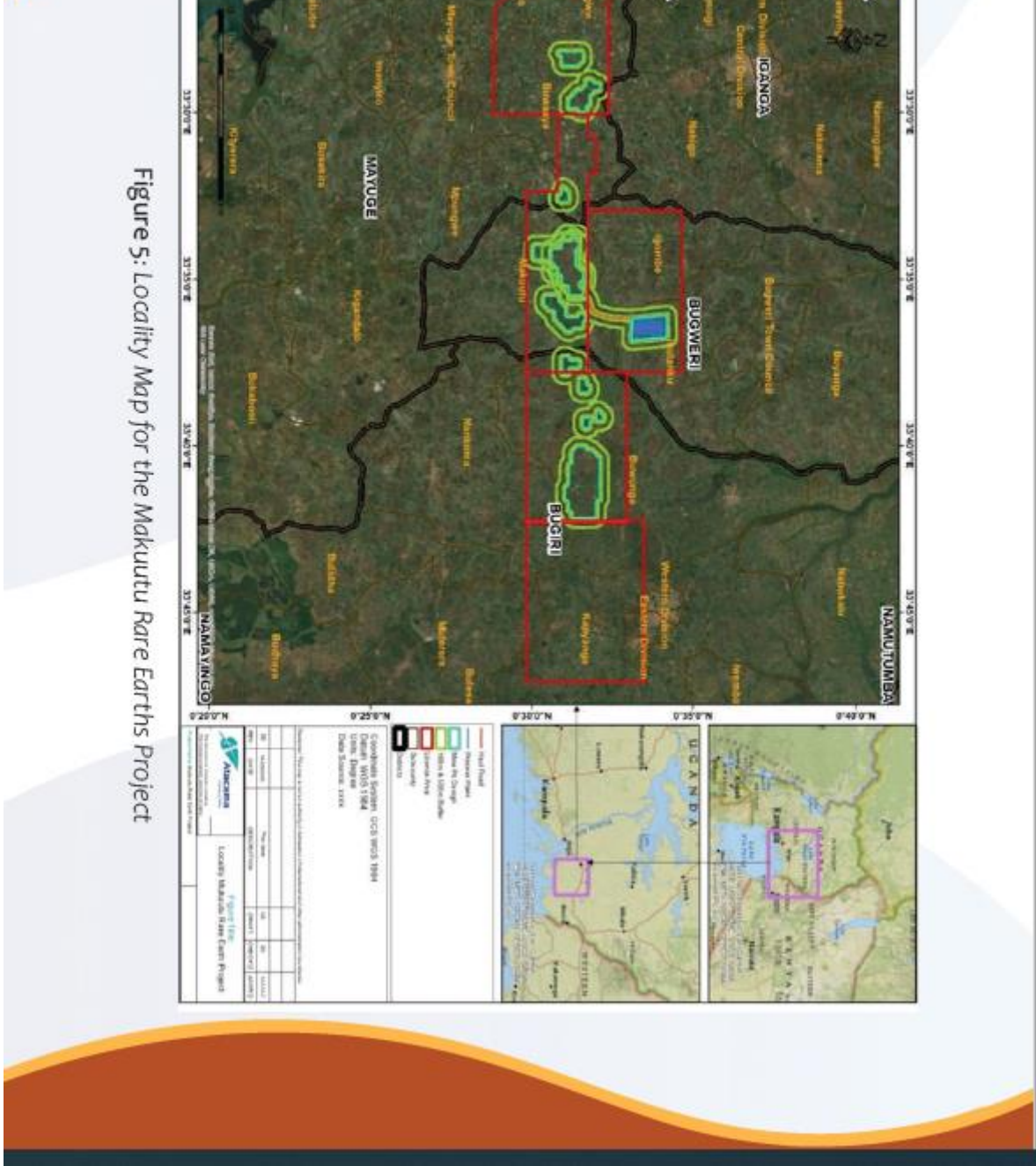


Figure 1 consists of two maps. The left map is a regional map showing the Lake Chad basin and the surrounding countries: Chad, Nigeria, Cameroon, and the Central African Republic. A pink rectangle indicates the study area. The right map is a more detailed map of the study area, showing the location of the study area (indicated by a pink rectangle) within the context of the Lake Chad basin and the surrounding countries (Chad, Nigeria, Cameroon, and the Central African Republic).



**e) Makuutu Central Mining Pit**

The proposed Makuutu Central Mining Pit is located in Nakavule, Makandwa Central and Mawololo villages, Makuutu Sub-county, Bugweri District (see Figure 6 below). Ore will be extracted, processed, washed, and rinsed, then returned to the mining pit – following which the land will be rehabilitated. The mining site will then be restored in line with the legal requirements.

**f) Processing Plant**

The processing plant shall receive the mined clays that will be processed and it will be located in Businda B, Bunyantole, Kabugweri and Namiganda villages, Ibulanku and Igombe Sub-counties, Bugweri District (area shaded blue in Figure 5 above).

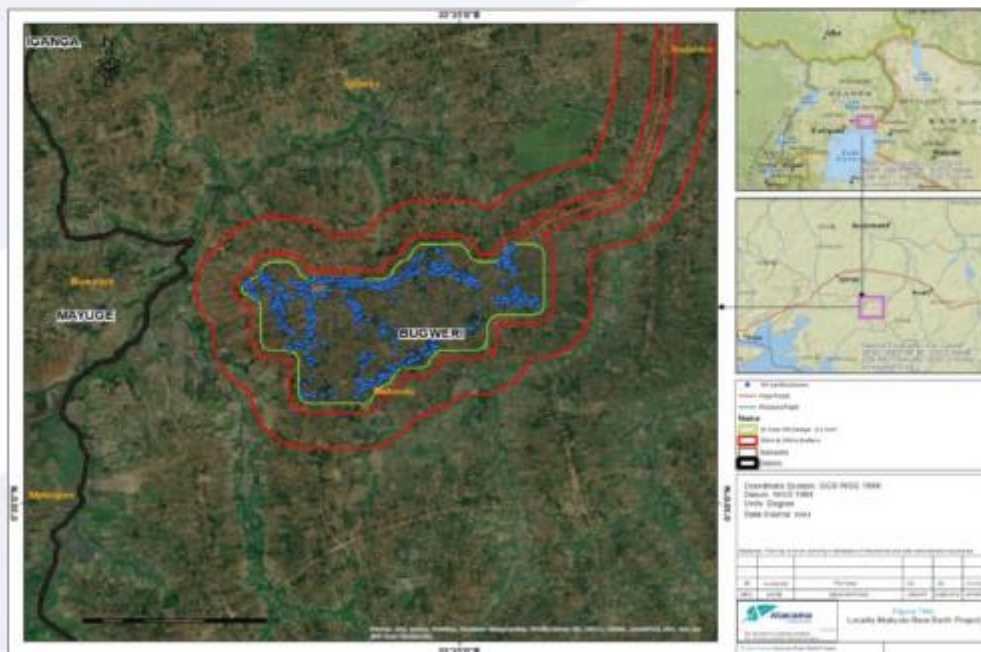


Figure 6: Map showing the Makuutu Central Mining Pit Project

## PURPOSE OF THIS DOCUMENT

The purpose of this PBID is to provide a brief description of the proposed Makuutu Rare Earths Project and to obtain comments and contributions from Interested and Affected Parties (I&APs) on the issues relating to the proposed Project.

Issues of concern and potential environmental and social impacts will be evaluated during the environmental and social impact assessment process.

The Environmental and Social Impact Assessment (ESIA) report, including concerns raised by I&APs will be submitted to the National Environment Management Authority (NEMA) for review and approval.

You are, therefore, hereby invited to comment on the environmental and social issues relating to the proposed Makuutu Rare Earths Project. Your comments will inform the ESIA report and ensure that relevant issues are evaluated.

## NEED FOR THE ESIA

The National Environment Act, 2019 list projects which require an ESIA. The activities are listed in Schedule 5, Part B and they include:

- a) Mineral exploration.
- b) Mining of metal and non-metal minerals.
- c) Processing of minerals, including smelting and refining of ores.

The above are activities associated with the proposed Makuutu Rare Earths Project. The ESIA is conducted in line with:

- 1. Uganda's National Legal requirements;
  - 2. International Finance Corporation (IFC) Performance Standards on Environment and Social Sustainability; and
  - 3. The Equator Principles.
- The project proponent is committed to upholding the highest degree of environmental and social safeguards.



## STAKEHOLDER ENGAGEMENT AND CONSULTATION

Effective ESIA process requires regular engagement with a wide range of stakeholders that play a significant role in shaping or affecting the Project. Therefore, during the ESIA process, it is essential that stakeholder engagement is undertaken to secure the meaningful participation of all stakeholders. Figure 7 indicates the general stakeholder consultation phases for the Project, and Figure 8 indicates the stages at which the stakeholder engagement team will engage with stakeholders during the Project planning and implementation process.

Therefore, an important part of preparing an ESIA is to define and inform stakeholders of the proposed Project and the process being followed as well as to identify issues and concerns.

During the ESIA process, meaningful engagement with Central Government Agencies, Local Government/District, Sub-county and Village leadership, project affected communities, Non-Governmental Organisations/Civil Society Organisations, private sector, among others will be undertaken to provide a better understanding of the Project, resulting in more informed decision-making.



Figure 7: General Stakeholder Consultation Phases for the Project

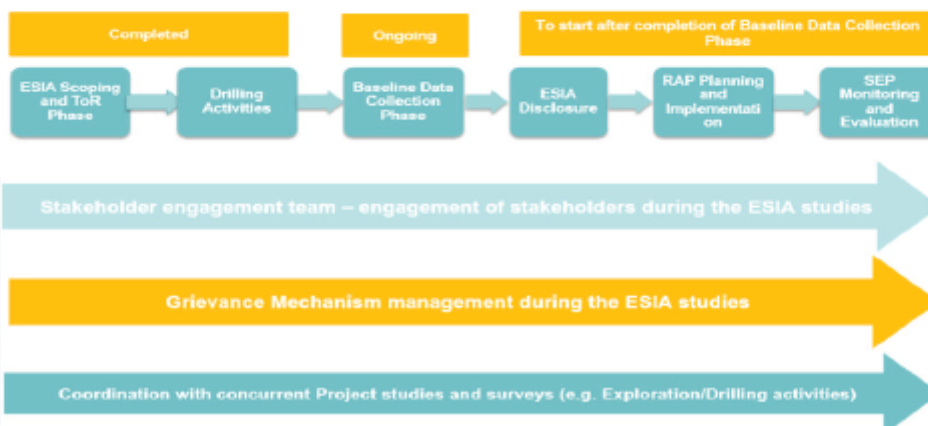



Figure 8: Stages of Stakeholder Consultation during the Project Planning Phase

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED MAKUUTU RARE EARTHS PROJECT – REPLY SLIP	
<p>This reply slip is provided to assist consultee responses. Please complete it and return it with your comments via post or email to Atacama Consulting (<a href="mailto:tonneyssemmanda@atacama.co.ug">tonneyssemmanda@atacama.co.ug</a>) copying <a href="mailto:admin@atacama.co.ug">admin@atacama.co.ug</a>.</p> <p>Alternatively, have the completed form ready for collected by an Atacama Consulting representative. Please inform us by phone (0783148101) if you need us to collect your completed form so that we can make the necessary arrangements to pick it up.</p>	 <p><b>The return address for comments:</b></p> <p>Atacama Consulting Plot 22B, Lower Naguru East Road, Naguru P.O. Box 12130, Kampala, Uganda. Email: <a href="mailto:tonneyssemmanda@atacama.co.ug">tonneyssemmanda@atacama.co.ug</a> Telephone: +256 (0) 783148101</p>
<p><b>Name of Project:</b> Environmental and Social Impact Assessment for the Proposed Makuutu Rare Earths Project.</p>	
<p><b>Name of Respondent:</b></p>	
<p><b>Address of Respondent:</b></p>	
<p>Do you hold any data /information which you consider to be of relevance to this study? If so, what type of information is it?</p>	
<p>What are your major interests and concerns with the proposed Project?</p>	
<p>Are there other environmental/social constraints or opportunities you would like to be considered in the study?</p>	
<p>Are there any additional stakeholders who you feel should be consulted regarding the proposed Project?</p>	
<p>Are there any omissions in the Project Background Information Document for which you require more information?</p>	
<p>Are there any other comments you would like make?</p>	



**QUESTIONS OR COMMENTS?**

**In Person:**

Atacama Consulting, Plot 22B Lower Naguru East Road, Naguru, Kampala.

**Telephone :**

+256 (0) 783148101

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**Post:**

Atacama Consulting, P.O Box 12130, Kampala, Uganda

## 23.2 Lusoga Translation



**PULOJEKITI YA MAKUUTU EKOLA KWITAKA / AMABAALE  
AGATABONHEKABONHEKA**

**OKUNHONHEREZA N'OKUGERAGERANHYA OBUZIBU /  
OKUKOSA OKUSOBOLA KUTUUKA KU BUTONDHE  
N'EMBEERA DHABANTU NGA BUVA MU IROMBE EKIKULU**

**EKIGHANDHIIKO EKIINHONHOLA EBIGEMA KU PULOJEKITI**





## ENANDHULA

Ionic Rare Earths Limited (“IonicRE”) esinzira Australia yasalagho okweiriza n’okukulakulanya pulojekiti ya Makuutu Rare Earths (“Makuutu” oba “Project”) eyagayaga ni 30 km okubita mu distrikiti inha edh’omu buvandhuba bwa Uganda dhebeeta, Bugweri, Iganga, Mayuge ni Bugiri ng’emaze n’okwekenhenhya eby’okwekengera n’emikisa.

Ekirombe kya Makuutu kiri kirala kw’ebyo ebitono ebinha emiganhulo aye nga birimu eitosi ery’okungulu erimu kubyuma bitonotono [undeveloped ionic adsorption clay (IAC)], dhebata mu mitendhera gy’ebirombe bya rare earth element (REE) ebisangibwa ku luya lwa maserengeta ga China. Makuutu eidha ku sima tani obukaire 500 obwa ore n’ebikandha (waste material) mu myaka gyayo 27 okukola tani 79,213 edhirimu kyebeeta Rare Earth Oxide (REO) nga mulimu emighanhulo gya billiyoni US\$7.6. Kiidha kuba kya mugaso inho mu ngingiza ya seente mu Uganda, okugerageranhya omugaite ogw’ensasula ya milliyoni US\$ 380 okwo ng’ogaiseku omusolo gwa miliyoni US\$ 965 mu kiseera pulojekiti kyenhamala.

Pulojekiti eidha kugaitaku okufuba okubonha nga embeera y’abantu, ebyokulya, n’enkolaganha y’abantu abanagemebwaku (Project Affected Person) eri bukalamu/ ekuumibwa bulungi era nga bataamu n’enkulakulana enhaleeta enkyukakyuka mu by’okusoma, obulamu bw’abantu n’ebyenfunha mu byalo ghalala ni mu Uganda yonhan yonha.

Makuutu eidha kuba yamugaso muni yonha yonha mu kusobozesa enkyukakyuka eyetaagisa okuva ku maanhi ag’amafuta agava mwitaka (fossil-fuel power) okwira ku maanhi agatawagho/agaizibwagho (renewable energy). Eidha kughereza/kukola amaanhi agamala aga heavy rare earth element resources okugerageranya kwa 90 GW aganh’ataambuza ebiwuudho/ebyuma ebyetoloola n’empewo ebitali bya giya (gearless direct drive offshore wind turbines) ghegunaatukira omwaka 2050. Kinho kiidha kutoolagho tani miliyoni 300 ey’omwika omubi muni yonha yonha oguva mu maandha (coal-fired carbon dioxide emissions), okuyamba okukomya obuzibu bw’enkyukakyuka y’embeera dh’obwire (Climate Change) n’obuzibu bwe kireeta mu nsi nga Uganda. Pulojekiti etwala ebifo bitaanho (5) ebyawandikibwa mu licence itanho (5) dhino (Retention Licence 1693, Retention Licence 00007, Exploration Licence 1766, Exploration Licence EL00147 ni Exploration Licence EL00148).

Makuutu ekuliriire mu mitendhera gya pulojekiti edhikola kwitosi elyaghaigulu erimu obuuma, edhiragibwa nga edhirina/edhirimu eby’obugaiga bw’omwitaka nga buli kuumpi era nga eligasa mu kusima okwa ghaigulu, nga lirina embeera enhungi inho ey’ebyuuma erituukibwaku kwidhaala lirala.



## ENHINHONHOLA YA PULOJEKITI YA MAKUUTU (MAKUUTU RARE EARTHS PROJECT)

### a) Pulojekiti

Pulojekiti eidha kusuunsula eby'obugaiga eby'omwitaka nga ekaali ku bitwala ku luya. Kinho kiikiriziganhya ni Uganda Vision 2040 ekoba nti okukulakulanhya okusima obugaiga bwomwitaka mu nsi, ensi eidha kufuba okubonha nga eyongera omugaso mu bugaiga obusimibwa n'okutaagho eby'okukozesa mu makolero ("To promote local beneficiation, the country will ensure value addition on the minerals and provide manufacturing feedstock.")

Pulojekiti eteteeka okukola/okufulumya a mixed rare earth carbonate abalirwa mubyamakolero mw'ebyo eby'ongeirwamu emiganhulo era ng'erina embeera dhino ghansi:

- a) Kiri kyebeeta chemical precipitate, ti mineral concentrate; ate
- b) Kiziramu bunhaga /nkeenu obu/esobola kutabula mulimu gwa kwaasa mabaale agatabonhekabonheka (rare earths) okugafuula obutundhu tundhu obwa rare earth oxides mwikolero ery'amaani mukusunsula n'okwaghula nga bakozesa obukugu/obukenkufu obwa waigulu.

Ekirungi ekiri mwitosi lya Makuutu (Makuutu Clays) n'okuba nga ebisimibwa mu Itosi tiryetaaga kwongera kusa, kumenhengula oba kwaasa okutoolaku okwaghula n'okulongosaamu- ekireta/ekivaamu kyebeeta a genuine rare earth chemical concentrate.

Ekenku bwemala okuteekebwa mu ntuumo, okutoolebwamu ebikyafu, n'okunaazibwa, entuumo eyidha kwikirizibwa okuvaamu amaadhi gonha gonha meemale enkenku bayidha kugiizaamu mu biinha okusobozesa eitaka okwizibwa mu mbeera enhungi.

Mu bumpi ekitabule (ore) kiiidha kusimibwa, kusunsulwa, kwozebwa n'okumunhunguzibwa meemale kiizibwemu mu biinha olwo bayizeeku eitaka ghaigulu liizibwegho okusobola okulimibwaaku. (bonha ekifanhani ekiiraku ghansi)

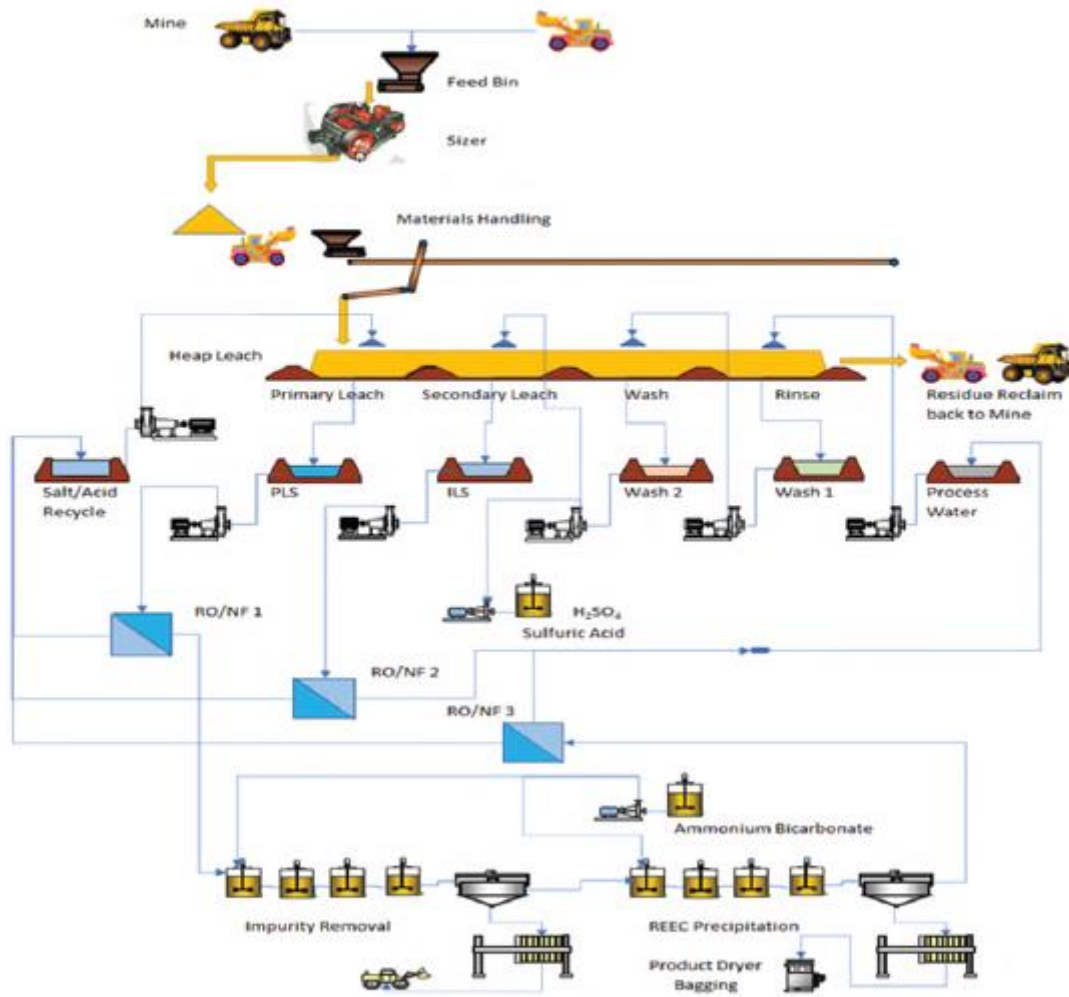


Figure 1: Entambuza ya pulojekiti ya REE eya Makuutu

### b) Omulimu/omukolo gw'okusima

Eitaka lya ghaigulu erigheza mita ndala liidha kutoolebwaku balite mu ntuumo meemale batoolegho eliiraku n'eitosi eririmu obuuma (overburden and clay-ore) nga bakozesa dhi loole-majegere n'ebitiyo (bonha ekifaanhanyi mu Figure 2). Eitosi eririmu obuuma (clay-ore) bayidha kulitambuza 4km okutuuka kwikolero erisunsula/erirongoosa nga babita ku luguudo olunhaaba nga balukalakase olw'omulimo ogwo gwonka nga lwaghufu kunguudo edhikozesebwa abantu. Mpeghanho REE ayidha kwawulibwa/kutoolebwa mw'itosi mu ngeri y'okunaaza. Eitosi erigheiremu buuma ni ore agheiremu ensa biidha ku biiza mu biinha balibwiike n'eitaka lire lyebaatooolaku ni batereka okusobola okwiza eitaka linho mugeri elisobozesa okulimibwa.



Figure 2: Okutiya/okutoolaku eitaka ni dhi loore-majegere n'ebitiyo



### c) Okwooza entuumu (Heap Leaching Process)

Ebisimibwa (Ore) byebanhatwaala ayidha kuteekebwa ku kiveera ekitabisa maadhi [impermeable plastic liner (Figure 3)] bamuyiweku ebirungo bya ammonium sulfate (Amsul) desorption / leach solution okutoolamu/okumenhengula amabaale ago/ebitole ebyo agatabonhekabonheka (rare earths) (bonha Figure 4). Mpeghaanho REE eidha kufuulibwa (Presipitated) nga REE carbonate yebanhaseengeedha, bakaze n'okugipakira mu nsagho edhoku twaala ku luya lwa Uganda. Kiidha kutwala nga emweezi 3 okutoolamu REE yonha yonha mu kitabule (ore) bamale bagyooze nga bakaali kugiizaamu mu biinha ghalala n'enkenku. N'olwe'kyo pulojekiti teidha kuba na biinha, ebifo bya kasasiro, oba ebisigalira bya bidhiba ng'omulimo gwayo gugheire. Omulimo gunho ng'ogaiseku obuteetaga kusima kwamanhi kighereza pulojekiti ya Makuutu ebisigalira bitono inho okusinziira ku bubba bwayo.



Figure 3: Okuzimba entuumo nga kiraga ekiveera ekigumu nga bali kukyaala ghansi kumukonho ogw'iekono (Left). kwidyo(Right) bali kutaaku eitaka nga batairemu obutuli obunhavyamba mu kunaaza.



Figure 4: Entuumo nga baliidhooza nga bakolesa ebirungo byebabisa mu bupayipu, n'ebidhibaby'ebirungo enhuma mu kifaanhanhi.

#### d) Eby'okwinhonhola ebiindhi ebigema ku pulojekiti

Pulojekiti mu kusooka eyidha kukolesa/kugha abantu 546 emirimo meemale beeyongere babe 1,200 mu bwire obwookukola n'amaanhi mu mwaka gwa 10 (ogw'eikumi) era etumbule/ ekulakulanhye abantu b'okukyalo nga babagulaku ebintu byebatuunda agho mu byalo n'empeereza dhe balinadho. Pulojekiti esuubira abakozi baayo okuba 100% bannha Uganda bw'enhatukira mu mwaka ogw'omusanvu okweyongerayo. Pulojekiti erinsha pulaani /entekateeka okukeendeeza obuzibu/okukosa mu mbeera dh'abantu.

#### Ebisinga kwetagisa/kutugemaku ni binho:

- Eikolero liidha kuba/kutyama kw'itaka eryaga 200 ha mu kifo ekizira kukosa mbeera dh'abantu na mbeera ya bwire inho.
- Okuta munkola enteekateeka y'okusima n'okulongosa ebirombe, ey'omu mitendhera, enasobozesa okufunha eitaka eririmibwa elinaaba lyetagibwa, mu nkola ya okukozesebwa okumala obwire butonho (short-term leases), meemale liirizibwe mwenhe lyo nga bamaze okulirongoosa okuba nga lisobola okulimibwa. Kinho kiidha kukeendheza okuteghanhya/okukosa abantu mungeri y'okubaseengula n'okusobola obutaleka nkululo/buzibu nga okusima kugheire.
- Pulaanhi (plan) enuungi ey'olugha n'okwiiza abantu bebasengwiire okweghala okubata mu buzibu.
- Pulogulamu ey'okukolaganha ghalala n'abategeka obubuga/butawuni mu kubukulaakulanhya ng'egemaganha ni pulaani ey'okusima n'okulongosa eitaka mu kiseera kyebanaamala aye ng'ekendheza okukosa obubuga.

### **EKIFO PULOJEKITI GHENAABA N'OBUBBA BWAYO**

Ekifaananhi Figure 5 ekiiraku kiraga pulojekiti ya Makuutu Rare Earths ghenaaba





Figure 5: Maapu eraga ekifo pulojekiti ya Makuutu Rare Earths gheenadba

e) Ekirombe kya Makuutu ekikulu

Ekirombe kya Makuutu ekiroghozebwaaku ekikulu kiidha kuba mu byalo bya Nakavule, Makandwa Central ni Mawololo, mu Makuutu mwigombolola lya Makuutu, (Makuutu Sub county), mu Bugweri District. (bonha ekifaananhi nu Figure 6 ekiiraku). Ebinaasimwa (Ore) biyidha kusimibwa, Bolongoosebwe, binaazibwe era binhumunguluzibwe, meemale biizibwe mu biinha/ebirombe, olwo eitaka lirongoosebwe. Ekirombe kiidha kwiizibwa buyaaka nga babita mu mateeka ageetagibwa.

f) Eikolero (Processing Plant)

Eikolero liidha kufunha eitosi erisiimiibwa lirongoosebwe era liidha kuba mu byalo bya Busindi B, Bunyantole, Kabugweri nu Bugweri District (bonha ekifo ekisiigiirwa mu kifaananhi Figure 5 ghaigulu)

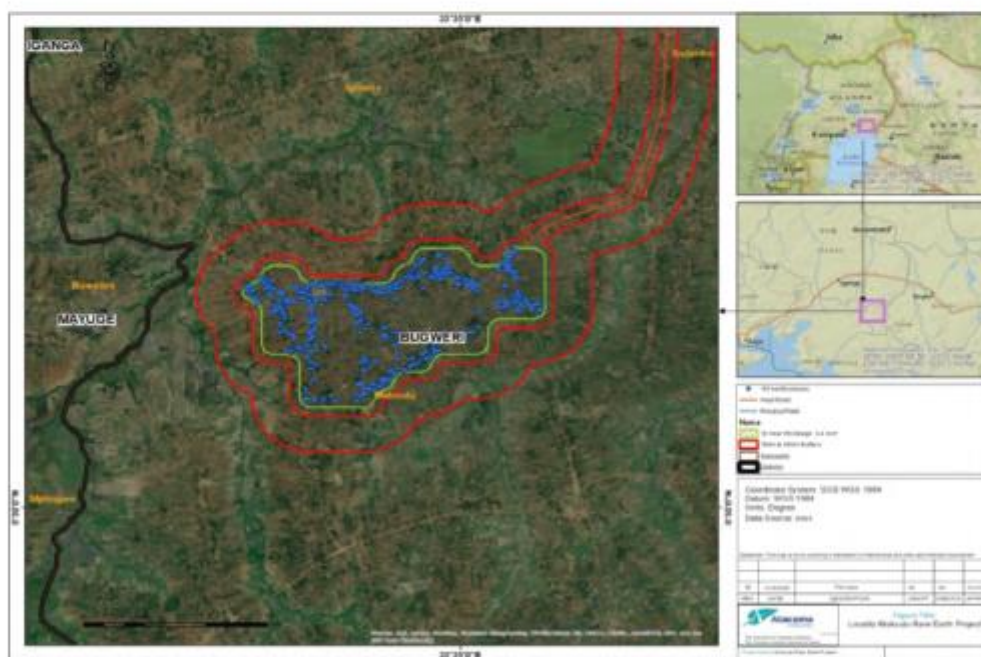


Figure 6: Maapu eraga ekirombe ekikulu eky'a Makuutu

## OMUGASO GW'EKIGHANDHIIKO KINHO

Omugaso gwa ekighandhiiko kinho n'okwinhonzola mu bufunze ku pulojekiti erowoozebwa eya Makuutu Rare Earths era n'okufunha endhowooza n'okugaitaku okuva mu bantu abendha kumanha n'abanhaagemebwaku/abanhakosebwa ku nsonga edhigema ku pulojekiti erowoozebwa.

Ensoonga edh'okwekengera n'ebisobola kukosa obutondhe ghalala n'embeera dh'abantu biidha ku lingirirwamu bwire obw'okulingirira mu buzibu obusobola kubaagho.

Lipoota ey'okulingirira mu nsoonga edhigema ku kukosa obutoonde n'embeera dh'abantu (Environmental and Social Impact Assessment (ESIA)) ng'erimu n'ebirowoozo by'abantu abendha kumanha n'abanagemebwaku/abanhaakosebwa eyidha kughebwa ab'ekitongole ekikola ku nsonga dh'eby'obutoondhe [National Environment Management Authority (NEMA)] olw'okugiriingamu n'okugiikiriza.

Mperaano buti oyetebeba okugha ebiroroghozo ku nsoonga dh'obutonde n'embeera dh'abantu edhigema ku pulojekiti eroroghozebwa eya Makuutu. Ebiroroghozo byo biidha kuyamba ebinaatekebwa mu lipoota era n'okukakasa nti ensonga edhigasa dhililirwa.

## OMUGASO GWA ESIA

Eiteeka lya 'The National Environment Act, 2019' ligha olukalala lwa pulojekiti edheetaaga ESIA. Ebikolwa byaghandhikibwa mu "Schedule 5, Part/akatundu B era lirimu binho:

- a) Okusima obugaiga bwomwitaka (Mineral exploration).
- b) Okusima obugaiga bw'omwitaka obulimu ebyuma n'ebiziramu byuma (Mining of metal and non-metal minerals.)
- c) Okulongosamu ebisime, nga kulimu okusanhuula n'okulongosaamu (Processing of minerals, including smelting and refining of ores.)

Ebikolwa ebyo ghaigulu bigema ku pulojekiti ya Makuutu Rare Earths eroroghozebwaaku. ESIA erikukolebwa ng'egoberera amateeka ago ghaansi:

1. Uganda's National Legal requirements;
2. International Finance Corporation (IFC) Performance Standards on Environment and Social Sustainability; ni
3. The Equator Principles.

Omutadhisi wa pulojekiti afuba okubonha nga eta munkola n'obugendererevu obwaghaigulu inho enkuuma y'obutondhe n'embeera dh'abantu.

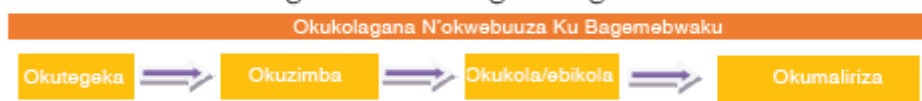


## OKUKOLAGANA N'OKWEBUUZA KU BAGEMEBWAKU

Ekola ya ESIA entuufu yetaaga okukolaganha okwa buli kiseera n'abagemebwaku abemitendhera mingi abalinha omugaso munhenhe mu ntambula oba okukosa pulojekiti. Mperaano mukukola ESIA, kya mugaso inho nti ghabaawo enkolagana n'abagemebwaku okufunha okwetaba okugasa okwabo abagemebwaku. Ekifanhanhi (Figure 7) kiraga entambula yonha yonha ey'okwebuza ku bagemebwaku eya pulojekiti, ate ekifanhanhi (Figure 8) kiraga emitendera /bwireki abanhakolagana n'abagemebwaku ghe banh'ebuuza kw'abo abagemebwaku mu bwiire obw'okutegeka pulojekiti n'okugita mu nkola.

Mperaano, ekikulu mu kutegeka ESIA n'okwinhonhola n'okutegeza abagemebwaku ku pulojekiti eroghozebwa n'ekola erikugobererwa era n'okunhonereza ku nsonga n'okwekengera.


Mu kukola ESIA, ghaidha kubaagho enkolaganha etegerekeka n'abakulira ebitongole bya gavument (Central Government Agencies, Local Government/District), eigombolola n'ebyalo (Sub-county and Village leadership), ebyalo ebinhagemebwaku/ebinhaakosebwa, Non-Governmental Organisations/Civil Society Organisations, private sector n'abandhi, okusobola okugha okumanhisa/okutegeera pulojekiti, ekinhaaletera okusalagho okutuufu nga bategeire.



**Figure 7: Emitendhera y'okwebuza ku banagemebwaku**



**Figure 8: Emitendera y'okwebuza ku banaagemebwaku mu kutegekapulojekiti**

OKUNHONHEREZA N'OKUGERAGERANHYA OBUZIBU/OKUKOSA OKUSOBOLA KUTUUKA KU BUTONDHE N'EMBEERA DH'ABANTU NGA BUVA MU PULOJEKITI YA MAKUUTU EROGHOZEBWA OKUKOLA KWITAKA/KU MABAALÉ AGATABONHEKABONHEKA - EKIGHANDHIKO KY'OKWIRAMU	
<p>Ekighandhiiko kinho kirigho kuyamba kufunha biroghoozo by'abairamu. Osabibwa okukiidhuza okisindhike n'ebiroghozo byo ng'obita ku kaposta oba email ari Atacama Consulting (<a href="mailto:tonneyssemmanda@atacama.co.ug">tonneyssemmanda@atacama.co.ug</a>) osindikireku ni <a href="mailto:admin@atacama.co.ug">admin@atacama.co.ug</a>.</p> <p>Oba beera ni foomu gy'oidhiwiza olidhirire omubaka wa Atacama Consulting aginhonhe. Osabibwa okutumanhisa kwisimu linho 0783148101, bw'oba nga weetaaga tuginhona tusobole kutaagho enkola ey'okuginhonha.</p>	 <p><b>Endagiriyo y'okwiiza ebirowoozo:</b></p> <p>Atacama Consulting, Plot 22B, Lower Naguru East Road, Naguru P.O. Box 12130, Kampala, Uganda. Email: <a href="mailto:tonneyssemmanda@atacama.co.ug">tonneyssemmanda@atacama.co.ug</a> Telephone: +256 (0) 783148101</p>
Eriinha Iya Pulojekiti: Environmental and Social Impact Assessment for the Proposed Makuutu Rare Earths Project.	
Eriinha ly'ayiramu:	
Endagiriyo y'airamu:	
Olinhayo ebighandhiiko/ebiroghoozo/amakobo by'ologhoza nga bisobola okugasa omusomo gunho? Oba olinha, biri mu gheri ki?	
Olinha nsoga ki esinga kukusanhusa/kukugemaku oba bye wekengera ku pulojekiti eroghozebwa /lghe pulojekiti eno ekugemaku etya?	
Eriyo obuzibu oba emikisa eyiindhi egigema ku butondhe/oba kumbeera ndh'abantu dh'oyendha dhigemebwaku /badhifeeku mu musomo?	
Eriyo abagemebwaku abandhi bw'owulira mule nga balina okwebuuzibwaku ku bigema ku pulojekiti eroghozebwa?	
Ghaliyo ensonga edhitagemebwaaku mu kighandhiiko ekinhoonhola dh'oyendha kw'ongera kufunha kwinhonhoka?	
Olinhayo ebiroghozo by'oyendha kugha?	





**ENDAGIRIRO Y'OKWIIZA EBIROWOOZO:**

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Telephone :  
+256 (0) 783148101

Email:  
tonneysessemmanda@atacama.co.ug  
admin@atacama.co.ug


P.O Box:  
Atacama Consulting, P.O Box 12130, Kampala, Uganda

## 24 ANNEXURE XI: FEEDBACK FORM IN ENGLISH AND LUSOGA

### 24.1 English Version

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED MAKUUTU RARE EARTHS PROJECT – REPLY SLIP	
<p>This reply slip is provided to assist consultee responses. Please complete it and return it with your comments via post or email to Atacama Consulting (<a href="mailto:tonneyssemmanda@atacama.co.ug">tonneyssemmanda@atacama.co.ug</a>) copying <a href="mailto:admin@atacama.co.ug">admin@atacama.co.ug</a>.</p> <p>Alternatively, have the completed form ready for collection by an Atacama Consulting representative. Please inform us by phone (0783148101) if you need us to collect your completed form so that we can make the necessary arrangements to pick it up.</p>	 <p><b>The return address for comments:</b>            Atacama Consulting,            Plot 22B, Lower Naguru East Road, Naguru            P.O. Box 12130, Kampala, Uganda.  <b>Email:</b> <a href="mailto:tonneyssemmanda@atacama.co.ug">tonneyssemmanda@atacama.co.ug</a>  <b>Telephone:</b> +256 (0) 783148101</p>
<b>Name of Project:</b> Environmental and Social Impact Assessment for the Proposed Makuutu Rare Earths Project.	
<b>Name of Respondent:</b>	
<b>Address of Respondent:</b>	
Do you hold any data / information which you consider to be of relevance to this study? If so, what type of information is it?	
What are your major interests and concerns with the proposed Project?	
Are there other environmental/social constraints or opportunities you would like to be considered in the study?	
Are there any additional stakeholders who you feel should be consulted regarding the proposed Project?	
Are there any omissions in the Project Background Information Document for which you require more information?	
Are there any other comments you would like to make?	


## 24.2 Lusoga Translation

OKUNHONHEREZA N'OKUGERAGERANYA OBUZIBU/OKUKOSA OKUSOBOLA KUTUUKA KU BUTONDHE N'EMBEERA DH'ABANTU NGA BUVA MU PULOJEKITI YA MAKUUTU EROGHOZEBWA OKUKOLA KWITAKA/KU MABAALE AGATABONHEKABONHEKA - EKIGHANDHIKO KY'OKWIRAMU	
<p><u>Ekighandhiiko kinho kirigho kuyamba kufunha birogghoozo by'abairamu. Osabibwa okukiidhuza okisindhike n'ebiroghoozo byo ng'obita ku kaposta oba email ari Atacama Consulting (tonnessemmanda@atacama.co.ug) osindikireku ni</u></p> <p><u>admin@atacama.co.ug.</u></p> <p>Oba beera ni foomu gy'oidhwiiza olidhirire omubaka wa Atacama Consulting aginhonhe. Osabibwa okutumanhisa kwisimu linho 0783148101, bw'oba nga weetaaga tuginhone tusobole kutaagho enkola ey'okuginhonha.</p>	 <p><b>Endagiriro y'okwiiza ebirowoozo:</b></p> <p>Atacama Consulting, Plot 22B, Lower Naguru East Road, Naguru P.O. Box 12130, Kampala, Uganda. <b>Email:</b> <a href="mailto:tonnessemmanda@atacama.co.ug">tonnessemmanda@atacama.co.ug</a> <b>Telephone:</b> +256 (0) 783148101</p>
Eriinha Iya Pulojekiti: Environmental and Social Impact Assessment for the Proposed Makuutu Rare Earths Project.	
Eriinha ly'ayiramu:	
Endagiriro y'airamu:	
Olinhayo ebighandhiiko/ebiroghoozo/amakobo by'ologhoza nga bisobola okugasa omusomo gunho? Oba olinha, biri mu gheri ki?	
Olinha nsoga ki esinga kukusanhusa/kukugemaku oba bye wekengera ku pulojekiti eroghozebwa/ Ighe pulolokiti eno ekugemaku etya?	
Eriyo obuzibu oba emikisa eyiindhi egigema ku butondhe/oba kumbeera ndh'abantu dh'oyendha dhigemebwaku /badhifeeku mu musomo?	
Eriyo abagemebwaku abandhi bw'owulira mule nga balina okwebuuzibwaku ku bigema ku pulojekiti eroghozebwa?	
Ghaliyo ensonga edhitagemebwaaku mu kighandhiiko ekinhoonhola dh'oyendha kw'ongera kufunha kwinhonhoka?	
Olinhayo ebiroghoozo by'oyendha kugha?	

## 25 ANNEX XII: STAKEHOLDER CONSULTATION MEETING MINUTES AND FEEDBACK FROM COMMUNITY STAKEHOLDERS

### 25.1 SCOPING PHASE

#### 25.1.1 Meeting with Bugweri DLG Technical Team









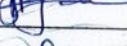
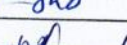

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info@jbn.co.ug | www.jbn.co.ug

**ATTENDANCE LIST**

Project Name: ESIA Makutu Kawa Earth Elements

Location: Bugweri DLG Date: 8/9/2020

No	Name	F/M	Designation	Contact	Signature
1.	BIRETE MARY	F	ACA	0772437124	
2.	Kagame Sarah	F	AMRO	0714679653	
3.	Mwende Ivan	M	PCDO	0789034926	
4.	MUNDA STEPHEN	M	ASS	0770531890	
5.	MAYEMBO ELOCH	M	CHA-ROK	077626624	
6.	KIRAHON SWABU	M	DMO	0701624855	
7.	JAMIL KUSIMA	M	Director - JBN	0904249020	
8.	Jude Nkanyo	M	JBN	0751398893	
9.	Andrew Nuwasima	M	"	078760868	
10.					
11.					

## 25.1.2 Meeting with Bugweri District Health Office (DHO)



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info@jbn.co.ug | www.jbn.co.ug

### ATTENDANCE LIST

Project Name: Markkuh Rame ~~Markkuh~~ elements

Location: Bugweri DHO Office Date: 9/9/2020

No	Name	F/M	Designation	Contact	Signature
1.	Kajura Andrew	m	Bio-stat	0700611658	[Signature]
2.	Dr. Muwanya Peter	M	DHO	0782553147	[Signature]
3.	Jude Nkeyayo .K	m	JBN	0751393893	[Signature]
4.					
5.					



### 25.1.3 Meeting with Igombe Sub County and Health workers



#### ATTENDANCE LIST

Project Name:

Rane East Project / Bagwa

Location:


Igombe He III Sub County

Date:

9/8/2020

No	Name	F/M	Designation	Contact	Signature
1.	Nkwanga Coline	M	MLA	0783900262	
2.	Maganda Salim	m	V.H.T	0783160729	
3.	Bagga. Moses.	M	V.H.T	0752/0776580040	
4.	IAGONZA ANNE SARAH	F	CDO	0750544501	
5.	BIRETE MARY	F	Sichief	077243724	
6.	MUTINBO JANUARO	M	2/K POST IGOMBE P/POST	0784685931	
7.	Sere Yassin	M	V.H.T	0780894461	
8.	Charles Namanyata	m	Records Igombe Health	0754896707	
9.	ALYENDE IVAN	M	DCDO	0784034926	
10.	JAMIL KUSIIMA	M	JBN - Team leader	0704249020	
11.	Magguma Sarah	F	AURO	0774679653	
12.	John Nkenyio. K	m	JBN	075335385	
13.	Andrew Nwasiima	M	JBN	0787600601	
14.					
15.					

## 25.1.4 Meeting with Mayuge District LG technical staff

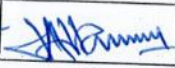

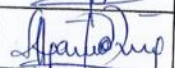


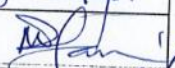

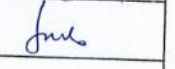
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**ATTENDANCE LIST**

Project Name: Makutu Rare Earth project

Location: Mayuge DLG Date: 10/9/2020

No	Name	F/M	Designation	Contact	Signature
1.	ARAMU THOMAS	M	SENIOR ENV. OFFICER	0752851765	
2.	MUTAWA WAW	M	Physical planner	0774971674	
3.	Baligeys Ronald	M	District Planner	0750697251	
4.	Kitarujja Leonard	M	DCAO	0701961454	
5.	Shilem James	M	RDC	0755-761236	
6.	Jamil Kusima	M	JBN	0772382626	
7.	Andrew Nwasinga	M	JBN	0704249020	
8.	Inde Nkeyayo K	M	JBN	078760069	
9.					

## 25.1.5 Meeting with RDC Mayuge District


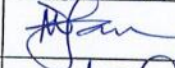

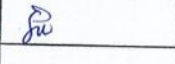
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info@jbn.co.ug | www.jbn.co.ug

**ATTENDANCE LIST**

Project Name:

Location: RARE ELEMENTS (MAKUTU) Date: 09/09/2020  
BUGWERI DISTRICT / RDC office

No	Name	F/M	Designation	Contact	Signature
1.	Ahimbisiwe G.R	M	RDC	0772912643	
2.	Jamil Kusima	M	JBN	0704249020	
3.	Andrew Nwasinga	M	JBN	078760069	
4.	Inde Nkeyayo K	M	JBN	0751393851	
5.					



### 25.1.6 Meeting with Bugiri DLG Environment Officer

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**ATTENDANCE LIST**

Project Name: Makutu Lake Earth Project

Location: Bugiri DLG Date: 11/09/2020

No	Name	F/M	Designation	Contact	Signature
1.	Kauna BENADEI	F	SE/DND	0774412577	[Signature]
2.	Jude Nkambo. K	M	JBN	0751393853	[Signature]
3.	Jamil Kusima	M	JBN	070424920	[Signature]
4.	Andrew Nwarima	M	JBN	078760868	[Signature]
5.					

### 25.1.7 Meeting with Makuutu Sub County LG Technical Staff

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P.O. Box 28434, Kampala, Uganda  
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info@jbn.co.ug | www.jbn.co.ug

**ATTENDANCE LIST**

Project Name: Makutu Lake Earth Project

Location: Makutu SC LG Date: 9/9/2020

No	Name	F/M	Designation	Contact	Signature
1.	marana wandera	M	SAS	0772445441	[Signature]
2.	KANGE GIRAS	M	H/ACC	0777065255	[Signature]
3.	Eguluwa Emmanuel	M	CDO	0702484974 0773847069	[Signature]
4.	Magnuma Sarah	F	MIRO	0774679653	[Signature]
5.	Jamil Kusima	M	JBN	070424920	[Signature]
6.	Andrew Nwarima	M	JBN	078760868	[Signature]
7.	Jude Nkambo	M	JBN	0751393853	[Signature]
8.					

## 25.1.8 Meeting with Buwaaya Sub County LG Technical Staff and Leaders

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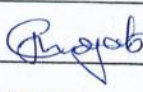




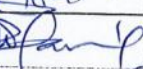
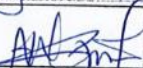

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info@jbn.co.ug | www.jbn.co.ug

### ATTENDANCE LIST

Project Name: Makulu Rawa Earth Project

Location: Buwaaya SC LG

Date: 10/5/2020

No	Name	F/M	Designation	Contact	Signature
1.	MUGABI JAMES	M	SECRETARY	075565973	
2.	HON. NATUBIRU AINA	F	VICE C/P Buwaaya SK	0783317326	
3.	MIGOLI SILASI	M	SUB COUNTY CHIEF	0772383315	
4.	KIYIMBA ERIN	M	O/ASSISTANT	0752094808	
5.	KASHIMU AWAZI	M	COUNCILLOR	0758504235	
6.	Jamil Kusuma	M	JBN	0704249020	
7.	Andrew Alwasima	M	PBN	0757600661	
8.	Indo Nkonzo	M	PBN	0751393850	
9.					

## 25.1.9 Meeting with Exploration team (Geologists)

### ATTENDANCE LIST

Project Name: Makindu Dome Fault project

Location: Makindu exploration site Date: 9/9/2020

No	Name	F/M	Designation	Contact	Signature
1.	NANGIDA OLIVIA	F	Sampler.	07886114986	
2.	Eduah Musiime	F	Geologist	0703674465	
3.	Stella Nankunga	F	Geologist	0701037998	
4.	Peter Nnyanzi	M	Geologist	0752828966	
5.	<del>Umuze</del> Owaga Seme	M	Geologist	0789104721	
6.	David Kyagulanyi	M		0772445962	
7.	Jamil Kuriime	M	JBN	0702445020	
8.	Andrew Nwasonima	M	JBN	0787600681	
9.	Jude Okonko	M	JBN	0751393888	
10.					
11.					



# 25.1.10 Meeting with Drilling Team at Mbaale site

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info@jbn.co.ug | www.jbn.co.ug

## ATTENDANCE LIST

Project Name: Makindu Rose tank project

Location: KBT Africa Drilling & Drilling Services Date: 4/8/2020

No	Name	F/M	Designation	Contact	Signature
1.	MUSOBYA ANJALI		MBAALE	0757980000	
2.	BALIKWA RONALD		Buwaya	0774708081	
3.	OKAMO Julius	M	Buwaya	0782416748	
4.	KUZA NATHAN	M	Buwaya	0785205919	
5.	KAYIZA GONFREY	M	Buwaya	0752703609	
6.	OSACHA RAPHAEL	M	Buwaya	0782103931	
7.	OMEREMUG John	M	Buwaya	0702621349	
8.	LAKWOOD LEALEY	M	Buwaya	0752273426	
9.	Jamil Kusims	M	JBN	0704249220	
10.	Andrew Nwaturima	M	JBN	0787600681	
11.	John Nkeneno	M	JBN	0731353898	
12.	ARAMU THOMAS	M	Senior ENV. Ofc	0752851965	
13.					
14.					

**ATTENDANCE LIST**

Project Name:

Makindu Rural Earth




①

Location:

Makandwa - Bwengya Village

Date:

9/9/2020

No	Name	F/M	Designation	Contact	Signature
1.	KASOGA JACKLINE	F			
2.	Naigera - SUZAN	F		0782432175	N.S
3.	Nabirye Bitrice	F			N.B
4.	Kotali mornica	F			W.M
5.	Nakasonga Robina	F			
6.	Milapibu Kabwanga	F			m.k
7.	Nabirye Ruth	F			N.R
8.	Maigaga Irene	F			M.I
9.	Nabirye Kevin	F		0759664445	N.K
10.	Nakaziba ESEZA	F			N.E
11.	Namaganda Aisha	F			N.A
12.	Namukose Dina	F			N.D
13.	Nampuna Aidha	F			N.A
14.	Kauma Swabura	F			K.S
15.	Naluganda Aminu	F		0753809992	
16.	Nawume BESI	F		0785720575	N.B
17.	Bamulambe Geturida	F			B.G



## ATTENDANCE LIST

Project Name: Markindu Park East

(2)

Location: Markindu - Binyanga Mwele Date: 9/9/2020

No	Name	F/M	Designation	Contact	Signature
1.	ISIIRKO MANUSULI	m		0757412365	
2.	DUTCH BINASALI	m		075741122	
3.	MAKOLA MUBIMU	m		0785720353	
4.	ISIIRKO ADELI	m	-	0783901301	
5.	KIFUKO MANISULI	m		0779541524	
6.	KASIBA UMARI	m		0775835908	
7.	MAGOLA FRED L. CI	m		0751435204	
8.	MUGIATI JOWALI	m		075752868	
9.	MUSASIZI WAISANA	m			
10.	WAISWA SAGATI	m			
11.	MATENDE ASHIRAFU	m			
12.	MUGIATI SHIRIFU	m			
13.	WAISWA JARIJU	m		0757412613	
14.	KAZIBA TOM	m			
15.	IBRA KAMBANGWA				
16.	YAFUGIA MUSES				
17.	MUZUBWE				

25.1.12 Community consultations at Buwaiswa trading center / Namadi village

**JBN** consults&planners

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**ATTENDANCE LIST**

Project Name:

Makadi Remoteness project

Location:

Buwaiswa / Namadi Lep Village

Date: 10/9/2020

No	Name	F/M	Designation	Contact	Signature
1.	BYONGA ERISA AGHAZIRA M	M	Buwaiswa	0781670401	[Signature]
2.	BABITA MONICA	F	C/person	0702498983	Babita M
3.	BANKWIZ JACKSON M	M	Buwaiswa	077841900	[Signature]
4.	Emmanuel	M	Namadi	0773308704	[Signature]
5.	Suma Kairia	M	Namadi	0789989197	[Signature]
6.	Kahinda Twalabatu M	M		0771264571	[Signature]
7.	Jude Nkenyo	M	JBN	0751393853	Jw
8.					

## 25.2 ESIA PHASE CONSULTATIONS

### 25.2.1 CONSULTATION ENGAGEMENT MEETING WITH NATIONAL GOVERNMENT MINISTRIES AND AGENCIES

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED MAKUUTU RARE EARTHS PROJECT	
CONSULTATION ENGAGEMENT MEETING WITH NATIONAL GOVERNMENT MINISTRIES AND AGENCIES	
DATE	4 <sup>th</sup> June 2021
VENUE	Zoom (Virtual meeting)
MEETING START	10:00 am
MINUTES BY	Tonney Ssemmanda

#### Attendance list

NO	ATTENDED BY		
	NAME	ENTITY AND TITLE	EMAIL ADDRESS
1.	Hosea Kizimula	Ministry of Agriculture, Animal Industry and Fisheries	
2.	Hadar Kiggundu	Senior Engineer, Ministry of Agriculture, Animal Industry and Fisheries	<a href="mailto:kiggunduh@gmail.com">kiggunduh@gmail.com</a>
3.	Andrew Kasibante	Ministry of Agriculture, Animal Industry and Fisheries	
4.	Stella Aguti	Ministry of Local Government	<a href="mailto:stelaguti@gmail.com">stelaguti@gmail.com</a>
5.	Leila Akello Gonasa	Principal Environment Inspector (Eng), National Environment Management Authority (NEMA)	<a href="mailto:leila.akello@nema.go.ug">leila.akello@nema.go.ug</a>
6.	David Ssebagala	Senior inspector of Mines, Directorate of Geological Survey and Mines, Ministry of Energy and Mineral Development.	<a href="mailto:sebdavds@gmail.com">sebdavds@gmail.com</a>
7.	Agnes Alaba, Acting Director	Directorate of Geological Survey and Mines, Ministry of Energy and Mineral Development	
8.	Tony Kato	Ministry of Gender, Labour and Social Development	<a href="mailto:mkattz1@gmail.com">mkattz1@gmail.com</a>
9.	Dr. Fred Tugume		
10.	Stephen McEwen	Project Director, Rwenzori Rare Metals (RRM)	<a href="mailto:edgarmugisha@atacama.co.ug">mailto:edgarmugisha@atacama.co.ug</a> <a href="mailto:stephen@ionicre.com.au">stephen@ionicre.com.au</a>
11.	Lee White	Principal Project Engineer, RRM	<a href="mailto:Lee@ionicre.com.au">Lee@ionicre.com.au</a>
12.	Patience Singo	Project Manager, RRM, Uganda office	<a href="mailto:patience@rwenzorimetals.com">patience@rwenzorimetals.com</a>
13.	Jim Tyler	Environment and Community Advisor, RRM	<a href="mailto:jim@environment-plus.com">jim@environment-plus.com</a>



NO	ATTENDED BY		
	NAME	ENTITY AND TITLE	EMAIL ADDRESS
14.	Jamil Kusiima	Technical Director, JBN Consults & Planners	jamil.kusiima@gmail.com
15.	Monica Salirwe	Senior Environmental Consultant, Atacama Consulting	<a href="mailto:monicasalirwe@atacama.co.ug">monicasalirwe@atacama.co.ug</a>
16.	Tonney Ssemmanda	Environmental Consultant, Atacama Consulting	tonneyssemmanda@atacama.co.ug

TEXT		
The meeting Commenced at 10:00 am.		
<b>Agenda items:</b>		
TIME	ACTIVITY	RESPONSIBILITY
10:00 am – 10:05 am	Opening Prayer	Atacama
10:05 am – 10:10 am	1. Self-introductions 2. Safety Moment	All Atacama
10:10 am – 10:20 am	Welcome Remarks	Atacama
10:20 am – 10:30 am	Purpose of the Meeting	Atacama
10:30 am – 10:45 am	Project Description	RRM
10:45 am – 11:05 am	ESIA Process	JBN/Atacama
11:25 am – 11:45 am	Open Discussions, Questions and Answers	All
11:45 am – 12:00 pm	Closing Remarks	RRM/JBN/Atacama
12:00 pm	End of Meeting	All
Opening Prayer		
Monica led members in a word of prayer.		
Self-Introduction		
<ul style="list-style-type: none"> <li>The chairperson (Monica) requested members in attendance to introduce themselves by name and the organisation they were representing.</li> </ul>		
Safety Moment		
<ul style="list-style-type: none"> <li>Monica conducted a presentation on the persistence of coronaviruses on surfaces.</li> </ul>		
Welcome Remarks		
<ul style="list-style-type: none"> <li>Jim Tyler made the opening remarks and an overview presentation about the Makuutu Rare Earth Project.</li> </ul>		
Purpose of the Meeting		
<ul style="list-style-type: none"> <li>Monica presented the purpose of stakeholder engagement and what is expected from the stakeholders.</li> </ul>		
Project Description		
<ul style="list-style-type: none"> <li>Jim Tyler presented the project overview, location, overview, mining technology and mining process.</li> </ul>		
ESIA Process		

- The consultants (Atacama Consulting and JBN Consults & Planners) presented the ESIA activities, processes and steps followed during the ESIA preparation.

No.	Question/Comment/Suggestion	Response
<b>David Ssebagala, Senior Inspector of Mines <i>Department of Geology and Mines, Ministry of Energy and Mineral Development</i></b>		
1.	What is the net present value of the Project and expected income to the government, for example royalties and corporate income tax?	<p>The benefit to the Government of Uganda is projected to be in the excess of US\$1 billion over the life of the Project. This is made up predominantly of taxes and royalties to the Ugandan government.</p> <p>It is also projected that direct employment will also contribute directly to the local districts that host the Project, in the excess of US\$100 million expected to be spent on local employment, local business and services.</p>
2.	The project description should include a summary of the project economic analysis.	The Project Description (Section 6) of the ESIA report includes an overview of the net positive social, environmental and economic benefits of the Project.
3.	The scope of the socio-economic study that has been highlighted is too shallow. It is similar to any small project. It is important to clearly highlight the effects that a Project of this magnitude has on the society and how any negative effects are going to be mitigated.	<p>A socio-economic household survey will be undertaken to gather socio-economic information pertaining to:</p> <ul style="list-style-type: none"> <li>• Family and relationship structures;</li> <li>• Livelihood &amp; farming practices;</li> <li>• Access to and level of education;</li> <li>• Access to services;</li> <li>• Access to health facilities and health status of families; and</li> <li>• Cultural practices.</li> </ul> <p>A qualitative socio-economic interview programme will be carried out in parallel with the household socio-economic survey. The objective of the interview programme will be to support the household survey by understanding the reasons behind socio-economic trends, demographic changes, settlement patterns or changes in the communities identified during the household survey.</p> <p>Section 10 of the ESIA provides a detailed breakdown of the socio-economic baseline study.</p>
4.	What volume of materials are going to be moved around? How many roads in Uganda have the capacity to move such material? Which roads will be used and how will you manage that logistical challenge?	<p>No material will be moved. Everything will be handled at the site. After the ore has been processed, the residue material will be washed, rinsed and allowed to drain all residual liquor from the heaps before it will be picked up and transported back to the empty mined areas and back filled into the empty pits.</p> <p>Refer to the detailed project description in Section 6 of the ESIA report.</p>

5.	The project description should be detailed enough to fully inform any person reading about the Project – they should get a clear picture of the nature of the Project.	Section 6 of the ESIA report includes the detailed project description based on the Project Scoping Study that was publicly released in April 2021.
<b>Hadar Kiggundu, Senior Engineer <i>Ministry of Agriculture, Animal Industry and Fisheries</i></b>		
6.	In relation to the restoration of the mining pit areas, mining comes with some negative impacts on soil fertility considering the volumes of materials to be extracted. I am not sure if the overburden going to be removed will be enough to fill the mining pit areas.	<p>Once the residue has been heaped, leached and washed, the heaps will be allowed to drain all free moisture, and the residue will then be back filled into the mining pits such that the ground can be rehabilitated. The trace residual ammonium in the solid will act as a fertiliser. Refer to the detailed project description in Section 6 of the ESIA report.</p> <p>Implementing a staged life of mine mining and rehabilitation plan that allows agricultural land required for mining to be acquired on short-term leases, and be rehabilitated back to productive agriculture land prior to return to the land-owner minimises the disturbance footprint and the scale of relocation in addition to leaving no legacy issues at the end of mining.</p>

25.2.1.1 Attendance Register for Consultation Meeting with National Government Ministries and Agencies

Participants (17)

Find a participant

TS	Tonny Ssemmanda (Host, me)			
MS	Monica Salirwe - Atacama Consulting (Co-host)			
J	Jamil			
AK	Agnes Kuterema			
AS	Aguti stella			
AK	Andrew Kasibante @ Agriculture			
DF	Dr. Fred TUGUME			
GB	Godfrey Bahati			
H	HADAR			
HM	Hosea MAAIF			
JT	Jim Tyler			
KT	Kato Tonny			
LW	Lee White, IXR, Principal Engineer			
LA	Leila Akello Gonasa			
PS	Patience Singo RRM			
SD	Ssebagala David			
SM	Stephen McEwen - IXR			

Invite

Mute All

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## 25.2.2 CONSULTATION ENGAGEMENT MEETING WITH MINISTRY OF WATER AND ENVIRONMENT / DIRECTORATE OF WATER RESOURCE MANAGEMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED MAKUUTU RARE EARTHS PROJECT	
CONSULTATION ENGAGEMENT MEETING WITH MINISTRY OF WATER AND ENVIRONMENT / DIRECTORATE OF WATER RESOURCE MANAGEMENT	
<b>DATE</b>	13 <sup>th</sup> July 2021
<b>VENUE</b>	Zoom (Virtual meeting)
<b>MEETING START</b>	10:00 am
<b>MINUTES BY</b>	Tonney Ssemmanda

### Attendance List

NO	ATTENDED BY		
	NAME	ENTITY AND TITLE	EMAIL ADDRESS
1.	Edward Martin Rwarinda	Ag. Ass Commissioner (C&E), Ministry of Water and Environment / Directorate of Water Resource Management	<a href="mailto:rwarindaedwardmartin@gmail.com">rwarindaedwardmartin@gmail.com</a>
2.	Joseph Odong	Ag. Senior Water Officer (EIA), Ministry of Water and Environment / Directorate of Water Resource Management	<a href="mailto:odongjoze@gmail.com">odongjoze@gmail.com</a>
3.	David Kataratambi	Senior Water Officer, Ministry of Water and Environment / Directorate of Water Resource Management	<a href="mailto:davidkataratambi44@gmail.com">davidkataratambi44@gmail.com</a>
4.	Maximo B. Twinomuhangi	Team Leader, Kyoga Water Management Zone, Ministry of Water and Environment	<a href="mailto:mtwinomuhangi@gmail.com">mtwinomuhangi@gmail.com</a>
5.	Athamah Kajimu	Water Officer, Ministry of Water and Environment	<a href="mailto:kajimujr@gmail.com">kajimujr@gmail.com</a>
6.	Victoria Kinobe Nakatudde	Water Officer, Ministry of Water and Environment / Directorate of Water Resource Management	<a href="mailto:victoriakinobe16@gmail.com">victoriakinobe16@gmail.com</a>
7.	Julius Aheebwa	Senior Water Officer, Ministry of Water and Environment	<a href="mailto:favourjulius@gmail.com">favourjulius@gmail.com</a>
8.	Lilian Bainemirembe	Water Officer, Ministry of Water and Environment	<a href="mailto:baineliliangabrielle@gmail.com">baineliliangabrielle@gmail.com</a>
9.	Pamela Musimenta	Water Officer, Ministry of Water and Environment	<a href="mailto:pamelamusimenta@gmail.com">pamelamusimenta@gmail.com</a>
10.	Stacey Natukunda	Ministry of Water and Environment	<a href="mailto:staceykunda@gmail.com">staceykunda@gmail.com</a>
11.	Lilian Musiime	Water Officer, Ministry of Water and Environment	<a href="mailto:mus.lilian@gmail.com">mus.lilian@gmail.com</a>

12.	Hanifa Bulyaba	IT Officer, Ministry of Water and Environment	
13.	Deo Odata	Senior Water Analyst, Ministry of Water and Environment	<a href="mailto:odotadeo@gmail.com">odotadeo@gmail.com</a>
14.	Sophie Luwano	Water Officer, Ministry of Water and Environment	<a href="mailto:sluwano@gmail.com">sluwano@gmail.com</a>
15.	Stephen McEwen	Project Director, RRM	<a href="mailto:edgarmugisha@atacama.co.ug">mailto:edgarmugisha@atacama.co.ug</a> <a href="mailto:stephen@ionicre.com.au">stephen@ionicre.com.au</a>
16.	Warren Tregurtha	CEO, Rwenzori Rare Metals Ltd	<a href="mailto:warren@rwenzorimetals.com">warren@rwenzorimetals.com</a>
17.	Lee White	Principal Project Engineer, RRM	<a href="mailto:Lee@ionicre.com.au">Lee@ionicre.com.au</a>
18.	Jim Tyler	Environment and Community Advisor, RRM	<a href="mailto:jim@environment-plus.com">jim@environment-plus.com</a>
19.	Jamil Kusiima	Technical Director, JBN Consults & Planners	<a href="mailto:jamil.kusiima@gmail.com">jamil.kusiima@gmail.com</a>
20.	Monica Salirwe	Senior Environmental Consultant, Atacama Consulting	<a href="mailto:monicasalirwe@atacama.co.ug">monicasalirwe@atacama.co.ug</a>
21.	Rhoda Nankabirwa	Senior Environmental Consultant, Atacama Consulting	<a href="mailto:rhodanankabirwa@atacama.co.ug">rhodanankabirwa@atacama.co.ug</a>
22.	Tonney Ssemmanda	Environmental Consultant, Atacama Consulting	<a href="mailto:tonneyssemmanda@atacama.co.ug">tonneyssemmanda@atacama.co.ug</a>

## TEXT

The Meeting Commenced at 10:00 am.

### Agenda items:

- Opening prayer
- Self-Introduction
- Opening Remarks by the Chairperson
- Presentation by the Consultant and Project Developer
- Discussion/Comments
- Way Forward

### Opening Prayer

- The Chairman invited the Consultant to lead in the opening prayer.
- Rhoda led members in a word of prayer.

### Self-introduction

- Members in attendance introduced themselves by name and the organisation they were representing.

### Opening Remarks by the Chairperson

- The Chairperson (Edward Martin Rwarinda) welcomed the Consultant and Project Developer to the meeting with MWE/DWRM staff, both based at the central offices and in the regional offices.

- He requested the Consultant to go through the project mining processes and provide details such as the type of project and the mining inputs so that the team could see how water resources would be impacted, and therefore be able to guide.
- He requested colleagues from the MWE to pay attention and see where they could guide in the ESIA process.
- He added that the mining industry has areas that are not common in Uganda that is why he insisted that all chemicals and inputs that are involved should be made clear to the MWE staff.
- He then asked the Consultant to go on with the presentation.

#### **Presentation by the Consultant**

- The Consultant and Project Developer presented the project overview, location, mining technology, mining process, ESIA activities, processes and steps followed during the ESIA preparation.

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
<b>Edward Martin Rwarinda, Ag. Ass Commissioner (C&amp;E), Ministry of Water and Environment / Directorate of Water Resource Management</b>		
1.	I would like to understand where you are in the ESIA process. Are you at the beginning of the ESIA or have you already moved too far in the process?	<p>At the time of this meeting, the ESIA team has conducted the biophysical baseline studies. The stakeholder consultation engagement had been undertaken at the national level with some of the GoU ministries and agencies and NGOs/CSOs.</p> <p>The socio-economic baseline survey activities had not yet been conducted. As soon as the lockdown is lifted, the team intends to continue with the stakeholder engagement activities at the local government and community level putting into consideration of the COVID-19 mitigation measures in place.</p> <p>The ESIA Scoping Report and Terms of Reference were completed and submitted to NEMA in September 2020 and approved in February 2021.</p>
2.	How many more engagements will be held with the MWE because you are almost at the end of the ESIA?	<p>The ESIA process is still ongoing. The biophysical baseline has been collected and the team is analyzing the data.</p> <p>The socio-economic baseline data has not yet been collected. The stakeholder engagement is still ongoing and if there is a need to seek clarity or further guidance with the MWE, the team will be able to reach out on the same.</p>
3.	We would like to express our interest in the environmental and socio-economic baseline data because it may help us in our catchment management activities which have been spearheaded by our water management zones, and in your case, the project is under the Kyoga Water Management Zone. We are also interested in getting some data that will help us to look at how we protect water sources that have been developed by different stakeholders in the water and environment sector. When the environmental and socio-economic baseline is complete, share with us at the MWE.	This has been noted. The environmental and socio-economic baseline report and the ESIA report will be shared with MWE.
4.	We would like to know if you already have a copy of the Environmental Impact Assessment Guidelines for Water Resources related projects in Uganda. The Guidelines provide guidance on what you should look at regarding the potential	The ESIA team has a copy of the Environmental Impact Assessment Guidelines for Water Resources related projects in Uganda and they are complementing that with the new national ESIA regulations (the National Environment (Environmental and Social Assessment) Regulations, 2020).

	impacts of the exploration and operation phase of the mining project. We emphasise that you look into Appendix 7.5 which will be used in evaluating the ESIA report; both E 1 and E 2 will be the basis for reviewing the ESIA report.	
5.	What is the name of the hydrologist on the ESIA team?	Mr. Vincent Ssebugwawo is the hydrologist working on the project.
6.	You have talked about the partnerships with community NGOs but I did not see the local governments and water management zones. I think you should add the local government and water management zones because the Team Leader based in Mbale will be very helpful in terms of giving you direction when it comes to catchment management planning and water protection planning.	All Community Development Programmes will be implemented in close collaboration with the GoU responsible authorities, ministries and agencies, including local government authorities and water management zones as well as NGOs working within the project area.
7.	When you talk about 200 hectares near Nakivumbi, you mention that there will be no resettlement necessary yet earlier on, somebody had talked of having some boreholes being displaced. To whom do these boreholes belong which are going to be displaced if there is no resettlement?	<p>The processing plant will be located on 200 hectares and this land is under a large-scale sugarcane plantation with no settlement – therefore, there will be no need for resettlement at this site.</p> <p>The 350 hectares of the Central Makuutu Mining pit have settlements and resettlement will be necessary as the mining pit expands to the areas where public infrastructure and more settlements are located. The resettlement will be staged because of the nature of the project activities - refer to Section 14.4 of the ESIA report for a detailed discussion.</p>
8.	As DWRM, we issue permits for boreholes. In the event that some boreholes are to be affected by the project, we want to know their borehole numbers and their administrative areas and then we can advise on how you can handle those water permits.	This is noted. The socio-economic survey team will capture the details of the boreholes within the project survey area.
9.	Since you already have the completed reports, you could share them with us through our contact person in the MWE, Mr. Joseph Odong, who will circulate the reports to staff. Upon review, we shall get in touch with you for any further inquiries.	The Scoping and Terms of Reference report was shared with Mr. Joseph Odong and it has the primary project information. The ESIA Report will be shared as soon as the report has been completed.
<b>Athamah Kajimu, <i>Water Officer, Ministry of Water and Environment</i></b>		
10.	What are the rare earths elements that you are going to mine in Makuutu?	The rare earths elements are often used in high technology operations. They include elements such as neodymium, praseodymium, dysprosium, terbium



		and gadolinium. What the project will be doing is picking the clay, removing the rare earths elements, and putting the clay back into the pit.
11.	You said you have not yet finalised the project design. We understand that the mining process will involve using different chemicals that might percolate into the groundwater. In your design, you should be able to include waterproofing.	The process plant will include a drainage channel to a storm water pond to capture all rain run-off with excess storm water released to the adjacent water courses. No effluent will be released unless it meets the release limits (discharge standards) set by NEMA. Refer to Section 6 and Section 13.4.2 of the ESIA report.
12.	Where will the water that will be collected in the ponds during the leaching process end up?	
Joseph Odong, Ag. Senior Water Officer (EIA), Ministry of Water and Environment /Directorate of Water Resource Management		
13.	How much water will be used for the entire project?	The Project is expected to have a net positive water balance and in an average rainfall year, will harvest 180,000 kL of water from the annual 20 ha of new mining pits at the initial 2.5 MTPA ROM level.
14.	In one of the slides, you have indicated that you have one groundwater monitoring well. I think you need to have more than one groundwater monitoring well and the location of the groundwater monitoring wells matters in order to identify the impacts of the project activities on groundwater.	<p>During the biophysical baseline surveys, we took 12 ground and surface water samples from the water courses downstream, within the central mining pit and the western areas. The analysis results show that all the samples are very similar in their water quality and water is very fresh with low metals.</p> <p>For water monitoring purposes, the project will monitor the mining areas around the process plant and all the downstream water bodies and points of discharge to confirm that there is no contamination.</p>
15.	I looked at the team composition in the Scoping Report and Terms of Reference report that was submitted to NEMA and the key water resources specialists - hydrologist and hydrogeologist are not on the ESIA team. Clarify whether those specialists are available.	The approval of the Scoping Report and Terms of Reference report by NEMA had conditions on the composition of the team and we have fulfilled the obligation to bring on board additional specialists. We have We have Mr. Isah Nabidde as the hydrogeologist who can provide additional input that could be required.
Maximo B. Twinomuhangi, Team Leader, Kyoga Water Management Zone, Ministry of Water and Environment		

	<p>All these important aspects of prevention of pollution, sampling, monitoring, surface and groundwater are usually carried out within the geographical extent of a catchment because these issues are interrelated and for them to be monitored so well, to make sense and speak to each other, you are talking about that geographical area that we call a catchment.</p> <p>During the presentation, I did not see any reference to whether a catchment or a sub-catchment has been delineated and where this project would fall within the catchments we have in the Kyoga Water Management Zone. We need to have a clear catchment delineation because it provides valuable insights into the relationship with specific biophysical or socio-economic aspects such as agriculture and relationship with other water sources and sensitive ecosystems such as the wetland that you have indicated where rice growing is undertaken. This is very important because when we understand this catchment, then we would also understand the major catchment in our zone for purposes of the existence of catchment management plans.</p>	<p>The project area is located within the Lumbye and Naigombwa sub-catchments so we are defining the information that we are receiving along the sub-catchments identified. We will appreciate if you have copies of the catchment or sub-catchment management plans to guide the ESIA process.</p>
16.	<p>In the presentation, you have talked about the land use cover map and to my understanding, this uses some remote sensing data and images but even if you could have used some data from ground truthing, land use and land cover evolve over time. Therefore, clarify the time period used for the map. Additionally, it would add value in the ESIA Report if land use cover information provided shows how land use and land cover has evolved in the project area over the last 5-10 years. You have also talked about degraded wetlands and rice cultivation. This is very important because it guides in some of the activities like tree planting, issues of catchment protection and how they will impact the livelihoods of the community because one of the areas you talked about is livelihoods. To change livelihoods, you need to know the deriving factors behind the changing land use and land cover over the years.</p>	<p>The GIS expert will provide maps indicating the land use change for the different land cover streams to understand how things have evolved at least for the last 10 or 20 years - refer to Section 9 of the ESIA Report for the detailed discussion of land use and land cover.</p>

17.	Analysis of topography and the general landscape and slope of the project area will be very important. We need to see the analysis of topography and catchment slopes coming out because this has a bearing on the hydrology of the area leading to issues like extreme floods and landslides as key risks.	Section 9 of the ESIA provides a detailed topography, general landscape and slope analysis. Section 13 provides a further risk and impact assessment on flood risk.
18.	In the presentation, I have seen issues to do with the potential risk of contaminating water resources and there was an attempt to come up with some plans to mitigate those risks but I think this project being important as it is, we need to have more elaborate plans in place to address the risks.	Section 13 of the ESIA report includes a detailed Environmental and Social Management and Monitoring Plan (ESMMP) including a plan for the management of the potential risk of contaminating water resources.
19.	You have talked about involving communities as one of the livelihood options but I did not see the issue of training communities to be equipped with skills, which they can build on, on an individual basis to enhance their livelihood or take part in the mining activities.	The Project is committed to ensuring social equity and has defined a strategy to ensure that directly impacted communities build capacity in areas of health, education and services to foster economic prosperity. The Project also intends to source staffing requirements from the local community in addition to skills development programmes. The initial workforce for the 2.5 million tonnes per annum operation will be approximately 300 persons and by the time the mine is fully ramped up, the workforce is expected to exceed 1,000 personnel.
20.	Topsoil stripping; you say that you will remove topsoil, keep it in a place and bring it back later after completion of mining in that specific area and for the Makuutu Central Mining Pit, that would be after ten years. The soil is naturally created and it takes a number of years to form the layers, structures, minerals, etc. As the soil is kept over such a long time period, it may undergo leaching. Therefore, how will the project ensure that the soil is maintained and restored in the most natural way possible?	One metre of topsoil will be stripped and stockpiled followed by truck and shovel removal of the overburden and clay ore. Topsoil will be removed and stockpiled to allow access to the shallow clay "ore-body". The rare earths will be desorbed out of the clay which will then be returned to the mining pit and covered with the stored topsoil. The land will be at least as productive as it was when acquired when it is returned to the farmer and the project will work closely with the government of Uganda authorities to verify that this approach is working. The Project will be continually acquiring new land and returning old land to farmers over the life of the mine.
21.	Cost benefit and risk analysis; a number of benefits have been mentioned. Is there a provision for clearly convincing us on the benefits but also the risks involved and how these weigh against each other in the form of a cost benefit analysis?	Section 6.1.5 of the ESIA report includes a detailed cost-benefit analysis and Section 13 of the ESIA report includes a detailed project risk analysis.
<b>Julius Aheebwa, Senior Water Officer, Ministry of Water and Environment</b>		
22.	The Consultant has mentioned that this is a big project which we also expect to have big impacts and we can look at the impacts in the context of a catchment but when you look at the ESIA	This is noted. The ESIA team will look at the potential risks to the catchment resources such as streams and wetlands because these systems are

	methodology presented, it appears as if the bigger extent of the project has not been considered. The approach seems to be more specific to the local project area other than regional. We suggest that the general ESIA approach changes so that it focuses on large scale impacts other than local impacts.	interlinked. Impacts will be assessed at both the local and regional level, taking into consideration cumulative impacts as well.  Refer to Section 13 for the detailed impact assessment.
23.	I have heard of monitoring ground and surface water. As a water resource manager, it is complex to monitor something you do not understand very well. Apart from collecting baseline information on water resources in the area, I would think that a comprehensive water resource assessment in the area would have been undertaken for the catchment so that we know the water balance aspects – such an assessment will prove to be very informative for monitoring purposes.	The ESIA team will seek additional information about the Lumbuye and Naigombwa sub-catchments from the Kyoga Water Management Zone, which information will further inform the hydrological assessments that have been conducted.  Refer to Section 9.2 of the ESIA Report for the hydrology baseline information.
24.	You have talked about the heap leaching process and there are chemicals like ammonia that will be used during the mining activities. In the ESIA report we would want to know the impacts of these chemicals on the water resources.  Additionally, are their substitutes that can be used instead of ammonia? How did you arrive at using the intended chemicals?  Are the chemicals more favourable in terms of environmental protection?	Refer to Section 13 of the ESIA Report for the discussion on potential impacts to water resources.  Additionally, refer to Section 6 of the ESIA Report for the discussion of the chemical inputs for the project activities. Broadly, the chemicals to be used were arrived at because they have been found to be most effective in similar mining processes. The ESIA Section 7.4 discussion on Processing Technology includes an overview of monovalent salt leaching of REE from ionic adsorption clay and in particular, ammonium sulphate (AMSUL) which is particularly effective and a widely used agricultural fertiliser.
25.	Mining decommissioning looks at mainly restoring the surface. It does not always put into consideration restoration of other resources like water sources in the area. At the end of the day, we shall have restored the environment without important resources like water swamps, so there should be a clear strategy on that matter.	This has been noted. Section 14.8 of the ESIA report includes a detailed restoration plan of the mining areas.
<b>Deo Odata, Senior Water Analyst, Ministry of Water and Environment</b>		
26.	You have a hydrologist on the ESIA team but looking at the context of the project, I would suggest that you also get a hydrogeologist on the ESIA team so that team looking at the water resources is complete.	The approval of Scoping Report and Terms of Reference report by NEMA had conditions on the composition of the team and we have fulfilled the obligation to bring on board additional specialists. Mr. Isah Nabidde as the hydrogeologist who can provide additional input that could be required.

27.	The key parameters of interest in the water analysis would be the 17 rare earth elements that will be extracted. They must be analysed so that we know the moment they appear in the environment indicating an impact to water quality.	The rare earth elements include neodymium, praseodymium, dysprosium, terbium and gadolinium, which are insoluble in water.
28.	We need to know these 17 elements by name and it will be important that you monitor radionuclide emissions; this should be included in the baseline and continued monitoring of the environment.	The Consultant is working together with the SGS South Africa laboratory to analyse the water samples for the rare earth elements as well as the potential radioactive materials especially uranium. The preliminary results indicate the absence of these rare earth elements and uranium in the samples - heavy metal concentrations in the surface and groundwater are very low and Uranium undetectable.
29.	For the heavy metals, we would require a full range because in the long run, the material you might use may contain these metals and eventually get back into the environment. When you start processing, you might discharge quite high concentrations into the environment which may be harmful.  I know that you will use a lot of acids and I do not know whether the neutralisation balance may counteract and then we get waste that is a bit neutral; we cannot rule out that nutrients leach. All such matters need to be monitored.	
30.	Aerial emission; leaching may not emit anything into the air but you have talked about incineration, whose cumulative impacts we do not know. You should also conduct an air quality assessment within the catchment and the project area.	Section 9.2 of the ESIA report includes a detailed water quality analysis which includes a full suite of heavy metals and Section 9.1.4 provides a detailed air quality analysis.
31.	You should also look at what is happening elsewhere and inform us in the subsequent engagements because it is not the first time that this kind of project is being implemented. There are so many examples in China, South Africa and in the USA. What are the environmental impacts that are already experienced in? Sometimes it is difficult on our side to tell exactly what we expect but if you can tell us what these other countries are experiencing with respect to the impacts of this type of project, it will be important.	The baseline air quality assessment has been undertaken as part of the ESIA studies - Section 9.1.4 of the ESIA report includes the detailed air quality assessment results.
32.	In Uganda, almost over 90% of the land is agricultural land. You are going to work within communities not like in these other countries like China and South Africa where the minerals might	This is noted. The existing REE supply chain is dominated by China and Makuutu is quite different from many other rare earth projects in the world. Makuutu is one of few ionic adsorption clay hosted REE deposits outside of Southern China which is the only current place with significant REE mining. Most rare earth projects around the world are hard rock REE minerals projects. Makuutu is fortunate in that the ore type, and process will produce a mixed rare earth carbonate that has a high proportion of 'critical rare earths' and 'heavy rare earths' – unlike the majority of the hard-rock rare earth projects that contain mostly 'light rare earths'. It is also low in the uranium and thorium radionuclides which are typically a challenge for hard-rock REE mines.
		Implementing a staged life of mine mining and rehabilitation plan that allows agricultural land required for mining to be acquired on short-term leases, and be rehabilitated back to productive agriculture land prior to return to the land-



	<p>occur in unsettled land. Therefore, our environment here is very sensitive simply because there are high settlements and there are agricultural areas.</p>	<p>owner minimises the disturbance footprint and the scale of relocation in addition to leaving no legacy issues at the end of mining.</p>
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<b>Way Forward</b>
<p><b>Monica Salirwe, Atacama Consulting</b></p> <p>Thank you, Mr. Martin for the facilitation and thank you very much all the participants from the MWE for all the recommendations, guidance and insights. On our part as the social and stakeholder engagement team, we have taken note of the feedback to engage the Kyoga Water Management Zone offices in the project area. We shall reach out to the Team Leader, Kyoga Water Management Zone for additional guidance.</p>
<p><b>Jamil Kusiima , JBN Consults and Planners</b></p> <p>I would like to appreciate MWE for the very good guidance and input into the study. There are a number of issues that have been raised such as the context of the ESIA in terms of catchments and sub-catchments, mitigations to address risks to water resources and the issue of restoring the environment and social infrastructure. We are going to start drafting the environment and social management plan and this input will very useful in coming up with these plans which will be embedded in the ESIA report.</p>
<p><b>Edward Martin Rwarinda, MWE</b></p> <p>Which documents are the consultants going to share with the MWE? It is not good to give us all the reports at the end. Let us have the baseline report when it is complete for purposes of reviewing. As you have seen from MWE's input, there are some questions which need to be answered.</p> <p><b>Jamil Kusiima, JBN Consults and Planners</b></p> <p>The scoping report was shared with the MWE. We are still compiling the ESIA biophysical baseline information and we have not yet concluded the socio-economic surveys. At this point, we may not have a lot of information to share apart from the water quality results from SGS. The other baseline information could be ready within two weeks from the date of the meeting.</p> <p><b>Monica Salirwe, Atacama Consulting</b></p> <p>We request to get back to you at the end of this week on the date when the report can be shared with MWE because the ESIA team would like to deliberate with several collaborators on the report to get concise feedback on when respective report sections can be shared.</p> <p><b>Edward Martin Rwarinda, MWE</b></p> <p>When we have an engagement with consultants, we want to have a record of the meeting. It is important that we have the minutes for this meeting. I therefore propose that the consultant come up with a record of what we have discussed and send it to Mr. Joseph Odong for the MWE to review and provide input.</p> <p><b>Monica Salirwe, Atacama Consulting</b></p> <p>Atacama will prepare the meeting minutes and share them with Mr. Joseph Odong on Friday, 23<sup>rd</sup> July 2021.</p>
<p><b>Jim Tyler, RRM</b></p> <p>We have completed the biophysical baseline studies but there is an impact study process looking at other project facilities and controls. The baseline data needs to be included in the context of the project, which activity will lead to impact analysis, an activity that is still ongoing between the consultant and the project team.</p> <p>Thank you very much the MWE and the consultant team for your participation and for the useful information.</p>
<p><b>Joseph Odong, MWE</b></p> <ul style="list-style-type: none"> <li>• The consultant to share the project documents that are ready for MWE's input;</li> <li>• Continued engagement with the MWE during report documentation; and</li> </ul>

- The consultant to consult the area water management zones and the local government.

**Edward Martin Rwarinda, MWE**

I would like to thank the MWE staff and Team Leader of the Kyoga Water Management Zone for the time spared to attend this stakeholder engagement meeting and for all the input, which I think will be very helpful to the Consultant. To the Consultant, we are always open to you and you are always welcome to us.

**CLOSURE:** The meeting was closed at 12:54 pm.





































































**Additional Comments provided by MWE/DWRM**

Following DWRM's review of the minutes above, the following additional comments/feedback in relation to the ESIA study were provided by DWRM on 30<sup>th</sup> July 2021.

<b>Applicable Section/Number in the Minutes above<sup>2</sup></b>	<b>Additional Comment by DWRM</b>
Response 11 and 12	There is need for the consultant to update DWRM on the final project designs so that necessary changes or inputs in line with water resources management may be made.
Response 13	Is this in consideration of climate change aspects? How will this harvest affect groundwater recharge in the area? Such a big mining project that is expected to last about 30 years will demand a lot of water from reliable water resources in the area. How sure are we that the area water resources are sufficient to sustain the project for this long? In general, the consultant should answer this question much more precisely using relevant information/reports.
Response 14	A monitoring design both in time, space and depth should be provided in the EIA document.
Response 23	Most times information provided in catchment management plans is general and is intended mainly for management/administrative purposes. It will not provide important local technical details required for proper planning of water resources for this particular project considering its nature, size and period it's projected to last. The consultant should critically consider this aspect.

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<sup>2</sup> Refer to the assigned number question and response in the meeting minutes.

Participants (22)		
Find a participant		
	Tonney Ssemmanda, Atacama Consulting(Me)	 
	Hanifa Bulyaba(Host)	  
	Jim Tyler	 
	Lee White	 
	Kajimu Athamah	 
	Jamil	 
	Monica Salirwe, Atacama Consulting	  
	Victoria N. Kinobe	 
	Warren Tregurtha	 
	Rhoda Nankabirwa	 
	Maximo Twinomuhangi	 
	EdwardMartin Rwarinda	 
	lilian Bainemirembe	 
	Sophie Luwano	 
	julius. A	 
	stacey N	 
	Lilian	 
	Joseph Odong	 
	Odota Deo W	 
	Pamela Musimenta	 
	kajimu Athamah	 
	Kataratambi	 

### 25.2.3 CONSULTATION ENGAGEMENT MEETING WITH NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED MAKUUTU RARE EARTHS PROJECT	
CONSULTATION ENGAGEMENT MEETING WITH NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)	
<b>DATE</b>	29 <sup>th</sup> June 2021
<b>VENUE</b>	Zoom (Virtual meeting)
<b>MEETING START</b>	10:00 am
<b>MINUTES BY</b>	Tonney Ssemmanda

#### Attendance list

NO	ATTENDED BY		
	NAME	ENTITY AND TITLE	EMAIL ADDRESS
1.	Isaac G. Ntujju	Principal Environment Inspector, National Environment Management Authority	<a href="mailto:isaac.ntujju@nema.go.ug">isaac.ntujju@nema.go.ug</a>
2.	Patience Nyawere	Environment Assessment Officer, National Environment Management Authority	<a href="mailto:patience.nyawere@nema.go.ug">patience.nyawere@nema.go.ug</a>
3.	Sarah Kawala	Environment Inspector, National Environment Management Authority	<a href="mailto:sarah.kawala@nema.go.ug">sarah.kawala@nema.go.ug</a>
4.	Sarah Aijuka	Senior Environment Inspector, National Environment Management Authority	<a href="mailto:sarah.aijuka@nema.go.ug">sarah.aijuka@nema.go.ug</a>
5.	Michael Otim	Apprentice, National Environment Management Authority	<a href="mailto:michaelotim7@gmail.com">michaelotim7@gmail.com</a>
6.	Immaculate Namuleme	Senior Environment Inspector, National Environment Management Authority	<a href="mailto:immaculate.namuleme@nema.go.ug">immaculate.namuleme@nema.go.ug</a>
7.	Stephen McEwen	<b>Project Director</b> , Rwenzori Rare Metals (RRM)	<a href="mailto:edgarmugisha@atacama.co.ug">mailto:edgarmugisha@atacama.co.ug</a> <a href="mailto:ugstephen@ionicre.com.au">ugstephen@ionicre.com.au</a>
8.	Lee White	Principal Project Engineer, RRM	<a href="mailto:Lee@ionicre.com.au">Lee@ionicre.com.au</a>
9.	Patience Singo	Project Manager, RRM, Uganda office	<a href="mailto:patience@rwenzorimetals.com">patience@rwenzorimetals.com</a>
10.	Jim Tyler	Environment and Community Advisor, RRM	<a href="mailto:jim@environment-plus.com">jim@environment-plus.com</a>
11.	Jamil Kusiima	Technical Director, JBN Consults & Planners	<a href="mailto:jamil.kusiima@gmail.com">jamil.kusiima@gmail.com</a>
12.	Martin Kabenge	JBN Consults & Planners	<a href="mailto:martokv@gmail.com">martokv@gmail.com</a>
13.	Rhoda Nankabirwa	Senior Environmental Consultant, Atacama Consulting	<a href="mailto:rhodanankabirwa@atacama.co.ug">rhodanankabirwa@atacama.co.ug</a>
14.	Tonney Ssemmanda	Environmental Consultant, Atacama Consulting	<a href="mailto:tonneyssemmanda@atacama.co.ug">tonneyssemmanda@atacama.co.ug</a>



TEXT		
The meeting Commenced at 10:00 am.		
<b>Agenda items:</b>		
TIME	ACTIVITY	RESPONSIBILITY
10:00 am – 10:05 am	Opening Prayer	Atacama
10:05 am – 10:10 am	1. Self-introductions 2. Safety Moment	All Atacama
10:10 am – 10:20 am	Welcome Remarks	Atacama
10:20 am – 10:30 am	Purpose of the Meeting	Atacama
10:30 am – 10:45 am	Project Description	RRM
10:45 am – 11:05 am	ESIA Process	JBN/Atacama
11:25 am – 11:45 am	Open Discussions, Questions and Answers	All
11:45 am – 12:00 pm	Closing Remarks	RRM/JBN/Atacama
12:00 pm	End of Meeting	All
<b>Opening Prayer</b>		
Rhoda led members in a word of prayer.		
<b>Self-Introduction</b>		
<ul style="list-style-type: none"> <li>The chairperson (Rhoda) requested members in attendance to introduce themselves by name and the organisation they were representing.</li> </ul>		
<b>Safety Moment</b>		
<ul style="list-style-type: none"> <li>Rhoda conducted a presentation on the persistence of coronaviruses on surfaces.</li> </ul>		
<b>Welcome Remarks</b>		
<ul style="list-style-type: none"> <li>Jim Tyler made the opening remarks and an overview presentation about the Makuutu Rare Earth Project.</li> </ul>		
<b>Purpose of the Meeting</b>		
<ul style="list-style-type: none"> <li>Rhoda presented the purpose of stakeholder engagement and what is expected from the stakeholders.</li> </ul>		
<b>Project Description</b>		
<ul style="list-style-type: none"> <li>Jim Tyler presented the project overview, location, overview, mining technology and mining process.</li> </ul>		
<b>ESIA Process</b>		
<ul style="list-style-type: none"> <li>The consultants (Atacama Consulting and JBN Consults &amp; Planners) presented the ESIA activities, processes and steps followed during the ESIA preparation.</li> </ul>		

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
<b>Isaac G. Ntujju, Principal Environment Inspector</b>		
1.	NEMA's constitutional role in environmental assessment business and stakeholder engagement is to provide guidance to minimise the back and forth once the ESIA has been completed because the project loses time and resources during that process.	This has been noted and highly appreciated.
2.	Often times it is usually one developer and one consultant. In this case, we have two consultants (Atacama Consulting and JBN Consults and Planners) maybe because of the complexity of the project. NEMA would want to see consultants work together and have a composite ESIA, not an ESIA with two reports that make it hard for the authority to correlate things – harmonise and work together very closely.	This has been well noted and the consultants shall endeavour to work as a team.
3.	How are you ranking impacts and impact significance? This is what sometimes people are interested in. Before you say that an impact is insignificant, how are you do arrive at that? Try to make the methodology in the report simple to understand because if the assessment methodology is not clearly stated it can bring challenges once we start the review process.	Section 13 of the ESIA report describes the methodology by which potential project-related impacts are assessed and then presents the results of the assessment and the mitigation measures that have been developed as a result of the assessment process.
4.	Make the project description and processes of all project components comprehensive so that you avoid the bias of the mining site and mining pit versus the processing plant.	Section 6 of the ESIA report includes the detailed project description and processes for all project components.
5.	NEMA visited the project area during the scoping phase. There is excitement and anxiety among the stakeholders which is good but how you communicate and the way you undertake stakeholder engagement is very important so that you manage the expectations from the onset.	This has been well noted. During the engagement and consultation with community members, information that responds to actual expectations and interests will be provided.
6.	You have indicated in your presentation that you will disclose the ESIA; are you going to do the ESIA disclosure after submitting it to NEMA or prior to submitting it to NEMA? According to the ESIA regulations, NEMA does the ESIA disclosure whereas consultants and the project developer undertake stakeholder engagement. ESIA disclosure will be part of the review process given the	NEMA will lead the ESIA disclosure process with support from the consultants and the project developer (RRM).

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
	magnitude of the project and the developer should plan for this, as the developer must bear the costs involved in the process.	
7.	Project employees living in the community, it is advantageous but also on occasions, it has its disadvantages for example men and women with money living in a very rural setting in Bugweri District can cause inflation and make life unbearable for others. We also have issues of domestic violence and distortions into households because of money. So while you have this strategy it has its merits and demerits but we would want you to look into it in your social assessment. You could have company policies to safeguard against such things and employees also know that if you misbehave while in the community, the penalties are very big.	This is noted. Project impacts associated with such social distortions have been assessed under Section 13 of the ESIA Report.
8.	You need to look into the issues of a mining plan. What are you going to do if you finish mining in Bugweri before moving to Bugiri or Mayuge? If you are going to have such a phased approach, you need to be clear in terms of your mining plan and strategy vs the site restoration as indicated in your presentation. This should be properly documented in the ESIA report.	A detailed mining plan has been put together for the life of mine and it will guide the year-on-year activities. Section 6.5 of the ESIA report includes the detailed project-mining plan.
9.	During the assessment of alternatives, look into the issue of technology and mineral processing.	Section 7 of the ESIA report includes the detailed analysis of project alternatives.
10.	Risk assessment and emergency preparedness; you need to do a risk assessment for personnel but there is also a risk to environmental resources. We visited the project site and while there are no major wetlands, the water table seems to be close. One of the slides in the presentation had a lady who was fetching water in the jerrycan from a stream or a spring, so when you do a risk assessment you need to look closely at certain things for example if chemical spilled into household use waters sources. We also understand the chemicals to be used are ideally fertilizers, how do you deal with such risks? You need a risk assessment that looks at the entire spectrum of potential hazards or emergencies that arise in a situation; we would appreciate that being part of the ESIA – have a chapter on the risk assessment	Section 13 of the ESIA report includes a consolidated environment and social risk assessment.

<b>Open Discussion Session of the Meeting</b>		
<b>No.</b>	<b>Query/Comment/Suggestion</b>	<b>Response</b>
	that looks at risks that can emerge and how you would manage them.	
11.	Grievance handling and mechanism - you have indicated in the presentation that Atacama will have a role in grievance handling. I hope these are going to be grievances during the ESIA assessment processes because once the assessment is complete, the role of Atacama ceases and the developer now has a full obligation and responsibility in terms of any grievances that do emerge.	Atacama's stakeholder engagement team shall inform all stakeholders about the grievance mechanism procedure at all meetings held during the stakeholder engagement and consultation process, receive and record grievances in the grievance log (with completion and issuance of grievance and acknowledgment of receipt forms) during the consultation process of the ESIA processes, and report all received grievances to RRM on a regular basis (as and when received) for investigation and resolution. Upon completion of the ESIA processes, all grievances will be managed by RRM's Community Liaison Officers (CLOs).
12.	During the presentation, you indicated that you have a comprehensive ESMP. It is acceptable to develop independent management plans but the ESMP should be comprehensive and clearly state the roles and interventions that the developer is going to undertake during the project implementation. Often times, we have received ESMPs that are skeletons and instead of addressing the practical issues and interventions towards the environmental and social impacts or concerns, it instead refers to a management plan that will be developed at a later date and that makes the decision of the authority a bit difficult to take.	Section 14 of the ESIA report includes a detailed Environmental and Social Management and Monitoring Plan (ESMMP).
13.	Uganda has joined the Extractive Industries Transparency Initiative (EITI) - often times we have certain obligations towards transparency and that is why disclosure will be utmost for the project.	This has been noted and a consultation meeting with national level NGOs and CSOs was held on 4 <sup>th</sup> June 2021 where the Uganda National Secretariat Head of the Extractive Industries Transparency Initiative (EITI) attended the meeting.
<b>Patience Nyawere, Environment Assessment Officer</b>		
14.	The project area has a number of wetlands and water streams and the proposed project activities involve a number of chemicals so you need to be mindful of contamination of the water resources and I hope that an environmental risk assessment will be undertaken not only on the chemicals to be used but also for the project as a whole.	The process plant will include a drainage channel to a storm water pond to capture all rain run-off with excess storm water released to the adjacent water-courses. No effluent will be released unless it meets the set release limits (discharge standards). Refer to Section 14.1.2 of the ESIA report. Section 13 of the ESIA report includes a consolidated environment and social risk.

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
15.	Ammonium sulphate will be used and it will work as a fertilizer; however, ammonium sulphate makes soils acidic so you need to be mindful because it acidifies the soils and makes them unusable by the communities given that they depend on farming.	<p>110,000 tonnes of sulfuric acid and 25,000 tonnes each of ammonium sulphate and ammonium bicarbonate will be used per year. Ammonium sulphate will be lowered to pH4 with additional sulfuric acid. Ammonium sulphate and ammonium bicarbonate will be in solid form in bags. The project will have good controls and facilities to contain the chemicals and good handling processes to make sure that chemicals do not spill and have a good emergency response plan as well which encompasses spill response.</p> <p>However, impacts associated with soil productivity have been assessed under Section 13 of the ESIA report.</p>
16.	There is need for a proper mining plan as you plan to start with the central mining pit in Bugweri District. I think this is a huge pit and you need to liaise with the Directorate of Geological Survey and Mines to come up with a proper mining plan taking into consideration how you intend to restore the area - successive restoration will be good on our side.	<p>A detailed mining plan has been put together for the life of mine and the year-on-year activities. Section 6.5 of the ESIA report includes the detailed project mining plan. Otherwise, the mining process will involve the following:</p> <ol style="list-style-type: none"> <li>1. One meter of topsoil will be stripped and stockpiled followed by truck and shovel removal of the overburden and clay-ore;</li> <li>2. The clay-ore will be transported 4km to the process plant on a dedicated haul road separate from public roads.</li> <li>3. The REE will then be desorbed from the clay in a heap leach process.</li> <li>4. The overburden and spent ore will be returned to the mining pit and capped with the stored topsoil to return the land to productive agricultural land.</li> </ol>
17.	The project will involve a number of chemicals – be informed that a chemical regulation is under preparation so in the future you might have more legal requirements.	This has been noted. Section 9 of the ESIA provides an account of the applicable legislation, where applicable draft legislation has also been considered.
<b>Sarah Kawala, Environment Inspector</b>		
18.	During the process of preparing the project ESIA, put into consideration all the recent regulations that have been reviewed as well as the drafts.	This has been noted. Section 8 of the ESIA provides an account of the applicable legislation, where applicable draft legislation have also been considered.



Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
19.	When you are submitting your ESIA report, present a detailed site layout for the different sites. This will help us to know which component is next to the sensitive ecosystems or water bodies.	Section 6 of the ESIA report includes a detailed site layout for the project.
20.	You need to present a detailed waste management plan in the ESIA report. The plan should document all different waste streams and properly describe how you intend to handle the waste streams.	Section 14.6 of the ESIA report includes a detailed waste management plan.
21.	As you are handling site by site, please present a restoration plan for each site and have the restoration plans submitted in the ESIA report.	Section 14.8 of the ESIA report provides a detailed description of the site restoration plan.
<b>Sarah Aijuka, Senior Environment Inspector</b>		
22.	The processing plant is going to be part of this ESIA. I would like to advise that in the ESIA report, it should also be very well attended to because a lot of attention may be given to the processes at the mining site and the processing plant is not given attention. Therefore, ensure that the activities at the processing plant are described in detail and very well elaborated especially things to do with waste and chemical management.	The project description (Section 6.6) of the ESIA report includes a description of the processing plant. The baseline section and impacts relating to the same are also presented in the EISA report, Section 9 and Section 13, respectively.
23.	You have indicated that chemicals will be used at the mining site and that those chemicals are good for the plants but there could be a lot of siltation due to the earth movements that are going to happen and we know that rivers within the project area feed into other rivers. Therefore, we hope that measures will be put in place to avoid siltation of the water courses.	Section 13 of the ESIA report provides a detailed assessment of the potential impacts to water sources and hydrological regimes.
24.	I am not sure where workers will be hired from. Where you have some people hired outside the project area, this could cause a lot of social problems that need to be looked into very carefully. The recruitment approach for project workers needs to be very elaborate because this could cause in-migration and that will call for an infrastructure management plan that you will need to put in place to ensure that you do not face a lot of social problems with the Project.	The Project intends to source staffing requirements from the local community. The initial workforce for the 2.5 million tonnes per annum operation will be approximately 300 persons and by the time the mine is fully operational, the workforce is expected to exceed 1,000 personnel. Refer to Section 6.11 for a detailed description of the human resource needs.

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
25.	The project is long term. 27 years is not a short time and we know that a number of things might have changed during the life of the project, maybe towards the time of project closure. You may need to consult again and see whether we may need to undertake the ESIA for the closure of this project because some facilities may require an ESIA at the end of the project.	This has been noted. Refer to Section 14.8 for an account of mine closure activities.

<b>Closing Remarks</b>
<p><b>Stephen McEwen</b></p> <p>Stephen thanked everybody for attending and appreciated seeing a full team from NEMA. He welcomed working together to get the results that everybody is happy with.</p>
<p><b>Jamil Kusiima</b></p> <p>On behalf of JBN, he thanked the participants and appreciated the feedback. He mentioned that the consulting team should be able to deliver a very good document for the assignment. He added that one member from NEMA's team mentioned that there were a number of draft regulations - it would be ideal if the drafts are shared because they do not seem to be publicly available.</p>
<p><b>Isaac I.G. Ntujju</b></p> <p>He reiterated the need for the project developer to refer to all the new environmental regulations that had been approved. NEMA released about eight (8) or nine (9) new regulations in 2019/2020 that supersede the previous regulations.</p> <p>Additionally, there are two drafts that the Project needs to entrust itself, i.e., the draft noise and vibration regulations and the draft chemicals regulations. He requested Patience Nyawere to share with the consultants and project developer the draft chemicals regulation and Sarah Kawala to share the noise and vibration draft regulation.</p> <p>The consultants and project developers were requested to look at the East African air quality standards because the eventual Ugandan regulations will be aligned with the stated East African standards.</p> <p>He appreciated NEMA being on brought because NEMA is often hesitant to engage when the ESIA process is ongoing; but it was a fruitful engagement. It gives us information and helps us to understand and appreciate the project so that at the point of review many of us have understood and analysed what is going on. It looks good on the presentation and I think the consultants are on track; they are doing a great job and they have really covered almost all the bases. We are glad to say that the consultants and the developer should continue with the work and we already gave feedback when the Scoping Report and Terms of Reference were submitted to NEMA.</p> <p>He added that when NEMA went to do a project verification, they had engagements with some of the community members. The feedback was very positive and we want you to continue to engage with the communities in such a manner and give them information so that your social license to operate such a big project is a big tick and a big plus.</p>
<p><b>Rhoda Nankabirwa</b></p> <p>On behalf of Atacama, Rhoda thanked everyone for attending the meeting and most importantly for keeping time.</p>
<p><b>CLOSURE:</b> The meeting was closed at 12:30 pm.</p>

Participants (14)

Find a participant

<b>TS</b>	Tonny Ssemmanda, Atacama Consulting (Me)		
<b>RN</b>	Rhoda Nankabirwa (Atacama Consulting)		
<b>JT</b>	Jim Tyler		
<b>A</b>	AIJUKA		
<b>II</b>	Isaac I.G. Ntujju		
<b>J</b>	Jamil		
<b>LW</b>	Lee White		
<b>M</b>	Martin		
<b>NI</b>	Namuleme Immaculate		
<b>O</b>	Otim michael		
<b>PN</b>	Patience Nyawere		
<b>PS</b>	Patience Singo RRM		
<b>SK</b>	Sarah k		
<b>SM</b>	Stephen McEwen (RRM / IonicRE)		

Invite

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## 25.2.4 CONSULTATION ENGAGEMENT MEETING WITH NATIONAL LEVEL NGOs AND CSOs

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED MAKUUTU RARE EARTHS PROJECT	
CONSULTATION ENGAGEMENT MEETING WITH NATIONAL LEVEL NGOs AND CSOs	
DATE	4 <sup>th</sup> June 2021
VENUE	Zoom (Virtual meeting)
MEETING START	2:00 pm
MINUTES BY	Tonney Ssemmanda

### Attendance list

NO	ATTENDED BY		
	NAME	ENTITY AND TITLE	EMAIL ADDRESS
1.	Gloria Mugambe	Head, Extractive Industries Transparency Initiative (EITI), Uganda National Secretariat	<a href="mailto:g_mugambe@yahoo.co.uk">g_mugambe@yahoo.co.uk</a>
2.	James Muhindo	Advocates Coalition for Development and Environment (ACODE)	<a href="mailto:muhindoj@gmail.com">muhindoj@gmail.com</a>
3.	Martin Lubwama	Business Development and PR Officer, Uganda Chamber of Mines & Petroleum	<a href="mailto:mlubwama@ucmp.ug">mlubwama@ucmp.ug</a>
4.	Richard Orebi	Program Associate, Global Rights Alert	<a href="mailto:rorebi@globalrightsalert.org">rorebi@globalrightsalert.org</a>
5.	Peruth Atukwatse	National Association of Professional Environmentalists (NAPE)	<a href="mailto:nape@nape.or.ug">nape@nape.or.ug</a>
6.	Joseph Muruye	LANDnet Uganda	<a href="mailto:jmuruye@landnet.ug">jmuruye@landnet.ug</a>
7.	Stephen McEwen	Project Director, Rwenzori Rare Metals (RRM)	<a href="mailto:mailto:edgarmugisha@atacama.co.ug">mailto:edgarmugisha@atacama.co.ug</a> <a href="mailto:stephen@ionicro.com.au">stephen@ionicro.com.au</a>
8.	Lee White	Principal Project Engineer, RRM	<a href="mailto:Lee@ionicro.com.au">Lee@ionicro.com.au</a>
9.	Patience Singo	Project Manager, RRM, Uganda office	<a href="mailto:patience@rwenzorimetals.com">patience@rwenzorimetals.com</a>
10.	Jim Tyler	Environment and Community Advisor, RRM	<a href="mailto:jim@environment-plus.com">jim@environment-plus.com</a>
11.	Jamil Kusiima	Technical Director, JBN Consults & Planners	<a href="mailto:jamil.kusiima@gmail.com">jamil.kusiima@gmail.com</a>
12.	Monica Salirwe	Senior Environmental Consultant, Atacama Consulting	<a href="mailto:monicasalirwe@atacama.co.ug">monicasalirwe@atacama.co.ug</a>
13.	Tonney Ssemmanda	Environmental Consultant, Atacama Consulting	<a href="mailto:tonneyssemmanda@atacama.co.ug">tonneyssemmanda@atacama.co.ug</a>



TEXT		
The meeting Commenced at 2:00 pm.		
<b>Agenda items:</b>		
TIME	ACTIVITY	RESPONSIBILITY
2:00 pm – 2:05 pm	Opening Prayer	Atacama
2:05 pm – 2:10 pm	1. Self-introductions 2. Safety Moment	All Atacama
2:10 pm – 2:20 pm	Welcome Remarks	Atacama
2:20 pm – 2:30 pm	Purpose of the Meeting	Atacama
2:30 pm – 2:45 pm	Project Description	RRM
2:45 pm – 3:05 pm	ESIA Process	JBN/Atacama
3:25 pm – 3:45 pm	Open Discussions, Questions and Answers	All
3:45 pm – 4:00 pm	Closing Remarks	RRM/JBN/Atacama
4:00 pm	End of Meeting	All
Opening Prayer		
<ul style="list-style-type: none"> <li>Monica led members in a word of prayer.</li> </ul>		
Self-Introduction		
<ul style="list-style-type: none"> <li>The chairperson (Monica) requested members in attendance to introduce themselves by name and the organisation they were representing.</li> </ul>		
Safety Moment		
<ul style="list-style-type: none"> <li>Monica conducted a presentation on the persistence of coronaviruses on surfaces.</li> </ul>		
Welcome Remarks		
<ul style="list-style-type: none"> <li>Jim Tyler made the opening remarks and an overview presentation about the Makuutu Rare Earth Project.</li> </ul>		
Purpose of the Meeting		
<ul style="list-style-type: none"> <li>Monica presented the purpose of stakeholder engagement and what is expected from the stakeholders.</li> </ul>		
Project Description		
<ul style="list-style-type: none"> <li>Patience presented the project overview, location, overview, mining technology and mining process.</li> </ul>		
ESIA Process		
<ul style="list-style-type: none"> <li>The consultants (Atacama Consulting and JBN Consults &amp; Planners) presented the ESIA activities, processes and steps followed during the ESIA preparation.</li> </ul>		

Open Discussion Session of the Meeting		
No.	Query/comment/suggestion	Answer/Response
<b><i>Gloria Mugambe, Head, Extractive Industries Transparency Initiative (EITI), Uganda National Secretariat</i></b>		
1.	You have indicated that the land to be acquired by the proposed Project belongs to one family and there is no need to displace so many people, but you have also mentioned that the Project will displace around 500 families. Could you please clarify that?	<p>The process plant area will be located in a current sugarcane plantation, which is operated by one family but with some land ownership contention (Section 6 of the ESIA).</p> <p>The Makuutu Central Mining Pit area belongs to many families; approximately 500 households will be affected by the proposed Project (Section 6 of the ESIA). Progressively, the mining area will be restored and will be available for use for agricultural activities.</p>
2.	How long will the Project take to restore the mining area?	The restoration of the mining area will be done immediately after rinsing of the mineral. Once the residue has been heaped, leached and washed, the heap will be allowed to drain all free moisture, and the residue will then be back filled into the mining pits such that the ground can be rehabilitated. The advantage for the Makuutu clays is that rare earth extracted from clays do not require further milling, crushing or cracking but purely separation and refining – a genuine rare earth chemical concentrate.
3.	When is the expected Project start date?	According to the current project schedule, the construction activities are planned for early 2023.
<b><i>James Muhindo, Advocates Coalition for Development and Environment (ACODE)</i></b>		
4.	PAPs who are going to be affected by the Project will need more precise information at this stage because it is going to be an opencast operation. The PAPs would need some relative certainty of the extent to which the displacement is going to happen. Otherwise, PAPs can take legal action against the Project if there is no full disclosure of project information.	<p>All PAPs (with a particular focus on vulnerable groups) and communities, regardless of their legal status will be consulted and engaged throughout the life of the Project. The households (HH) survey will be done at 100% of the households that are potentially physically or economically displaced by the Project so that the Project understands the livelihoods status for each affected HH and their needs. Refer to Section 10 of the ESIA report for a detailed discussion of the HH socio-economic findings.</p> <p>Resettlement for the directly affected PAPs will be phased (with progressive revegetation). A Resettlement Action Plan (RAP) will be undertaken, an activity that will be independent of this ESIA process, but to some extent, will be informed by the findings of this ESIA process.</p>

<b>Open Discussion Session of the Meeting</b>		
<b>No.</b>	<b>Query/comment/suggestion</b>	<b>Answer/Response</b>
5.	How are drainage and water systems in the area going to be impacted by the Project?	The process plant will include a drainage channel to a storm water pond to capture all rain run-off with excess storm water released to the adjacent water-courses. No effluent will be released unless it meets the release limits (discharge standards) set by NEMA. Refer to Section 6 and Section 13.4.2 of the ESIA report.
6.	Drainage and hydrology is an issue that is going to be sensitive because of the high propensity of the Project to cause pollution in terms of chemicals used when leaching and disposing of the tailings after removing the Rare Earth materials. This is something that the ESIA report should be able to indicate.	
7.	<p>The Project has a life span of over 30 years and yet the land acquisition plans seem to be temporary. It is clear that some areas will be acquired on a long-term basis, and not temporarily and PAPs will not be able to utilise the land shortly after.</p> <p>In terms of social impacts and human displacement, it needs to be clarified which sections of the Project will require permanent land acquisition so that PAPs within those areas are aware and the design of the livelihood restoration programmes are for longer term impact as opposed to PAPs whose land is going to be acquired temporarily.</p>	<p>Any disturbance of surface rights of the landowner will be adequately and fairly compensated. The management of the land acquisition and resettlement process is also critical in gaining acceptance and Project support by the host communities. Therefore, the land acquisition model (lease or outright purchase) will be clearly defined and a transparent process undertaken to ensure land acquisition and resettlement is done in a smooth and acceptable manner.</p> <p>What is critical is for the Project to undertake progressive land acquisition so that the number of people to be resettled is manageable at any given time.</p>
<b><i>Richard Orebi, Program Associate, Global Rights Alert</i></b>		
8.	District engagements are very important and should be emphasised because most of the times, with new developments in an area, you find that districts or local governments are not involved and not allowed access to the sites and yet these are the entities that local communities look up to. Therefore, district engagements should be emphasised, including developing the relevant district capacity.	<p>All local government level leaders, community leaders, traditional leaders will be consulted and engaged throughout the life of the project.</p> <p>For the ESIA study, all local government level leaders were consulted as elaborated in Section 11 of this ESIA report.</p>
9.	How is the Project looking out for the local community in terms of employment opportunities? If the Project takes away the sugarcane plantation, there are a number of people employed in the plantations and their jobs will be affected and yet they do not have the skills to take on	The Project intends to source staffing requirements from the local community. The initial workforce for the 2.5 million tonnes per annum operation will be approximately 300 persons and by the time the mine

<b>Open Discussion Session of the Meeting</b>		
<b>No.</b>	<b>Query/comment/suggestion</b>	<b>Answer/Response</b>
	alternative jobs. How is the Project prepared to develop their skills so that they do not lose their jobs?	is fully operational, the workforce is expected to exceed 1,000 personnel.
10.	Livelihood restoration programmes need to be done in consultation with the PAPs to make the programmes effective.	The households (HH) survey will be done at 100% of the affected households so that the Project understands the livelihoods status for each affected HH and their needs. The approach will inform the community development programme but also influence the manner in which the RAP would be undertaken.
<b><i>Peruth Atukwatse, National Association of Professional Environmentalists (NAPE)</i></b>		
11.	500 households are likely to be affected by the Project in terms of what? Their gardens, residences or livelihoods? The challenge with resettlement is that sometimes, PAPs don't have information on the land valuation rates.	The 500 households are potentially physically and/or economically affected by the proposed Project – refer to Section 10 of the ESIA for the detailed discussion on land acquisition.
12.	At what level will communities be involved in the Project?	The Project is committed to ensuring social equity and has defined a strategy to ensure that directly impacted communities build capacity in areas of health, education and services, to foster economic prosperity. The Project also intends to source staffing requirements from the local community. The initial workforce for the 2.5 million tonnes per annum operation will be approximately 300 persons and by the time the mine is fully ramped up, the workforce is expected to exceed 1,000 personnel.
13.	Relating to cultural heritage, what exactly are you planning to do if you find that there are important cultural sites within the Project area?	<p>During the scoping phase, no physical cultural resources were witnessed.</p> <p>The study team will undertake transect-based foot walk surveys within the Project area, marking all important archaeological and cultural heritage spots (if any) as well as examining the identified artefacts in the field. A Cultural Heritage Management Plan (CHMP) and a Chance Finds Procedure (CFP) will be prepared as additional management tools.</p> <p>Refer to Section 10 for a detailed discussion on cultural heritage.</p>
14.	Gender issues are not mentioned. How is the Project going to make sure that both men and women are involved and that women are supported in the land acquisition process?	The socio-economic study team will undertake gender profiling in terms of demographics (age, sex, age groups, etc.) gender roles and

Open Discussion Session of the Meeting		
No.	Query/comment/suggestion	Answer/Response
	In our experience, usually women are left out yet they are the ones who use the land.	<p>differences in agricultural production and gender-based vulnerability during the household survey.</p> <p>Project employment and activities will also consider both men and women and during compensation.</p>



25.2.4.1 Attendance Register for the Stakeholder Engagement Meeting with national level NGOs and CSO

Participants (13)

Find a participant

TS	Tonny Ssemmanda, Atacama Consulting (Co-host, me)		
MS	Monica Salirwe, Atacama Consulting (Host)		
J	Jamil		
GM	Gloria Mugambe		
	James Muhindo		
JT	Jim Tyler		
JM	Joseph Muruye		
LW	Lee White		
	Martin - Uganda Chamber of Mines and Petroleum- BD PR		
OR	Orebi Richard Global Rights Alert		
PS	Patience Singo RRM		
P	Peruth		
SM	Stephen McEwen		

Invite

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## 25.2.5 CONSULTATION ENGAGEMENT MEETING WITH BUGWERI DISTRICT LOCAL GOVERNMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED MAKUUTU RARE EARTHS PROJECT	
CONSULTATION ENGAGEMENT MEETING WITH BUGWERI DISTRICT LOCAL GOVERNMENT	
<b>DATE</b>	17 <sup>th</sup> August 2021
<b>VENUE</b>	Bugweri District Local Government Offices
<b>MEETING START</b>	11:30 a.m.
<b>MINUTES BY</b>	Peter Atukwatsibwe

**Attendance List and Photos** – Refer to attached Attendance Register and photos at the end of these meeting minutes.

TEXT
The Meeting Commenced at 11:30 a.m.
<b>Agenda items:</b> <ul style="list-style-type: none"> <li>• Opening Prayer</li> <li>• Self-Introduction</li> <li>• Welcome Remarks by the Chairperson</li> <li>• Presentation by the Consultant</li> <li>• Discussion/Comments/Way Forward</li> <li>• Closure</li> </ul>
Opening Prayer
<ul style="list-style-type: none"> <li>• The meeting was opened by an opening prayer from one of the attendees.</li> </ul>
Self-introduction
<ul style="list-style-type: none"> <li>• Members in attendance introduced themselves by name, organisation, and role- refer to the attached Attendance Register.</li> </ul>
Opening Remarks by the Chairperson
<ul style="list-style-type: none"> <li>• The Chairperson (Mary Birete, Deputy Chief Administrative Officer, Bugweri District Local Government) welcomed the Resident District Commissioner, District local government officials and the Consultant to the meeting. She further stated that she had been delegated by the Chief Administrative Officer (CAO) to chair the meeting since the CAO was not able to make it.</li> <li>• She welcomed the Consultant to Bugweri District Local Government and informed members in attendance that the meeting was related to the mineral exploitation in Makuutu Sub-county. She furthered informed members in attendance that assessment of the mineral potential of Makuutu had commenced three (3) years back and that the Consultant is currently undertaking studies to assess the potential environmental and social impacts of the mining project on the people of Makuutu.</li> <li>• She implored other district leaders in attendance to ask as many questions as they wished to the Consultant so as to collect accurate information that they can share with the area residents whenever asked. She then emphasised the need for the leaders to ensure that they are well endowed with project information so as not to mislead</li> </ul>

<p>residents as they come to them seeking for information.</p> <ul style="list-style-type: none"> <li>• The Chairperson then invited the Consultant's team to make a presentation about the project.</li> </ul>
<p><b>Presentation by the Consultant</b></p>
<ul style="list-style-type: none"> <li>• The Consultant's representative (Ms. Monica Salirwe), thanked the district local government officials for agreeing to the meeting.</li> <li>• The Consultant's team then presented the project overview, location, mining technology, mining process, ESIA activities, processes and steps being followed as part of the ESIA preparation.</li> <li>• The Chairperson then thanked the Consultant's team for the presentation and opened the floor for questions/comments and discussions.</li> </ul>

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
1.	Are there plans to replicate what is being held here (consultation meeting) within the project host communities?	<p>The Consultant's team has started its consultations with the District Local Government Officials and intends to cascade the same to the project host communities. The consultations commenced at the district local government level in order to officially introduce the intended activities to the district team and to further introduce the consulting team.</p> <p>Due to social distancing requirements and as per the Presidential Directive of 30<sup>th</sup> July 2021 (where gatherings were limited to only 20 people) as part of the measures against the spread the Covid-19, the engagements with the communities were to be held virtually through radio dialogue shows.</p>
2.	There is need to engage with the cultural leaders because they wish to be part of the process. It will be good to meet with the area Member of Parliament on how to engage with the cultural leaders?	<p>The Consultant's team was scheduled to meet the cultural leaders to understand and find out the different cultural heritage sites in the area (refer to the Bugweri Chiefdom cultural leaders meeting minutes).</p> <p>Additionally, the socio-economic study team is inclusive of a Cultural Heritage Specialist who will be key in identifying and providing the necessary technical guidance in management of cultural heritage aspects as part of the ESIA – refer to Section 11 of the ESIA Report for a discussion of the Cultural Heritage Baseline and Section 14 for the Cultural Heritage Impact Assessment.</p>
3.	From the presentation, it seems as though the project area has already been identified. I, therefore, request that the Sub-county officials and other key stakeholders are taken through a site visit to familiarise themselves with the project extent. Additionally, such a site visit will guide aspects of resettlement that could be associated with the project.	This was noted and shared with the project developer, RRM, for further actions.
4.	In due course of the project, there will be interaction with the community and there could be social impacts such as workers' compensation, sexual harassment, and health and safety issues, among others. What mitigation plans are in place?	The ESIA study will cover all the physical, biological and social aspects associated with the proposed project. Issues such as occupational health and safety, workers compensation and sexual harassment will be looked at as part of the ESIA impact assessment.

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
		Refer to Section 14 and section 16.9 of the ESIA report for the related (occupational and community health and safety) impact assessment discussion.
5.	As you undertake the ESIA, do you intend to work along with the District Environment Officer (DEO) and the District Community Development Officer (DCDO) or you will be working independently as the Consultant?	The ESIA will be undertaken with a multi sectoral approach. The Consultant will, therefore, work in consultation with the relevant bodies to derive guidance. For example, the Sociologist on the ESIA team will consult the DCDO to identify key community development issues that should be factored in the ESIA studies and that should guide the development of a Community Development Plan. Additionally, the project reports will be submitted to relevant authorities (including the district authorities) for their review and further guidance.
6.	We have been having very bad roads in Makuutu, and recently these have been improved and yet we notice the increased level of traffic heading to and from Makuutu. We, therefore, wish to find out what partnerships can be formed between the district and the project developer. It is also important for us to share knowledge in terms of size of project vehicles vis-à-vis the capacity of the road infrastructure in place to carry the vehicles.	<p>The project will need access roads for the project vehicles and for some of these, according to the Mining Bill, 2019, it is mandatory for project developers to contribute to the relevant community needs through an established and approved Community Development Plan.</p> <p>Therefore, the project developer will continue working with the district local government in establishment of such community development initiatives.</p>
7.	Kindly provide details regarding land management processes related to the proposed project. You also promised to come with documents for us to sign. As a district, we have some land in the proposed project area.	In terms of national administrative structures, all physical development should be introduced to the local governments for guidance. Therefore, the project developer will work in liaison with the local government authorities on the relevant land acquisition and management matters.
8.	I have been following the work plan and much of your engagements have been with the Makuutu Sub-county officials, and now with the District Local Government. Is there a plan to engage the with the district council? This is because the district council is the political leadership of the district.	<p>The study is focusing on the processing plant and the central mining pit which are located in Igombe, Ibulanku and Makuutu Sub-counties; therefore, it is the leadership of these sub-counties that will be engaged for the ESIA purposes.</p> <p>However, other relevant leaders will be consulted as the project progresses and as the need arises.</p>
9.	I have heard you (RRM/project developer) say that you have brought a container on site. Who is guarding it? Who among the top administrators of the district is aware of its presence?	This has been noted and the project developer will be notified as such.



Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
	We have issues of land here and it will be best to ensure that all concerned parties are notified.	
10.	There is need to be honest about the impacts of the proposed project such as impacts on agricultural activities. Issues of food security should be put into consideration. There should also be emergency services established for the proposed project.	These have been noted and will be put into consideration during the ESIA studies.  Refer to Section 16.3 for a discussion related to food security impacts and Section 16.5 for a discussion on emergency services.
11.	When you develop the Environmental and Social Management Plan, we would like for it to be implemented rather than being left on paper.	This has been noted. The project developer is committed to maintaining the highest standard of environmental and social accountability during implementation of the proposed project activities.
Closing Remarks		
<p>The Chairperson of the meeting thanked the Consultant's team for the information shared and requested that when the Environmental and Social Management Plan is developed, it should be implemented rather than being left on paper.</p> <p>The Consultant's thanked the district leadership for agreeing to the meeting and for making their technical input into the ESIA studies.</p>		
CLOSURE: The meeting was closed at 12:50 p.m.		

### 25.2.5.1

*Attendance Register for the Consultation Meeting with Bugweri District Local Government*

Date of first issue	30 <sup>th</sup> October 2015	STAKEHOLDER CONSULTATION REGISTER		Approved by	Edgar Mugisha
Original Author	Barnabas Busheshe	ATCM-FRM-10-01		Revision no.	02
Reviewed by	Edmond Twinobusingye	Checked by	Monica Salirwe	Date of last review	13 <sup>th</sup> February 2019
Main source of requirement		Procedure for handling customer related processes			

CLIENT:		RWENZORI RARE METALS			
PROJECT:		MAKUUTU RARE EARTHS PROJECT - ESIA			
VENUE:		BUGWERI DISTRICT LOCAL GOVERNMENT - ENGAGEMENT WITH DISTRICT OFFICIALS			
DATE:		17.08.2021		TIME STARTED:	11:30 am.
				TIME ENDED:	12:50 pm.
Name	Occupation	Contact Details			Signature
		Address	Telephone	Email	
KISULE JAMES F	MC/ENGINEER	BUGWERI	0777678071	kisulejamesf@gmail.com	
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NAGYUMA SARAH	Environment for CAD	BUGWERI	0774679653	nagyuma.sarah@yahoo.com	
NAGYUMA CHAPPA		BUGWERI	0702439656	nagyma@gmail.com	
NAMBECCI PROSS HIRACIWA	SEC SOCIAL SERVICES	BUGWERI DLG	0701530555	Pross-jackanyima@gmail.com	
BAMWIRE HERBERT	C/PERSON DRABILITY	BUGWERI	073431285		
BALIKISA STEPHEN	SEC. FINANCE	BUGWERI	070732242	balikisa.steph@gmail.com	
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PATIENCE SINYA	PROJECT MANAGER	BUGWERI	07775776	patience.sinyanationtel.com	
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BIRETE MARY	DEPUTY CAO	BDLG	0772437124	biretemary@gmail.com	
ASP BIRIMWE ALBERT	BPL	BUGWERI	0701978082	albert.birimwe@gmail.com	
EBOPU EMMANUEL	DLG BUSSE & PERSON	BUGWERI	0782016775	ebopuemanuel@gmail.com	

Date of first issue	30 <sup>th</sup> October 2015	STAKEHOLDER CONSULTATION REGISTER ATCM-FRM-10-01		Approved by	Edgar Mugisha
Original Author	Barnabas Busheshe			Revision no.	02
Reviewed by	Edmond Twinobusingye	Checked by	Monica Salirwe	Date of last review	13 <sup>th</sup> February 2019
Main source of requirement		Procedure for handling customer related processes			

CLIENT:	RWENZORI RARE METALS				
PROJECT:	MAKUTU RARE EARTHS PROJECT - ESIA				
VENUE:	BUGWERI DISTRICT LOCAL GOVERNMENT- ENGAGEMENT WITH DISTRICT OFFICIALS				
DATE:	17-08-2021	TIME STARTED:	11:30 AM	TIME ENDED:	12:50 PM
Name	Occupation	Contact Details			Signature
		Address	Telephone	Email	
DEBORAH HIMIRIMU	SE & COMMS	Jinja	075492976	deborahhimirimu@gmail.com	
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MAGOLA ISSAH	DISTRICT PLANNER	Bugweri	0782033239	magola2007@gmail.com	
HARARI KAGEGE	AGRICULTURE	Bugweri	0701031362	kagachharari81@gmail.com	
Dr. Muwerezza Peter	DHO	Bugweri	0782553147	pmuwerezza@musph.ac.ug	
KATUNU MUWATSHI	JOURNALIST	Bugweri	0753-066665	katunumuwatshi@gmail.com	
Ivan Mugemera	PRESS	Jinja	0705403355	Ivanmugemera@gmail.com	
Iqbal FAIZAL	PRESS	Iqbal	0757296342	iqbalfaizal32@gmail.com	
Kadacuma Amos	press	Jinja	0753995950	Kadacumamos@gmail.com	
MUSUUBO JACKSON	press	IGATA	0750002233		
Mukama Faizal	press	Jinja	0753524439	mukamafaizal37@gmail.com	
Magola Solomon	press	Jinja	0755120128	Solomonmagola@gmail.com	



25.2.5.2 Bugweri District Local Government Stakeholder Consultation Meeting Photos



## 25.2.6 CONSULTATION ENGAGEMENT MEETING WITH IBULANKU SUB-COUNTY OFFICIALS

25.2.7 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED MAKUUTU RARE EARTHS PROJECT	
CONSULTATION ENGAGEMENT MEETING WITH IBULANKU SUB-COUNTY OFFICIALS	
<b>DATE</b>	18 <sup>th</sup> August 2021
<b>VENUE</b>	Ibulanku Sub-county Headquarters
<b>START TIME</b>	09:42 a.m.
<b>MEETING END TIME</b>	12:30 p.m.
<b>MINUTES BY</b>	Desire Iraguha

**Attendance List and Photos** – Refer to attached Attendance Register and photos at the end of these meeting minutes.

TEXT
The Meeting Commenced at 9:42 a.m.
<b>Agenda Items:</b> <ul style="list-style-type: none"> <li>• Self-Introduction</li> <li>• Presentation by the Consultant and Project Developer</li> <li>• Discussion/Comments</li> <li>• Way Forward</li> </ul>
Self-introduction
<ul style="list-style-type: none"> <li>• Members in attendance introduced themselves by name, role and the entities they represented.</li> </ul>
Presentation by the Consultant
<ul style="list-style-type: none"> <li>• Denis Kyongera, on behalf of the Consultant's team presented the project overview, location, mining technology, mining process, ESIA activities, processes and steps to be followed during the ESIA preparation.</li> <li>• Denis indicated that Project Background Information booklets would be shared with the Local Council Chairpersons so that they could continue providing information to community members.</li> </ul>

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
Ndoga Ibrahim – Chairperson LC3, Ibulanku Sub-county		
1.	We appreciate that you have highlighted the positive benefits of this project, however we know that negative consequences are inevitable, please highlight these for our understanding.	<p>The major aim of an environmental assessment is to assess any project anticipated impacts, and also mitigate or minimise negative impacts and enhance the positive ones.</p> <p>Take an example of increased traffic in the area which may result into road accidents. As part of the ESIA study, we provide recommendations for appropriate mitigation measures for the proposed Project.</p> <p>A detailed discussion of the anticipated negative and positive impacts is provided in Sections 14.2 of the ESIA report.</p>
2.	What kind of rare minerals is the project going to extract from the area?	The rare earth elements are often used in high technology operations. They include elements such as neodymium, praseodymium, dysprosium, terbium and gadolinium. What the project will be doing is picking the clay, removing the rare earths elements, and putting the clay back into the pit – refer to Section 6 of the ESIA report for a detailed project description.
Kiyuba Issa – LC I Chairman Buniantole		
3.	Is it possible for the project to set up a health centre within the area in order to boost service delivery?	<p>The project will have a Community Development Plan (CDP) that will indicate how it (project) will contribute to various causes in the project area to benefit local communities. Some of these contributions might be in the areas of improving the road network, schools, medical facilities, farming practices and skilling of youth. Communities will be invited to contribute/make input into the development of the CDP – refer to Section 16.3 that provides further insights into community development.</p>
4.	Will the project allow people in this area to tap on the proposed electricity generation facilities at a free cost without having to pay electricity bills?	
5.	At the end of the project, will the electricity be left for the existing local communities or it will be decommissioned too?	
Wangubo Halid – Sub- County Chief		
6.	Are you going to compensate Project Affected Persons? What if someone refuses to relocate how will you handle this?	<p>There will be engagements and consultations that will be focused on land valuation and compensation under Resettlement Action Plan (RAP) studies, as the proposed Project advances to that stage.</p> <p>All the aspects and questions related to land acquisition will be addressed then.</p>



Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
7.	The issue of taxes, as a Sub County how do we benefit in terms of subcounty taxes?	The project developer is required to comply with all its tax obligations including the requirement of local service tax.
<b>Ochaya Francis – LCI Namiganda</b>		
8.	Is the compensation rate developed by the company or the district?	The proposed Project will adopt an approved Bugweri District compensation rate during the computation of value for affected assets, i.e., crops, trees, etc. However, this is a matter that will be looked at in detail at the time of Resettlement Action Planning.
<b>Maganda Musa – Chairperson Land Committee, Ibulanku Sub-county</b>		
9.	You indicated that the project will have about 2000 workers. Where will these workers come from? Is it the local communities?	The Project is committed to ensuring social equity and has defined a strategy to ensure that directly impacted communities build capacity in areas of health, education and services to foster economic prosperity. The Project also intends to source staffing requirements from the local community in addition to skills development programmes. The initial workforce for the 2.5 million tonnes per annum operation will be approximately 300 persons and by the time the mine is fully ramped up, the workforce is expected to be 1,200 personnel with the intention that all of these people be Ugandan. Training will be provided to local communities to maximise their opportunities for work with project.
10.	Upon project decommissioning, when will the project developer return the land to the land owners?	During the Resettlement Action Planning phase, the modalities for returning land to individual land owners will be communicated and discussed with the Project Affected Persons and the relevant authorities.
11.	Since you are the Consultant, your work usually comes to an end and leave the area. Where do we as local people start from after your departure?	The project developer will set up a community liaison office to ensure continued communication between the two parties (the project developer and the communities).
<b>Closing Remarks</b>		
The LC 3 Chairperson appreciated the consulting team for turning up for the meeting and appreciated the new upcoming project in the area as it is expected and hoped that the proposed Project will address the high unemployment challenge in the area, particularly among the youth.		
<b>CLOSURE:</b> The meeting was closed at 12:30 p.m.		

25.2.7.1 Attendance Register for Consultation Meeting with Ibulanku Sub-county

Date of first issue	30 <sup>th</sup> October 2015	STAKEHOLDER CONSULTATION REGISTER		Approved by	Edgar Mugisha
Original Author	Barnabas Busheshe	ATCM-FRM-10-01		Revision no.	02
Reviewed by	Edmond Twinobusingye	Checked by	Monica Salirwe	Date of last review	13 <sup>th</sup> February 2019
Main source of requirement		Procedure for handling customer related processes			

CLIENT:	RWENZORI RARE METALS				
PROJECT:	MAKUUTU RARE EARTHS PROJECT-ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT				
VENUE:	IBULANKU SUB-COUNTY HEADQUARTERS				
DATE:	18 <sup>th</sup> August 2021	TIME STARTED:	09:42am	TIME ENDED:	12:30pm
Name	Occupation	Contact Details			Signature
		Address	Telephone	Email	
HIGBERG A. FATIMA	PARISH CHIEF	BURKANTO	077099734	alshahfah@gmail.com	[Signature]
NAKASOLO MARIAM	PARISH CHIEF	NAMIGANDA	0777746456	-	[Signature]
DEBORAH NAMIRIMU	SE & COMMS	JINJA	0775492976	deborahnamirimu@gmail.com	[Signature]
Din Shaw A	Env Officer	Ibulanku st	0702610592	abdallahdeen7@gmail.com	[Signature]
KIYUBA ISSA	CHMAN L.C.I	BURKANTO	0774/0702010334	Kiyuba Issa 1971@gmail.com	[Signature]
NDABA MUHAMMAD	CHMAN L.C.I	KABUGWERI	0715390038	-	[Signature]
OCHAMA FRANCIS	CHMAN L.C.I	NAMIGANDA	0753706198	-	[Signature]
NANDITHURU ASUMAN	C.D	IBULANKU	0773800251	nandithurubuma@gmail.com	[Signature]
WANGULO HALID	Subcounty Mkt	Ibulanku	0702971190	wangulohalid79@gmail.com	[Signature]
MAGANDA MUSA	CHMAN L.C.I	IBULANKU	0757050527	-	[Signature]
	CHMAN L.C.I				
	CHMAN L.C.I				
NDHOGA IBRAHIM	CHMAN L.C.I	Ibulanku sk	0774511197	Endhogaibrah@gmail.com	[Signature]
KIIZA SAMUEL	CHMAN L.C.I	IBULANKU	0782567706	-	[Signature]

25.2.7.2 Ibulanku Sub-county Stakeholder Consultation Meeting Photos



## 25.2.8 CONSULTATION ENGAGEMENT MEETING WITH IGOMBE SUB-COUNTY

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED MAKUUTU RARE EARTHS PROJECT	
CONSULTATION ENGAGEMENT MEETING WITH IGOMBE SUB-COUNTY	
<b>DATE</b>	18 <sup>th</sup> August 2021
<b>VENUE</b>	Igombe Sub-county Headquarters
<b>MEETING START</b>	12: 45 p.m.
<b>MEETING END TIME</b>	3:10 p.m.
<b>MINUTES BY</b>	Edmond Twinobusingye

**Attendance List and Photos** – Refer to attached Attendance Register and photos at the end of these meeting minutes.

TEXT
The Meeting Commenced at 12:45 p.m.
<b>Agenda items:</b> <ul style="list-style-type: none"> <li>• Opening Prayer</li> <li>• Self-Introduction</li> <li>• Opening Remarks by the Community Development Officer (CDO)</li> <li>• Presentation by the Consultant and Project Developer</li> <li>• Discussion/Comments</li> <li>• Way Forward</li> </ul>
Opening Prayer
The opening prayer was led by Andrew Kisame (Speaker, Igombe Sub-county).
Self-introduction
Members in attendance introduced themselves by name, role and the entity they represented.
Opening Remarks by the Chairperson
<ul style="list-style-type: none"> <li>• The Community Development Officer welcomed all participants that had made it to the meeting.</li> <li>• She indicated that leaders at the sub-county were delighted to take part in the consultation meeting and were pleased to know that Makuutu Sub-county has minerals since this will bring industries, employment and development in the area.</li> <li>• She mentioned that it is important for landowners and local government authorities to be consulted and involved so that they are fully aware about the project and its activities. She indicated that leaders should be enlightened about the benefits of the proposed Project. She further indicated that issues of land compensation and Corporate Social Responsibility (CSR) should be highlighted and made clear to the meeting participants.</li> <li>• She further indicated that meeting participants expected to be enlightened on how the environment will be protected from destruction when the proposed Project commences.</li> </ul>
Presentation by the Consultant

- Denis Kyongera, on behalf of the Consultant team presented the project overview, location, mining technology, mining process, ESIA activities, processes and steps to be followed during the ESIA preparation.
- Denis indicated that Project Background Information Documents (PBID) would be shared with the Local Council Chairpersons so that they could continue providing information to the community members.

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
<b>Menya Emmanuel - Farmer</b>		
1.	In the presentation, you indicated that Igombe Sub-county has minerals. Please clarify on the types of minerals and in which villages they are located in this sub-county.	RRM conducted an exploration survey in the villages of Mawololo, Buyayu, Makandwa Central and Nakavule all in Makuutu Sub-county that led to the discovery of valuable clays that contain Rare Earth Elements (RRE). The grades of the Project's REE are comparable to grades in other viable REE clay deposits worldwide. RRE are not conventional minerals such as gold or diamonds – refer to a detailed discussion of the same in Section 6 of the ESIA report. It should be noted that in Igombe Sub-county, only Businda B village will be affected by a proposed Project haul road.
<b>Kunya Samuel - CDO</b>		
2.	On compensation, how can we ensure that the right claimants are the ones that receive compensation?	There will be engagements and consultations that will be focused on land valuation and compensation under Resettlement Action Plan (RAP) studies, as the proposed Project advances to that stage. All the aspects and questions related to land acquisition will be addressed then.
<b>Magoola Abbey – Chairman Land Committee</b>		
3.	Please provide clarification on aspects of the project such as relocating Project Affected Persons, building houses for relocated persons and leases on the land as attained by the project developer. When the lease on the land expires, will the land automatically revert to the previous owners who may have been relocated?	There will be engagements and consultations that will be focused on land valuation and compensation under Resettlement Action Plan (RAP) studies, as the proposed Project advances to that stage. All the aspects and questions related to land acquisition will be addressed then.
4.	We have heard from a neighbouring sub-county that land surveys are being undertaken in a process that is not transparent/fair. Money is not being paid to people staying on the land where surveys are being undertaken. Should we have hope that this will not be the case here in Igombe Sub-county?	This project will ensure that before any activities related with land acquisition are undertaken, engagements are conducted with stakeholders including the local leaders. The process of compensation is yet to start. What we are doing now are the preliminary studies that aim to understand the environmental and social conditions in the project area, to adequately inform the ESIA studies – refer to Section 5 for the detailed ESIA study methodologies.
<b>Kagoya Esther – Sub-county Chief</b>		



5.	How will you handle cases where PAPs receive partial compensation for land that will not immediately be utilised by the project developer?	The project will aim to provide full compensation to project affected persons before their land can be acquired/leased. As indicated earlier, queries about compensation and resettlement will be handled during RAP studies, once the proposed Project progresses to that stage.
6.	In the presentation, you indicated that the sub-county would receive local service tax. Please clarify whether the local service tax will be collected by the district or the subcounty?	The project developer is required to comply with all its tax obligations including the requirement of local service tax.
7.	How will local communities benefit from the project?	The project will have a Community Development Plan (CDP) that will indicate how it (project) will contribute to various causes in the project area to benefit local communities. Some of these contributions might be in the areas of improving the road network, schools, medical facilities, farming practices and skilling of youth. Communities will be invited to contribute/make input into the development of the CDP – refer to Section 16.3 that provides further insights into community development.
<b>Batwaula Awali – LC I Chairperson (Businda B)</b>		
8.	About the project providing employment to community members, what criteria will be followed to enlist workers on the project activities?	The project will need workers of various skills that will range from skilled and semi-skilled labour as well as casual labour. Community members will be enlisted according to their skills. Where personnel with required skills are not available and are sourced from outside Uganda, the personnel will be required to train Ugandans who will then be capable of undertaking these roles after seven (7) years.
<b>Way Forward</b>		
<p><b>a. Leaders in Attendance</b></p> <ul style="list-style-type: none"> <li>Leaders in attendance indicated that radios with a wide coverage in the project area include NBS, Baaba and Busoga 1 radios. These can be used to broadcast information about the project to community members.</li> </ul> <p><b>b. LC3 Chairperson, Igombe Sub-county</b></p> <p>In his concluding remarks, he thanked members and the consultant for attending the meeting. He indicated that the project would bring development to Igombe Subcounty and cautioned the leaders not to mix politics in the project. He indicated that the leaders were ready to cooperate with the project to bring development to the subcounty.</p>		
<b>CLOSURE:</b> The meeting was closed at 3:10 p.m.		

## 25.2.8.1 Attendance Register for Consultation Meeting with Igombe Sub-county

Date of first issue	30 <sup>th</sup> October 2015	STAKEHOLDER CONSULTATION REGISTER ATCM-FRM-10-01		Approved by	Edgar Mugisha
Original Author	Barnabas Busheshe			Revision no.	02
Reviewed by	Edmond Twinobusingye	Checked by	Monica Salirwe	Date of last review	13 <sup>th</sup> February 2019
Main source of requirement		Procedure for handling customer related processes			

CLIENT:	RWENZORI RARE METALS				
PROJECT:	MAKUTU RARE EARTHS PROJECT - ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT				
VENUE:	IGOMBE SUB-COUNTY HEADQUARTERS				
DATE:	18 <sup>th</sup> August 2021	TIME STARTED:	14:12 Hours	TIME ENDED:	03:10 pm
Name	Occupation	Contact Details			Signature
		Address	Telephone	Email	
MENYA EMMANUEL	FARMER	IGOMBE	0776352042	ya Emmanuel 209nc	
Kagoya Esther	S/C CHIEF	igombe	0774787811	okagoya3@gmail.com	
KUNYA SAMUEL	G.D.O	"	0782468109	Kunya Samuel@gmail.com	
DAWATULA ANNA	CHURCH LCI	IGOMBE	0773557819	-	
MAGoola ABRAHAM	4m Land com	IGOMBE	0779542121	-	
KISAME ANDREW	Speaker igombe	IGOMBE	0786666483	-	
BASOGA AUGUSTA	CHIEF/C Land	Wabunga	0775750701	-	
YAZIDIMWANGA	CHIEF	Wabunga	0774566586	-	
Nyencle Yaweri	CHIEF	igombe	0776211212	-	
KATERO JULIUS	Parish Chief	Kikundi	0706215876	-	
*DEBORAH NAMIRIMU	SE & COMMS	Jinja	0775492976	deborahnamirimu	
Namayanja Alice	Y/C LCI	igombe	0776511025	namaya.alice4@ug	
NYERO BONIFACE	ole igombe PP	igombe	0782522840	-	
MLINDO JANUARY	2yc POST	IGOMBE	0784685931	-	
KAKAIRI DAVID	Parish Council Wabunga	igombe	0781385800	-	



### 25.2.9 CONSULTATION ENGAGEMENT MEETING WITH MAKUUTU SUB-COUNTY OFFICIALS, MAWOLOLO, MAKANDWA CENTRAL AND NAKAVULE VILLAGE CHAIRPERSONS

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED MAKUUTU RARE EARTHS PROJECT	
CONSULTATION ENGAGEMENT MEETING WITH MAKUUTU SUB-COUNTY OFFICIALS, MAWOLOLO, MAKANDWA CENTRAL AND NAKAVULE VILLAGE CHAIRPERSONS	
DATE	17 <sup>th</sup> August 2021
VENUE	Makuutu Sub-county Offices
MEETING START	2:30 pm
MINUTES BY	Lydia Kyobe

**Attendance List and Photos** – Refer to attached Attendance Register and photos at the end of these meeting minutes.

TEXT
The Meeting Commenced at 2:30 p.m.
<b>Agenda items:</b> <ul style="list-style-type: none"> <li>• Self-Introduction</li> <li>• Opening Remarks by the Chairperson</li> <li>• Presentation by the Consultant and Project Developer</li> <li>• Discussion/Comments</li> <li>• Way Forward</li> </ul>
Self-introduction
<ul style="list-style-type: none"> <li>• Members in attendance introduced themselves by name, role and the organisation they represented.</li> </ul>
Opening Remarks by the Chairperson
<ul style="list-style-type: none"> <li>• Mr. Anthony Idiuro (Natural Resources Officer, Makuutu), welcomed the Consultant and Project Developer to the meeting with the subcounty and LC 1 officials.</li> <li>• He provided welcome remarks and mentioned that the community members were eager to know about the proposed project activities and to know how the activities would affect them.</li> <li>• Mr. Manana Wandera, (Sub-county Chief, Makuutu) thanked the project management team. He added that the sub-county anticipates a lot from the Project especially in regards to Corporate Social Responsibility (CSR) such as the rehabilitation of buildings/structures which has so far been done by Rwenzori Rare Metals.</li> <li>• He also mentioned that community members tend to think that Projects of this nature often have a lot of benefits especially monetary benefits and this is why there are a lot of stakeholders in the area and unfortunately, not all of them can benefit from the Project.</li> <li>• He thanked the team on ground that is committed and is working hand in hand with the community and that the presence of the Project is felt on the ground.</li> </ul>

- He also mentioned that the visit of the Consultant was very timely as many stakeholders have had questions to do with compensation, environmental issues and that the meeting attendees were looking forward to hearing from the Consultant.
- He further mentioned that the most prevailing issue amongst the community members is the worry of land grabbing.
- Additionally, he mentioned that there are some groups that are conservative in Makuutu Sub-county, for example, there is a cult in Makuutu that is against all government programs such as development projects, or immunisation. Therefore, measures will need to be taken to cater for such groups.
- The RRM Project Manager provided a brief background about the ESIA process and further introduced the Consultant to the meeting attendees. He then asked the Consultant to go on with the presentation.

#### **Presentation by the Consultant**

- The Consultant presented the project overview, location, mining technology, mining process, ESIA activities, processes and steps followed during the ESIA preparation.

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
<b>Mr. Magola Fred, L.C1 Buyayu</b>		
1.	Will community members also be consulted about the Project?	<p>Part of the purpose of the ESIA site visit is to consult stakeholders at various levels, i.e., the community, district, sub-county and village, among others to provide information to help the stakeholders understand the Project so that any concerns can be factored into the Project planning processes.</p> <p>However, due to the current COVID-19 restrictions, not all community members will be consulted directly. However, the Consultant plans to hold radio dialogues shows such that Project information can be availed to the community and feedback from the stakeholders in the community can be received and answered through feedback forms that will be left with each of the LC I Chairpersons.</p> <p>All LC 1 Chairpersons will be left with Project Background Information Documents (PBID) where the project information has been summarised and translated in Lusoga. In the same PBID, the booklets have feedback forms such that if there are any queries or concerns or recommendations, the forms can be filled in and submitted to the LCI for onward collection by the Consultant team.</p>
2.	Is there going to be a process of counting members in the community that will be affected by the proposed Project such that all can be compensated accordingly?	<p>The ESIA process will look into socio-economic aspects (discussed in Section 11 of the ESIA Report) of the proposed Project, which will factor in a household socio-economic survey for the potential affected households, for purposes of understanding the socio-economic aspects in the potentially affected communities, but not for matters of compensation.</p> <p>Compensation is a critical thing and there are various stages involved in Project development before the compensation stage can be looked into. At the moment, feasibility studies are still being undertaken to understand whether the project is financially, socially and environmentally feasible and acceptable before the proposed project can progress.</p>
<b>Project Team</b>		
3.	Since Socio-economic household surveys are covering many households, how do you advise the Consultant to conduct the recruitment of enumerators from Mawololo, Nakavule, Makandwa Central villages.	<p>The Chairperson advised that it would be best to recruit enumerators from the aforementioned villages given that they would be more familiar with their respective communities and it would be easier to get the information required.</p> <p>Secondly, the sub-county officials mentioned that it would be best to inform the community leaders (LC 1) earlier on the dates and time they hope to do the surveys such that they can</p>



		mobilise and notify the community members ahead of time so they would all be available when the surveys are being conducted.
<b>Project Team</b>		
4.	Concerning the radio show, we would like to seek guidance on the three (3) most popular radio stations the community members listen to and the times most people listen to the radio.	The Chairman LCI, Mr. Ali of Makandwa Central village mentioned that NBS Radio, Baba Radio and Busoga One Radio are the most listened to and that the most popular times are 1:00 p.m. and after 9:30 p.m.
<b>Agaba Douglas- Field Technician, Makuutu Sub County</b>		
5.	What time and dates will the radio programmes be aired?	Information in regards to which radio stations, dates and times will be communicated to the officials two days before the date of the radio shows. This is because the Consultant team has to interface with the radios identified to agree on the modalities, etc.  The officials also advised for community radios ("Mambo Bandos"), if acceptable, to be used to disperse information in regards to the radio programmes.
<b>Way Forward</b>		
Monica Salirwe, on behalf of the Consultant team thanked the Mr. Manana Wandera, the Sub County Chief, Makuutu for the facilitation and thanked all the participants from Makuutu Sub-county for all the recommendations, guidance and insights. On our part as the social and stakeholder engagement team, we have taken note all the feedback and will action the same accordingly.		
<b>CLOSURE:</b> The meeting was closed at 4:20 p.m.		

25.2.9.1 Attendance Register for Consultation Meeting with Makuutu Sub-county

Date of first issue	30 <sup>th</sup> October 2015	<b>STAKEHOLDER CONSULTATION REGISTER</b>		Approved by	Edgar Mugisha
Original Author	Barnabas Busheshe	<b>ATCM-FRM-10-01</b>		Revision no.	02
Reviewed by	Edmond Twinobusingye	Checked by	Monica Salirwe	Date of last review	13 <sup>th</sup> February 2019
Main source of requirement		Procedure for handling customer related processes			

CLIENT:	Rwenzori Rare Metals				
PROJECT:	Makuutu Rare Earth Project Environmental and Social Impact Assessment				
VENUE:	Makuutu Sub-county				
DATE:	17/02/2021	TIME STARTED:	2:30pm	TIME ENDED:	4:20pm
Name	Occupation	Contact Details			Signature
		Address	Telephone	Email	
Denis Kyongera	Consultant	Atacama Consulting	0773758184	deniskyongera@atacamas.co.ug	
DEBORAH NAMIRIMU	SE & COMMS	PRM	0755492976	deborahnamirimu@gmail.com	
Manana wandera	sub county chg makuutu		0772445441	henrywandera1259@gmail.com	
Bamukamba Ronah	chief makuutu		0776150210	bamukamba ronah 21@icloud.com	
Idiara Anthony	Natural Resources Officer Makuutu		0752646277	anthonyidiara@gmail.com	
Famba Stephen	CEO	Makuutu	0709-092037	stephenfamba@gmail.com	
Mirembe Esther	parish chief	Makuutu	0702226916		
MAGIBLA FRED	C/P L.C.I	Bu-Nyu	0779765029		
ABUDU ADO	chief	Makuutu	078227637		
NOHEGO IBRAHIM	parish chief	Nkono I	0751356610	ndhegoibrahim@gmail.com	
MAGANDA MUHAMMAD	C/P L.C.I	Makuutu	0755513631		
Susana Sulaiman	C/P L.C.I	Makuutu	0703884511		
Richard Orok	Consultant	Atacama	0704745542	richardorok@atacamas.co.ug	
AGABA DOUGLAS	PRM TECHNICIAN	Makuutu	070307786	emmadouglasagaba@gmail.com	

25.2.9.2 Makuutu Sub-county Stakeholder Consultation Meeting Photos



25.2.10 CONSULTATION ENGAGEMENT MEETING WITH NON-GOVERNMENTAL ORGANISATIONS (NGO) GROUP I

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED MAKUUTU RARE EARTHS PROJECT	
CONSULTATION ENGAGEMENT MEETING WITH NON-GOVERNMENTAL ORGANISATIONS (NGO) GROUP I	
DATE	19 <sup>th</sup> August 2021
VENUE	Bugweri District Local Government
MEETING START	1555Hrs
MINUTES BY	Edmond Twinobusingye

**Attendance List and Photos** – Refer to attached Attendance Register and photos at the end of these meeting minutes.

TEXT
The Meeting Commenced at 1555 Hrs.
<b>Agenda items:</b> <ul style="list-style-type: none"> <li>• Opening prayer</li> <li>• Self-Introduction</li> <li>• Presentation by the Consultant and Project Developer</li> <li>• Discussion/Comments</li> <li>• Way Forward</li> </ul>
Opening Prayer
<ul style="list-style-type: none"> <li>• The opening prayer was led by Musoli Ayubu.</li> </ul>
Self-introduction
<ul style="list-style-type: none"> <li>• Members in attendance introduced themselves by name, role and the entity they were representing.</li> </ul>
Presentation by the Consultant
<ul style="list-style-type: none"> <li>• Denis Kyongera, on behalf of the Consultant presented the project overview, location, mining technology, mining process, ESIA activities, processes and steps followed during the ESIA preparation.</li> </ul>

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response)
Rose Nataabi – Manager, Bugweri Farmer’s Association		
1.	At the end of the Project life span when restoration of the mining areas has been undertaken, will the land revert to its original owners who are going to be displaced by project activities?	<p>The project developers will obtain a lease to use the areas and at the end of the project life span following restoration, the land will revert to its original owners.</p> <p>The land will be at least as productive as it was when acquired when it is returned to the farmer and the project will work closely with the government of Uganda authorities to verify that this approach is working. The Project will be continually acquiring new land and returning old land to farmers over the life of the mine.</p>
Ayub Musoli – Executive Director, Multipurpose CSO		
2.	There are likely to be cases where some land owners will refuse to cede/lease land to the project developers. How do you intend to handle such cases?	<p>Before the project acquires land, Resettlement Action Planning will be undertaken. Engagements and consultations will be undertaken with communities and other stakeholders during which issues of land acquisition, valuation and compensation will be highlighted and explained in detail.</p>
Wenene Susan – Programme Specialist (USAID/MUCOBAD)		
3.	The project will transcend generations. The persons that will sign the lease/other agreements with the Project developer are likely not to be around at the end of the project lifespan. Besides, some people may have forgotten the extent of their land when they return after the project has wound up. How will this be handled?	
4.	Please clarify whether the chemical that will be used to leach the minerals from the clay will not harm people or the environment.	<p>Measures will be taken to ensure that the chemical does not leak to the surrounding environment. Additionally, the project will have a spill contingency plan that will highlight responses to a potential spill.</p> <p>The ESIA (Section 7.4) discussion on Processing Technology includes an overview of monovalent salt leaching of REE from ionic adsorption clay and in particular, ammonium sulphate (AMSUL) which is particularly effective and a widely used agricultural fertiliser.</p>
5.	I once worked for a gold mining project that extended to Busia/Namayumba. The mining pits that were not restored were	These are valid occupational and community health and safety implications for the proposed Project. The Project area will be fully fenced and security

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response)
	filled with brown water. A child from the community fell in one of the open pits left by the project and died. How will this project support communities during such unfortunate incidents?	patrolled and not accessible by the community, Refer to Section 16.9 for a summary of the occupational health and safety management plan. .
6.	Please clarify whether the processing plant will not emit dangerous fumes that will harm the environment such that communities are impacted by the project. Additionally, please enlighten us on how the project will handle communities that are negatively impacted by the project.	<p>The primary issue for air quality during the project implementation (i.e., construction, operation and restoration) is expected to be:</p> <ul style="list-style-type: none"> <li>• Dust emissions at the processing plant establishment phase,</li> <li>• Vehicle exhaust emissions from hauling of mined materials and transportation of equipment, and</li> <li>• Emissions from power generation at work sites.</li> </ul> <p>A detailed air quality impact assessment and corresponding mitigation measures have been discussed in Section 10.1.3 of the ESIA report.</p>
7.	Will the workers on the project be provided with Personal Protective Gear? Besides, should an accident be fatal and a worker loses their life, will the project have a bereavement package say for the orphans in such cases?	<p>The Project commits to the safety of its employees, contractors and subcontractors at worksites and other places of work, and will operate in collaboration with and to the requirements of the local health authorities.</p> <p>All project employees will be equipped with, and use, appropriate personal protective equipment (PPE) to adequately protect them from hazards associated with their specific occupation in accordance with Section 19 of the Uganda Occupational Safety and Health Act, 2006.</p> <p>The project will also comply with the Government of Uganda's Workers' Compensation Act, 2000 which outlines the compensation to workers for injuries suffered and Scheduled diseases incurred during the course of employment.</p>
8.	How will cases of child labour on the project be avoided?	In accordance with the Ugandan Employment Act (2006), Section 32, the employment of anyone under the age of 18 will be forbidden in regards to the proposed Project activities.
9.	Will the project create awareness about HIV? Will the project have Corporate Social Responsibility activities aimed at helping persons living with HIV?	Yes, the Project will conduct HIV/AIDS awareness sessions and Project developer employees, contractors and subcontractors will be required to



Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response)
		attend these sessions. It is important to note that this is a requirement as per the National HIV/AIDs and the World of Work Policy, 2007.
<b>Kadunga Muhammed – Youth Chairperson, Bugweri District</b>		
10.	I am born in Makuutu. It is important that the project fulfils its commitment to restoration of the environment after the project lifespan just like has been indicated in the project description that has been presented.	This has been noted. Section 6 of the ESIA report includes a detailed restoration plan of the mining areas.
11.	There have been cases where projects do not fulfil their pledge to compensate all affected people. Please ensure that this project fully compensates all project affected persons.	The project will aim to provide full compensation to project affected persons before their land can be acquired/leased. Queries about compensation and resettlement will be handled during RAP studies, once the proposed Project progresses to that stage.
12.	Will the proposed processing plant be in the form of a large factory? There is need to know how far community members will be allowed to stay in close proximity to the processing plant.	The proposed processing plant is expected to cover an estimated 200 hectares and the facility will be located in the villages of Buniantole, Kabugweri and Namiganda all in Ibulanku Sub-county, Bugweri District.  The current identified site is predominantly used for farming and there are minimal established settlements within the site.
13.	We envisage a lot of dust to be generated on the access roads. Is it possible for the project to tarmac the road from Busesa to Makuutu up to the mining and processing plant?	The project will have a Community Development Plan (CDP) that will indicate how it (project) will contribute to various causes in the project area to benefit local communities. Some of these contributions might be in the areas of improving the road network, schools, medical facilities, farming practices and skilling of youth. Communities will be invited to contribute/make input into the development of the CDP – refer to Section 16.3 that provides further insights into community development.
14.	There will be need for a health centre for the workers on the project. Additionally, it would be good for the project to equip the existing government health centres such as the one in Makuutu, Nakivumbi-Namiganda and in Kivumba.	

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response)
15.	Additional stakeholders that require consultation are the cultural leaders, elders, opinion leaders, women leaders, youth leaders. These will be key in sensitization of community members about protecting themselves from HIV among other diseases that may become prevalent when the project starts.	<p>Stakeholders have been identified through a Stakeholder Engagement Plan<sup>3</sup> and will be engaged at various levels.</p> <p>Consultations have been held with National level stakeholders (Ministries, Departments, Agencies) including national NGOs/CSOs, local government levels (Bugweri district local government, and at subcounty levels i.e., at Makuutu, Ibulanku and Igombe Sub-counties) and with representatives of Bugweri Chieftdom as detailed in this Stakeholder Engagement Report.</p> <p>Owing to the current Covid-19 restrictions, information sharing with local communities was undertaken via radio stations (NBS FM (English – twice a week) and Baba FM (Lusoga – four times a week)) where the project information was relayed for a month.</p>
16.	How will the jobs on the project be distributed among the genders?	<p>The project will need workers of various skills that will range from skilled and semi-skilled labour as well as casual labour. Community members will be enlisted according to their skills. Where personnel with required skills are not available and are sourced from outside Uganda, the personnel will be required to train Ugandans who will then be capable of undertaking these roles after seven (7) years.</p> <p>The project developer is an equal opportunity employer and will follow the principle of equal opportunity in regards to its hiring procedures and will not discriminate against race or gender, and will give everyone an equal chance.</p>
17.	What kind of jobs will be available for members of the local community?	
18.	Is it documented how the districts, e.g., Bugweri will benefit from the project?	Section 98 (1) of the Mining Act, 2013 <sup>4</sup> states that, <i>“All minerals obtained or mined in the course of prospecting, exploration, mining or mineral beneficiation operations shall be subject to the payment of royalties on the</i>

<sup>3</sup> It is important to note that this plan is dynamic and will be updated periodically as new stakeholders are identified.

<sup>4</sup> Note that this Act is still under review and is currently the Mining Bill of 2019.

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response)
		<p><i>gross value of the minerals based on the prevailing market price of the minerals at such rates as shall be prescribed."</i></p> <p>Additionally, subsection (2) states that, "<i>Royalties shall be shared by the Government, Local Governments and owners or lawful occupiers of land subject to mineral rights in the manner specified in the Second Schedule to this Act.</i>"</p> <p>It is against the above requirement that project developer will pay its royalties to the Bugweri District Local Government.</p>
19.	Is there a way of making fertilizers from the residues of the processes on the project for the benefit of farmers in the community?	During the process of extracting Rare Earth Elements from the mined clay, the project will irrigate the mined resources with an ammonium sulphate (Amsul) leach solution to dissolve the rare earths. The use of ammonium sulphate will enrich the soil with much needed plant nutrients prior to back-filling the mining void along with the soil.
20.	There is need to mobilize community members to plant trees along the access roads and the project sites.	This has been noted. The project will have a Community Development Plan (CDP) that will indicate how it (project) will contribute to various causes in the project area to benefit local communities. Some of these contributions might be in the areas of improving the road network, schools, medical facilities, farming practices and skilling of youth. Communities will be invited to contribute/make input into the development of the CDP – refer to Section 16.3 that provides further insights into community development.
21.	It is important that Non-Government Organisations are involved in the sensitisation of community members about the project.	<p>Local NGOs are valued by RRM. They are also key towards organising community sensitisation programs as they understand the local community's contexts better.</p> <p>The current engagement with NGOs is aimed at providing project information in an open and transparent manner as each NGO has a specific mandate.</p>

## Way Forward

**Leaders in attendance**

- The project will benefit the community and the country at large. It is important that we support it to succeed.

**CLOSURE:** The meeting was closed at 1700 Hrs.

25.2.10.1 Attendance Register for Consultation Meeting with NGOs Group /

Date of first issue	30 <sup>th</sup> October 2015	<b>STAKEHOLDER CONSULTATION REGISTER</b>		Approved by	Edgar Mugisha
Original Author	Barnabas Busheshe	<b>ATCM-FRM-10-01</b>		Revision no.	02
Reviewed by	Edmond Twonobusingye	Checked by	Monica Salirwe	Date of last review	13 <sup>th</sup> February 2019
Main source of requirement		Procedure for handling customer related processes			

CLIENT: <b>RWENZORI RARE METALS</b>					
PROJECT: <b>MAKUUTU RARE EARTHS PROJECT - ESIA</b>					
VENUE: <b>BUGWERI DISTRICT LOCAL GOVERNMENT - ENGAGEMENT WITH CSOs/NGOs</b>					
DATE: <b>19 August 2021</b>		TIME STARTED: <b>15:55 hrs.</b>		TIME ENDED: <b>17:00 hrs</b>	
Name	Occupation	Contact Details			Signature
		Address	Telephone	Email	
<b>Klenene Misan</b>	<b>Program specialist</b>	<b>HEAD OF RARE EARTHES</b>	<b>0724993964</b>	<b>swenewamukobach@gmail.com</b>	
<b>DEBORAH NAMIRIMU</b>	<b>S/E E COMMIS</b>	<b>SINSA</b>	<b>075492976</b>	<b>deborahnamirimu@gmail.com</b>	
<b>Nattabi ROSE</b>	<b>Manager</b>	<b>BUGWERI</b>	<b>072910445</b>	<b>nattabirosejanaki@gmail.com</b>	
<b>MUSULO AYUBU</b>	<b>EXECUTIVE DIRECTOR</b>	<b>MULTIPURPOSE CSO</b>	<b>0703429371</b>	<b>ayubumusulo2019@gmail.com</b>	
<b>Kauma Hadia</b>	<b>Busoga Regional Coordinator</b>	<b>MUSAMBA-KIN</b>	<b>0756044735</b>	<b>kauma.hadia@taloo.com</b>	
<b>KADUMOTA MOTTAMBA</b>	<b>Head of CSOs</b>	<b>BUGWERI</b>	<b>070212765</b>	<b>070212765 CSO OFFICE</b>	
<b>Klajuma Sarah</b>	<b>Env. officer</b>	<b>"</b>	<b>0701160240</b>	<b>0744679653</b>	

25.2.10.2      *NGO Group / Stakeholder Consultation Meeting Photo*





## 25.2.11 CONSULTATION ENGAGEMENT MEETING WITH MAKUUTU SUB-COUNTY

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED MAKUUTU RARE EARTHS PROJECT	
CONSULTATION ENGAGEMENT MEETING WITH MAKUUTU SUB-COUNTY	
<b>DATE</b>	20 <sup>th</sup> August 2021
<b>VENUE</b>	Bugweri District Local Government-NGO Group II Engagement
<b>MEETING START</b>	10:20 a.m.
<b>MEETING END TIME</b>	12:15 p.m.
<b>MINUTES BY</b>	Lydia Kyobe

**Attendance List and Photos** – Refer to attached Attendance Register and photos at the end of these meeting minutes.

TEXT
The meeting commenced at 10:20 a.m.
<b>Agenda items:</b> <ul style="list-style-type: none"> <li>• Self-Introduction</li> <li>• Opening Remarks by the Chairperson</li> <li>• Presentation by the Consultant and Project Developer</li> <li>• Discussion/Comments</li> <li>• Way Forward</li> </ul>
Self-introduction
<ul style="list-style-type: none"> <li>• Members in attendance introduced themselves by name, roles and the organisation they represented - refer to the attendance register.</li> </ul>
Opening Remarks by the Project team
<ul style="list-style-type: none"> <li>• Denis Kyongera, Consultant representative introduced the Project to the meeting attendees and provided a brief background about the project and the reason as to why the engagement was being conducted.</li> </ul>
Presentation by the Consultant
<ul style="list-style-type: none"> <li>• The Consultant presented the project overview, location, mining process, ESIA activities, processes and steps followed during the ESIA preparation.</li> </ul>

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
<b>Mr. Mundu Steven - District Surveyor<sup>5</sup></b>		
1.	During land acquisition, it would be good to have specific details on how land is to be acquired and handed back to the respective land owners following completion of the Project given that land is of importance in Busoga region.  Some aspects that need to be clarified to landowners are the different land tenure systems and that land for the project is to be leased.	The issue of land has been emphasised in previous meetings held with other stakeholders at Bugweri District and Ibulanku, Igombe and Makuutu Sub-counties.  The feedback is dully noted. At the commencement of the resettlement action planning process, the recommendations will be taken into consideration, including sensitisation about the land acquisition process and the different types of tenure systems.
2.	Will the Project construct some roads/maintain the existing roads?	The Project is going to construct a proposed haul road that will be used for transporting the mined materials from Makuutu Sub-county to a processing plant to be located in Ibulanku Sub-county. However, if the road to be constructed interferes with current roads used by communities, alternative routes/roads will be established for communities to use and traffic control personnel will be recruited to reduce on traffic/accidents on the roads – refer to an elaboration of this in Section 6 of the ESIA report.
<b>Mr. Mugulusi Brian- Managing Director</b>		
3.	There is need for the Project team to execute exactly what is promised to avoid cases of community retaliation.	The recommendation has been noted. A grievance mechanism committee was put in place where by unsatisfied community members could report any grievances such that the Project can address them in a coherent and timely manner – refer to Section 12.10 of the ESIA report for an account of the grievance mechanism.
<b>Project Team</b>		
4.	Does the District have district compensation rates for the financial year 2021-2022? This is because compensation of affected assets (crops & trees) is based on approved district	The most recent district compensation rates are for 2018/2019 Financial Year. However, these will be looked into and updated accordingly.

<sup>5</sup> The District Surveyor was not part of any NGO in that meeting. However, since the meeting was held at the district premises, he utilised the opportunity to share his views.

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
	compensation rates. If rates are not available, it has the potential to delay the project.	
<b>Mr. Mundu Steven - District Surveyor</b>		
22.	Will the extraction of minerals from underground disrupt water supply and the water table?	Hydrology studies were undertaken as part of the ESIA to understand how the project will affect the quantity and quality of water based on the planned extraction techniques and equipment to be used during the mining process.  Refer to Section 10,2 of the ESIA report for the related hydrology and water quality impact assessment discussion.
23.	How are these NGOs going to be involved in the upcoming project?	Local NGOs are valued by RRM. They are also key towards organising community sensitisation programs as they understand the local community's contexts better.  All Community Development Programmes will be implemented in close collaboration with the GoU responsible authorities, ministries and agencies, including local government authorities and water management zones as well as NGOs working within the project area.
<b>Conclusion</b>		
Denis Kyongera appreciated the NGOs in attendance for turning up for the meeting.		
<b>Closure</b>		
The meeting ended at 12:53 p.m.		

25.2.11.1 Attendance Register for Consultation Meeting with NGOs Group II

Date of first issue	30 <sup>th</sup> October 2015	STAKEHOLDER CONSULTATION REGISTER ATCM-FRM-10-01		Approved by	Edgar Mugisha
Original Author	Barnabas Busheshe			Revision no.	02
Reviewed by	Edmond Twinobusingye	Checked by	Monica Salirwe	Date of last review	13 <sup>th</sup> February 2019
Main source of requirement		Procedure for handling customer related processes			

CLIENT:	RWENZORI RARE METALS				
PROJECT:	MAKUNTU RARE EARTHS PROJECT- ESIA				
VENUE:	BUGWERI DISTRICT LOCAL GOVERNMENT - NGO'S / CSOs				
DATE:	20 AUGUST 2021	TIME STARTED:	10:20 AM	TIME ENDED:	12:53 PM.
Name	Occupation	Contact Details			Signature
		Address	Telephone	Email	
MUGALUSI BRIAN	MANAGING DIRECTOR		0753155628	brianmugali020@gmail.com	
MUTESI SUZAN	WOMEN IN LEADERSHIP		0750516058	SUSANMUTESI@gmail.com	
MUNDU STEPHEN	SURVEYOR (A.S.S)		0770531890	mundusteven0@gmail.com	
WAMBAI ANDREW	DIRECTOR	NEW LIFE ORG	0782237558	WMBANDREW23@gmail.com	
DEBORAH NAMIRIMU	SE & COMMS	RAM	07751192976	deborahnamirimu@gmail.com	
Tonny Semmande	consultant	Atacama	0783148107	tonny.semmande@atacama.co.ug	
Denis Kyongere	Consultant	Atacama	0773752121	denis.kyongere@atacama.co.ug	
Richard Okoth	Consultant	Atacama	0764548542	richardokoth@atacama.co.ug	
KASUBO DOROTHY	Coordinator	Buranga	0776612080	Kasubod Dorothy Kasubod@gmail.com	
Byakino Yakur	Secretary	(Dmt) (HAC)	0706167293	byakinyakur62@gmail.com	
MUNOTA MARIN	MANAGING DIRECTOR	Evangelical	0773683723	MUNOTAMARIN@gmail.com	

25.2.11.2 NGOs Group II Stakeholder Consultation Meeting Photo



## 25.2.12 CONSULTATION ENGAGEMENT MEETING WITH BUGWERI CHIEFDOM OFFICIALS

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED MAKUUTU RARE EARTHS PROJECT	
CONSULTATION ENGAGEMENT MEETING WITH BUGWERI CHIEFDOM OFFICIALS	
<b>DATE</b>	19 <sup>th</sup> August 2021
<b>VENUE</b>	Nile Courts Hotel
<b>MEETING START</b>	11:09 a.m.
<b>MEETING END</b>	2:30 p.m.
<b>MINUTES BY</b>	Peter Atukwatsibwe

**Attendance List and Photos** – Refer to attached Attendance Register and photos at the end of these meeting minutes.

TEXT
The Meeting Commenced at 11:09 a.m.
<b>Agenda items:</b> <ul style="list-style-type: none"> <li>• Introductions</li> <li>• Welcome Remarks by the Chairperson</li> <li>• Presentation by the Consultant</li> <li>• Discussion/Comments/Way Forward</li> <li>• Closure</li> </ul>
Opening Remarks by the Chairperson
<ul style="list-style-type: none"> <li>• The Chairperson (Prime Minister of Bugweri Chiefdom) welcomed all the members in attendance and requested his team to introduce themselves by names and roles.</li> </ul>
Presentation by the Consultant
<ul style="list-style-type: none"> <li>• The Consultant's representative (Mr. Denis Kyongera), introduced the project and the reason as to why Bugweri Chiefdom was being consulted.</li> <li>• The presentation entailed the project overview, location, mining technology, mining process, ESIA activities, processes and steps being followed as part of the ESIA preparation. Additionally, the presentation provided details related to the areas that will form part of the project extent.</li> <li>• The Chairperson then thanked the Consultant's team for the presentation and opened the floor for questions/comments and discussions.</li> </ul>



Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
<b>Waiswa Hatim (Clerk to Council – Bugweri Chiefdom)</b>		
1.	Project activities are already ongoing on yet you are still in consultation phase?	What is being undertaken at the moment are geotechnical and geophysical surveys to appreciate the site. Mining activities have not yet commenced and hence why the ESIA studies are being undertaken at this time.
<b>Wankuma Abel – Sabalangira (Prince of Princes/Chief Prince), Bugweri Chiefdom</b>		
2.	How will compensation be effected in cases where people will have to be moved along with graves on their land?	There will be engagements and consultations that will be focused on land valuation and compensation under Resettlement Action Plan (RAP) studies, as the proposed Project advances to that stage.  All the aspects and questions related to land acquisition will be addressed then.
	Additionally, you mentioned that the top layer will be scraped off and returned after 27 years. We are wondering whether this soil will still be where it was kept and of the same quality as when it was picked.	One metre of topsoil will be stripped and stockpiled followed by truck and shovel removal of the overburden and clay ore. Topsoil will be removed and stockpiled to allow access to the shallow clay “ore-body”. The rare earths will be desorbed out of the clay which will then be returned to the mining pit and covered with the stored topsoil. The land will be at least as productive as it was when acquired when it is returned to the farmer and the project will work closely with the government of Uganda authorities to verify that this approach is working. The Project will be continually acquiring new land and returning old land to farmers over the life of the mine.
3.	Local people are given the lowest paying jobs on the project whereas the high paying jobs are given to other people. What are the mechanisms in place against such?	The Project is committed to ensuring social equity and has defined a strategy to ensure that directly impacted communities build capacity in areas of health, education and services to foster economic prosperity. The Project also intends to source staffing requirements from the local community in addition to skills development programmes. The initial workforce for the 2.5 million tonnes per annum operation will be approximately 500 persons and by the time the mine is fully ramped up, the workforce is expected to exceed 1,200 personnel with the intention that all these be Ugandan by Year 7. Large numbers of Project Affected Persons will additionally be employed on established Livelihoods

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
		Projects planned for rehabilitated areas including fish farms, agroforestry and intensive agriculture (refer section 16.3).
4.	We lack some social infrastructure such as schools. Assuming the project has started and more schools and health centres have been built and then left back at the end of the project. Are there mechanisms to build capacity of the locals in managing such infrastructure?	The project will have a Community Development Plan (CDP) that will indicate how it (project) will contribute to various causes in the project area to benefit local communities. Some of these contributions might be in the areas of improving the road network, schools, medical facilities, farming practices and skilling of youth. Communities will be invited to contribute/make input into the development of the CDP – refer to Section 16.3 that provides further insights into community development.
5.	How is the project going to train locals with skills in mining?	All Community Development Programmes will be implemented in close collaboration with the GoU responsible authorities, ministries and agencies, including local government authorities and NGOs working within the project area.
<b>Betty Namaganda – Youth Minister</b>		
6.	Will what you are saying be implemented or will it be left in the reports?	The project will have a Community Development Plan (CDP) that will indicate how it (project) will contribute to various causes in the project area to benefit local communities. Some of these contributions might be in the areas of improving the road network, schools, medical facilities, farming practices and skilling of youth. Communities will be invited to contribute/make input into the development of the CDP – refer to Section 16.3 that provides further insights into community development.
<b>Wandera Anthony - Permanent Secretary, Bugweri Chiefdom</b>		
7.	Why does the project need to construct many roads?	The project will construct a haul road that will be aligned to avoid communities and which will be completely separate from public roads..
<b>David Nkuutu</b>		
8.	The roads will be either upgraded or diverted. What kind of roads should we expect around the mining center?	Active mining operations including roads will be fully fenced off from the general public but these areas will be progressively rehabilitated and support long-term community livelihood projects (refer section 16.3) which will have appropriate roads.
9.	While they construct roads, they are going to divert the already existing roads, can the project developer ensure that these roads are well improved so as to compensate these impacts? Can you also ensure that our views are very explicitly expressed in writing?	The Project will construct independent roads that will not be publicly accessible in order to enable Project operations. The mining pit will expand at a rate of about 35 hectares a year and will ultimately encroach on some public roads. District Planners and other stakeholders will be

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
		consulted well in advance of any impact on public roads and alternate roads will be in place prior to any impact from mining operations.
10.	We need a Liaison Officer to be employed on the project so as to ensure that our interests are well represented at all times.	As at the time of preparation of this ESIA report, the project developer was in the process of hiring four Community Liaison Officers. The officers will be tasked with engaging community members, providing appropriate feedback to queries and participating in grievance management through receiving, recording and engaging grievants.
11.	What is the history of Rwenzori Rare Metals? Where else have they done mineral exploration before?	The Australian Ionic Rare Earths Company is a majority shareholder in Rwenzori Rare Metals and has a team of highly experienced and qualified experts in mining. This team is working with specialist mining consultants to plan, design and develop the Project to International World Class Standards to maximise the social, environmental and economic benefits of the Project to all stakeholders including local communities.
<b>Rose Musana – Speaker, Bugweri Chieftdom</b>		
12.	Will Project Affected Persons (PAPs) be compensated for only areas where minerals will be found or for their entire land? In case compensation is to be done only for areas where minerals are found, has the project developer considered the fact that after minerals are extracted, the surrounding land may not be usable at all?	The 350 hectares of the Central Makuutu Mining pit have settlements and resettlement will be necessary as the mining pit expands to the areas where public infrastructure and more settlements are located. The resettlement will be staged because of the nature of the project activities - refer to Section 14.4 of the ESIA report for a detailed discussion. There will be engagements and consultations that will be focused on land valuation and compensation under Resettlement Action Plan (RAP) studies, as the proposed Project advances to that stage. All the aspects and questions related to land acquisition will be addressed then. Regarding the productivity of the land, the ESIA Section 7.4 discussion on Processing Technology includes an overview of monovalent salt leaching of REE from ionic adsorption clay and in particular, ammonium sulfate (AMSUL) which is particularly effective and a widely used agricultural fertiliser, i.e., the land will remain productive after mineral extraction.
<b>Concluding Remarks/Recommendations</b>		

The Chairperson of the meeting requested the Consultant to advise the developer to keep in touch with the Chiefdom in all stages of the project so that the institution's interests are well catered for. He then made the following recommendations;

- He stressed the fact that the Chiefdom's leadership is not pursuing selfish interests but rather the interests of the people of Bugweri.
- He also emphasised the importance of transparency and disclosure.
- He also requested to know more about the ownership of the company to be sure that it does not have any ill intentions as far as dealing with the community is concerned.
- Can the roads to be constructed be permanent roads? This is because we wish for these programs to have a lasting impact on the community.
- Can we have the skills required on the project disclosed to the communities? This will enable the community leadership to do deliberate pre-skilling to provide more specialised services to the project.
- There should be residual programs to stay after the project.
- He explained that Busoga has 11 Chiefdoms headed by Chiefs. Under each Chiefdom is a sub-county and under a sub-county, there are parishes and cells.
- Local supply to the project should be sourced locally and communities should be informed early on what is needed/required.
- Project employment requirements should be communicated early enough so that people can prepare.
- Pre-skilling for the local community should be considered.
- The project should meet 30% employment for the local community as per IFC requirements.
- Sensitive positions for project employment should be locally filled for example CLOs, environmental office, etc.
- Bugweri Chiefdom Governance structure should be represented in all project activities.
- Memorandum of Understanding between Bugweri Chiefdom and Makuutu Rare Earths Project should be signed.
- All roads within the project area should be elevated to minimal standards to avoid community members use the project roads.
- Improvement of the existing schools, health centres as opposed to constructing new ones.
- Construction of better water infrastructure in the project area.
- Extension of electricity to the project area.
- Carryout the extensive and intensive RAP.
- Cultural sites that might be affected by the project should be handled very well.

The Consultant thanked the Chairperson (Prime Minister) for agreeing to the meeting and for making their technical input into the ESIA studies.

**CLOSURE:** The meeting was closed at 2:30 p.m.

25.2.12.1 Attendance Register for Consultation Meeting with Bugweri Chiefdom

Date of first issue	30 <sup>th</sup> October 2015	STAKEHOLDER CONSULTATION REGISTER ATCM-FRM-10-01		Approved by	Edgar Mugisha
Original Author	Barnabas Busheshe			Revision no.	02
Reviewed by	Edmond Twinobusingye	Checked by	Monica Salirwe	Date of last review	13 <sup>th</sup> February 2019
Main source of requirement		Procedure for handling customer related processes			

CLIENT:	RWENZORI RARE METALS				
PROJECT:	MAKUTHI RARE EARTHS PROJECT - ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT				
VENUE:	NIKE COURIS - ENGAGEMENT WITH BUGWERI CHIEFDOM OFFICIALS				
DATE:	19. August. 2021	TIME STARTED:	11.09 AM	TIME ENDED:	02:30pm
Name	Occupation	Contact Details			Signature
		Address	Telephone	Email	
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MUSANA ROSE	SPAKER	BUGWERI	0772-671320	MusanaRose11@gmail.com	[Signature]
WANDERA ANTHONY	PERMANENT SEC	BUGWERI	0704327920	tony6453@gmail.com	[Signature]
OKUAFI ALBERT	MIN. of Finance	BUGWERI	0787422351	okuafi@yahoo.com	[Signature]
KAKARE AJUB AUSI	PRINCE OF MAKUTHI	BUGWERI	0777161647	kakareajubausi@gmail.com	[Signature]
WANKUMA ABEL TIBBEDI	ISABALANGIRA	BUGWERI	0772665031/070632500	wankumaabel@gmail.com	[Signature]
H.R.H NKUMU SANKU	2. CHIEF MENA	BUGWERI	0703822624/0774770114	SamNkumu@gmail.com	[Signature]
Godfrey Nabongo	Prime Minister	BUGWERI	0772-369579	gnabongo64@gmail.com	[Signature]
Nkumu Bandababwa	Assistant Mayor	BUGWERI	0724888021	nkumubandababwa@yahoo.com	[Signature]
Murunguzi Nache	Min. of Agric & Env	BUGWERI	0772-841843	MurunguziNache@yahoo.com	[Signature]
Tammy Semmanda	Consultant	Atacama	0783148101	tammysemmanda2020@atacamagroup.com	[Signature]

25.2.12.2 Bugweri Chiefdom Stakeholder Consultation Meeting Photos





### 25.2.13 STAKEHOLDER ENGAGEMENT WITH BUGIRI DISTRICT LOCAL GOVERNMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED MAKUUTU RARE EARTHS PROJECT	
STAKEHOLDER ENGAGEMENT WITH BUGIRI DISTRICT LOCAL GOVERNMENT	
DATE	11 <sup>th</sup> November 2021
VENUE	Bugiri District Local Government Headquarters
MEETING START	10:50 a.m.
MINUTES BY	Tonney Ssemmanda

**Attendance List and Photos** – Refer to the attached Attendance Register and Photos at the end of these meeting minutes.

TEXT
The meeting commenced at 10:50 a.m.
<b>Agenda items:</b> <ul style="list-style-type: none"> <li>• Opening Prayer</li> <li>• Self-introductions</li> <li>• Remarks from the Assistant Chief Administration Officer (ACAO)</li> <li>• Remarks from the District Internal Security Officer (DISO)</li> <li>• Remarks from the District Environment Officer</li> <li>• Presentation</li> <li>• Discussion</li> <li>• Closing remarks</li> </ul>
Opening Prayer
Deogratius Mwendha, the representative of the District Community Development Officer, led members in a word of prayer.
Self-Introduction
The Chairperson (Hakim Mutusa, Assistant Chief Administration Officer (ACAO)) requested members in attendance to introduce themselves by name, role and organisation they represented.
Remarks from ACAO
<ul style="list-style-type: none"> <li>• He welcomed everyone in the meeting and added that he was representing the CAO, who was away on official duties in Kampala.</li> <li>• He informed members that RRM activities started in 2018 in Makuutu Sub-county, Bugweri District and many engagements were held though some people seem not to be informed.</li> <li>• He indicated that people minds towards development projects change negatively and this is common, especially with mining projects as people think that the project developer is taking 'their' minerals.</li> <li>• He also indicated that some people wanted to be compensated a lot of money for the drilling activities which were undertaken on their land.</li> </ul>
Remarks from District Internal Security Officer (DISO)
<ul style="list-style-type: none"> <li>• Alfred Nangoshah welcomed everyone in the meeting. He hinted that the mapping was undertaken for minerals in Uganda and confirmed the potential to generate tax for the Government of Uganda.</li> </ul>

<ul style="list-style-type: none"> <li>• He added that the government cannot work alone and has thus created an enabling environment for investment. He welcomed RRM to partner with the government to improve the treasury.</li> <li>• He welcomed the stakeholder engagement team and requested that the presentation be simplified to aid community sensitisation.</li> </ul>
<b>Remarks from the Senior District Environmental Officer (SDEO)</b>
<ul style="list-style-type: none"> <li>• Benadet Kawuma welcomed everybody in the meeting and informed the members that the invitation letter that was sent to them summarises what was to be discussed during the meeting.</li> <li>• She also reported that RRM has been present in Bugiri District since 2018.</li> </ul>
<b>Discussion</b>
<ul style="list-style-type: none"> <li>• The Chairperson opened the floor for discussion as indicated below.</li> </ul>

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
<b>Meddi Kisubi Kagooma, Community Development Officer, Muterere Sub- County</b>		
1.	As Community Development Officers, how are we going to be facilitated to sensitise people about the Makuutu Rare Earth Project?	For the detailed ESIA studies, Atacama Consulting was contracted by RRM to lead and conduct the stakeholder engagement activities for the Project. In this activity, Atacama has worked closely with local leaders within the project affected areas.  Additionally, RRM has a community liaison team that is responsible for the day-to-day engagement and liaison with communities to ensure further engagement and grievance management.
2.	Engagement meetings should be taken down at the sub-county and village level so that people can get more project-specific information.	Stakeholder engagement is a continuous process, and engagements are still ongoing at various stages as per the Project Stakeholder Engagement Plan. All sub-counties and communities at the village level within the project area will be engaged before the commencement of mining activities.
<b>Irene Lydia Nakibuka, Physical Planner, Bugiri Municipality (representing the Town Clerk of Bugiri Municipality)</b>		
3.	As Bugiri Municipality, this is the first time to hear about this Project.	Bugiri District was engaged during the Scoping Phase of the ESIA and ongoing local level engagement has occurred during the ongoing Exploration Drilling Programme. This engagement will increase as the Project transitions from Exploration to Mining in Bugiri District as per the Project Stakeholder Engagement Plan. Bugiri Municipality will further be engaged during the Project's future engagements.
4.	What kind of minerals will be mined?	Rare earths elements such as neodymium, praseodymium, dysprosium, terbium and gadolinium will be mined (refer to Section 6 of the ESIA for the Project Description). These are often used in high technology operations. Once the elements have been precipitated from the clay, the soil will be used for backfilling to cover the mining pits.
5.	Will the Project affect the entire village or part of the village?	The exact Project footprint per village is not yet defined in Bugiri District as the exploration activities are still ongoing. Once the exact footprint is defined, this information will be shared with the relevant stakeholders, such as the identified affected villages.
<b>Emusugut Francis Ekodoi, LCIII Chairperson, Kapyanga Sub-county</b>		
6.	Previously, I received people from RRM who marked nine (9) potentially affected villages, but the invitation	The exact project footprint per sub-county is not yet firmly defined in Bugiri District as exploration activities are still ongoing, which explains the additional villages. Relevant project information will be shared with the respective

	letter to this meeting indicated additional villages. Why is this so?	stakeholders as applicable following conclusion of the exploration activities in Bugiri District.
7.	People were not happy with the money given to them during the test pit exercise. One of the land owners refused the money in as much as he allowed the project team to go on with their exercise on his land.	We are unaware of the details of this specific complaint which may be an isolated incident but fair compensation is agreed up front with landowners for the low scale damage associated with exploration activities. If exploitable minerals are found and mining progresses then a comprehensive Compensation and Resettlement Action Plan will ensure that landowners are not socially or financially disadvantaged
8.	Will RRM compensate people in the event that their houses are affected by the Project?	Yes. All properties affected by the Project activities will be compensated in line with the Resettlement Action Plan, which is yet to be prepared.
9.	RRM/the stakeholder engagement team needs to engage the community so that people can get information about the Project.	Stakeholder engagement is a continuous process as per the Project Stakeholder Engagement Plan, and engagements are still ongoing. All communities within the project area will be engaged before the commencement of mining activities.
<b>Deogratus Mwondha, Representative of the Bugiri District Community Development Officer (DCDO)</b>		
10.	The PowerPoint presentation was elaborate, and there seems to be a good plan for addressing potential issues. However, project commitments at inception may sometimes not materialise during project implementation. What is the assurance that RRM will remain committed to the current plan?	Section 14 of the ESIA report includes a detailed Environmental and Social Management and Monitoring Plan (ESMMP), including a plan for monitoring all project aspects. Local leaders will be involved in the project monitoring and evaluation to ensure that project commitments are realised.
<b>Siraji Wasige, Senior Environmental Officer, Bugiri Municipality</b>		
11.	For future engagements, plan to make use of visual presentations such as videos that can be better understood.	This has been noted.
12.	Apart from resettlement, what are the other foreseeable negative impacts of the Project?	<p>The major aim of an ESIA is to assess any project anticipated impacts, and also mitigate or minimise negative impacts and enhance the positive ones.</p> <p>Examples of project impacts identified at this stage include loss of livelihood, increased traffic in the area, which may result in road accidents, among others. A detailed discussion of the anticipated negative and positive impacts is provided in Section 14.2 of the ESIA report.</p> <p>As part of the ESIA study, recommendations and appropriate mitigation measures specific to the identified impacts have been provided in Section 9 of the ESIA report.</p>

**Closing Remarks by Mr. Moses Kaziba, District Speaker (Representative for the Bugiri LC5 Chairperson)**

- He welcomed everyone who attended the meeting and thanked the Consultants for the presentation.
- He also indicated that he was wary of the potential land grabbing as a result of development projects like the Makuutu Rare Earth Project and thus encouraged engagement at the community level.
- He encouraged members present to embrace the Makuutu Rare Earth Project and committed to always being available when required.

**CLOSURE:** The meeting was closed at 12:19 p.m.

25.2.13.1 Attendance Register for Bugiri District Local Government

Date of first issue	30 <sup>th</sup> October 2015	<b>STAKEHOLDER CONSULTATION REGISTER</b>		Approved by	Edgar Mugisha
Original Author	Barnabas Busheshe	ATCM-FRM-10-01		Revision no.	02
Reviewed by	Edmond Twinobusingye	Checked by	Monica Salirwe	Date of last review	13 <sup>th</sup> February 2019
Main source of requirement		Procedure for handling customer related processes			

CLIENT:	Lwenzori Rare Metals				
PROJECT:	Environmental and Social Impact Assessment for the proposed Makutu Rare Earths Project				
VENUE:	BUGIRI DISTRICT LOCAL GOVERNMENT HEADQUARTERS				
DATE:	11 <sup>th</sup> Nov. 2021	TIME STARTED:	10:50 a.m	TIME ENDED:	12:15 p.m
Name	Occupation	Contact Details			Signature
		Address	Telephone	Email	
OKWARE DAVID	PERAGI	MUTERERE	0788045707		
BATAMBUKE MESUSERA	CDO	Kapungu	0782 615490	batambunge1965@gmail.com	
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Amaculane Julie	stc chief	Buwungu	0782187138	amaculanejuliet@gmail.com	
WALUBI ROBERT	SCHIEF	MUTERERE	0704330115	Walubirobert681@gmail.com	
NABWIRE LETICIA	PHYSICAL PLANNER	BDLG	0772083625	nabwireleticia1980@gmail.com	
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INABUGIE PATRICK	CIMANI LCII	WANKUMBIK	0759124222		
YANGOSHAH AFRED	DISO	BUGIRI	0782526912		
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EMUSYUKU FRANCIS EKOLLO	LC3	KAPYANGA	0752647173		
KAFUKO HASSAN	SAS KAPYANGA	KAPYANGA	075105046	Kafukohassan@gmail.com	
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ALU GOTA CASIA W	DIST. CP Land	BUGIRI	0774961342		



Date of first issue	30 <sup>th</sup> October 2015	STAKEHOLDER CONSULTATION REGISTER ATCM-FRM-10-01		Approved by	Edgar Mugisha
Original Author	Barnabas Busheshe			Revision no.	02
Reviewed by	Edmond Twinobusingye	Checked by	Monica Salirwe	Date of last review	13 <sup>th</sup> February 2019
Main source of requirement		Procedure for handling customer related processes			

CLIENT:	Rwenzori Rare metals				
PROJECT:	Environmental and Social Impact Assessment for the proposed Makindu Rare Earths Project				
VENUE:	BUGIRI DISTRICT LOCAL GOVERNMENT HEADQUARTERS				
DATE:	11/11/2022	TIME STARTED:	10:50 a.m	TIME ENDED:	12:15 p.m
Name	Occupation	Contact Details			Signature
		Address	Telephone	Email	
MUTUSA HAKIM	A - CDO	BDLG	0706502875	harmeniwi299@gmail.com	[Signature]
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KABAALE SUNDU	CDU	Bugirigwa	0752682769	kabaaali.sundu@gmail.com	[Signature]
MUNIRABURA LUBITA	LCT III	Bugirigwa	0772542363	0778286530	[Signature]
ESALE GEORGE	M.D.E	BDLG	0778770240	george.esale1@gmail.com	[Signature]
Kagya Marcellina	For Sec. kad board	BDLG	0779460225	kagymarcellina03@gmail.com	[Signature]
Nandhulu Juma	Link to Council	Bugirigwa Bldg	0771180862	mvigira1987@gmail.com	[Signature]
STELLA ABAWA	For sec production	BDLG	0755175772	abawastellan@gmail.com	[Signature]
Rhoda Nankabirwa	Consultant	Atacama	0703892239	rhodanankabirwa@atacama.co.ug	[Signature]
Tonney Semumanda	Consultant	Atacama	0783148101	tonneysemumanda@atacama.co.ug	[Signature]

25.2.13.2      *Photos of Bugiri District Local Government Meeting*





## 25.2.14 STAKEHOLDER CONSULTATION WITH BUSOGA KINGDOM OFFICIALS

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED MAKUUTU RARE EARTHS PROJECT	
STAKEHOLDER CONSULTATION WITH BUSOGA KINGDOM OFFICIALS	
DATE	11 <sup>th</sup> November 2021
VENUE	Speke Courts Hotel, Jinja
MEETING START	2:29 pm
MINUTES BY	Tonney Ssemmanda

**Attendance List and Photos** – Refer to the attached Attendance Register and Photos at the end of these meeting minutes.

TEXT
<p><b>Agenda items:</b></p> <ul style="list-style-type: none"> <li>• Self-Introduction</li> <li>• Welcome Remarks by the Chairperson</li> <li>• Presentation by the Consultant</li> <li>• Discussion/Comments/Way Forward</li> <li>• Closure</li> </ul>
Opening Remarks by the Chairperson
<ul style="list-style-type: none"> <li>• The Chairperson (His Royal Highness (HRH) Nkuutu Samuel Zirabamuzaale, Royal Chief, Busoga Kingdom) welcomed all the members in attendance and thereafter requested the Consultant make the presentation.</li> </ul>
Presentation by the Consultant
<ul style="list-style-type: none"> <li>• The Consultant's representative (Rhoda Nankabirwa) introduced the Project and also highlighted the reason why Busoga Kingdom was being consulted.</li> <li>• The presentation entailed the project overview, location, mining technology, mining process, ESIA activities, processes and steps being followed as part of the ESIA preparation. Additionally, the presentation provided details related to the areas that will constitute the project extent.</li> <li>• The Chairperson thanked the Consultant's team for the presentation and opened the floor for questions/comments and discussions.</li> </ul>

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
<b>HRH Nkuutu Samuel Zirabamuzaale</b>		
1.	How will the local people, especially the youth, benefit from the Project?	The Project intends to source staffing requirements from the local community and will support training and education to facilitate this. The initial workforce for the 2.5 million tonnes per annum operation will be approximately 300 persons, and by the time the mine is fully operational, the workforce is expected to exceed 1,000 personnel. In addition to the opportunity for direct employment and contract work with the Project the Project will be investing in livelihood projects including fish farming, intensive agriculture and tree plantations on rehabilitated project land to sustain the livelihoods of both Project Affected Households and other local people. The investment of millions of dollars into social programmes including infrastructure, community health and education will also create significant employment.
2.	The project lifetime is currently estimated at 27 years; by then, it will be difficult for people to go back to their land. If you work with the Kingdom, it may ease the process of tracing the former settlers and bringing them back to their land.	<p>The staged nature of mining and resettlement will greatly mitigate social impact. People will be resettled to a new house with replacement land or sustained livelihoods in addition to compensation for loss of assets when their land is needed. The land will then be restored to productive use before being handed back to the community. The management of the land acquisition and resettlement process is also critical in gaining acceptance and Project support by the host communities. Therefore, the land acquisition model (lease or outright purchase) will be clearly defined and a transparent process undertaken to ensure land acquisition and resettlement is done in a smooth and acceptable manner.</p> <p>Implementing a staged life of mining and rehabilitation plan that allows agricultural land required for mining to be acquired on short-term leases, and be rehabilitated back to productive agricultural land prior to return to the land-owner minimises the disturbance footprint and the scale of relocation in addition to leaving no legacy issues at the end of mining.</p>
<b>Ronald Mwangwa, Secretary, Busoga Kingdom</b>		
3.	With the Project taking 15 years in Bugweri District, what mechanism of checks and balances is in place to make sure that	While mining and processing will commence in Bugweri there will be ongoing exploration and test work across the project footprint and all Districts will benefit from social programmes funded directly by the Project

	the three (3) districts share the project benefits when the Project starts?	and from Project Royalties as well as employment and infrastructure development. The project will have a Community Development Plan (CDP) that will indicate how it (project) will contribute to various causes in the project area to benefit local communities. Some of these contributions might be in the areas of improving the road network, schools, medical facilities, farming practices and skilling of youth. Communities will be invited to contribute/make input into the development of the CDP – refer to Section 11.3 that provides further insights into community development.
4.	Did you go through the local authorities and the Kingdom to sign the Sales Purchase Agreement, the Non-Circumvention, Non-Disclosure & Working Agreement (NCNDA) and the Irrevocable Master Fee Protection Agreement (IMFPA)?	RRM take all steps necessary to ensure that the Project is compliant with all Ugandan legal and regulatory frameworks. RRM has not yet signed such documents with any authority at the national and local government level because the Project is still at the exploration stage.
5.	Will you sign a Memorandum of Understanding with the chiefdoms?	RRM will continue working closely with all relevant authorities and engaging them at all project development phases with the aim of harmonised community development programmes. RRM is amenable to signing an MOU with the Chiefdoms provided the aims and intentions are clearly spelt out and is in the interests of RRM Shareholders and the people of the Busoga Kingdom. An agreement which benefits both parties would be welcomed.
<b>Joshua Tulengera, Prime Minister, Bukooli Chiefdom</b>		
6.	Will the land be returned to the former owners at the end of the project lifetime?	RRM will implement a staged mining and rehabilitation plan that allows agricultural land required for mining to be acquired on short-term leases, followed by rehabilitation to productive agriculture land prior to return to the former land-owner or others as negotiated. This will minimise the disturbance footprint and the scale of relocation, in addition to leaving no legacy issues at the end of mining.
7.	Before recruitment in Bugweri District, potential employees should be sent to the office of the Prime Minister, Bukooli Chiefdom for verification.	This has been noted. RRM would look to employ people local to the area provided they have the necessary qualifications, skills and experience. The company is committed to employ from the region, and will sign an MOU with Kingdom to agree on possible employment effort. It must be however noted that it wont always be possible to get qualified people from the area. However company commits to providing opportunities for training for the youth within the region.
8.	How will Bukooli Chiefdom benefit from the Project?	The Bukooli Chiefdom will benefit from the projected US \$47 million Project investment in social programmes (ie. infrastructure, community

		<p>health, education and livelihoods), the return of an estimated US \$76 million as the 20% (ie. 17% to Districts and 3% to Landowners) of Project Royalties and the employment of large numbers of people on the project as employees and contractors and, on livelihood projects established on rehabilitated land.</p> <p>The Project requires a large range of highly technical qualified people and will provide employment and training to maximise the opportunity of local people to fill these roles. The intention is that 100% of the employees be Ugandan by Year 7. The Project intends to source staffing requirements from the local community. The initial workforce for the 2.5 million tonnes per annum operation will be approximately 300 persons and by the time the mine is fully operational, the workforce is expected to exceed 1,000 personnel.</p> <p>It is also projected that direct employment will also contribute directly to the local districts that host the Project in the excess of US\$100 million expected to be spent on local employment, local business and services.</p> <p>The project will have a Community Development Plan (CDP) that will indicate how it (project) will contribute to various causes in the project area to benefit local communities. Some of these contributions might be in the areas of improving the road network, schools, medical facilities, farming practices and skilling of youth. Communities will be invited to contribute/make input into the development of the CDP – refer to Section 11.3 that provides further insights into community development.</p>
<b>John Frances, Minister, Bukooli Chiefdom</b>		
9.	<p>Many times, we (leaders) receive Projects like this one with the hope that they will benefit our communities but they end up affecting our communities. For example in Busia District, children are involved in the mining activities and they might not be able to go back to school. What mechanisms are in place to protect the children within the communities affected by this mining project?</p>	<p>The Makuutu Project will abide by Ugandan Law, International Conventions to which Uganda is a signatory and Company Policy to protect vulnerable people, including children and will not be employing any children, The impact associated with child labour has been identified and assessed in Section 9.2.9.17 of the ESIA report.</p> <p>Project employment will follow the Ugandan Employment Act (2006), Section 32, which forbids the employment of anyone under the age of 18.</p> <p>The project will have a Community Development Plan (CDP) that will indicate how it (project) will contribute to various causes in the project area to benefit local communities. Some of these contributions might be in the</p>



		<p>areas of improving the road network, schools, medical facilities, farming practices and skilling of youth. Communities will be invited to contribute/make input into the development of the CDP – refer to Section 11.3 that provides further insights into community development.</p> <p>In accordance with the Ugandan Employment Act (2006), Section 32, the employment of anyone under the age of 18 will be forbidden in regards to the proposed Project activities.</p>
10.	RRM needs to indicate the percentage share of benefits to Bukooli Chiefdom.	<p>The Project expects to deliver gross royalty payments to Uganda of US\$380 million over its life and understands that Ugandan Tax Law requires 17% of this to be returned to the local District and 3% to landowners. This is, however, a matter for Uganda and outside the control of the Project.</p> <p>The Project will have a Community Development Plan (CDP) that will indicate how it (project) will contribute to various causes in the project area to benefit local communities. Some of these contributions might be in the areas of improving the road network, schools, medical facilities, farming practices and skilling of youth. Communities will be invited to contribute/make input into the development of the CDP – refer to Section 11.3 that provides further insights into community development.</p>
11.	One of the people from Bukooli Chiefdom should be a partner on this Project.	The Project will work closely with all relevant stakeholders in streamlining and implementing community development programmes – refer to Section 11.3 of the ESIA report.
<b>Hajji Sowali Mwondha – Vice-chairman Royal Council, Bukooli Chiefdom</b>		
12.	At the time of project implementation, you never consult with the chiefdoms but instead work with the district and the CAO. This is not acceptable.	RRM will continue working closely with all relevant authorities/stakeholders and engaging them at all project development phases.
13.	Children from Bukooli must get jobs. The chiefdom is not begging but instructing RRM not to source for employees from elsewhere.	The Project will need workers of various skills that will range from skilled and semi-skilled labour as well as casual labour and will look to employ locals in the first instance. Community members will be enlisted according to their skills. Where personnel with required skills are not available and are sourced from outside Uganda, the personnel will be required to train Ugandans who will then be capable of undertaking these roles after seven (7) years.

14.	Bukooli Chiefdom is interested in signing a Memorandum of Understanding with RRM regarding the sharing of project profits/proceeds. It will be good for RRM to indicate within the Memorandum of Understanding the profit percentage share to Busoga Kingdom.	<p>The benefit to the Government of Uganda is projected to be in the excess of US\$1 billion over the life of the Project. This is made up predominantly of taxes and royalties to the Ugandan government.</p> <p>Section 98 (1) of the Mining Act, 2013<sup>6</sup> states that, <i>“All minerals obtained or mined in the course of prospecting, exploration, mining or mineral beneficiation operations shall be subject to the payment of royalties on the gross value of the minerals based on the prevailing market price of the minerals at such rates as shall be prescribed.”</i></p> <p>Additionally, subsection (2) states that, <i>“Royalties shall be shared by the Government, Local Governments and owners or lawful occupiers of land subject to mineral rights in the manner specified in the Second Schedule to this Act.”</i></p> <p>It is also projected that direct employment will also contribute directly to the local districts that host the Project, in the excess of US\$100 million, expected to be spent on local employment, local business and services.</p> <p>The Project will also prepare and implement a Community Development Plan (CDP) that will indicate how it (Project) will contribute to various causes in the project area to benefit local communities. Some of these contributions might be in the areas of improving the road network, schools, medical facilities, farming practices and skilling of youth. Communities will be invited to contribute/make input into the development of the CDP – refer to Section 11.3 that provides further insights into community development.</p>
<b>Wandera Sitokota, Culture Minister, Busoga Kingdom</b>		
15.	We need to know the starting wage for workers.	At the time of preparation of the ESIA report, the wages for workers had not yet been determined. However, they will largely be determined based on good labour and working conditions and acceptable wage rates within the country, the district and the sector.

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<sup>6</sup> Note that this Act is still under review and is currently the Mining Bill of 2019.

16.	Going forward, the Kingdom should be represented in all district meetings.	RRM will continue working closely with all relevant authorities/stakeholders and engaging them at all project development phases. According to the Project Stakeholder Engagement Plan (Refer section 11.2 of the ESIA , stakeholders will be consulted and engaged based on the specific engagement and consultation objectives.
17.	Without a signed agreement, Bukooli Chiefdom has not accepted the Project.	Rwenzori Rare Metals has not yet signed any MoUs with any authority at the national and local government level because the Project is still at the exploration level. RRM will continue working closely with all relevant authorities and engaging them at all project development phases for harmony and the social licence to operate.
<b>HRH Okaali Vicky Kawunhe, Bukooli Chiefdom Head, Busoga Kingdom</b>		
18.	Will the Project provide insurance to workers in case of injuries?	<p>The Project commits to the safety of its employees, contractors and subcontractors at worksites and other places of work, and it will operate in collaboration with and to the requirements of the local health authorities.</p> <p>All project employees will be equipped with and use, appropriate personal protective equipment (PPE) to adequately protect them from hazards associated with their specific occupation in accordance with Section 19 of the Uganda Occupational Safety and Health Act, 2006.</p> <p>The Project will also comply with the Government of Uganda's Workers' Compensation Act, 2000, which outlines the compensation to workers for injuries suffered and scheduled diseases incurred during the course of employment.</p>
19.	In the event that cultural heritage and archaeological sites are affected by the Project, will RRM pay for their relocation?	<p>The study team has undertaken transect-based foot walk surveys within the Project area in Makuutu Central Mining Pit, marking all important archaeological and cultural heritage spots as well as examining the identified artefacts in the field. A Cultural Heritage Management Plan (CHMP) and a Chance Finds Procedure (CFP) have been prepared as additional management tools to guide how archaeological finds will be managed during project implementation.</p> <p>Refer to Section 7.2.8 for a detailed discussion on cultural heritage.</p>
20.	Before signing a Memorandum of Understanding with the districts, RRM needs to sign an MoU with Busoga Kingdom.	RRM has not yet signed any MoUs with any authority at the national and local government level because the Project is still at the exploration stage.

		RRM will continue working closely with all authorities and engaging them at all project development phases.
<b>CLOSURE:</b> The meeting was closed at 15:50 p.m.		

25.2.14.1 Attendance Register for Busoga Kingdom Officials Meeting

Date of first issue	30 <sup>th</sup> October 2015	<b>STAKEHOLDER CONSULTATION REGISTER</b>		Approved by	Edgar Mugisha
Original Author	Barnabas Busheshe	ATCM-FRM-10-01		Revision no.	02
Reviewed by	Edmond Twinobusingye	Checked by	Monica Salirwe	Date of last review	13 <sup>th</sup> February 2019
Main source of requirement		Procedure for handling customer related processes			

CLIENT:	Rwenzori Rare metals				
PROJECT:	Environmental and social impact Assessment for the proposed Makindu Rare earths Project				
VENUE:	Speke courts Hotel Jinja				
DATE:	11 <sup>th</sup> Nov. 2021	TIME STARTED:	14:10	TIME ENDED:	15:50

Name	Occupation	Contact Details			Signature
		Address	Telephone	Email	
Mwandera Sitokota	Min. Culture	Bukooli	0778197031		Mwandera Sitokota
Mwandha Alama	Clerk	Bukooli	0775861446		Mwandha Alama
MUMUKAMO MUGOTA	Min. Culture	BUKOOLI	0700479808		Mumukamo Mugota
AKAYE MOSES	Royal Chief	Bukooli	0757023494		AKAYE MOSES
MUGOTA TAKUJI	Minister of Information	Bukooli	0753027965	Selecha7021@gmail.com	Mugota Takuji
HAJJI SIKALI MUBANDHA	V/CHIEF LOYAL	Bukooli	0785078289		Hajji Sikali Mubandha
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Iulengera Joshua	P.M	Bukooli	0772380493		Iulengera Joshua
Musowbere Mubandha	Min. Culture	Bukooli	0740167607		Musowbere Mubandha
MUTUMBA W. KALENDE	C. ROYAL CHIEF	BUKOOLI	0754505136	Mutumba@ugremai	Mutumba W. Kalende
KAKAIRE AMUL	Reyer	Bukooli	0780730342		Kakaire Amul
MUGOTA DAVIN	PRINCE	BUGIRI	078662203	2:00 pm	Mugota Davin



Date of first issue	30 <sup>th</sup> October 2015	STAKEHOLDER CONSULTATION REGISTER		Approved by	Edgar Mugisha
Original Author	Barnabas Busheshe	ATCM-FRM-10-01		Revision no.	02
Reviewed by	Edmond Twinobusingye	Checked by	Monica Salirwe	Date of last review	13 <sup>th</sup> February 2019
Main source of requirement		Procedure for handling customer related processes			

CLIENT:	Rwenzori Rare Metals.				
PROJECT:	Environmental and Social Impact Assessment for the proposed Makutu Rare Earths project.				
VENUE:	Speke Courts Hotel Jinja				
DATE:	11 <sup>th</sup> Nov. 2021	TIME STARTED:	14:10	TIME ENDED:	15:50
Name	Occupation	Contact Details			Signature
		Address	Telephone	Email	
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Nandudu Fatuma	minister	BUSOGA K.	075147563		[Signature]
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MWENDHA ISMAIL	MUKUNGU	Bugiri	0759566159	2:46	[Signature]
KAAWO NAA KAWERE	DP	Bukoba	0772697413	nkawere@gmail.com	[Signature]
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SAMUEL ZIRABAMAZI	CHIEF	KINGDOM	0703822624	yahoo.com	[Signature]
IRIT OKITHI VICKY	CHIEF	BUSOGA	0752064752	VICKY OKITHI KAWWA	[Signature]
KAVUNTE	CHIEF	ISINBOM	0771650422	@G-mail.com	[Signature]
John Francis	MINISTER	Bugiri	0772647011	johnfrancis@gmail.com	[Signature]
Rhoda Nankabirwa	Consultant	Atacama	0703892239	rhodanankabirwa@atacamarug	[Signature]



25.2.14.2      *Photos from Busoga Kingdom Meeting*



## 25.2.15 STAKEHOLDER CONSULTATION MEETING WITH MAYUGE DISTRICT LOCAL GOVERNMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED MAKUUTU RARE EARTHS PROJECT	
STAKEHOLDER CONSULTATION MEETING WITH MAYUGE DISTRICT LOCAL GOVERNMENT	
DATE	16 <sup>th</sup> November 2021
VENUE	Mayuge District Local Government Headquarters
MEETING START	10:48 a.m.
MINUTES BY	Tonney Ssemmanda

**Attendance List and Photos** – Refer to the attached Attendance Register and Photos at the end of these meeting minutes.

TEXT
The meeting commenced at 10:48 a.m.
<b>Agenda items:</b> <ul style="list-style-type: none"> <li>• Opening Prayer</li> <li>• Self-introductions</li> <li>• Remarks from the Chief Administration Officer (CAO)</li> <li>• Remarks from Senior District Environmental Officer (SDEO)</li> <li>• Presentation</li> <li>• Discussion</li> <li>• Closing remarks</li> </ul>
Opening Prayer
Mr. Moses Ediiri (Lands Officer) led members in a word of prayer.
Self-Introduction
The Chairperson (Mr. Anthony Martin Lukwago, Chief Administration Officer (CAO)) requested members in attendance to introduce themselves by name, role and organisation they represented.
Remarks from CAO
<ul style="list-style-type: none"> <li>• The CAO welcomed the Consultant (Atacama Consulting), whom he had worked with in the Bunyoro region and expressed confidence in Atacama to handle the process professionally as they have done so in the Bunyoro region.</li> <li>• He welcomed the sub-county chiefs, chairpersons and other sub-county officials in the meeting.</li> <li>• Considering that there are not so many projects in the Busoga region, he encouraged the leaders present to embrace the Makuutu Rare Earth project.</li> <li>• He was curious to understand the mining technology to be used as well as get assurance that the local communities would not be severely impacted by the proposed project activities.</li> <li>• He also requested to be furnished with RRM's exploration and retention licenses, to among other reasons, ascertain their validity.</li> </ul>
Remarks from the Senior District Environmental Officer (SDEO)
<ul style="list-style-type: none"> <li>• Aramu Thomas welcomed everybody in the meeting, and he indicated that it had been ten (10) years since the project activities (gravity tests and exploration studies) commenced in Mayuge District.</li> </ul>

- He informed the members present that within Mayuge District, the Project is mainly in Imanyiro, Buwaya, Nakigo and Mpungwe sub-counties.
- He informed the audience of the requirements of the National Environment (Environmental and Social Assessment) Regulations, 2020, of which stakeholder consultation is mandatory.
- He emphasised that RRM holds valid exploration and retention licences from the Ministry of Energy and Mineral Development.

#### **Discussion**

- The Chairperson opened the floor for discussion, as indicated below.

Open Discussion Session of the Meeting		
No.	Query/Comment/Suggestion	Response
<b>Anthony Martin Lukwago, Chief Administration Officer (CAO)</b>		
13.	The project cost-benefit analysis should be clarified.	Section 6.1.5 of the ESIA report includes a detailed cost-benefit analysis which indicates that the Project will have net positive economic, social and environmental benefit to the local area to Uganda more broadly. Section 13 of the ESIA report includes a detailed project risk analysis.
14.	What are the direct benefits for the peasants, especially those to be displaced by the Project?	<p>The Compensation and Resettlement Action Plan presents the strategy to ensure that displaced people are not socially disadvantaged. This includes replacement housing, replacement or compensation for loss of assets including land, and livelihood restoration. The Project will also have a well-funded Community Development Plan (CDP) that will indicate how it (Project) will contribute to various causes in the project area to benefit local communities. Some of these contributions might be in the areas of improving the road network, schools, medical facilities, farming practices and skilling of youth. Communities will be invited to contribute/make input into the development of the CDP – refer to Section 16.3 that provides further insights into community development.</p> <p>The Project intends to source staffing requirements from the local community. The initial workforce for the 2.5 million tonnes per annum operation will be approximately 300 persons and by the time the mine is fully operational, the workforce is expected to exceed 1,000 personnel.</p>
15.	What happens in between project time and restoration time and time for taking people back to their land?	<p>Mining pits will be completely backfilled with overburden and “spent-ore” following heap-leaching and washing. Stored topsoil will be reapplied and with liming and full fertilisation the land will returned to high quality agricultural land in a process expected to take about 6 months. Refer to the detailed project description in Section 6 of the ESIA report.</p> <p>The Project will implement a staged life of mine mining and rehabilitation plan that allows agricultural land required for mining to be acquired on short-term leases and be rehabilitated back to</p>

		productive agriculture land prior to return to the land-owner minimises the disturbance footprint and the scale of relocation in addition to leaving no legacy issues at the end of mining.
16.	When shall we hear from Atacama after this engagement?	Stakeholder engagement is a continuous process, and engagements are still ongoing; all communities within the project area will be engaged before the commencement of mining activities.
17.	Are we going to discuss the Resettlement Action Plan (RAP)	Resettlement will be undertaken at a later stage. During the process there will be engagements and consultations that will be focused on land valuation and compensation under Resettlement Action Plan (RAP) studies as the proposed Project advances to that stage.  All the aspects and questions related to land acquisition will be addressed then.
18.	RRM and the consultant should plan for more engagements so as to provide more detailed project information to the stakeholders	Stakeholder engagement is a continuous process and engagements are still ongoing; all communities within the project area will be engaged before the commencement of mining activities.
<b>Moses Ediro, Lands Officer, Mayuge District</b>		
19.	What should we expect out of Rare Earth Elements (REE)?	The REE are often used in high technology operations. They include elements such as neodymium, praseodymium, dysprosium, terbium and gadolinium – refer to Section 6 of the ESIA report for a detailed project description.
20.	What criteria will be used to identify households eligible to receive cash and in-kind compensation?	As the proposed project advances, Resettlement Action Plan (RAP) studies will be undertaken to establish physical and economic displacement as a result of the Project. RAP related engagements and consultations will, among other objectives, aim to address land acquisition, land and asset valuation and compensation thereof.
<b>Peter Tasibula Nkwanga, Vice-chairperson, Mayuge District</b>		
21.	Previously, mining in Mayuge District has been restricted to sand and stones. This project is, therefore, one of a kind.	Yes. The Project is new and the first of its kind in Uganda.
22.	The economic aspect of the Project and benefits to the people should be clarified to indicate whether the 1% of annual project revenue is part of RRM's CSR activities or part of the royalty plan.	Section 98 (1) of the Mining Act, 2013 states that, "All minerals obtained or mined in the course of prospecting, exploration, mining or mineral beneficiation operations shall be subject to the payment

23.	The royalty plan for the various sub-counties should be clarified.	of royalties on the gross value of the minerals based on the prevailing market price of the minerals at such rates as shall be prescribed.”
24.	The economic aspect of the Project to the people of Mayuge District should be clarified.	<p>Additionally, subsection (2) states that, “Royalties shall be shared by the Government, Local Governments and owners or lawful occupiers of land subject to mineral rights in the manner specified in the Second Schedule to this Act.”</p> <p>The allocation of Project Royalties is a Ugandan Government responsibility, but Ugandan law requires that 17% of Royalties return to directly impacted Districts and 3% to landowners.</p> <p>In addition to this the Project will independently allocate an initial 1% of revenue, expected to be about US\$1million a year to Social programmes. This contribution will be capped at US \$2million a year by about Year 7Some of these contributions might be in the areas of improving the road network, schools, medical facilities, farming practices and skilling of youth. Communities will be invited to contribute/make input into the development of the CDP – refer to Section 11.3 that provides further insights into community development.</p>
<b><i>Ivan Onduso, Physical Planner, Mayuge District</i></b>		
25.	It is likely that the whole of Mbaale Trading Centre will be affected by displacement. Following compensation, will the people be allowed to resettle wherever they wish, or is there a plan for establishing a resettlement village nearby?	As the proposed project advances, Resettlement Action Plan (RAP) studies will be undertaken to establish physical and economic displacement as a result of the Project. RAP related engagements and consultations will, among other objectives, aim to address land acquisition, land and asset valuation and compensation thereof. Therefore, all the aspects and questions related to land acquisition will be addressed then.
<b><i>Musa Lubanga, Natural Resources Officer, Mayuge District</i></b>		
26.	Regarding the waste management of the Project, it is better for RRM to consider modern techniques of waste management since the proposed constructed wetland will not perform the real treatment just like a natural wetland within Makuutu Sub-county would.	The Project has a comprehensive waste management plan within the principles of reduce, reuse, recycle and landfill disposal as a final resort. With no on-site camp, volumes of sewage should be relatively low but constructed wetlands are one option that has proven to be a sustainable solution for the management of waste water in wet tropical environments such as oil and gas projects in Brazil. It should be noted that effluent testing from any constructed wetland will be undertaken prior to its release into the natural environment. All



		effluent parameters shall meet the requirements for wastewater release into water or on land as per the National Environment (Standards for Discharge of Effluent into Water or Land) Regulations, 2020.
27.	The Project has taken a number of years at the exploration stage, and the potential areas for minerals have been marked out. Because of that, no activity has been undertaken on the land since then, and thus the Consultant should clarify whether the lost productivity will be considered at the time of compensation.	The important point is that any resettlement will be staged in line with the mining plan. Landowners will continue to use their land as they always have until it is needed. They will then be resettled to a new house with replacement land and restored livelihoods. Mined land will then be restored to productive agricultural land to support livelihoods. As the proposed project advances, Resettlement Action Plan (RAP) studies will be undertaken to establish physical and economic displacement as a result of the Project. RAP related engagements and consultations will, among other objectives, aim to address land acquisition, land and asset valuation and compensation thereof. Therefore, all the aspects and questions related to land acquisition will be addressed then.
28.	The ponds left after mining will be a source of stagnant water and breeding grounds for mosquitoes. As such, malaria and other water-borne diseases are expected. A plan for the health system which addresses such concerns should be provided.	<p>There will be no ponds left after mining with the exception of fish ponds and potentially crop irrigation ponds to support livelihoods. This has been noted. Implementing a staged life of mine mining and rehabilitation plan that allows agricultural land required for mining to be acquired on short-term leases, and be rehabilitated back to productive agriculture land prior to return to the land-owner minimises the disturbance footprint and the scale of relocation in addition to leaving no legacy issues at the end of mining.</p> <p>The Project will have a Community Development Plan (CDP) that will indicate how it (Project) will contribute to various causes in the project area to benefit local communities. Some of these contributions might be in the areas of improving the road network, schools, medical facilities, farming practices and skilling of youth. Communities will be invited to contribute/make input into the development of the CDP – refer to Section 11.3 that provides further insights into community development.</p>
29.	The Ministry of Works and Transport plans to upgrade Iganga-Busikiro-Mbaale road, and the project plans to excavate in such areas. RRM is advised to engage with the	This has been noted. Stakeholder engagement is a continuous process, and engagements are still ongoing and relevant stakeholders will be engaged.

	Ministry of Works and Transport before mining activities start.	
<b>Aramu Thomas, Senior Environmental Officer, Mayuge District</b>		
30.	The main purpose of the ESIA is to come up with proposals or mitigation measures so that the Project does not become a curse. It is therefore advisable that a Resettlement Action Plan is prepared in consultation with the district so that affected people can be resettled smoothly.	Section 10 of the ESIA report includes a detailed Environmental and Social Management and Monitoring Plan (ESMMP). A resettlement Action Plan will also be prepared to manage the impacts related to resettlement. During the preparation of the RAP, the relevant stakeholders as well as Project Affected Persons will be consulted.
31.	The proposed shallow open pit mining presents a challenge of management of overburdened soils as these may also contain radioactive elements such as Uranium which was identified in Mayuge District by a series of studies. A mechanism to handle the possibility should be provided.	The Makuutu Project, typical of Ionic Adsorption Clay REE deposits, has very levels of Thorium and Uranium and no challenges with radionuclides. The baseline surface and groundwater also indicate very low levels of Uranium below the 0.01 mg/L detection level and of Thorium which was also very low and mainly below the 0.5 mg/L detection limit. For water monitoring purposes, the project will routinely monitor the mining areas around the process plant and all the downstream water bodies and points of discharge to confirm that there is no contamination.
32.	There is a need to carry out ecological analysis to identify the species to be affected so that during restoration, the affected species are replanted other than introducing new ones that may not save the purpose of environmental conservation.	Most of the Project area is currently degraded farmland that will be returned to high quality farmland. Rare species such as Mvule ( <i>Milicia excelsa</i> ) will be included in the rehabilitation area and opportunities will also be taken to create wildlife habitat as well as to work with stakeholders to restore degraded wetlands downstream of mining areas. Section 6.7.2.2 of the ESIS lists the plants identified during the flora surveys. Special attention will be given to IUCN listed species, and during restoration, native trees will be replanted.
33.	During mining, the air quality will be altered, and thus RRM should consider equipping hospitals with staff skills and facilities to manage such life-threatening situations as part CSR.	The Project is not expected to impact community health. Dust will be well controlled and there will no other emissions that could impact community health. Mining roads and haul roads will be completely separated from public roads but the need for strategic support to generally upgrade local roads will be undertaken in consultation with District Planners. The Project will have a Community Development Plan (CDP) that will indicate how it (Project) will contribute to various causes in the project area to benefit local communities. Some of these contributions might be in the areas of improving the road network, schools, <b>medical facilities</b> , farming practices and skilling
34.	The road network is going to be destroyed as a result of the Project and therefore RRM, should provide a plan for improving the existing roads as well as rehabilitating roads destroyed due to project activities.	

		of youth. Communities will be invited to contribute/make input into the development of the CDP – refer to Section 11.3 that provides further insights into community development.
35.	RRM intends to extract rare earth metals, but there are also other raw materials that shall be extracted from the environment in the process. RRM should therefore seek approval for the use of every raw material, especially the natural resource materials like stones, sand and forest resources, among others in line with the Mayuge District Natural Resource Management Ordinance.	The project may need rock to sheet haul roads which would be obtained from properly licenced quarries. This has been noted. RRM shall seek approvals from the relevant authorities before using any natural resource material.
36.	There shall be a change in the surface and underground hydrological cycle. Excavation of ditches which will potentially affect borehole yields especially during the dry season as well as siltation of springs during the wet season. RRM should consider providing alternative water sources to the affected communities.	The clay-orebody is a poor aquifer which accounts for the absence of water-bores and springs in mining areas. Any impacted spring at the edge of the mining areas or from ancillary infrastructure would be replaced. The project will be self-sufficient with water due to stormwater harvesting and the creation of potable water from Processing Plant membrane circuit. It will not impact community water supply and will either dispose of the good quality excess 380,000 L of water a year into the river system under licence from DWRM or, use it for livelihoods projects such as irrigation of crops or the creation of fish farms. A potential impact to surface and ground water yields has been assessed as indicated in Section 9.2.8 of the ESIA report and mitigation measures for the same have been provided.
37.	Immigration due to the movement of people seeking job opportunities may lead to moral degeneration and promiscuity. To mitigate against such impacts, RRM should consider, as a priority, employing the local people from Mayuge.	The project will need workers of various skills that will range from skilled and semi-skilled labour as well as casual labour. Community members will be enlisted according to their skills. Where personnel with required skills are not available and are sourced from outside Uganda, the personnel will be required to train Ugandans who will then be capable of undertaking these roles after seven (7) years.  The potential impact of population influx has been assessed in Section of the ESIA report, and corresponding mitigation measures have been provided as well.
38.	In the ESIA report, I expect the Consultant to disclosure information about the project turnover so that we determine the 1% for the local development, but also it will be the basis	Section 9.2 of the ESIA report includes a detailed cost-benefit analysis and the economics of the Project are presented in Table 5. The life of project revenue is expected to be US \$7.6 billion.

	to determine different royalties and taxes that the district is supposed to benefit.	
39.	RRM should furnish Mayuge District Local Government and the respective sub-counties with the exploration licenses before the ESIA report is approved.	<p>This has been noted. The exploration and retention licences will be sent to the district, through the CAO.</p> <p>At the time of submission of the ESIA report, RRM had not yet received mining licences from the Ministry of Energy and Mineral Development because the project was still in the exploration phase, which will determine the next project development phase, i.e., mining. The mining licences, upon receipt, will be shared with the relevant authorities.</p>
40.	RRM should provide Mayuge District Local Government and the respective sub-counties with a site layout plan for the entire project before the final approval is given by NEMA.	Section 3.3.4 of the ESIA report includes a detailed site layout for the Project.

### Closing Remarks RDC

- The RDC (Richard Gulume) thanked RRM for the meeting in which environmental matters were discussed.
- He explained that the mineral being mined by RRM is one of the most expensive minerals in the world, and therefore the host districts should be able to bargain.
- He advised that Mayuge District should consider including a geologist on the district technical team, even if it meant dropping some current positions otherwise, the district risks not being able to negotiate since they may not be aware of the technicalities of the resource that is available.
- The local people need to be sensitised by the local leaders to avoid situations where out of ignorance, communities fight projects which are potentially beneficial to them.
- He urged all the meeting attendees to share knowledge with others, and to seek guidance where needed. The LC3 chairpersons were encouraged to share information with communities while the CAO would share information with the district council members.

**CLOSURE:** The meeting was closed at 12:37 p.m.

25.2.15.1 Attendance Register for Mayuge District Local Government Meeting

Date of first issue	30 <sup>th</sup> October 2015	STAKEHOLDER CONSULTATION REGISTER ATCM-FRM-10-01		Approved by	Edgar Mugisha
Original Author	Barnabas Busheshe			Revision no.	02
Reviewed by	Edmond Twinobusingye	Checked by	Monica Salirwe	Date of last review	13 <sup>th</sup> February 2019
Main source of requirement	Procedure for handling customer related processes				

CLIENT:	Rwenzori Rare metals				
PROJECT:	Makutu Rare Earths project - ESA				
VENUE:	Mayuge District Local Government				
DATE:	16 <sup>th</sup> 11/2021	TIME STARTED:	10:48am	TIME ENDED:	12:37pm

Name	Occupation	Contact Details			Signature
		Address	Telephone	Email	
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Main source of requirement		Procedure for handling customer related processes			

CLIENT:	Rwenzori Rare Metals					
PROJECT:	Makuntu Rare Earth Project - ESIA					
VENUE:	Mayuge District Local Government					
DATE:	16 <sup>th</sup> Nov. 2021	TIME STARTED:	10:48 am.	TIME ENDED:	12:37 pm	
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25.2.15.2      *Photos of Mayuge District Local Government Meeting*



## 25.3 Feedback from Community Level Stakeholders

### 25.3.1 FEEDBACK FROM MAWOLOLO VILLAGE

No.	Name of Stakeholder	Comment/Question
1.	Isiiko Ashraf (0751617651/0774617651)	<ul style="list-style-type: none"> <li>Why does the client decide for us the compensation amount and yet it is our land?</li> </ul>
		<ul style="list-style-type: none"> <li>Will the project provide employment opportunities for our children?</li> </ul>
		<ul style="list-style-type: none"> <li>Consideration should be made for hospitals, churches and schools.</li> </ul>
		<ul style="list-style-type: none"> <li>We would like trees, coffee plantations, and fruit trees to be planted, however we are worried about the resettlement process.</li> </ul>
		<ul style="list-style-type: none"> <li>The client should not decide for us how much we should be compensated for our own land.</li> <li>We would like to be compensated soon</li> <li>When shall we be paid our money?</li> </ul>
2.	Kakaire Sadati	<ul style="list-style-type: none"> <li>Why doesn't the company dig its own ground water to be used instead of damaging existing wetlands in the area?</li> <li>Can the project activities be undertaken during day time instead of running machinery at night time as this creates nuisance noise?</li> <li>Why did you not undertake trainings of us local communities prior to commencing project activities?</li> <li>The project should consider construction of community health facilities.</li> <li>Are there any job opportunities which can be given to us local people as this is our area?</li> </ul>
3.	Kiwanuka Ronald	<ul style="list-style-type: none"> <li>Us the uneducated people would like to be given a chance to work for this project.</li> </ul>
4.	Samanya David	<ul style="list-style-type: none"> <li>Why should the project compensate us little money and yet our environment will be damaged by it?</li> </ul>
5.	Namukuvu Lukia	<ul style="list-style-type: none"> <li>During compensation, will you pay for things on our land such as trees and other plants such as <i>matooke</i> (bananas)?</li> </ul>
6.	Namukose Jalia	<ul style="list-style-type: none"> <li>We are yet to understand the project details in this area.</li> <li>We see trucks moving around our area and we are wondering what they are doing.</li> <li>Why are you asking us about the properties we have in our area?</li> <li>Why are you asking us about the diseases that affect our children?</li> </ul>
7.	Kakaire Willison	<ul style="list-style-type: none"> <li>We want to know what the project is doing in our area.</li> <li>Do you want to buy off our land?</li> <li>What is the project looking for underground?</li> <li>We want the project to undertake awareness training in our area.</li> </ul>



No.	Name of Stakeholder	Comment/Question
8.	Mwase Buwazi	<ul style="list-style-type: none"> <li>Does the project want to steal our land?</li> <li>Why are we being paid little money and yet you are drilling in our own land?</li> <li>Does the project intend to compensate us for our land or not?</li> <li>Does everyone's land have rare minerals. I see they have not yet come to drill at my piece of land?</li> </ul>
9.	Mwami Kiwanuka Ronald	<ul style="list-style-type: none"> <li>We hear that the project has job opportunities, are there any jobs for us the uneducated people?</li> </ul>
10.	Kasoga Monika	<ul style="list-style-type: none"> <li>How do I benefit from the project since when they commenced drilling, they have never drilled in my land?</li> <li>Will you be drilling in everyone's land, or you select areas where to drill?</li> </ul>
11.	Kagoya Zamu	<ul style="list-style-type: none"> <li>How do we benefit from this project?</li> </ul>
12.	Zulaika Naiwembwe	<ul style="list-style-type: none"> <li>We are used to our area, does the project plan to relocate us?</li> <li>The money we are being offered during the drilling activities is very little and yet our food crops are being destroyed in the process.</li> </ul>
13.	Mukyala Kagoya Sarah	<ul style="list-style-type: none"> <li>We are sad because we don't know what is going on with the project. We are not being sensitised about it.</li> <li>Why don't you schedule a meeting in this place to inform us about project activities?</li> </ul>
14.	Balikitenda Zauta	<ul style="list-style-type: none"> <li>While planning to relocate us, where does the project plan to relocate us to?</li> <li>Why aren't we all being given cash payments collectively rather than selecting out individuals who are being paid?</li> </ul>
15.	Mukyala Tibetolokwa Tapenensi	<ul style="list-style-type: none"> <li>Since there are rare minerals in this area, why can't we be given some money as a way of appreciating us?</li> <li>Are you relocating individuals or the entire village?</li> </ul>
16.	Weere Bakali	<ul style="list-style-type: none"> <li>When the valuers and surveyors come to our land, should we expect them to pay us immediately?</li> </ul>
17.	Weriaka Asuman	<ul style="list-style-type: none"> <li>Why are we being compensated little money and yet our crops are being destroyed during the drilling activities?</li> <li>The machines being used during the drilling activities are making a lot of noise and yet we are being compensated with little money.</li> </ul>
18.	Meriembe Rose	<ul style="list-style-type: none"> <li>For us who have lived in this area all our lives, who will assist us following resettling in a new area?</li> <li>How will local people benefit from this project?</li> </ul>
19.	Kaboyi David	<ul style="list-style-type: none"> <li>I hear rumours that you want to relocate us. How about our properties? Where are you taking us?</li> <li>Where are we going to be relocated? Some of us have other plots of land where we can relocate to.</li> </ul>
20.	Musene Saban	<ul style="list-style-type: none"> <li>We have not had any awareness training. We are just seeing on going project activities.</li> <li>An awareness training session needs to be put in place to inform us about the project activities.</li> </ul>
21.	Namukose Ruth	<ul style="list-style-type: none"> <li>As you plan to relocate us, shall we be paid or compensated for the land which will be taken by the project?</li> </ul>

No.	Name of Stakeholder	Comment/Question
		<ul style="list-style-type: none"> <li>As part of compensation, shall you construct for us new houses in a new location?</li> <li>Why do you not set up an awareness meeting within the local community?</li> </ul>
22.	Abweniki Kadijah	<ul style="list-style-type: none"> <li>I am disadvantaged as a woman and all my children who would take care of me passed away.</li> </ul>
23.	Balikitenda Zaum	<ul style="list-style-type: none"> <li>Is there a relocation place where the project intends to put us after they take our land?</li> <li>Why are only few people being selected for payment and leaving the rest of us out?</li> </ul>
24.	Butebi Abdul	<ul style="list-style-type: none"> <li>We hear that there are minerals underground in our land. However, I do not know what is in my land.</li> <li>We see trucks and drilling on going within our area; these are spoiling our soils and food crops.</li> <li>When the time comes, shall we be compensated to move to new areas or we shall stay?</li> </ul>
25.	Sannyu Huseine	<ul style="list-style-type: none"> <li>We hear rumours that you are looking for minerals in this area, however we as the local people do not know how they look like.</li> <li>We have never received any training from the project developer even though we hear that you want to buy off our land.</li> <li>We request that you do not relocate us, but rather mine whatever minerals you need and leave as you have been doing previously.</li> <li>We have stopped growing our crops because we are being told that you are going to relocate us; this may result into hunger since we do not have any food.</li> </ul>
26.	John Golongo	<ul style="list-style-type: none"> <li>Our children within the community need to be prioritised when giving jobs.</li> </ul>
27.	Sumu Hussein	<ul style="list-style-type: none"> <li>We hear rumours that you are looking for minerals in this area, however we as the local people do not know how they look like.</li> <li>We have never received any training from the project developer even though we hear that you want to buy off our land.</li> <li>We request that mining of the rare minerals be done without relocating us</li> <li>We are no longer growing crops because we are worried we are going to be displaced any time.</li> </ul>
28.	Mukyala Naigaga Azina	<ul style="list-style-type: none"> <li>The presence of these minerals has led to improved value of our land compared to land in other areas.</li> </ul>
29.	Mukulu Philpo	<ul style="list-style-type: none"> <li>What support should we expect from the project developer as we have very young children we are currently taking care of?</li> <li>We are being given very little money compared to the valuable minerals located in our land.</li> </ul>
30.	Kakaire Wilson	<ul style="list-style-type: none"> <li>We want to know what this project is about?</li> <li>What is being extracted from the ground?</li> <li>Shall we be compensated for the land?</li> </ul>
31.	Mukesi Richard	<ul style="list-style-type: none"> <li>What is being extracted from the ground?</li> <li>If I want to sell off my land to the project, will I be given the money I need?</li> <li>Is the project still taking samples from our land?</li> <li>Can the project supply us with essential supporting services such as sugar, soap, etc.</li> </ul>

No.	Name of Stakeholder	Comment/Question
		<ul style="list-style-type: none"> <li>As you plan to compensate us, will the project return our land after project activities are over?</li> <li>Will the local people be given jobs after the project is well established in the area?</li> <li>The project should improve our existing roads as part of their work.</li> <li>The project should extend electricity power to our village.</li> </ul>
32.	<i>No name was provided</i>	<ul style="list-style-type: none"> <li>I am worried about being evicted from my home because of this project.</li> <li>The project should be careful to protect the environment as we grow crops and rear our animals on it.</li> </ul>
33.	Nkuutu Aggrey	<ul style="list-style-type: none"> <li>I am thinking about my land and buildings. Is the project paying based on my property?</li> <li>Some people do not have jobs.</li> <li>They have not discussed any issues about our land.</li> </ul>
34.	Buyinza James	<ul style="list-style-type: none"> <li>We are worried this project will steal our land.</li> <li>The project is damaging our land.</li> <li>Awareness training from the LC 1 and Ministry of Energy and Mineral Development officials.</li> </ul>
35.	Namulondo Mary	<ul style="list-style-type: none"> <li>This project may displace us from our homes without compensating us.</li> <li>Because of ongoing project activities, we spent some time without getting water.</li> <li>How will the destroyed property be compensated?</li> <li>We would like to have engagement activities/meetings with the project developer so that we are properly informed of project activities.</li> </ul>
36.	Mwase Hussein Ndimulondo (0777260381)	<ul style="list-style-type: none"> <li>Residents ought to be paid based on their property being affected by the project.</li> <li>The project should create jobs for unemployed youth.</li> <li>The government should be informed of this upcoming project.</li> <li>We need to be informed of the on-going project activities.</li> </ul>
37.	Bigambu Isa (0754273788/ 0783181366)	<ul style="list-style-type: none"> <li>We request that this project benefits the local people particularly those who are affected by it.</li> <li>The project should provide employment opportunities for the locals.</li> <li>Why are we not consulted prior to coming up with amounts; the UGX 75,000 being paid to us is very little money.</li> <li>Local people, LC 1 and LC III chairpersons and the GoU need to be engaged.</li> <li>The project needs to increase on the compensation money being given to us since even our crops are being destroyed in the process.</li> <li>We want to be physically engaged by the project developer.</li> </ul>



No.	Name of Stakeholder	Comment/Question
		<ul style="list-style-type: none"> <li>• Compensation for destroyed crops was paid to my wife and I was not given any money and yet the crops are grown on my land.</li> </ul>
38.	Musimba Munimu (0704891301)	<ul style="list-style-type: none"> <li>• We expect the project to help develop our village.</li> <li>• I am worried about air pollution as a result of this project.</li> <li>• We would like experts to come and explain to us this project.</li> <li>• We request for the project to compensate us appropriately.</li> </ul>
39.	Byakika Tinana	<ul style="list-style-type: none"> <li>• We expect this project to help us develop.</li> <li>• The project developer needs to introduce the project to us in an awareness meeting.</li> <li>• We anticipate that you will displace us from our homes.</li> </ul>
40.	Mukasa Joseph	<ul style="list-style-type: none"> <li>• The project needs to have proper procedures when undertaking drilling activities.</li> <li>• I am worried that our property will be undervalued hence low pay.</li> <li>• The project needs to be truthful and open with us the local people.</li> <li>• Area Member of Parliament needs to be engaged.</li> <li>• We need to know the project duration.</li> <li>• We expect truthfulness and openness from the project developer.</li> </ul>
41.	Kanaso Moses	<ul style="list-style-type: none"> <li>• We expect this project to treat the local people appropriately and compensate them well.</li> <li>• The project should improve existing road facilities in this area.</li> <li>• Does the project plan to relocate us?</li> <li>• The project needs to carefully think through the idea of relocating us.</li> <li>• We the locals need to be prioritised when giving jobs under this project.</li> </ul>
42.	John Golongo and Baayo Gabriel Ajoma	<ul style="list-style-type: none"> <li>• We welcome this project in our area. However, we request that we are compensated appropriately.</li> <li>• The project should rehabilitate our roads and drainage system.</li> <li>• Religious and cultural leaders need to be engaged.</li> <li>• Shall we stay on our land during project activities or we shall be relocated.</li> <li>• The children of the local people need to be given employment opportunities by the project.</li> </ul>
43.	Kakuuma David	<ul style="list-style-type: none"> <li>• Ours soils may not be able to grow crops again.</li> <li>• Access to water may be difficult as a result of this project.</li> <li>• Where shall we be relocated to following compensation.</li> <li>• During the relocation process, mutual discussion needs to be made with the affected people.</li> </ul>
44.	Mukwana Mohamed Aleem	<ul style="list-style-type: none"> <li>• There is a lot of mistrust and misinformation about the project coupled with dishonesty.</li> <li>• Where shall we go following relocation.</li> <li>• We need an awareness training by the project developer in this village.</li> <li>• We need affirmation that after displacement, our land will be returned to us at the end of the project.</li> </ul>
45.	Nuhuu Mugiini	<ul style="list-style-type: none"> <li>• I am worried that my land is going to be illegally taken by the project.</li> <li>• We need an awareness training about the project activities.</li> </ul>

No.	Name of Stakeholder	Comment/Question
46.	Ndaye Brian	<ul style="list-style-type: none"> <li>We are interested in the valuation exercise which will be undertaken by the experts.</li> </ul>
47.	Nabongho Musa (0773906765/ 0753 985263)	<ul style="list-style-type: none"> <li>We need to be paid an appropriate amount.</li> <li>Valuation needs to be done first, then we are compensated and project activities can go on.</li> <li>People who ought to be engaged include Busoga Kingdom land management committee and NEMA.</li> <li>How much will be paid to project workers?</li> <li>What will be the basis for the prices used in the valuation exercise especially for land?</li> </ul>
48.	Idube Muzutuuru	<ul style="list-style-type: none"> <li>We do not understand what we are being explained to in these engagements. We request that a training about the project be made to enlighten us.</li> </ul>
49.	Tusubira Moses (0772 510509)	<ul style="list-style-type: none"> <li>How do us local people benefit from this project?</li> <li>Village leaders need to be engaged.</li> <li>We would like to understand the Memorandum of Understanding between Atacama and Makuutu.</li> </ul>
50.	Mugoya Sadam (0752373413)	<ul style="list-style-type: none"> <li>We request for salary increments.</li> <li>People should not be relocated unless they have been paid off first.</li> <li>We would like employment opportunities.</li> <li>The issue of relocating people has not been highlighted in the BID.</li> <li>People need to be further sensitised about this project.</li> </ul>
51.	Magala Grace	<ul style="list-style-type: none"> <li>Issues of relocating us need to be clearly communicated to us.</li> <li>No relocation should be made before paying off people.</li> </ul>
52.	Idube Kassani	<ul style="list-style-type: none"> <li>We request that the project is clearly introduced to us before project activities commence.</li> <li>Our land may become unproductive due to project activities.</li> <li>How far has the relocation exercise reached?</li> <li>We do not know the future plans of this project.</li> </ul>
53.	Baligeya George (0756930143)	<ul style="list-style-type: none"> <li>I am worried I may not have where to go following displacement from my land.</li> <li>We are yet to know what exactly this project is about.</li> <li>Can the project allow local people to have shares in it so we can benefit from it too?</li> </ul>
54.	Busolo Hamidu	<ul style="list-style-type: none"> <li>The project should be conscious of our environment and protect it from harm as we rely on it for food and animal rearing.</li> </ul>
55.	Suuna Sulaiman (0773468966)	<ul style="list-style-type: none"> <li>Our crops have been destroyed by this project, even so we are being compensated with little money.</li> <li>The project should help improve our livelihoods as we are doing badly.</li> </ul>
56.	Batwawula Charles	<ul style="list-style-type: none"> <li>We hope that we shall be paid for the land which will be taken by the project.</li> <li>The project should help improve our livelihoods as we are doing badly.</li> <li>Our leaders need to be consulted as part of this project engagement activities.</li> <li>How shall we be paid for the land taken by the project.</li> <li>So far, we have not benefited from the project.</li> </ul>

### 25.3.2 FEEDBACK FROM MAKANDWA CENTRAL VILLAGE

No.	Name of Stakeholders	Comments/ Questions
1.	Maganda Rafiti	<ul style="list-style-type: none"> <li>Shall we be paid before displacing us from our land?</li> </ul>
2.	Mulondo Musitafa	<ul style="list-style-type: none"> <li>Where are we going to be relocated to after displacing from our land?</li> <li>Shall we be given appropriate compensation following displacement from our land?</li> </ul>
3.	Kamba Scovia	<ul style="list-style-type: none"> <li>Where are we going to be relocated to after being displacing from our land?</li> <li>Shall we be given appropriate compensation following displacement from our land?</li> <li>Shall we be compensated for this for environmental damage?</li> </ul>
4.	Weere Jesca	
5.	Babirye Bese	<ul style="list-style-type: none"> <li>The amount of money currently being given to us is not enough because our crops are being destroyed in the process.</li> <li>We request that enough money is given to us prior to relocation.</li> </ul>
6.	Agatta Owino	<ul style="list-style-type: none"> <li>Shall we be relocated from our current land?</li> </ul>
7.	Namulondo Scovia	<ul style="list-style-type: none"> <li>Shall the project open for us bank accounts where our money will be deposited?</li> </ul>
8.	Nabongo Isima	<ul style="list-style-type: none"> <li>We need to be consulted prior to any project activities being undertaken.</li> <li>We have never had a meeting with the project developer about this project.</li> <li>We request that water is extended to our area.</li> <li>The amount of money currently being given to us is not enough as even as our crops are being destroyed in the process.</li> <li>We would like to be involved as stakeholders in the project activities even after relocation.</li> <li>The project should construct health facilities to benefit us local people.</li> <li>The youth in this area need to be prioritised when giving jobs.</li> </ul>
9.	Nangobi Scovia	<ul style="list-style-type: none"> <li>How much money shall we be given for this project as they take our land?</li> <li>The team used during the resettlement exercise, is it the same as the one being used currently?</li> <li>We are currently being given little money for the currently on-going project activities</li> </ul>
10.	Ogubba Jospher	<ul style="list-style-type: none"> <li>We want the project to undertake a training exercise before continuing with their activities.</li> <li>We are currently being compensated little money.</li> </ul>
11.	Magumba Muteguya	
12.	Maaka Yazidi	<ul style="list-style-type: none"> <li>We want the project to undertake a training exercise before continuing with their activities.</li> <li>We are currently being compensated little money.</li> <li>We would like to be given jobs as part of this project.</li> <li>The project should provide services such as water, hospitals and improve roads within this area.</li> </ul>
13.	Namugwere Betty	<ul style="list-style-type: none"> <li>Will the project find replacement land for us?</li> </ul>
14.	Kadondi Janja	<ul style="list-style-type: none"> <li>Do you want to just extract what is underground or you will relocate us also?</li> <li>Shall the project compensate us appropriately for the land taken?</li> </ul>
15.	Awori Mery	

16.	Okoth Scovia	<ul style="list-style-type: none"> <li>• The amount of money currently being given to us is not enough as our crops are being destroyed in the process (75,000 UGX per pit).</li> <li>• During relocation shall we be given cash compensation or an appropriate location will be found for us?</li> </ul>
17.	Wagaluka Mucemia	<ul style="list-style-type: none"> <li>• The amount of money currently being given to us is not enough as our crops are being destroyed in the process.</li> <li>• What plans does the project have for the local people since they have lived here all their life?</li> <li>• During relocation shall we be given cash compensation or an appropriate location will be found for us?</li> <li>• The project should provide services such as water, hospitals and improve roads within this area</li> <li>• The youth in this area need to be prioritised when giving jobs.</li> <li>• Can the project create education bursaries to benefit our children?</li> </ul>

### 25.3.3 FEEDBACK FROM NAMIGANDA VILLAGE

No.	Name of Stakeholder	Comment/Question
1.	Florence Katebule	<ul style="list-style-type: none"> <li>The stakeholder consultations were well conducted. Local community members were able to connect with the project.</li> <li>The project will boost businesses within the project area.</li> <li>Expressed concern on whether the proposed processing plant would emit gases that would lead to increased disease outbreaks.</li> <li>Requested that residents of the project area, the elderly, and religious leaders should also be engaged.</li> <li>What is the mining duration?</li> <li>Recommended that potential Project Affected Persons (PAPs) should be adequately compensated.</li> </ul>
2.	Ajuma Rose	<ul style="list-style-type: none"> <li>The project should conduct monthly stakeholder engagement activities.</li> <li>The project would lead to employment of youths.</li> <li>The project should plant trees to mitigate impacts of climate change.</li> <li>Requested that members of her family should also be engaged.</li> <li>Inquired whether the project would also employ uneducated community members?</li> <li>The operational activities of the project are likely to impact the surrounding environment.</li> <li>The project should provide clean water to project affected communities.</li> </ul>
3. 3	Nabyuma Stephen	<ul style="list-style-type: none"> <li>The project would create job opportunities for people.</li> <li>The project should rehabilitate existing wells and boreholes.</li> <li>Consultations should also be held with religious leaders.</li> <li>Memorandum of Understanding (MoU) should be signed between potential Person Affected Persons (PAPs) and the project.</li> <li>Schools and worship centers/shrines should not be relocated.</li> </ul>
4.	Ochaya Francis	<ul style="list-style-type: none"> <li>The proposed project will create employment opportunities for the people.</li> <li>Expressed concerned related to soils losing fertility as a result of the project.</li> <li>Consultations of all village and subcounty local leaders should be conducted.</li> <li>If project activities go beyond the 27-year planned mining duration, will PAPs be compensated for the additional project duration?</li> <li>Local Council (LC) I leaders should be given allowances since they continuously transmit project related information to local community members.</li> </ul>
5.	Sizoomu Patrick	<ul style="list-style-type: none"> <li>The message from the engagement activities was well received.</li> <li>The proposed project will create employment opportunities for the people.</li> <li>Expressed concern regarding relocation of PAPs from their homes.</li> </ul>

No.	Name of Stakeholder	Comment/Question
		<ul style="list-style-type: none"> <li>Requested that religious leaders be consulted.</li> <li>PAPs should be promptly compensated and additionally, they should be provided monthly disturbance allowance.</li> <li>What will the project do to ensure the existing water resources are not impacted?</li> </ul>
6.	<i>No name was provided</i>	<ul style="list-style-type: none"> <li>Concerned that PAPs may not be fairly compensated.</li> <li>The project should skill people on tree planting.</li> <li>Indicated that exploration activities are still ongoing.</li> <li>How far should people stay/reside away from the mining pit?</li> <li>All people neighbouring the project are should benefit from the proposed project.</li> </ul>
7.	<i>No name was provided</i>	<ul style="list-style-type: none"> <li>The proposed project will create employment opportunities for the people.</li> <li>The project should not grab people's land.</li> <li>Requested that residents of the area should be consulted.</li> <li>Who will undertake valuation/surveys of affected assets within the proposed project area?</li> <li>Requested for fair and equitable compensation for affected assets.</li> </ul>
8.	Seboowa Falidi	<ul style="list-style-type: none"> <li>Community members have been informed about the project following the stakeholder engagement activities.</li> <li>Increase in sub-county tax base due to project implementation.</li> <li>Concerned that mining activities may impact the soil productivity in the area.</li> <li>Area Local council I leaders should be frequently consulted throughout the project lifespan.</li> <li>If project activities go beyond the 27-year planned mining duration, will potential PAPs be compensated for the additional project duration?</li> <li>There should be transparency during the recruitment of personnel for project-related jobs.</li> </ul>

#### 25.3.4 FEEDBACK FROM BUNIAANTOLE VILLAGE

No.	Name of Stakeholder	Comment/Question
1.	Magoola Yenusu	<ul style="list-style-type: none"> <li>The project should provide employment opportunities to the local communities.</li> <li>Requested the project to construct a health centre in Buniantole village.</li> <li>Requested that the LCI Chairperson should be engaged.</li> </ul>
2.	Kiyuba Issa	<ul style="list-style-type: none"> <li>The locals should be given priority when it comes to employment.</li> <li>He expects the project to contribute to economic development of the village in addition to PAPs receiving adequate compensation for affected assets.</li> </ul>



		<ul style="list-style-type: none"> <li>• The project should construct a health center and at the same time rehabilitate existing schools within the village.</li> <li>• Consultations of local leaders, religious leaders and elderly persons should be conducted.</li> </ul>
3.	Balikoowa Jessy	<ul style="list-style-type: none"> <li>• The project should construct a health center at the village.</li> <li>• Local leaders should be consulted.</li> <li>• The project to prioritise employment of local communities.</li> <li>• The project should construct a health center at the village since there will be influx of more people in the area.</li> <li>• Compensate all potential PAPs.</li> <li>• The project should frequently conduct consultations with the area LCI Chairperson.</li> <li>• Rehabilitate existing schools within the village.</li> <li>• Expects the project to foster economic development in the village.</li> <li>• Requests the project to provide opportunities to elderly persons.</li> <li>• Expects the project to boost businesses with the village.</li> </ul>
4.	Balikoowa Moses	
5.	Balikowa Janepher	
6.	Balikowa Peter	
7.	Tezita Abeli	
8.	Byakika William	
9.	Namwase Annet	
10.	Namutamba Hadija	
11.	Kauma Sarah	
12.	Biziwena Nyende	
13.	Hajji Mutwalibi Nyende	
14.	Nakasango Hadija	
15.	Menya Yakubu	
16.	Menya Fatuma	
17.	Nabirye Miliyonsi	
18.	Nampera Jane	
19.	Kagoya Zaituna	
20.	Nangobi Najati	
21.	Ndereya Moses	
22.	Mukama Fred	
23.	Namulondo Marriam	
24.	Isabirye Joswa	
25.	Nabangi Edward	
26.	Munuulo Osamia	
27.	Kozala Stephen	
28.	Namwase Zeulensi	
29.	Waigulo Andrew	

30.	Waiswa Bumali	
31.	Bwonso Lamula	
32.	Mugwana Isima	

### 25.3.5 FEEDBACK FROM KABUGWERI VILLAGE

No.	Name of Stakeholder	Comment/Question
1.	Takali Lukia (0778781304)	<ul style="list-style-type: none"> <li>• Requests the establishment of committees. He also emphasised the use of English as medium of communication since the region has very many ethnic groups.</li> <li>• Requests for a stakeholder engagement and consultation meeting.</li> <li>• Concerned that the project may lead to increase in Gender Based Violence.</li> <li>• Requested that the LCI of the village and Police officer in charge of the subcounty should be engaged.</li> <li>• Emphasised the need for transparency, continuous involvement of the community throughout the project lifespan.</li> </ul>
2.	Ogunda Joseph (0773555367)	<ul style="list-style-type: none"> <li>• Indicated that the local communities have not received much information about the project.</li> <li>• Requested the project to carry out more community sensitisation about the project.</li> </ul>
3.	Naigaga Margret	<i>Filled the form but did not provide any comments or questions.</i>
4.	Nalukazi Rose	<ul style="list-style-type: none"> <li>• Expects the project to increase employment opportunities for locals in the village.</li> <li>• Requests the project to promptly and adequately compensate PAPs.</li> <li>• The project should construct a health center and at the same time rehabilitate existing schools within the village.</li> <li>• Requests the project to conduct consultations with the youth and cultural leaders.</li> </ul>
5.	Onyango Francis	<ul style="list-style-type: none"> <li>• He hopes that the project will lead to economic development of the affected villages.</li> <li>• Requests the project to conduct fair and equitable compensation of PAPs.</li> <li>• He suggests that the project should establish project coordinators within Bugweri. The project coordinators will be in-charge of disseminating project related information to the communities.</li> <li>• He suggests that the project should carry out sensitisation of the local communities with regards to the project.</li> <li>• Requests the project to provide the local communities with start-up capital.</li> </ul>
6.	Magoola James (0788898904)	<ul style="list-style-type: none"> <li>• He hopes that the project will lead to development of the village.</li> <li>• The project should carry out more community sensitisation.</li> <li>• Children, cultural leaders, LC I Chairperson and other local leaders should also be consulted.</li> </ul>

		<ul style="list-style-type: none"> <li>• What are some of the documents required especially if one is a potential PAP?</li> <li>• How long will the exploration activities take before the mining activities can commence?</li> </ul>
7.	Basoga Patrick	<ul style="list-style-type: none"> <li>• The communities are excited about the upcoming project.</li> <li>• They would need know what the next phase of the project would be.</li> </ul>
8.	Tenywa Yakubu Wangampi	<ul style="list-style-type: none"> <li>• Expects the project to compensate PAPs.</li> <li>• He hopes for more project-related community sensitisation.</li> <li>• Children, cultural leaders and the LC I chairperson should be engaged.</li> </ul>
9.	Ibinga Richard (0771013053)	<ul style="list-style-type: none"> <li>• He is concerned about cases of unfair compensation.</li> <li>• He requests for more stakeholder consultation activities.</li> <li>• Children, and cultural leaders should be engaged.</li> <li>• He understands the entire process of the Project.</li> </ul>
10.	Makamazibu Fred	<ul style="list-style-type: none"> <li>• Needs more information on the process of compensation.</li> <li>• Expects the project to construct a health center which will help the community.</li> <li>• Children and cultural leaders should also be consulted.</li> <li>• Needs more sensitisation on aspects of the project.</li> </ul>
11.	Wante Ibrah (0786022061)	<ul style="list-style-type: none"> <li>• Expects to be promptly and adequately compensated.</li> <li>• Children and local leaders should also be consulted.</li> <li>• Needs information on the potential impacts of the project.</li> <li>• Children and the LCI chairperson should be consulted.</li> <li>• Expects the project to adequately compensate potential PAPs.</li> </ul>
12.	Kulaira Katema	<ul style="list-style-type: none"> <li>• He expects the project to create employment opportunities for the communities.</li> <li>• Consideration should be given to people that will be relocated due to the operations of the proposed project.</li> <li>• The project should also establish strategies that will lead to the development of neighbouring villages.</li> <li>• PAPs should be prioritised during the project implementation.</li> </ul>
13.	Namususwa Zahara	<ul style="list-style-type: none"> <li>• Concerned about the issue of resettlement and how it will be implemented.</li> <li>• She is concerned that they have not received much consultations with regards to the project.</li> <li>• PAPs, local leaders (LCI, LCII and LCIII) and the area Member of Parliament should be consulted.</li> <li>• How will people benefit from the proposed project?</li> <li>• Requests to give priority to the local communities during project employment?</li> </ul>

### 25.3.6 FEEDBACK FROM BUSINDA B VILLAGE

No.	Name of Stakeholder	Comment/Question
1.	Oketch Peter	<ul style="list-style-type: none"> <li>• He is worried that the project may take away their land prior to being compensated.</li> <li>• Expects the project to provide fair and adequate compensation for affected assets.</li> <li>• What is the commencement date for the project?</li> <li>• Suggested that the local communities should have their own independent lawyers who will provide legal support to the affected communities.</li> </ul>
2.	Mbako Fredrick (078922394, 0757876818)	<ul style="list-style-type: none"> <li>• Requested for more consultative meetings with Atacama authorities.</li> <li>• Those to be affected should be relocated to places with more or less the same environment.</li> <li>• The elderly, local leaders e.g., LC 1-5, land tribunals including surveyors, etc., should also be consulted.</li> <li>• When will the project begin? Will PAPs be relocated before project commencement?</li> <li>• Those to be affected should be given enough time to sort themselves through regular meetings.</li> </ul>
3.	Kisubi George Stephen (0778967439)	<ul style="list-style-type: none"> <li>• He is worried about project speculators.</li> <li>• All impacted types of trees, land, homes should be compensated for.</li> <li>• Can I further develop my land?</li> <li>• Expects the project to compensate them in a manner that it will not leave worse off.</li> </ul>
4.	Kawuma Ruth Kisubi (0779506548)	<ul style="list-style-type: none"> <li>• The project should consider establishing schools, health centers, water system, and roads within the area.</li> <li>• Requests for relocation allowance (in form of cash).</li> </ul>
5.	Mwebya Sowed	<ul style="list-style-type: none"> <li>• Expects the project to develop employment in Uganda.</li> <li>• The project should pay for our land and settlement.</li> <li>• Pay to correct our environment.</li> <li>• <b>How will people know that you are done with the work and relocate to their land?</b></li> <li>• We appreciate the program.</li> </ul>
6.	Muwaguzi Charles Kaitata (0707011474, 0781594549)	<ul style="list-style-type: none"> <li>• Most of the land owners can read and understand English and Luganda but not Lusoga.</li> <li>• My piece of land is in the affected area which has halted my extensive farming.</li> <li>• Most elderly have been so depressed; they need counselling as they fear resettlement.</li> <li>• Members of parliament should at times move with Atacama for sensitisation.</li> <li>• The processing plant at Businda B will cause pollution. How will the workers/truck drivers be protected?</li> </ul>

		<ul style="list-style-type: none"> <li>Most of the land owners in the community are middle aged, they were educated in English and Luganda. Therefore, print more books in the language they understand.</li> </ul>
7.	Magoola James (0788898904)	<ul style="list-style-type: none"> <li>Requests for continuous sensitisation of the community.</li> <li>Am worried about how people will be compensated.</li> <li>My children and the clan should be consulted as well.</li> <li>The project should establish a mechanism for reporting grievances.</li> <li>Our ideas and thoughts should be implemented right here in our community.</li> </ul>

### 25.3.7 FEEDBACK FROM NAKAVULE VILLAGE

No.	Name of Stakeholders	Comments/ Questions
1.	Mukisa Vicent	<ul style="list-style-type: none"> <li>Why is it that for the long period ever since project activities commenced in this area, no engagement meeting has ever been organised with us?</li> </ul>
2.	Nsandu Richard	<ul style="list-style-type: none"> <li>Project workers should be warned not to involve themselves sexually with our wives.</li> <li>Is it true that the project developer is planning to resettle us?</li> </ul>
3.	Wakabira Geoffrey	<ul style="list-style-type: none"> <li>So far, we are being compensated with little money, the UGX 70,000 being given to us currently is very little money.</li> <li>Is it true that the project developer is planning to resettle us?</li> </ul>
4.	Warieka Ezikaraa	<ul style="list-style-type: none"> <li>On my piece of land, I have items such as banana plantations, trees, coffee, avocado trees, etc. During resettlement will you come to us for mutual discussion and agreement in relation to our affected property?</li> <li>Why are drilling activities being undertaken now? We expect that by this time the project developer is sure that this area has the minerals they are looking for?</li> </ul>
5.	Kakaire Arafati	<ul style="list-style-type: none"> <li>How much shall we be compensated for our affected property?</li> </ul>
6.	Ngobi Fred	<ul style="list-style-type: none"> <li>We hear you want to displace us from our land; however, I am in debt with a loan I used to buy my motorcycle how shall I be helped?</li> <li>What will be done for our affected crops such as coffee?</li> </ul>
7.	Oketch Ruth	<ul style="list-style-type: none"> <li>How will land owners benefit from this project?</li> <li>Us the uneducated people are currently unemployed; how will the project help us gain employment?</li> </ul>
8.	Magemeso Alex	<ul style="list-style-type: none"> <li>Why are we being given money after drilling activities and yet it is little money?</li> <li>How will our cultural heritage (personal shrines) be relocated or will they be left behind?</li> </ul>
9.	Kakaire Matiya	<ul style="list-style-type: none"> <li>We want to know if the project intends to displace us or not?</li> </ul>

		<ul style="list-style-type: none"> <li>• What is this project about and what are the currently ongoing activities?</li> </ul>
10.	Kagoda Martin	<ul style="list-style-type: none"> <li>• We are worried about this resettlement exercise as most of us are born here and have spent our entire lives here.</li> <li>• Does the project have a place where they will relocate us following resettlement?</li> </ul>
11.	Mutesi Lydia	
12.	Balikowa Moses	
13.	Kakaire Shakulu	
14.	Nsadu Yokana	<ul style="list-style-type: none"> <li>• Why doesn't the project employ our children to work?</li> <li>• What is this project about and what are the currently ongoing activities?</li> </ul>
15.	Maganda Magidu	<ul style="list-style-type: none"> <li>• What is this project about and what are the currently ongoing activities?</li> <li>• We are currently being given little money as compensation for every drill pit being dug.</li> </ul>



### 25.3.8 FEEDBACK FROM BUYAYU VILLAGE

No.	Name of Stakeholders	Comments/ Questions
1.	Kabaya Matiya	<ul style="list-style-type: none"> <li>During the drilling activities, why is it that when our crops are destroyed you are the ones who determine how much we should be paid?</li> </ul>
2.	Kadondo Janifa	<ul style="list-style-type: none"> <li>Even after destroying my crops during the drilling activities on my land, I was paid only UGX 20,000. Shouldn't the project negotiate with us first before coming up with these amounts?</li> <li>Shall we be relocated as part of this project?</li> <li>We request for an increment on the money being given to us currently</li> </ul>
3.	Nabirye Aisha	<i>Filled in the form but did not provide any comments/questions</i>
4.	Kabikazi Benefaziyo	<ul style="list-style-type: none"> <li>How will us multiple land owners be handled during the resettlement exercise?</li> <li>We are currently being compensated little money during the drilling activities even after destroying our crops.</li> </ul>
5.	Bawano Kadijja	<ul style="list-style-type: none"> <li>Will all our property be valued and paid for prior to resettlement?</li> <li>The compensation should be sufficient to replace all our affected property and land.</li> </ul>
6.	Namwebwe Jamawa	
7.	Nampiima Margret	
8.	Napina Aziza	
9.	Tibiita Geofrey	<ul style="list-style-type: none"> <li>What is currently being drilled by the project?</li> <li>Will the company facilities be constructed in the Bugweri area or will they be located in another area?</li> <li>Existing roads need to be rehabilitated by the project.</li> <li>Shall we be compensated for the land and property taken or we shall just be chased from our land?</li> <li>We ought to be compensated for our land fairly.</li> </ul>
10.	Nakiyuka Jalia	<ul style="list-style-type: none"> <li>Can't the project consider other options rather than displace us from our land?</li> <li>We are worried about relocating to a new area.</li> </ul>
11.	Kirunda Alamazani	<ul style="list-style-type: none"> <li>I want to be given at least 30% of the mineral benefits from my land.</li> <li>During the resettlement exercise, shall we be chased from our own land or some form of compensation will be given to us?</li> <li>Our crops are being destroyed during drilling and yet they are not being paid for.</li> <li>We hear that we are being paid little money compared to what is being dispatched by the project (i.e., we are being paid YGX 70,0000 instead of 700,000).</li> </ul>
12.	Balikoowa Faizo	<ul style="list-style-type: none"> <li>Why doesn't the project first engage us before undertaking any activities in our area?</li> </ul>
13.	Nangobi Lukia	

14.	Nakayima Hanifa	<ul style="list-style-type: none"> <li>• Shall we be compensated for the land being taken by the project?</li> <li>• The project needs to increase on the amount of money being given to us, considering our crops are being destroyed during drilling.</li> </ul>
15.	Nampina Ziida	<ul style="list-style-type: none"> <li>• Are the on-going drill activities the only activities to be done or the project will buy off our land and relocate us in future?</li> <li>• Shall we be compensated for the land being taken by the project?</li> </ul>
16.	Naigaga Fatumah	<ul style="list-style-type: none"> <li>• The project drilling activities were done in my garden and payment was given to someone else.</li> <li>• How do us local people benefit from this project?</li> <li>• If the minerals are discovered within my house, will it be destroyed and another constructed for me in another place?</li> </ul>
17.	Namukose Hajjira	<ul style="list-style-type: none"> <li>• Why are we being asked how many children we have during the socio-economic survey exercise?</li> <li>• Will my children also be given some form of compensation?</li> </ul>
18.	Nakaziba Sharifah	<ul style="list-style-type: none"> <li>• Why is the project considering relocating us?</li> <li>• We are being compensated little money and yet our crops are being destroyed.</li> </ul>
19.	Kagoya Farida	
20.	Kabaya Robert	<ul style="list-style-type: none"> <li>• We request that a project awareness and sensitisation exercise be undertaken before continuing with any work in this area.</li> </ul>
21.	Naibira Sharifa	<ul style="list-style-type: none"> <li>• We are worried that our land will be stolen from us in the long run by the project</li> </ul>
22.	Nakiliya Zizia	<ul style="list-style-type: none"> <li>• We request that we are compensated with enough money so that we can also improve our livelihood.</li> </ul>
23.	Namamba Sumaya	<ul style="list-style-type: none"> <li>• During resettlement, shall you find us a new location to stay following which we can return to our land after the project is over?</li> </ul>

# **MRE-CSO**

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Makuutu Rare Earth Civic Society

## **Report**

### **Makuutu Rare Earth Project; Knowledge and Attitudes among the Makuutu People: A Baseline Pilot Study report**

23<sup>rd</sup> Aug, 2021

**Principal Investigators:** Tusubira Evans<sup>1</sup>, Malagala Tenwya Aloysius<sup>2</sup>, Alex Bateganya

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**By:**

Tusubira Evans

**On behalf of:**

Makuutu Rare Earth Civic Society

## Background

MRE-CSO is a local Community Based Organization (CBO) based in Makuutu and initiated to promote the participation of citizens and stakeholders in societally relevant dialogue and decision-making processes with respect to Rare Earth Elements resources within Makuutu

We promote the participation of citizens & stakeholders in dialogue & decision-making processes of relevance for society with the purpose of promoting sustainable and responsible production and processing of Rare Earth Elements

To prevent societal harm and conflict and to support a smooth Makuutu Rare Earths Project (MRE-Project) implementation, we carried out an assessment among local people and local leaders to gauge their level of knowledge and attitudes about the project.

We carried out a rapid phone-based descriptive survey to collect information on knowledge and attitudes about the project as well as assessment of the training needs among the community. A target sample of at least 100 local people and 20 Local Council Chairmen from 20 villages from Makuutu Parish was involved in the study. Some of the survey questions were extracted from the "Atacam/IonicRE/Rwenzori Community dialogue brochure"

## Results

The respondents were predominately males 79%. Almost 3/4 of the respondents indicated 20 or more years of leaving in Makuutu which indicates that it is a stable non-migratory population (n = 61, 53%).

Out of the 87 community members and 13 local community leaders who participated in the survey only 4 (3%) knew what the project was about.

There were so many myths about the project some being that *it is about gold, that Government has sold their land to investors, 44% had reservation of being relocated, 76% would prefer not to come back to Makuutu after relocations, 87% of those below 35 years fear that their parents who own land would not give them their share, 100% of the respondents have no idea about the project boundary with confusion about who will be and will not be compensated*

## Conclusion

There are several vulnerabilities that needs to be handled in the pre-production, production and post-production phases

Trans generational equity in the local context is a real threat to the project and needs lots of inputs and might require consenting processes

## Way Forward

MRE-CSO has a plan to organize 'Citizen Labs', to consult local communities in project areas to facilitate discussions between local communities and industrial partners, family members, communities and leaders etc to highlight challenges and opportunities related to the mining projects. The outputs of these consultations will allow the mining company to co-create a level of social acceptance and incorporate local stakeholders' feedback into future developments.

## 26Annex XIII: Project Approvals and Licenses



THE REPUBLIC OF UGANDA

THE MINING ACT.

THE MINING REGULATIONS.

### EXPLORATION LICENCE

FORM XIX.  
Reg. 13(2).

No. 1766

1. This exploration licence is hereby granted to **M/S RWENZORI RARE METALS LTD. OF P.O. BOX 1520, KAMPALA** for **THREE** years from the **06<sup>th</sup>** day of **July** year, **2018** to prospect for **REE, GOLD, U, PGM/E AND BASE METALS** within the boundaries as delineated approximately on the attached map and colored **RED**

2. This licence is subject to the provisions of the Mining Act and the applicable Mining Regulations.

Special conditions: -

- (i) Pay annual mineral rent on each anniversary of the grant of the licence without demand as required under section 106 of the Act;
- (ii) Submit environmental restoration plan in accordance with section 110 of the Act;
- (iii) Prevent and minimize pollution to the environment during the exercise of the rights as required under section 109 of the Act;
- (iv) Provide a self monitoring plan as required under regulation 67 of the Mining Regulations;
- (v) Comply with other laws and regulations as required under section 11 of the Act;
- (vi) Submit quarterly returns as required under the applicable Mining Regulations; and
- (vii) Government shall retain the right to have unlimited access to this exploration area in the course of carrying out scientific investigations into the geological or mineral resources.

Rent and Fees of: Shs. **3,900,000=** paid; vide receipt Nos. **2170002582185 & 2180003677144** of **04<sup>th</sup> April, 2017** and **11<sup>th</sup> June Year 2018** respectively.

Dated this **06<sup>th</sup>** day of **July**, year **2018**.

**Agnes Alaba**

**Commissioner for the Geological Survey and Mines Department**

CC: Chief Administrative Officer, **Bugiri** District.

CC: Chief Administrative Officer, **Iganga** District

CC: Uganda Land Commission, Kampala.





# EXPLORATION LICENCE

Number **EL\_1766**

Date of application: 6/04/2017

Date of Title: 2/07/2018

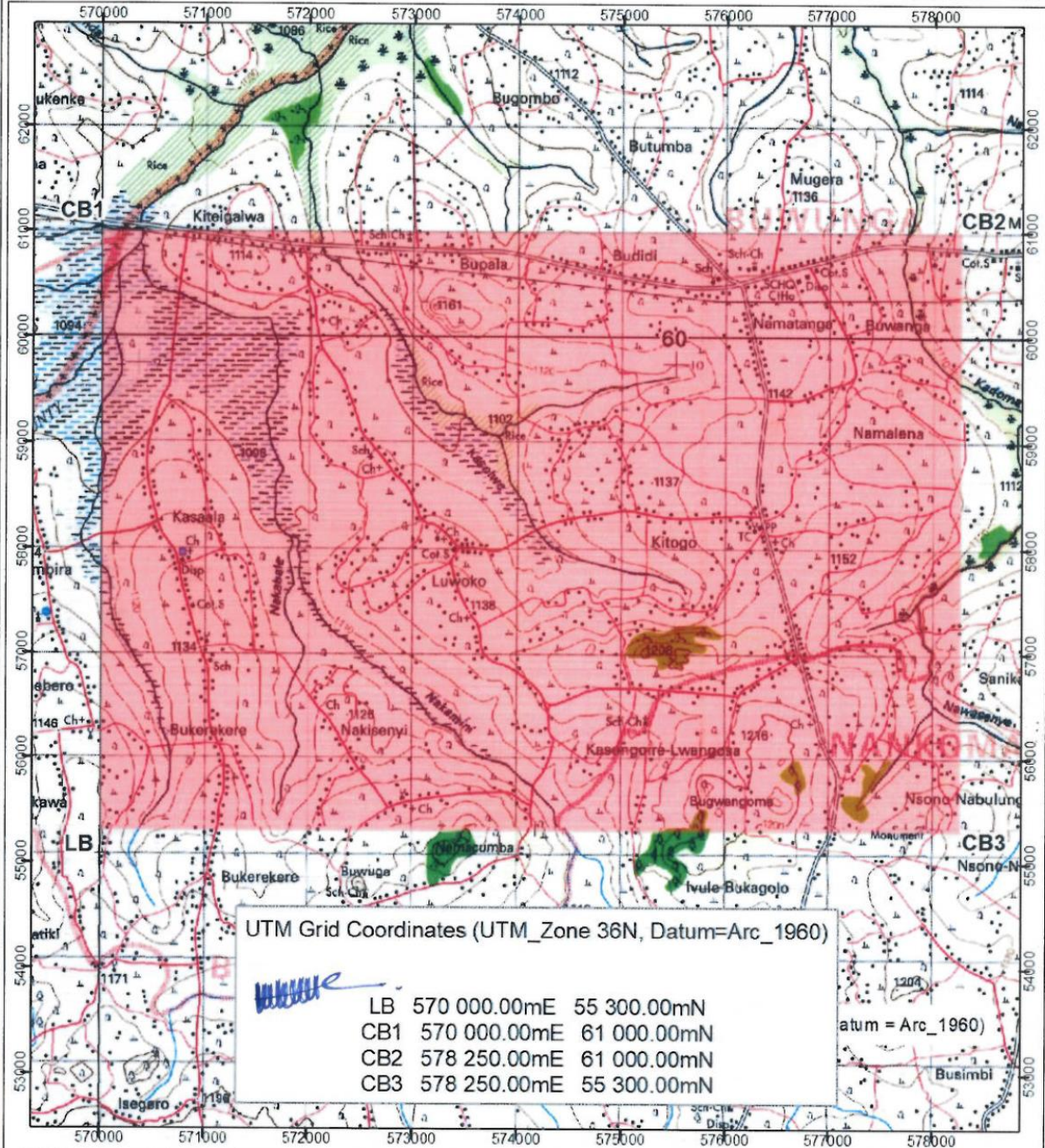
Prospecting Licence: 00009138

Commodity : Gold, Base Metals, PGMs, REE, Uranium



T.Number: 2528

Sheet No. 63/3

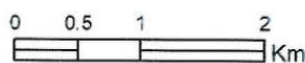


Approx. Area = 47.0250 Km<sup>2</sup>

Scale: 1: 50 000

M/S Rwenzori Rare Metals Ltd,  
P. O. BOX 1520,  
Kampala\_Uganda

Districts: Bugiri, Iganga



Prepared by *Agssc* Date *2/7/2018* Sign *Shagana*

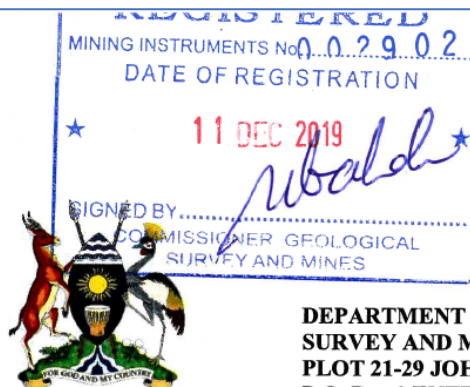
Checked by *Ag Psc* Date *04/07/2018* Sign *Affemmy*

**Department Of Geological Survey and Mines**





TELGRAM: DISCOVERY  
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GENERAL (+256-414) 320656/320790  
DIRECT (+256-414) 320118  
DIRECT (+256-312) 320559  
FAX: (+256-414) 320364  
E-mail: dgsm@minerals.go.ug  
Website: http://dgsm.go.ug



FORM XX.  
Reg. 19(4).

DEPARTMENT OF GEOLOGICAL  
SURVEY AND MINES,  
PLOT 21-29 JOHNSTONE ROAD  
P.O. Box 9 ENTEBBE, UGANDA.

THE REPUBLIC OF UGANDA  
THE MINING ACT, 2003.  
THE MINING REGULATIONS, 2019.

#### RETENTION LICENCE

RL00007



This retention license, is hereby granted under section 37 of the Act to **Rwenzori Rare Metals Limited** of 26 **Kyadondo Road, DFCU Towers, Nakasero, Uganda** for **Three (3) years** from the 27/11/2019 to retain the retention area concerned in respect of **Rare Earth Elements** minerals within the boundaries as delineated approximately on the attached map and coloured in **RED**

1. This licence is subject to the provisions of the Mining Act and the applicable Mining Regulations.

#### Special Conditions: -

- (i) Pay annual mineral rent on each anniversary of the grant of the licence without demand as required under section 106 of the Act;
- (ii) Submit environment restoration plan in accordance with section 110 of the Act;
- (iii) Prevent and minimize pollution to the environment during the exercise of the rights under this licence as required under section 109 of the Act;
- (iv) Provide updated studies and assessments of the prospects of the developments and commercial exploitation of the mineral deposits as required under section 39 of the Act.
- (v) Submit quarterly returns as required under the applicable Mining Regulations.
- (iv) Rent and Fees of the following have been paid:

Type	Date Paid	Amount (UGX)	PRN
Fee: Application Registration	01/11/2019	500,000.00	2200001996745
Fee: Annual Rent (RL)	05/11/2019	4,400,000.00	2200002068698

*Godfrey Bahati*  
Godfrey Bahati

*Ag. Commissioner for the Geological Survey and Mines Department.*

CC: Chief Administrative Officer, Iganga  
CC: Chief Administrative Officer, Mayuge  
CC: Regional Inspector of Mines, Tororo Office

Date Issued: 14/02/2020







# Department Of Geological Survey and Mines

Retention Licence

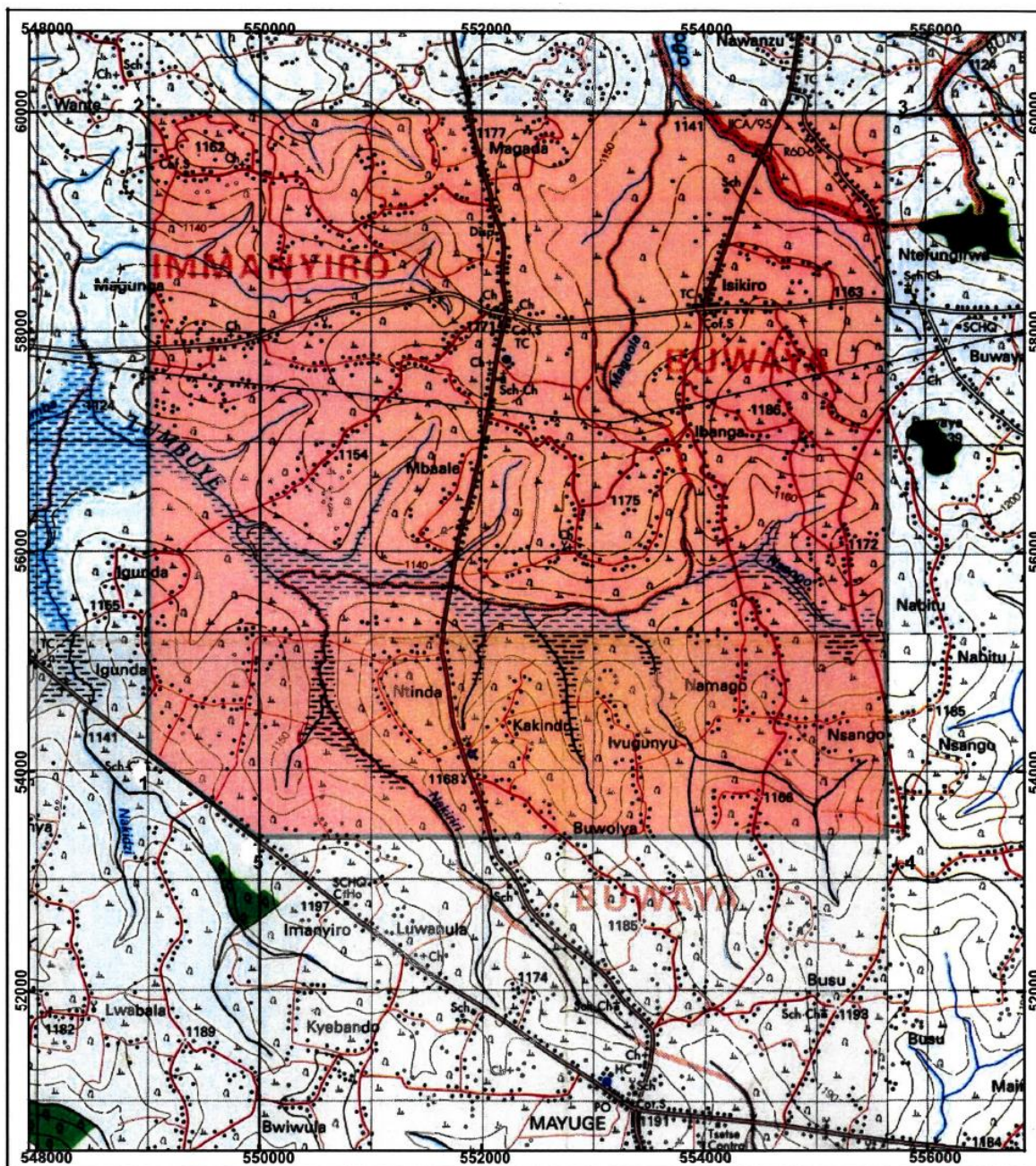
RL00007



Date of Title: 27/11/2019  
Related Licence: EL0971  
Commodity: Rare Earth Elements

M/S Rwenzori Rare Metals Limited,  
26 Kyadondo Road, DFCU Towers, Nakasero  
P.O.BOX 1520,  
Kampala - Uganda

TN (application Number): TN3115  
Sheet Number: 62/4 & 72/2  
District: Iganga *Mayuge* /  
Official Area: 43.3875Km<sup>2</sup>



0 0.5 1 2  
Kilometers

Scale: 1: 50 000

Checked by *Ag. Sen GIS* Date *20.07.2020* Sign *RT/b*

Beacons	Coordinates UTM Zone 36N_Arc1960	
	Easting(x)/mE	Northing(y)/mN
1	549000	54160
2	549000	60000
3	555630	60000
4	555630	53400
5	549975	53400





THE REPUBLIC OF UGANDA

THE MINING ACT.

THE MINING REGULATIONS.

FORM XX.  
Reg. 19(4).

**RETENTION LICENCE**

No. 1693

1. This retention license, is hereby granted under section 37 of the Act to **M/S KWERI LIMITED** of **P. O. BOX 71680, KAMPALA** for **THREE** years from the **02<sup>nd</sup>** day of **November** year **2017** to retain the retention area concerned in respect of **RARE EARTH ELEMENTS** within the boundaries as delineated approximately on the attached map and colored **RED**.

2. This license is subject to the provisions of the Mining Act and the applicable Mining Regulations.

Special conditions: -

- (i) Pay annual mineral rent on each anniversary of the grant of the license without demand as required under section 106 of the Act;
- (ii) Submit environmental restoration plan in accordance with section 110 of the Act;
- (iii) Prevent and minimize pollution to the environment during the exercise of the rights as required under section 109 of the Act;
- (iv) Provide updated studies and assessments of the prospects of the developments and commercial exploitation of the mineral deposits as required under section 39 of the Act.
- (v) Comply with other laws and regulations especially The National Environment Act, Cap. 153; The Uganda Wildlife Act (1996), Cap. 200; Water Act, Cap. 152; The National Forestry and Tree Planting Act, 8/2003 as required under section 11.
- (vi) Submit quarterly returns as required under the applicable Mining Regulations; and
- (vii) Government shall retain the right to have unlimited access to this exploration area in the course of carrying out scientific investigations into the geological or mineral resources.

Rent and Fees of: **UGX. 9,900,000/=** paid; vide Payment Registration Nos **2180000063561** and **2180001064369** of **10<sup>th</sup> July 2017** and **24<sup>th</sup> October 2017** respectively.

Dated this **02<sup>nd</sup>** day of **November** year **2017**.

  
Edwards Katto

**Commissioner for the Geological Survey and Mines Department.**

CC: Chief Administrative Officer, Bugiri District.  
CC: Chief Administrative Officer, Iganga District.  
CC: Chief Administrative Officer, Mayuge District.





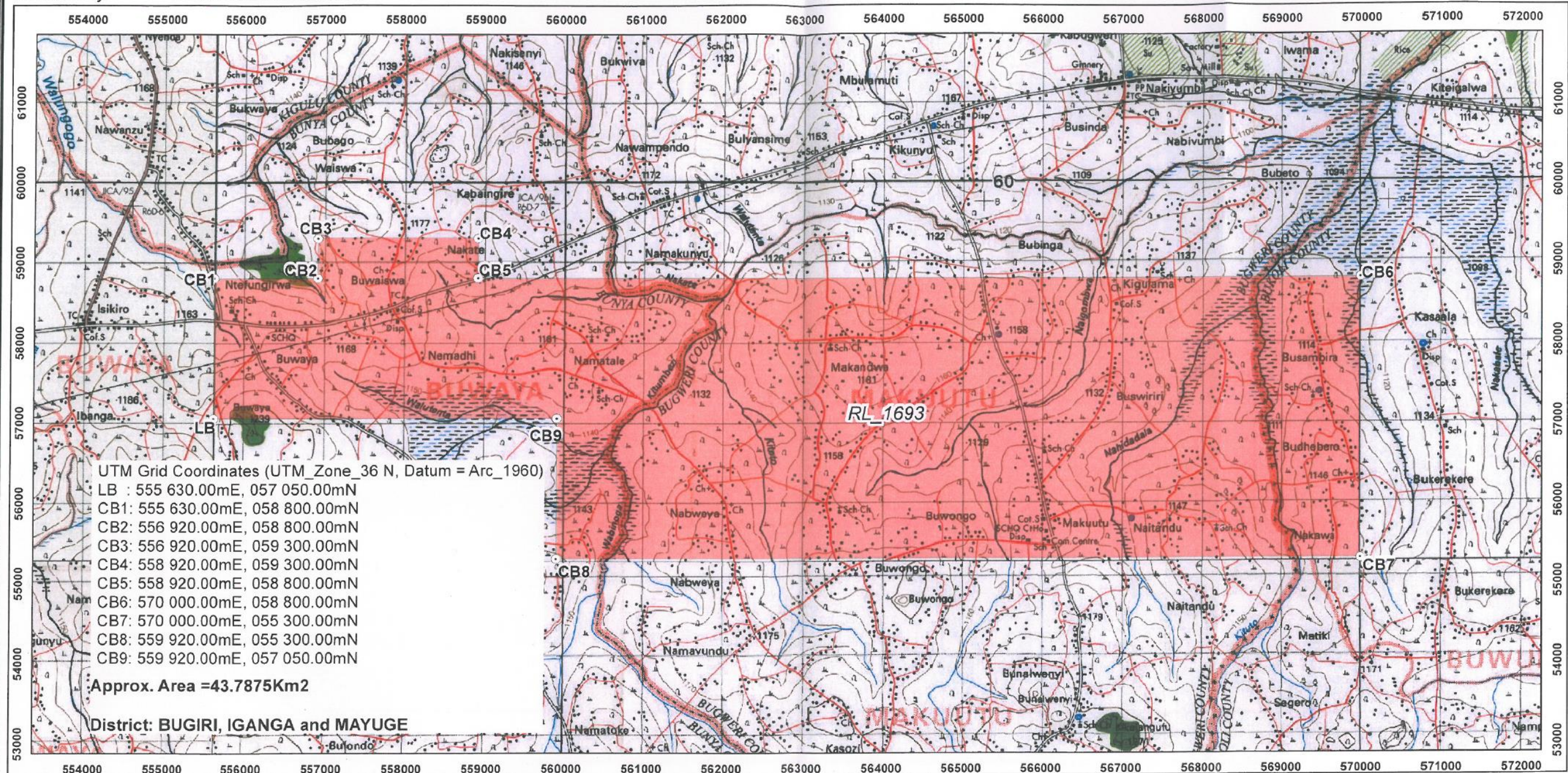
# RETENTION LICENCE

Number: **RL\_1693**



Date of application: 10/07/2017  
Date of Title : 01/11/2017  
Commodity : Rare Earth Elements

T.Number: 2587  
Sheet No. 63/3 & 73/1



Scale: 1: 50 000



Prepared by Ag.sc Date 01/11/2017 Sign Mugasa Sarah

Checked by Ag Psc Date 01/11/2017 Sign [Signature]

**M/S KWERI LIMITED,**  
P.O. Box 71680,  
Kampala, Uganda



[Signature]

**Department Of Geological Survey and Mines**





TELEGRAM: DISCOVERY  
TELEPHONE: GENERAL (+256-414) 320656/320790  
DIRECT (+256-414) 320559  
DIRECT (+256-312) 262902  
FAX: (+256-414) 320364  
E-mail: dgsm@minerals.go.ug  
minerals@infocom.co.ug  
Website: www.uganda-mining.go.ug



THE REPUBLIC OF UGANDA

DEPARTMENT OF GEOLOGICAL  
SURVEY AND MINES,  
PLOT 21-29 JOHNSTONE ROAD,  
P.O. Box 9 ENTEBBE, UGANDA.

IN ANY CORRESPONDENCE ON  
THIS SUBJECT PLEASE QUOTE NO. **MINES 310/681/01**

**02<sup>nd</sup> November 2017**

M/S Kweri Limited  
P. O. BOX 71680,  
**KAMPALA**

**TO GAZETTE GRANT OF RL1693**

This is in reference to Section 93(4) of the Mining Act, 2003 that requires that grant, renewal, suspension of a mineral right be published in the gazette.

Since section 12(1) of the Act requires that the Commissioner takes such measures as to ensure that a holder of a mineral right complies with the provisions of the Mining Act, including securing guarantees from the licensee, you are hereby reminded that the license granted to you should be gazetted.

The cost of publishing the information in the Gazette is up to UGX. 300,000/= per article and attached hereto is a sample of the publication in your particular case. The license holder bares the expense of publishing in the gazette as may be analogized from the provisions of Mining Regulations 42(2).

This is therefore, to inform you to urgently comply with section 93(4) as failure shall constitute a breach of law.

**Edwards Katto**

**Commissioner for the Geological Survey and Mines Department**

cc: RL1693

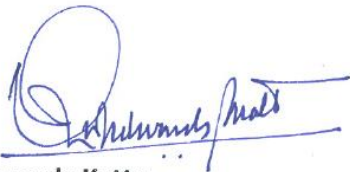
THE MINING ACT, 2003  
(The Mining Regulations, 2004)

NOTICE OF GRANT OF A RETENTION LICENSE

IT IS HEREBY NOTIFIED that Retention License, number **RL1693** registered as number **002455** has been granted in accordance with the provisions of Section 36 and Section 37 to **M/S KWERI LIMITED** of **P. O. BOX 71680, KAMPALA** for a period of three (3) years effective from **02<sup>nd</sup> November, 2017**.

The retention area subject to the Retention License is **43.7875 km<sup>2</sup>** and is on topography map, sheet numbers **63/3 & 73/1** situated in **Bugiri, Iganga** and **Mayuge** Districts.

Dated at Entebbe this 02<sup>nd</sup> day of November, 2017.



**Edwards Katto**

***Commissioner for the Geological Survey and Mines Department.***





THE REPUBLIC OF UGANDA

THE MINING ACT.

THE MINING REGULATIONS.

### TRANSFER OF RETENTION LICENCE No. 1693

In accordance with regulation 15, provision to regulation 62(g) of the Mining Regulations, 2004 and provision to section 93(1) of the Mining Act, 2003, Exploration License No. 1693 bearing Registered Mining Instrument No. 002455 granted on 02<sup>nd</sup> November, 2017 herewith attached is transferred from M/S KWERI LIMITED of P. O. BOX 71680, KAMPALA to M/S RWENZORI RARE METALS LIMITED of P. O. BOX 1520, KAMPALA with effect from JANUARY 23, 2018.

Transfer and Registration Fees of UGX 10,500,000/= paid vide Payment Registration Numbers 2180001824959 and 2180001825005 all of January 19, 2018.

Dated this 23<sup>rd</sup> Day of January Year 2018.

Edwards Katto

*Commissioner for the Geological Survey and Mines Department.*

- CC: Chief Administrative Officer, Bugiri District.
- CC: Chief Administrative Officer, Mayuge District.
- CC: Chief Administrative Officer, Iganga District.




TELGRAM: DISCOVERY  
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 DIRECT (+256-312) 320559  
 FAX: (+256-414) 320364  
 E-mail: dgsn@minerals.go.ug  
 Website: <http://dgsn.go.ug>



FORM XX.  
 Reg. 19(4).

DEPARTMENT OF GEOLOGICAL  
 SURVEY AND MINES,  
 PLOT 21-29 JOHNSTONE ROAD  
 P.O. Box 9 ENTEBBE, UGANDA.

**REGISTERED**  
 MINING INSTRUMENTS No. 003200  
 DATE OF REGISTRATION 09 SEP 2021  
 SIGNED BY   
 COMMISSIONER GEOLOGICAL  
 SURVEY AND MINES

THE REPUBLIC OF UGANDA  
 THE MINING ACT, 2003.  
 THE MINING REGULATIONS, 2019.

**RETENTION LICENCE**

RL00234



This retention license, is hereby granted under section 37 of the Act to **Rwenzori Rare Metals Limited** of 26 Kyadondo Road, DFCU Towers, Nakasero, Uganda, P. O. Box 1520, Kampala for Three (3) years from the 06/07/2021 to retain the retention area concerned in respect of **Base Metals, Industrial Metals, Industrial Minerals, Rare Earth Elements** minerals within the boundaries as delineated approximately on the attached map and coloured in **RED**

1. This licence is subject to the provisions of the Mining Act and the applicable Mining Regulations.

Special Conditions: -

- Pay annual mineral rent on each anniversary of the grant of the licence without demand as required under section 106 of the Act;
  - Submit environment restoration plan in accordance with section 110 of the Act;
  - Prevent and minimize pollution to the environment during the exercise of the rights under this licence as required under section 109 of the Act;
  - Provide updated studies and assessments of the prospects of the developments and commercial exploitation of the mineral deposits as required under section 39 of the Act.
  - Submit quarterly returns as required under the applicable Mining Regulations.
- (iv) Rent and Fees of the following have been paid:

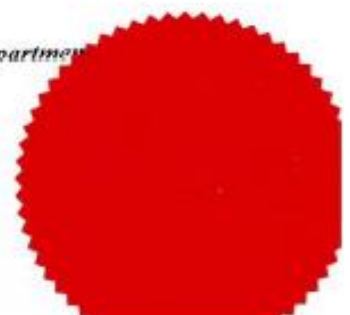
Type	Date Paid	Amount (UGX)	PRN
Fee: Application and Preparation (RL)	21/06/2021	5,000,000.00	2210007835894
Fee: Application Registration	12/07/2021	500,000.00	2220000137857
Fee: Annual Rent (RL)	04/08/2021	4,800,000.00	2220000460185

  
 Agnes Alaba

For. Commissioner for the Geological Survey and Mines Department

CC: Chief Administrative Officer, Bugiri  
 CC: Inspector of Mines, Tororo

Dated: 27/09/2021







## Department of Geological Survey and Mines



### Retention License

**RL00234**

Date of Title: 06/07/2021

Rwenzori Rare Metals Limited

TN (Application Number):  
TN03555

Related License: EL1766

26 Kyadondo Road, DFCU Towers, Nakasero, Uganda

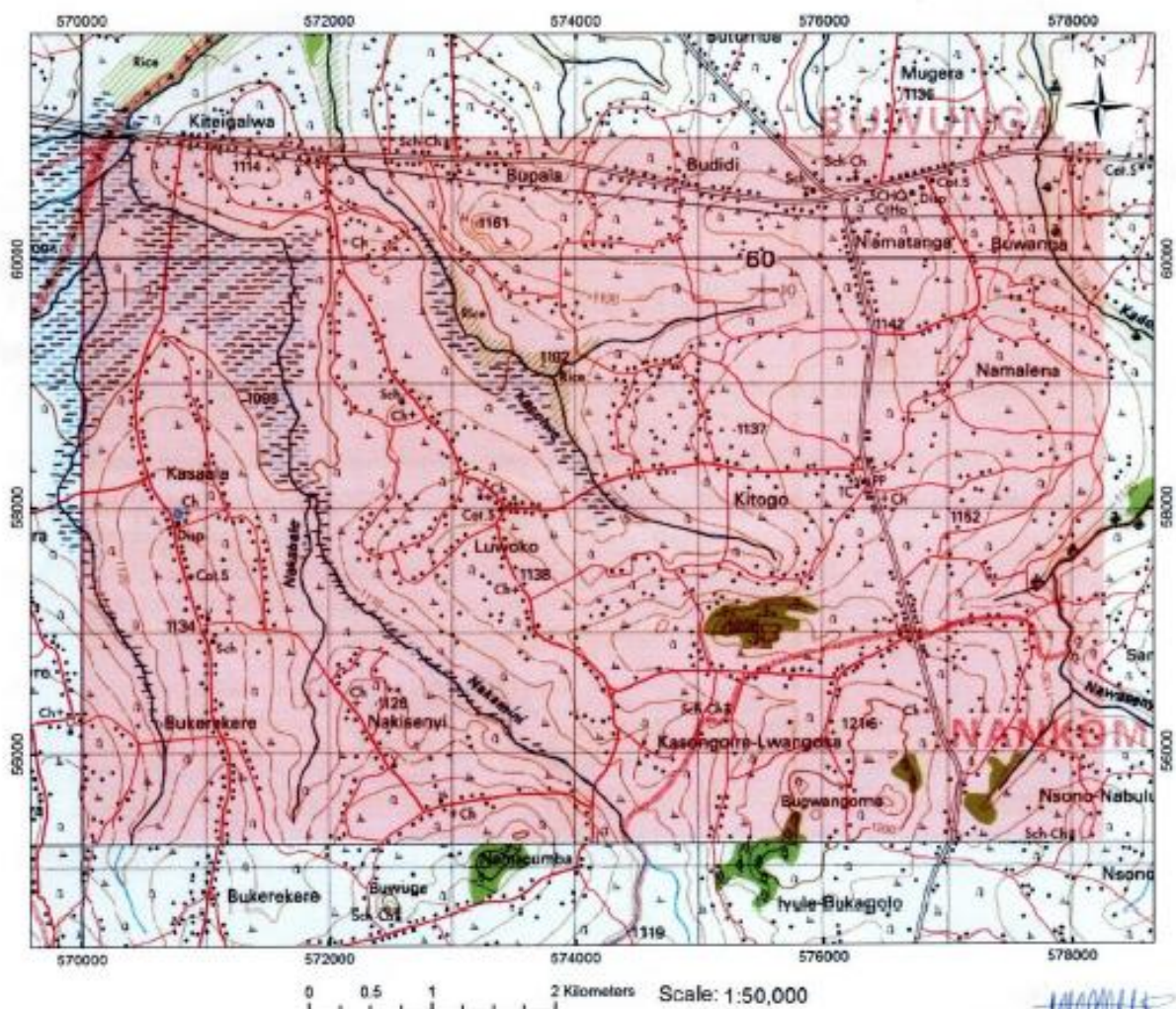
Sheet No. 63/3

Commodity: Base Metals, Industrial  
Metals, Industrial Minerals, Rare  
Earth Elements

P.O. Box 1520, Kampala, Uganda

District: Bugiri

Official Area: 47.0300 Km<sup>2</sup>



Checked by: Dr. S. S. S. S.

Date: 23/07/2021

Sign: [Signature]

#### Coordinates

UTM36N\_Arc1960

Part Name	Order	East (x) in meters	North (y) in meters
Part 1	1	570,000.00	55,300.00
	2	570,000.00	61,000.00
	3	578,250.00	61,000.00
	4	578,250.00	55,300.00

TELGRAM: DISCOVERY  
TELEPHONE:  
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DIRECT (+256-414) 320118  
DIRECT (+256-312) 320559  
FAX: (+256-414) 320364  
E-mail: [dgsm@minerals.go.ug](mailto:dgsm@minerals.go.ug)  
Website: <http://mgsm.go.ug>



FORM XIX.  
Reg. 15(2).

DEPARTMENT OF GEOLOGICAL  
SURVEY AND MINES,  
PLOT 21-29 JOHNSTONE ROAD  
P.O. Box 9 ENTEBBE, UGANDA.



THE REPUBLIC OF UGANDA  
THE MINING ACT, 2003.  
THE MINING REGULATIONS, 2019.

EXPLORATION LICENCE

EL00257



1. This exploration licence, is hereby granted to **Rwenzori Rare Metals Limited** of P.O. Box 1520, Kampala, 26 Kyadondo Road, DFCU Towers, Nakasero, Uganda for **THREE** years from the 21/10/2021 to 20/10/2024 to prospect for **Base Metals, Industrial Metals, Industrial Minerals, Rare Earth Elements** within the boundaries as delineated approximately on the attached map and colored **RED**.

2. This licence is subject to the provisions of the Mining Act and the applicable Mining (Licencing) Regulations. Special conditions: -

- (i) Pay annual mineral rent on each anniversary of the grant of the licence without demand as required under section 106 of the Act;
- (ii) Submit environmental restoration plan in accordance with section 110 of the Act;
- (iii) Prevent and minimize pollution to the environment during the exercise of the rights as required under section 109 of the Act;
- (iv) Provide a self-monitoring plan as required under regulation 57 of the Mining (Licencing) Regulations;
- (v) Comply with other laws and regulations especially The National Environment Act, Cap. 153; The Uganda Wildlife Act (1996), Cap. 200; Water Act, Cap.152; The National Forestry and Tree Planting Act, 8/2003 as required under section 11.
- (vi) Submit quarterly returns as required under the applicable Mining (Licencing) Regulations; and
- (vii) Government shall retain the right to have unlimited access to this exploration area in the course of carrying out scientific investigations into the geological or mineral resources.

Rent and Fee(s) of the following have been paid:

Type	Date Paid	Amount (UGX)	PRN
Fee: Application and Preparation (EL)	15/07/2021	1,000,000.00	2220000181233
Fee: Application Registration	28/09/2021	500,000.00	2220001946429
Fee: Annual Rent (EL)	12/10/2021	2,800,000.00	2220002353353

Agnes Alaba

*For. Commissioner for the Geological Survey and Mines Department*

CC: Chief Administrative Officer, Iganga  
CC: Chief Administrative Officer, Mayuge  
CC: Regional Inspector of Mines, Tororo

Dated: 22/11/2021







Department of Geological Survey and Mines

## Exploration License

**EL00257**



**Rwenzori Rare Metals Limited**

26 Kyadondo Road, DFCU Towers, Nakasero, Uganda

P.O. Box 1520, Kampala, Uganda

Date of Title: 21/10/2021

Related License: PL0000000131

Commodity: Base Metals, Industrial Metals,  
Industrial Minerals, Rare Earth Elements

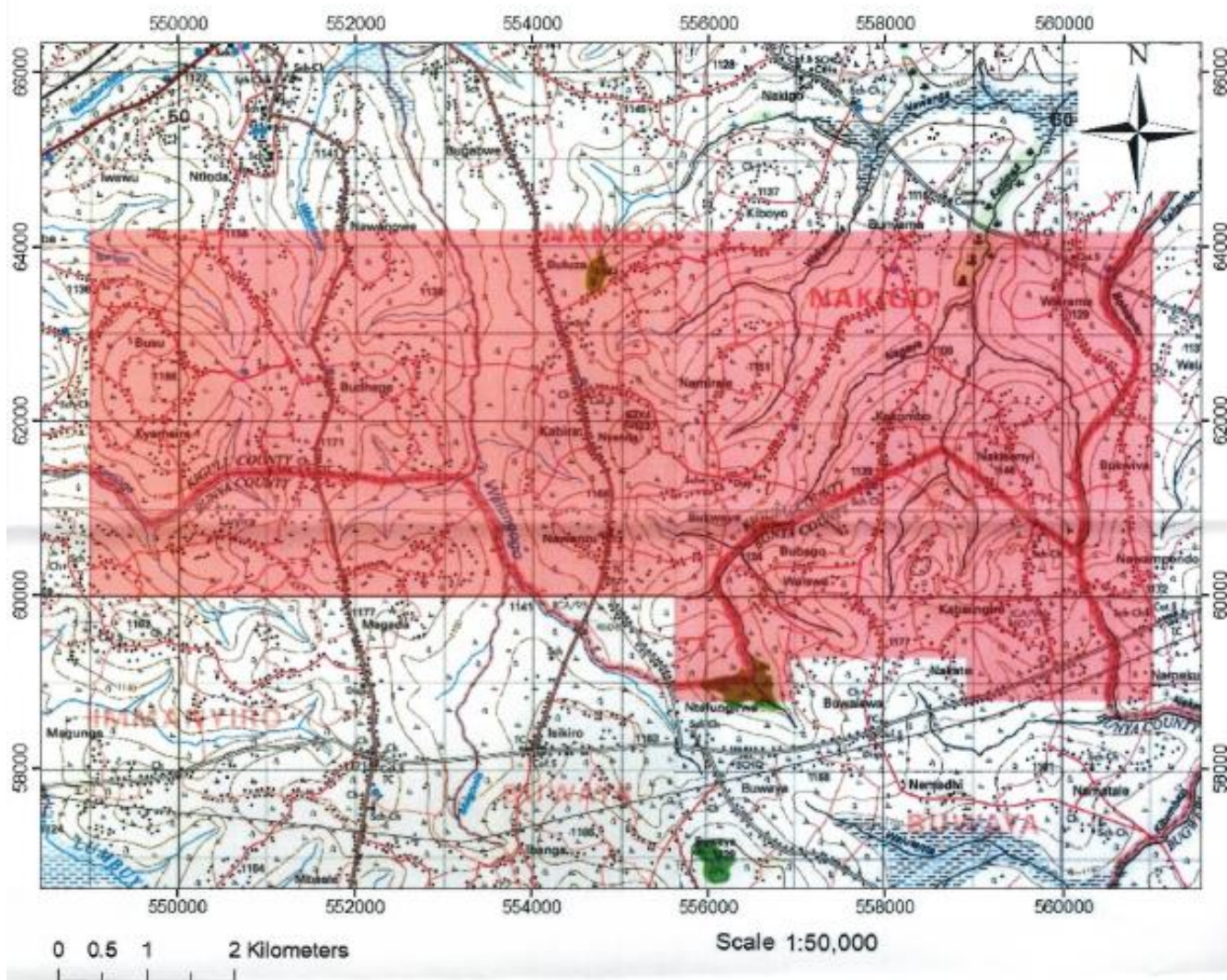
TN (Application Number):

TN03573

Sheet No. 62/4 & 63/3

District: Iganga, Mayuge & Bugweri

Official Area: 55.5100 Km<sup>2</sup>



Checked by: AS. Sen. GSC Date: 22/11/2021 Sign: [Signature]

UTM36N\_Arc1960

Order	East (x) in meters	North (y) in meters			
Part 1			6	556,920.00	59,300.00
1	549,000.00	64,195.00	7	558,920.00	59,300.00
2	549,000.00	60,000.00	8	556,920.00	58,800.00
3	553,630.00	60,000.00	9	561,000.00	58,800.00
4	553,630.00	58,800.00	10	561,000.00	64,150.00
5	556,920.00	58,800.00			