ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR PROPOSED RENOVATION AND EQUIPPING OF HEALTH FACILITIES IN UGANDA

(Proj Ref: MoH/SEVCS/HI/08-09/00732)

Volume 2 of 4: Eastern Region facilities

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Acronyms and definitions

APCS: Air pollution control system
ARAP: Abbreviated Resettlement Action Plan
BAT: Best Available Technologies
BEP: Best Environmental Practices
EF: Emission factor
EHS: Environment Health & Safety
ESIA: Environmental & Social Impact Assessment
ESMP: Environmental and Social Management Plan
GDP: Gross Domestic Product
GH: General Hospital(s)
GIIP: Good international industry practice
GIS: Geographical Information Systems
GoU: Government of the Republic of Uganda
HC: Health center (e.g. HC IV, HC III, HC II)
HCF: Healthcare facility/ facilities
HCW: Healthcare Waste
HCWM: Healthcare Waste Management
HIV/AIDS: Human immunodeficiency virus/ acquired immunodeficiency syndrome
HSSPII: Health Services Support Project II
IDA: International Development Association
IP/PAP: Interested Parties / project-affected people
LC: Local Council
MoH: Ministry of Health (Uganda)
NEMA: National Environment Management Authority
NOx: Oxides of nitrogen
OPD: Out Patient Department
PCDD: Polychlorinated dibenzo-para-dioxins
PCDF: Polychlorinated dibenzofurans
PIC: Products of incomplete combustion
POP: Persistent organic pollutants
PM\(_{10, 2.5}\): Particulate matter of size 10 or 2.5 microns respectively
POPs: Persistent organic pollutants
PPE: Personnel Protection Equipment
PPP: Purchasing Power Parity
RRH: Regional Referral Hospital(s)
SOx: Oxides of sulphur (e.g. SO\(_2\), SO\(_3\))
TEF: Toxic equivalence factor
TEQ: Toxic Equivalent
ToR: Terms of Reference
UBOS: Uganda Bureau of Statistics
UNMHCP: Uganda National Minimum Healthcare Package
UNGASS: United Nations General Assembly Special Session
UPOP: Unintentionally formed Persistent Organic Pollutants
WBG: World Bank Group
WHO: World Health Organization

\(^{1}\) IDA is the part of World Bank that helps the world’s poorest countries. Established in 1960, IDA offers interest-free credit and grants to the world’s 81 poorest countries- home to 2.5 billion where a majority of the people live on less than 2 US dollars per day. This highly concessionary financing is vital because such countries have little capacity to borrow on market terms. IDA resources and technical assistance supports country-led poverty reduction strategies in key areas, namely increased productivity, better governance and accountability, access to education and healthcare for poor people.
Units and measures

Km: kilometre  
m: metre  
tpy: tonne per year  
MWth: Thermal megawatt (unit of heat)  
Pg: Picogram  
µ: Micro (1/1000000)

Definitions:

Dioxins or Polychlorinated dibenzodioxins (PCDDs): are a group of polyhalogenated compounds which are known to be potent human carcinogens (cancer-causing chemical compounds). Dioxins can occur as by-products of incineration of chlorine-containing substances such as chlorine-containing plastics.

Incineration: is a waste treatment technology that involves combustion of organic materials and/or substances converting them into incinerator bottom ash, flue gases, and particulates. Flue gases may contain significant amounts of particulate matter, heavy metals, dioxins, furans, sulfur dioxide and hydrochloric acid. Flue gases are therefore cleaned before they are dispersed in the atmosphere.

Infectious Waste: This is the portion of medical waste that can transmit disease. On average about 10-15% of medical waste is actually infectious waste. Infectious waste comprises five categories: cultures and stocks, human pathological waste, human blood and blood products and sharps.

Hazardous waste: Shares the properties of a hazardous material (e.g. ignitability, corrosivity, reactivity, or toxicity), or other physical, chemical, or biological characteristics that may pose a potential risk to human health or the environment if improperly managed.

Hospital Waste: All solid waste, both biological and non-biological, that is produced at a hospital and is discarded without further use.

Medical Waste: Materials generated as a result of patient diagnosis and/or treatment or the immunization of human beings.

Solid (non-hazardous) wastes: Generally include any garbage, refuse. Examples of such waste include domestic trash and garbage; inert construction / demolition materials; refuse, such as metal scrap and empty containers (except those previously used to contain hazardous materials which should, in principle, be managed as a hazardous waste).

Point sources: These are discrete, stationary, identifiable sources of emissions that release pollutants to the atmosphere (e.g. incinerators).
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Executive Summary

Uganda Government, through Ministry of Health (MoH) with funding from International Development Association (IDA), intends to implement the *Uganda Health Systems Strengthening Project* which (under the “Health Infrastructure” component) seeks to improve functionality of existing healthcare infrastructure of 46 existing health facilities in various districts. These include 27 health center IVs (HCIV); 17 general hospitals (GHs) and 2 regional referral hospitals (RRH). Most of the hospitals were built and equipped in the early 1960’s and 70’s and no major rehabilitation and re-equipping have since been done. Many of the buildings need renovation while equipment is either obsolete or in an unusable state and needs replacement. Healthcare Infrastructure in Uganda suffered total neglect during the political upheavals in 1970s and early 1980s. Over the years, delivery of healthcare services deteriorated due to poor management and lack of maintenance.

01 THIS PROJECT: EXISTING CONDITIONS AND PROPOSED RENOVATIONS

The project will comprise work on Regional Referral Hospital (RRH), General Hospitals (GH) and health centers of service grade IV (HC IV). Healthcare facilities in Eastern Region and respective renovation works are shown in table below, followed by a description of each service level of facilities comprised in this region.

Table ES1: Healthcare facilities to be rehabilitation in Eastern Region

<table>
<thead>
<tr>
<th>Current state and proposed renovation</th>
<th>Hospitals</th>
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<tbody>
<tr>
<td>1 Upgraded to new status/New Hospital</td>
<td>Buwenge, Bukwo, Moroto</td>
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<tr>
<td>2 Dilapidation (Water Supply and Sewerage)</td>
<td>Moroto, Bugiri, Iganga, Kawolo, Pallisa</td>
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<tr>
<td>3 Dilapidation (Roof leakages)</td>
<td>Moroto, Bugiri, Iganga, Kawolo, Pallisa</td>
</tr>
<tr>
<td>4 Dilapidation (General Repairs)</td>
<td>Moroto, Bugiri, Iganga, Kawolo, Pallisa</td>
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<tr>
<td>5 Location along busy Highways and therefore, handling heavy numbers of accident and emergencies</td>
<td>Kawolo, Iganga, Bugiri</td>
</tr>
<tr>
<td>6 Need remodelling due to changes in policy, diagnostic and treatment methods and emerging diseases</td>
<td>Moroto</td>
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a) Regional Referral Hospital

Of all healthcare facilities in the Eastern region Moroto hospital, whose status has recently been elevated from “General” to “regional referral” hospital, will be demolished and reconstructed. Moroto hospital was built in early 1930’s before the new categorization of services in accordance with the Health Sector Strategic Plan (HSSP) and not much renovation has since ever been undertaken on it.

b) General Hospitals

General hospitals comprised in “Eastern Region” category of this ESIA study are Kawolo Hospital, Buwenge Hospital, Iganga Hospital, Bugiri Hospital, Pallisa Hospital and Bukwo Hospital. Besides renovations outlined in table above, due to changes in disease patterns and in diagnostic methods, existing hospitals will be remodeled to provide for emerging trends of diseases and to control communicable diseases. Maternity wards shall also be modified to increase size of delivery rooms and to provide for obstetric theatres.
c) Health Center IV

HC IVs comprise an OPD, a Maternity Ward, an Operating Theatre, General Ward and Staff houses. During their inception in 1997/98, many HC IVs were upgraded from various levels of service with the aim to enable provision for Emergency Obstetric Care (EMOC) and also bring healthcare services closer to people. This necessitated construction of an operating theatre and doctors houses.

During Health Sector Support Project-2 (HSSPII) project, 148 operating theatres and doctors houses were constructed. However, many were poorly constructed and need improvement. As a result, most operating theatres and doctors houses shall need to be reconstructed. The housing situation shall be enhanced to bring number of staff houses to 25%. In this (Eastern) region HC IV facilities are:

Table ES2: HCIV in Eastern region to be rehabilitated under this project

<table>
<thead>
<tr>
<th>District</th>
<th>HC IV</th>
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<tr>
<td>Mukono</td>
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<tr>
<td>Pallisa</td>
<td>Kibuku Health Centre IV</td>
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d) Medical Equipment and Furniture

Inception of the proposed project was based on the fact that at all hospitals, essential medical equipment is obsolete and uneconomical to repair. For equipment installed 30-40 years ago, spare parts are no longer available due to advance in technology. Therefore to strengthen the referral system, medical equipment will be provided under this project.

02 INSTITUTIONAL FRAMEWORK

The ESIA was conducted under the following policy, legal and institutional framework

Policy Framework:

- a) The National Environment Management Policy, 1994
- b) The National Medical Equipment Policy, 2009
- c) The National Health Policy, 1999
- d) National Policy on Injection Safety and Health Care Waste Management, 2004

Legal Framework:

- b) National Environment Act, Cap 153
- c) Land Act, Cap 227
- d) Local Governments Act, Cap 243
- e) Public Health Act, Cap 281
f) National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999

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

h) National Environment (Waste Management) Regulations, 1999

i) Draft National Air Quality Standards, 2006

j) Employment Act, 2006

k) Historical and Monuments Act, 1967

l) Occupational Safety and Health Act (2006)

Institutional Framework:

   a) National Environmental Management Authority (NEMA)
   b) Ministry of Health (MoH)
   c) Ministry of Gender, Labour & Social Development
   d) District Local Administration Structures

World Bank Group Guidelines:

Under its “General EHS Guidelines (April 30, 2007)”, The World Bank has several guidelines shown in the table below, many of which are applicable to various components of the proposed project namely:

   i) Air emissions from onsite waste combustion units (“incinerators”)
   ii) Hazardous waste management
   iii) Noise
   iv) Occupational health and safety (against biological and radiological hazards).
   v) Community health and safety including traffic safety such as during project construction or disease prevention (where incinerator emissions waft into buildings and affect not only local communities but also patients visiting healthcare facilities).
   vi) Construction and decommissioning.

03 ANALYSIS OF ALTERNATIVES

i) “No-Action” Scenario

The “no-action” option would eliminate the opportunity to improve healthcare services much needed by the Healthcare Sector especially for the poor, potential jobs creation, and secondary socio-economic benefits, which the proposed development would have created. Simply because there is no capability for a health care facility to handle surgery does not mean there are no patients in communities who require such services. Similarly it is not true that a health center without capability to care for prematurely born babies does not encounter this need.

ii) “Action” Scenario

The major benefits of the proposed project lie in improving availability and access to modern medical services apparently not available due to lack of equipment and dilapidated infrastructure or facilities at almost every healthcare facility in Uganda.

iii) Stack Design for Small Incineration Units

To reduce air pollution from small onsite medical waste incineration units, there is need to alter design of stacks to avoid or reduce indoor air pollution and elevated ground level pollutant concentration due to plume downwash where such units are located close to healthcare facility buildings. A recommended stack design based on WGB EHS Guidelines is shown in Section 4.4.1.1.
04 POTENTIAL SOCIO-ENVIRONMENTAL IMPACTS

The report analyses potential project impacts and proposes mitigation (or enhancement) measures and impact management recommendations. These are summarized below.

A) CONSTRUCTION-PHASE IMPACTS

- **POSITIVE IMPACTS:**
  
i) Income to material/equipment suppliers and contractors

Proposed renovation of health centers will necessitate procurement of equipment, construction materials and services, providing income to suppliers and contractors.

Earth materials needed for construction e.g. murram, aggregate (stone, sand) are obtained from quarry operations. Conscious or unwitting purchase of these materials from unlicensed operations indirectly supports, encourages and promotes environmental degradation at illegal quarry sites and can cause medium- to long-term negative impacts. It should therefore be a contractual obligation for contractors to procure construction materials from legitimate or licensed sources (as advised by local authorities).

- **NEGATIVE IMPACTS**

  i) **Occupational health safety (OHS) Risks for Contractors**

At all sites, renovation works will have the following occupational health and safety risks with potential to cause serious injuries to workers:

- Exposure to asbestos containing materials. Most old buildings built in 1930s were roofed with asbestos sheets. Examples exist at some HCFs e.g. Kiyunga HCIV.
- Burns from welding (hot works)
- Falls from working at heights or wet surfaces
- Noise and body vibration during demolition works
- Injury from falling or flying debris during demolishing

**Impact mitigation**

Contractors should provide all workers with requisite protective gear.

ii) **Injury to patients or healthcare staff by construction activities**

Renovation works would not close off visits to healthcare facilities by patients neither would inpatients be required to vacate facilities being worked on. Construction work undertaken inside buildings in which, at the same time, medical services are provided has potential to cause injuries to patients or health workers.

**Impact mitigation**

- Contractors should use screens or nets to avoid flying debris. They should ensure good housekeeping and clean operations immediately removing rubble strewn outside construction areas.
- Construction workers should be aware of the sensitive nature of workplaces they are operating in and be advised to limit verbal noise or other forms of noise. For example, metallic objects or tools can be passed on to a colleague below to be quietly laid down instead of dropping them from heights onto cement/concrete floors with loud bangs, affecting patients.
iii) **Indoor air quality deterioration due to dust**

Demolition to modify internal built environment will lead to considerable levels of indoor cement dust which can affect workers and patients. This impact will potentially happen at every facility but especially ones housed in small buildings with limited space, such as at Budaka HC IV whose service areas has been partitioned into small rooms and Budondo HC IV.

**Impact mitigation**
- Contractors should use dust screens or nets in windows, doorways and ventilators of rooms where demolition or other dusty construction activities are occurring.
- Ensure good housekeeping and clean construction operations where, among other necessary actions, dust should be quickly swept off cement floors and collected in covered containers.

iv) **Traffic accidents**

Construction activities may result in a significant increase in number of heavy vehicles during transport of construction materials and equipment increasing community risk of traffic-related accidents or injuries to workers. Specific areas with potential road accident risk from construction traffic are Nankoma HC IV, Buyinja HC IV and Kibuku HC IV located near primary schools in respective trading centers.

**Impact mitigation**

a) Adopt best transport safety practices with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public, as follows:
   - Emphasizing safety aspects among project drivers. Specifically ensure drivers respect speed limits through built areas, school crossings and urban centers.
   - Position traffic guides at school crossings to control driver speeds.
   - Employ safe traffic control measures, including road signs and flag persons to warn of dangerous conditions and children crossings.

b) Ensure contractors regularly maintain vehicles to minimize potentially serious accidents caused by, for example, brake failure common with heavily loaded trucks.

v) **Improper management of demolition (and general construction) waste**

At each healthcare facility, renovation activities will involve demolition and construction activities that might generate considerable waste comprising brick and concrete rubble, metal, glass cullet, plastic /PVC tubing and timber waste. Considering that most facilities are over 40-50 years old, presence of lead in paint on walls to be demolished may not be ruled out, so is asbestos, as earlier mentioned.

**Impact mitigation**

- Contractors should undertake waste segregation at source to separate hazardous from non-hazardous waste.
- Seek guidance of local environmental officers to identify acceptable disposal sites.
**Impact management**

Supervising engineers and local environmental officers should ensure that contractors do not illegally dump waste in non-designated areas, causing public health risk and environmental contamination.

**vi) Temporary disruption of healthcare services**

Since facilities under renovation would not be closed, modifications of buildings in which medical services are provided may entail moving patients or equipment from one area to another within or out of the building. This may cause temporary disruption in delivery of health services to patients at facilities under renovation. Critically to be affected would be patients under intensive care or mothers at advanced stage of delivery or elderly and disabled patients.

**Impact mitigation**

Plan pre-construction activities early to identify suitable rooms or adjoining buildings into which patients or service areas can be relocated with minimal inconvenience to patients.

**Impact management**

Contractors should work closely and harmoniously with healthcare facility administrators to find practical ways to minimize temporary disruption of services.

**vii) Social misdemeanor by construction workers**

While most workers may originate from the local community where they have families, there might be others from distant places and working away from their wives. In especially poor rural settings or trading centers, contractors might be lionized as being wealthy which might induce illicit sexual relationships or prostitution, with attendant risk for spread of HIV/AIDS.

**Impact mitigation**

- As a contractual obligation, contractors should be required to have an HIV/AIDS policy and a framework (responsible staff, action plan, etc) to implement it during project execution.
- All construction workers should be orientated and sensitized about responsible sexual behavior in project communities.

**Impact management**

Where a contractor has a centralized camp for construction workers, posters on HIV/AIDS prevention should be displayed in communal areas. Free condoms should be provided in private areas such as toilets. At worker’s camps, a strict “No fraternization” policy should be maintained and workers restricted against leaving or entering camp after 6 PM to discourage prostitution.

**viii) Impact of material transport**

Various materials required for renovation works (steel, sand, blocks/bricks, lumber, gravel, etc.) will be transported to sites from various suppliers. This poses impacts associated with spills or dusting during transportation.
Mitigation

Fine earth materials (sand, murrram) should be covered during haulage to facilities under renovation to prevent spillage and dusting. Contractors should ensure that haulage trucks should have tailgates that close properly and tarpaulins to cover material being hauled. The cleanup of spilled earth and construction material on the paved roads should be a responsibility of the Contractor and done in a timely manner (say within 2 hours) so as not to inconvenience or endanger road users. These requirements should be included as clauses in contractors’ contracts (see Appendix 5).

Impact management

Management of adverse impacts associated with materials haulage can be achieved not only through implementation of the above mitigation actions but also surveillance and supervision of construction contractors.

ix) Temporary scenic blight

Construction activities will require material, equipment and cordons at healthcare facilities. Since facilities under renovation would not be closed from access by public, presence of these activities and materials thereof will cause temporary visual blight at all sites.

Mitigation

Wherever possible, contractors should ensure minimal footprint of construction activities.

Impact management

All unnecessary equipment should be removed from site as soon as possible.

B) OPERATION-PHASE IMPACTS

- **POSITIVE IMPACTS**

i) Improved medical services at healthcare facilities

The project will have a long-term positive impact on health services available to Ugandans. Renovation and installation of medical equipment will enable currently healthcare facilities to provide new or improved services to patients.

A key benefit to women is the opportunity to safely deliver children in a medical environment where existing healthcare facilities do not have maternity wards or capability to handle complicated deliveries through medical theatre operations.

Enhancement measures

Renovation of healthcare facilities should be matched with commensurate staffing of medical personnel adequately trained in use of newly installed equipment. Equipment that cannot be operated to benefit improved service delivery would not have significant merit to recipient communities.

Some rural healthcare facilities lacked grid electricity relying on solar power or onsite diesel generators to operate equipment but fuel cost curtail their benefit. At several health centers patients are often required to purchase fuel to run an onsite electricity generator.
A key necessity therefore is to ensure power supply, not only for lighting but also to operate medical equipment. Although they may not provide steady power supply required by some sensitive medical equipment, diesel generators are necessary at healthcare facilities which have no grid power supply.

ii) **Improvement in livelihoods and local economies**

Improved healthcare will reduce morbidity; improve labor productivity and household incomes leading to the long-term benefit of improved local economies.

iii) **Employment opportunities**

Equipping healthcare facilities with modern equipment, enabling provision of new healthcare services and resultant increase in visiting patients may create additional long-term technical and non-technical job opportunities for medical professionals, janitors, security guards, etc.

iv) **Reduced public risks due to improvement in healthcare waste management**

Proper management of medical waste involving segregation of hazardous from non-hazardous streams and proper disposal would mitigate existing public health risk associated with improper disposal of healthcare waste. Properly designed healthcare waste incineration units without stack plume downwash would avoid offsite health risk associated with incineration emissions.

*Enhancement measure*

Healthcare facilities should undertake regular monitoring of waste management practices including incineration.

v) **Improved aesthetics and life of healthcare facilities**

Renovation will improve aesthetics of healthcare facilities which, in present state are dilapidated. Renovation will also extend useful life of healthcare buildings and equipment.

*Enhancement measure*

Engineering design for proposed renovation works should incorporate a maintenance plan.

- **NEGATIVE IMPACTS**

i) **Air pollution from onsite incinerators**

Incineration of hospital waste in brick incineration units without provision for emissions treatment could result in localized pollution of air with pollutants such as respirable ash, furans and dioxins when emissions waft into buildings. Since incineration units at most healthcare facilities were located close to healthcare buildings or adjoining communities, this affects both patients and public and nearby communities.

*Mitigation*

- Adopt stack design recommended by WBG Guidelines (see Section 4.4.1.1).
- Operators of incineration units should be adequately trained to ensure efficient operation.
Impact management

- **Engineering design** of stacks on onsite brick incinerators should follow good international industry practice (GIIP) as outlined in World Bank’s *EHS Guidelines: Air emissions and ambient air quality*, April 2007.
- **Inspection/ monitoring:** Healthcare administrators should undertake regular visual inspection of incinerator stack for incidents of downwash.
- **Annual environmental audit:** Healthcare facilities should undertake annual environmental audits.
- **Training** of incinerator operators is important for them to be familiar with basic principles and routine practices. For example homogenization of waste is crucial for efficient and complete combustion to avoid generation of dioxins when wet waste batches quench flames and lower combustion temperature below levels at which such pollutants are destroyed.

ii) Community health risk due to improper waste management

Improper waste disposal can cause public health risks and environmental pollution: impaired air quality, stormwater contamination of water courses or when people and children rummage through raw waste stockpiles. Sewage management also posed varying degrees of challenge at HCFs with some lacking treatment facilities or where they existed, were in a state of disrepair such as at: Pallisa, Iganga, Bugiri, Kawolo and Moroto Hospitals. Almost all HCIVs relied on onsite septic systems and pit-latrines for sullage and nights soil disposal.

Impact mitigation

- Ensure proper waste management practices as recommended in the study on improvement of healthcare waste management in Uganda
- Project should also repair sewage systems where found dilapidated.

iii) Occupational health and safety risks

Medical facilities are a potential source of infectious waste in gaseous, liquid or solid forms. These could pose unsafe conditions for healthcare staff. Of particular concern are janitors handling infectious waste (including sharps) without adequate protective gear, storage of sharps in containers that are not puncture-proof and management of radioactive waste at healthcare facilities where x-ray equipment will be installed. While some OHS risks will be new borne by equipment or services introduced after renovation or upgrade of facilities, most other effects are existing (hence cumulative) and would only be acerbated by increased scale of medical services or activities.

Impact mitigation

The primary measure to mitigate OHS impacts is *prevention* which entails identification of risks and instituting pro-active measures to avoid them. In part this can be achieved by following GIIP or national guidelines. For unavoidable risks, personal protective equipment (PPE) should be provided to workers.

Places of work involving occupational exposure to ionizing radiation should be provided with requisite protection established and operated in accordance with recognized international safety standards and guidelines. A key consideration is protection of patients or other health workers outside x-ray rooms from radiation effects by providing concrete walls of safe thickness around X-ray units or windows at a safe height (this may be higher than for normal windows) and lead shields on doors.

---

1 MoH 2005 (revised march 2009): Improvement of healthcare waste management In Uganda (conducted by Carl Bro)
iv) Fire Safety

Without provisions for fire safety, there is a risk of fire outbreak at healthcare facilities with disastrous life and financial impact. Fires can start from ignitable materials in laboratories, cigarette smoking in non-designated places or improper electrical connections.

**Impact mitigation**

- Provide fire extinguishers to healthcare facilities as part of proposed renovation project.
- Key healthcare staff should have basic training in fire control
- Fire emergency telephone numbers should be displaced in communal areas

**Impact management**

- Each healthcare facility should have a fire emergency management plan and undertake fire drills at a minimum once a year.

v) Misuse or inability to use installed equipment

This project would be in vain if healthcare staff had no requisite training and skill to use installed equipment for improved service delivery. This would be a significant, negative medium-term but reversible impact.

**Impact management**

- Provide training necessary to enable medical personnel to operate equipment provided.
- Through regular supervision, ensure only trained authorised personnel operate equipment.

vi) Not maintaining improved facilities

When improved facilities are not continually maintained, they would quickly degenerate to pre-project condition. This would be a negative, significant medium-term impact but reversible.

**Impact management**

Each HCF should have a maintenance budget.

**IMPACT MONITORING AND MANAGEMENT PLAN**

The ESMP for proposed renovation works of healthcare facilities identifies potential environmental and social aspects that should be monitored. It identifies parties responsible for monitoring actions, associated costs, indicators and training or capacity building needs.
**Table ES3: Socio-Environmental Management Plan.**

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<thead>
<tr>
<th>Text Reference</th>
<th>Impact and Mitigation/Enhancement commitments</th>
<th>Desired Outcomes</th>
<th>Monitoring: Performance Indicators/Targets or Acceptance Criteria</th>
<th>Timing</th>
<th>Responsibility</th>
<th>Incremental Costs (USD) for all HCFs sites</th>
<th>Capacity Building and Training Requirements</th>
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<td><strong>6.2 CONSTRUCTION PHASE</strong></td>
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<tr>
<td><strong>6.2.1 Positive impact</strong></td>
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<tr>
<td><strong>6.2.1.1 Income to equipment ad material suppliers</strong></td>
<td>Project will promote local procurement where technically or commercially reasonable and feasible.</td>
<td>Ensure that local communities and businesses benefit from procurement process</td>
<td>Number of local businesses benefiting from construction related procurement</td>
<td>Before and during commencement of construction/renovation</td>
<td>MoH and Contractor</td>
<td>Negligible</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>For earth materials, procure from legitimate sources to avoid encouraging environmental degradation</td>
<td>Project’s material demand does not encourage environmental degradation</td>
<td>All quarries from which materials (sand, stone) are obtained are licensed by the local authorities.</td>
<td>Before and during construction/renovation</td>
<td>MoH and Contractor</td>
<td>Negligible</td>
<td>None</td>
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<tr>
<td><strong>6.2.2 Negative impacts</strong></td>
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<tr>
<td><strong>6.2.2.1 OHS risks to construction workers</strong></td>
<td>Contractor should provide PPE to all workers</td>
<td>Reduce health and safety risks to construction workers</td>
<td>Zero injuries in any month of construction phase</td>
<td>Before construction/renovation commences</td>
<td>MoH and Contractor</td>
<td>$ 2000 for a team of 50 workers at 1 HCF (hence $32,000 for 16 HCFs).</td>
<td>Application of various types of PPE and their proper use.</td>
</tr>
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<td></td>
<td>Contractor should provide onsite toilet and washing water for workers where they cannot use existing ones at healthcare facilities (either being inaccessible or razed during reconstruction)</td>
<td>Workers have adequate sanitary provisions</td>
<td>Ablution facilities exist on site</td>
<td>During construction/renovation</td>
<td>MoH</td>
<td>Negligible (should be part of contractor’s bid)</td>
<td>None</td>
</tr>
<tr>
<td><strong>6.2.2.2 Injury to patients or healthcare workers by construction activities</strong></td>
<td>Contractors should cordon off areas under construction and provide signage to warn of ongoing construction works.</td>
<td>Construction works do not cause injury to patients and health workers</td>
<td>Zero injuries in any month of construction phase</td>
<td>During construction/renovation</td>
<td>MoH and Contractor</td>
<td>Negligible</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Ensure good housekeeping and clean</td>
<td>No demolition rubble is dangerously strewn</td>
<td>No demolition rubble strewn</td>
<td>During construction/</td>
<td>MoH and Contractor</td>
<td>Negligible</td>
<td>Good construction practices</td>
</tr>
</tbody>
</table>

**NOTES:**
- *Income to equipment and material suppliers*:
  - Project will promote local procurement where technically or commercially reasonable and feasible.
  - Ensure that local communities and businesses benefit from construction related procurement.
- For earth materials, procure from legitimate sources to avoid encouraging environmental degradation.
  - Project’s material demand does not encourage environmental degradation.
  - All quarries from which materials (sand, stone) are obtained are licensed by the local authorities.
- *OHS risks to construction workers*:
  - Contractor should provide PPE to all workers.
  - Reduce health and safety risks to construction workers.
  - Zero injuries in any month of construction phase.
  - Before construction/renovation commences.
  - Contractor should provide onsite toilet and washing water for workers where they cannot use existing ones at healthcare facilities (either being inaccessible or razed during reconstruction).
  - Workers have adequate sanitary provisions.
  - Ablution facilities exist on site.
  - During construction/renovation.
  - Contractors should cordon off areas under construction and provide signage to warn of ongoing construction works.
  - Construction works do not cause injury to patients and health workers.
  - Zero injuries in any month of construction phase.
  - During construction/renovation.
  - Ensure good housekeeping and clean.
  - No demolition rubble is dangerously strewn.
  - No demolition rubble strewn.
  - Monitoring: Performance Indicators/Targets or Acceptance Criteria.
  - Timing.
  - Responsibility.
  - Incremental Costs (USD) for all HCFs sites.
  - Capacity Building and Training Requirements.
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</thead>
<tbody>
<tr>
<td>6.2.2.3</td>
<td>Indoor air quality deterioration due to dust</td>
<td></td>
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<td>None</td>
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<td></td>
<td>Contractors should use dust screens or nets in windows, doorways and ventilators of rooms where demolition or other dusty construction activities are occurring</td>
<td>No excessive dust emissions noted outside construction areas</td>
<td>No complaints about excessive dust from construction areas (this should be verified by perusal of records in complaints log)</td>
<td>During construction/renovation</td>
<td>MoH and Contractor</td>
<td>Comprised in above cost (for control of flying debris)</td>
<td>None</td>
</tr>
<tr>
<td>6.2.2.4</td>
<td>Traffic accidents</td>
<td></td>
<td></td>
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<td>None</td>
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<tr>
<td></td>
<td>Ensure drivers respect speed limits through built areas and urban centers.</td>
<td>No road accident by project traffic</td>
<td>No accident occurs in each month of construction duration</td>
<td>During construction/renovation</td>
<td>MoH and Contractor</td>
<td>Negligible</td>
<td>Contractor needs speed awareness through built areas and urban areas</td>
</tr>
<tr>
<td></td>
<td>Employ safe traffic control measures, including temporary road signs and flag persons to warn of dangerous conditions and children crossings</td>
<td>No road accident by project traffic</td>
<td>No accident occurs in each month of construction duration</td>
<td>During construction/renovation</td>
<td>MoH and Contractor</td>
<td>$ 500 at 1 HCF site, (hence $8,000 for 16 HCF sites).</td>
<td>None</td>
</tr>
<tr>
<td>Text Reference</td>
<td>Impact and Mitigation/Enhancement commitments</td>
<td>Desired Outcomes</td>
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<tr>
<td>6.2.2.5</td>
<td>Improper management of demolition (and general construction) waste</td>
<td>Seek guidance of local environmental officers to identify acceptable disposal sites</td>
<td>Contractor has records of proper waste disposal indicating quantities dumped and location of dumping site,</td>
<td>No report of illegal waste dumping in non-designated areas</td>
<td>Throughout construction/renovation</td>
<td>MoH; Contractor; Local Environmental Officer.</td>
<td>Negligible</td>
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<td></td>
<td>Contractors should undertake waste segregation at source to separate hazardous from non-hazardous waste</td>
<td>Hazardous waste separated from non-hazardous waste on site and each waste stream disposed of according to NEMA requirements in designated sites.</td>
<td>Separate containers on site for hazardous and non-hazardous waste on site</td>
<td>Throughout construction/renovation</td>
<td>MoH; Contractor; Local Environmental Officer.</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Waste (such as metal scrap or wood waste) that can be reused/recycled may be given to local people.</td>
<td>Amount of waste disposed of minimized by reuse, wherever feasible</td>
<td>Record of material types and estimated quantity diverted for reuse</td>
<td>Throughout construction/renovation</td>
<td>Contractor;</td>
<td>Negligible</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Seek guidance of local environmental officers to identify acceptable disposal sites.</td>
<td>Waste disposed of at designated sites</td>
<td>No complaint of waste dumped illegally in non-designated sites</td>
<td>Throughout construction/renovation</td>
<td>Local Environmental Officer.</td>
<td>Negligible</td>
<td>-</td>
</tr>
<tr>
<td>6.2.2.6</td>
<td>Temporary disruption of healthcare services</td>
<td>Seek guidance of local environmental officers to identify acceptable disposal sites.</td>
<td>Waste disposed of at designated sites</td>
<td>No complaint of waste dumped illegally in non-designated sites</td>
<td>Throughout construction/renovation</td>
<td>Local Environmental Officer.</td>
<td>Negligible</td>
</tr>
<tr>
<td>Text Reference</td>
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<td>Desired Outcomes</td>
<td>Monitoring: Performance Indicators/Targets or Acceptance Criteria</td>
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<td></td>
<td>Plan pre-construction activities early to identify suitable rooms or adjoining buildings into which to relocate patients or service areas with minimal inconvenience, especially to patients under intensive care</td>
<td>Minimal disruption to ongoing healthcare services</td>
<td>A written pre-construction plan available on site to re-arrange service areas so as to minimize disruption of healthcare operations and evidence of compliance with it</td>
<td>Throughout construction/renovation</td>
<td>MoH; Contractor; HC Administrator/ Superintendent</td>
<td>Negligible</td>
<td>None</td>
</tr>
</tbody>
</table>

6.2.2.7 Social misdemeanor by construction workers

|                | As a contractual obligation, contractors should be required to have an HIV/AIDS policy and a framework (responsible staff, action plan, etc) to implement it during project execution. Awareness training on HIV/AIDS should be provided to construction workers | No illicit sexual relationships among construction workers and local community | All construction workers are aware of HIV/AIDS risk and responsible living. All construction workers living in a camp adhere to a “No fraternization” and comply with latest entry time into camp (6PM) set to avoid prostitution. | Throughout construction/renovation | MoH | $ 600 for 500 HIV/AIDS posters/fliers and free condoms (hence $9600 for 16 HCF sites) | None |

6.2.2.8 Impact of material transport

<p>|                | Fine earth materials (sand, murram) should be covered during haulage to facilities under renovation to prevent spillage and dusting Road dust should be controlled through bowsing or speed control) | No material spills on roads during haulage to sites | No accidents caused by construction material split on road | Throughout construction/renovation | MoH; Contractor; Police | Negligible (this should be part of contractor’s bid) | None |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>6.2 (all subsections)</td>
<td>Impact of construction activities</td>
<td>Construction activities do not cause adverse socio-environmental impacts</td>
<td>Annual construction audits do not indicate adverse impacts not mitigated</td>
<td>1 time per year <em>(NB. Estimated construction duration = 1 year per lot, see Table.4)</em></td>
<td>MoH (construction audit may be undertaken by MoH or consultant it hires)</td>
<td>USD4000 per location <em>(hence USD64,000 for 16 sites)</em></td>
<td>Environmental auditing of construction projects</td>
</tr>
</tbody>
</table>

### 6.3 OPERATION PHASE

#### 6.3.1 Positive impacts

#### 6.3.1.1 Improved medical services at healthcare facilities

- Renovation of healthcare facilities should be matched with commensurate staffing with medical personnel adequately trained in use of newly installed equipment
- Installed medical equipment fully utilised to enhance medical services at HCs
- Every HC has trained staff to properly and safely operated provided medical equipment
- 1 month after equipment installation
- MoH and supplier
- None (procurement cost assumed to include training)
- Staff training in operation of newly installed medical equipment

#### 6.3.1.4 Reduced public risks due to improvement in healthcare waste management (including incineration)
<table>
<thead>
<tr>
<th>Text Reference</th>
<th>Impact and Mitigation/Enhancement commitments</th>
<th>Desired Outcomes</th>
<th>Monitoring: Performance Indicators/Targets or Acceptance Criteria</th>
<th>Timing</th>
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<th>Incremental Costs (USD) for all HCFs sites</th>
<th>Capacity Building and Training Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reduced public risks due to improvement in healthcare waste management</td>
<td>Medical waste and incinerator emissions do not cause offsite public health risk</td>
<td>Annual environmental audits find no plume downwash from incinerators. Incinerators stacks designed based on GIIP / WBG EHS guidelines No un-incinerated medical solid waste on premises or waste dumps</td>
<td>Undertake full environmental audit once per year</td>
<td>MoH</td>
<td>Environmental audit cost: USD100000 (for each of HCIV-IV); USD150000 for Hospital. Hence $90000 for 9 HCIV in this lot and $105000 for 7 hospitals in this lot. ⇒ ⇒ ⇒ ⇒ total for 4 annual audits: USD780,000</td>
<td>Operation of incineration units</td>
</tr>
</tbody>
</table>

### 6.3.2 Negative impacts

#### 6.3.2.1 Air pollution due to improperly designed incinerator stacks

<table>
<thead>
<tr>
<th>Text Reference</th>
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<tbody>
<tr>
<td></td>
<td>Incinerator stacks designed according to GIIP or WBG guidelines</td>
<td>No offsite air pollution from incineration (such as due to plume downwash).</td>
<td>Visual observation reveal no plume downwash of stack emissions</td>
<td>From start of use of new incinerators</td>
<td>MoH; Healthcare facility administrator</td>
<td>Negligible</td>
<td>None</td>
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<tr>
<td></td>
<td>Train operator of incineration unit in efficient operations. Incinerators are properly operated</td>
<td>Incineration does not generate dioxins</td>
<td>Incinerator operator complete training course</td>
<td>1 month before commissioning incinerator</td>
<td>MoH</td>
<td>USD 1000 per site (hence $16,000 for 16 training sites)</td>
<td>Operation of incineration unit/ facility</td>
</tr>
<tr>
<td></td>
<td>Consultations with potentially affected people should be done by design consultant to inform siting of incinerators at each site</td>
<td>Consent obtained from nearby property owners about location of incinerator</td>
<td>Record of consultation with property owners near to proposed incinerator site</td>
<td>At design stage</td>
<td>MoH</td>
<td>Negligible (part of design role)</td>
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<td>6.3.2.2</td>
<td>Community health risk due to improper waste management</td>
<td>Ensure proper waste management practices as recommended in the study on improvement of healthcare waste management in Uganda</td>
<td>No community health risk due to improper waste management</td>
<td>No raw medical waste is dumped at public dumps</td>
<td>Daily</td>
<td>Healthcare facility administrator/ Superintend</td>
<td>Negligible</td>
</tr>
<tr>
<td>6.3.2.3</td>
<td>Occupational health and safety risks</td>
<td>Provide PPE to all workers</td>
<td>Places of work involving occupational exposure to ionizing radiation should be provided with requisite protection established and operated in accordance with recognized international safety standards and guidelines.</td>
<td>Minimal work-related injuries or infections</td>
<td>All healthcare staff have necessary PPE</td>
<td>Daily</td>
<td>Healthcare facility administrator/ Superintend</td>
</tr>
<tr>
<td>6.3.2.4</td>
<td>Fire risk</td>
<td></td>
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<tr>
<td>Text Reference</td>
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<td></td>
<td>Provide fire extinguishers to healthcare facilities.</td>
<td>Every HC has basic capacity to fend off a small or average fire outbreak.</td>
<td>Each HC has a minimum of 2 medium-size fire extinguishers (one of which should be for electrical fires).</td>
<td>During equipment installation upon completion of renovation works.</td>
<td>MoH</td>
<td>$100 per extinguisher (Provide 2 units per HCIV hence $1800 for 9 HCs and 6 units per hospital (or $4200) for 7 hospitals). ⇒ Total: $6000.</td>
<td>Basic fire fighting skills. Fire drill and emergency plan to be developed by hospital administrators under guidance of Health Infrastructure Division, HID of MoH.</td>
</tr>
<tr>
<td></td>
<td>Key healthcare staff should have basic training in fire control.</td>
<td>Fire emergency telephone numbers should be displaced in communal areas.</td>
<td>Atleast 2 medical staff have certificate of basic fire fighting.</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>Fire emergency telephone numbers should be displaced in communal areas.</td>
<td>Each healthcare facility should have a fire emergency management plan.</td>
<td>Fire emergency telephone numbers displaced in atleast 2 communal areas.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Each healthcare facility should have a fire emergency management plan.</td>
<td>Undertake fire drills at healthcare facility, at a minimum once a year.</td>
<td>A documented fire emergency plan.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Undertake fire drills at healthcare facility, at a minimum once a year.</td>
<td></td>
<td>A documented fire drill.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.3.5.2 Misuse or inability to use installed equipment</td>
<td>Provide requisite training during equipment installation.</td>
<td>Medical equipment not misused and operated by trained staff</td>
<td>Each HC has staff to operate installed medical equipment</td>
<td>1 month upon completion of renovation works</td>
<td>MoH</td>
<td>Negligible (assumed part of procurement cost)</td>
<td>None</td>
</tr>
</tbody>
</table>

TOTAL COST $923,000
Conclusion

The proposed project has potential to significantly improve quality of healthcare services and efficiency of service provision in Uganda with socio-environmental benefits such as reduced morbidity and increased productivity of labor hence higher household incomes (especially for rural agrarian communities); opportunity to have access to healthcare services hitherto unavailable at HCFs due to lack of equipment or facilities (e.g. operating theaters). Besides, project development and operation will provide considerable economic opportunity for material/equipment suppliers, construction contractors and medical professionals.

A key significant negative impact will arise from healthcare waste management, especially incineration. When incinerator stacks adopt a standard height irrespective of density of habitation and nature of nearby buildings, there is a risk of chronic exposure to incineration emissions due to plume downwash. This impact would be acerbated by inadequately trained operators. Where raw medical waste continues to be improperly dumped at public dumps the project would aggravate public health risk when children or people rummage through potentially infectious waste.

All potential adverse impacts are litigable when measures proposed (Chapter 6) are implemented, in which case benefits of this project to the nation would by far outweigh potential negative effects.
1 Introduction

1.1 Health Situation in Uganda and Project Background

In 2010, projected population of Uganda is about 32 million people, over 87% being rural and nearly 13% urban\(^1\). The gender ratio is 95.3 men per 100 women\(^2\) and life expectancy at birth is 49 years for men and 51 years for women. Infant mortality rate is 134 per 1000 live births. Thirty-eight percent of the population is living below the poverty line and poverty is the main underlying cause of poor health in Uganda. Other factors are low literacy levels (69%), high prevalence of communicable diseases, emergence of diseases due to lifestyle, inadequate distribution of social service amenities and dilapidated healthcare infrastructure\(^3\). The population of Uganda is grossly underserved with health workers and has one of the lowest doctor-patient ratios in the world. The doctor-patient ratio is 18,600 to 1 and the nurse-patient ratio is 7700:1\(^4\). HIV/AIDS impresses a huge burden on healthcare services in Uganda and disease burden of the general population. The current HIV prevalence is estimated at 5.4% among adults and according to the Uganda HIV and AIDS sero-behavioural survey, the number of people living with HIV is higher in urban areas (10.1% prevalence) than rural areas (5.7%); it is also higher among women (7.5%) than men (5.0%)\(^5\).

Table 1: Uganda’s Health Statistics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross national income per capita (PPP international $):</td>
<td>880</td>
</tr>
<tr>
<td>Life expectancy at birth male/female (years):</td>
<td>49/51</td>
</tr>
<tr>
<td>Probability of dying under five (per 1 000 live births):</td>
<td>134</td>
</tr>
<tr>
<td>Probability of dying between 15 and 60 years m/f (per 1 000):</td>
<td>518/474</td>
</tr>
<tr>
<td>Total expenditure on health per capita (International $, as of 2006):</td>
<td>143</td>
</tr>
<tr>
<td>Total expenditure on health as % of GDP (year 2006):</td>
<td>7.2</td>
</tr>
</tbody>
</table>


Uganda Government, through Ministry of Health (MoH) with funding from International Development Association (IDA), intends to implement the Uganda Health Systems Strengthening Project which (under the “Health Infrastructure” component) seeks to improve functionality of existing healthcare infrastructure of 46 existing health facilities in various districts. These include 27 health center IV (HCIV); 17 general hospitals (GHs) and 2 regional referral hospitals (RRH). Most of these healthcare facilities were built and equipped in early 1960s or 1970s and little or no maintenance has since been undertaken. Many buildings

\(^1\) National Health Policy: Republic of Uganda, Ministry of Health. September 1999.
thereof need renovation while medical equipment is either obsolete or in unusable state and needs replacement.

With this IDA funding, Government of Uganda (GoU) will improve healthcare facilities to attain minimum standards necessary for delivery of quality services. At various healthcare facilities, rehabilitation will entail:

i) Internal remodeling of existing buildings to create functional units such as theatres, operating rooms, X-ray rooms, etc.
ii) Construction of staff housing,
iii) Supply, installation and commissioning of medical equipment and furniture,
iv) Construction and installation of medical incinerators. Incinerators will be provided at regional referral hospitals (RRH), general hospitals (GH) and selected health center IVs (HCIV).

MOH contacted *Air Water Earth (AWE)* to undertake socio-environmental impact assessment and an abbreviated resettlement action plan (ARAP) wherever implementation of the proposed project would lead to physical or economic displacement of people. The ESIA study assessed existing infrastructure in line with increased demand for services and propose interventions aimed to enhance healthcare services delivery. The proposed renovations aim to meet challenges of emerging disease patterns and diagnostic technologies. Rather than simply identify impacts, the ESIA has to the extent possible provided guidance on actual management of impacts during project development and operation. It is not hoped that the healthcare facilities would never be decommissioned, but rather be continually rehabilitated and re-equipped as technology advances; hence decommissioning impacts have not been assessed.

### 1.2 Proposed Renovations

Health provision in Uganda is shared between *Government-funded* facilities (typically large hospitals); *private not-for-profit facilities* which include church-supported hospitals; medium-sized clinics; *private for-profit or commercial health units* and self-employed physicians.

Under the government healthcare system, healthcare services are delivered through a tiered structure at the top of which are national referral hospitals while the lowest is Health Center II (HCII). Uganda has a total of 3245 healthcare facilities of which about 2,301 are Government-owned, 659 belong to Private-not-for-Profit (PNFP) entities and 277 belong to the private sector¹. By category, these facilities comprise:

- 113 Hospitals (59 Government, 46 PNFP and 8 Private),
- 169 Health Centre IV (156 Government, 12 PNFP and 1 Private),
- 955 Health Centre III (762 Government, 186 PNFP and 7 Private),
- 2008 Health Centre II (1332 Government, 415 PNFP and 261 Private),

Government hospitals include 4 National Referral Hospitals (NRF), 11 Regional Referral Hospitals (RRH)\(^1\) and 44 General Hospitals (GH).

Most of the hospitals were built and equipped in the early 1960’s and 70’s and no major rehabilitation and re-equiping have since been done. Many of hospital buildings need renovation and obsolete equipment needs replacement. Healthcare Infrastructure in Uganda suffered total neglect during the political upheavals in 1970s and early 1980s and over these years, healthcare services deteriorated due to poor management and lack of maintenance.

1.2.1 Regional Referral Hospital (RRH)

In this (Eastern) region, Moroto hospital whose status has recently been elevated from General to regional referral hospital will be demolished and built anew.

Moroto, like most regional referral hospitals was built in the early 30’s before the new categorization of services in accordance with the Health Sector Strategic Plan (HSSP). Since the categorization of health facilities, new services have been introduced at RRHs resulting into the need to remodel existing structures or provide new ones. The hospital wards are of inadequate size since they were built for a smaller population in those times. In the reconstructed hospital, Moroto RRH will have new emergency services and an intensive care unit to cater for increased referral services.

1.2.2 General Hospitals (GH)

General hospitals comprised in “Eastern Region” category of this ESIA study are: Kawolo Hospital, Buwenge Hospital, Iganga Hospital, Bugiri Hospital, Bugiri Hospital, Moroto Hospital and Bukwo Hospital.

The above general hospitals are in four categories below:

- **Category 1**: Built in the 1930s.
- **Category 2**: (commonly known as Phase 1): Comprise non-storied buildings built and completed around 1969.
- **Category 3**: (commonly known as Phase 2): Comprise storied buildings built after 1970.
- **Category 4**: These are seven in number and were built after 1998.

Due to changes in disease patterns and in diagnostic methods, existing hospitals in all four categories will be remodeled to provide for a Chronic Care Clinic to cater for emerging trends of diseases and to control communicable diseases. Maternity wards shall also be modified to increase size of delivery rooms and to provide for obstetric theatres.

General condition at existing healthcare facilities are described below:

---

\(^1\) NRH are Mulago, Butabika, Gulu and Mbarara Hospitals.
Box 1: Condition of existing healthcare facilities

**Category 1:** Hospitals were built in 1930s when national population was below 2 million. The buildings are small and their layout does not favour efficient operations and complete re-planning is therefore required. The existing staff houses are in a dilapidated state and some have been condemned by district authorities as unsuitable for occupancy. These hospitals will therefore be provided with staff housing.

In Eastern Region, a category-1 hospital comprised in this project is Moroto Hospital.

**Category 2:** These hospitals were built in permanent materials and have good structural integrity. However their buildings need renovation and limited remodeling for improvement of service delivery. The existing staff houses are adequate in number and structurally sound but require new architectural finishes and general fittings, which shall be provided.

The hospitals in this category are generally characterized by the following:

- Leakages in roofs
- Broken door shutters and glazing in windows
- Unusable plumbing fittings
- Broken down water supply and sewage systems
- Insufficient lighting in wards due to unaffordable electricity costs
- Lack of fencing to demarcate plot boundaries and stop encroachment
- Dilapidated access roads and walkways

In this (Eastern) region, hospitals in this category are: Iganga, Kawolo and Pallisa.

**Category 3:** These hospitals were built in a permanent reinforced concrete frame with a lift and ramp access to upper floors. The main frame is structurally sound but buildings need renovation and limited remodeling for improved service delivery. Number of existing staff houses is adequate and they are structurally strong except for architectural finishes and general fittings that shall be improved. Hospitals in this category are generally characterized by the following:

- Severe leakages in roofs
- Broken door shutters and glazing in windows
- Unusable plumbing fittings
- Unusable water supply and sewage systems
- Insufficient lighting in wards due to unaffordable electricity costs (solar lighting in medical wards is considered)
- Lack of fencing to demarcate plot boundaries and stop encroachment
- Dilapidated access roads and walkways

The hospitals in this category include: Bugiri

**Category 4:** The buildings are adequate except for minor repairs and finishing and improvements/provision of a Chronic Care Clinic, laboratory services and an obstetric theatre. There is also a noted inadequacy of staff housing. These hospitals were built at Bwera, Kaabong, Adjumani, Kamuli, Kisoro, Rakai and Kalisizo. Therefore, in the Eastern Region classification there are no hospital in this category.
1.2.3 Health Center IV (HC IV)

HC IVs comprise an OPD, a Maternity Ward, an Operating Theatre, General Ward and Staff houses. During their inception in 1997/98, many HC IVs were upgraded from various levels of service with aim to enable provision for Emergency Obstetric Care (EMOC) and also bring healthcare services closer to people. This necessitated construction of an operating theatre and doctors houses.

During Health Sector Support Project-2 (HSSPII) project, 148 operating theatres and doctors houses were constructed. However, many were poorly constructed and need improvement. As a result, most operating theatres and doctors houses shall need to be reconstructed. The housing situation shall be enhanced to bring number of staff houses to 25%. In this (Eastern) region HC IV facilities are:

Table 2: HC IV in Eastern Region category

<table>
<thead>
<tr>
<th>District</th>
<th>HC IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mukono</td>
<td>Ntenjeru-Kojja Health Centre IV</td>
</tr>
<tr>
<td></td>
<td>Buvuma Health Centre IV</td>
</tr>
<tr>
<td>Jinja</td>
<td>Budondo Health Centre IV</td>
</tr>
<tr>
<td>Iganga</td>
<td>Kiyunga Health Centre IV</td>
</tr>
<tr>
<td></td>
<td>Bugono Health Centre IV</td>
</tr>
<tr>
<td>Bugiri</td>
<td>Nankoma Health Centre IV</td>
</tr>
<tr>
<td></td>
<td>Buyinja Health Centre IV</td>
</tr>
<tr>
<td>Budaka</td>
<td>Budaka Health Centre IV</td>
</tr>
<tr>
<td>Pallisa</td>
<td>Kibuku Health Centre IV</td>
</tr>
</tbody>
</table>

1.2.4 Medical Equipment and Furniture

Most hospitals were built and equipped in early 1960s and 1970s and much of the equipment is now unusable or obsolete thus rendering its maintenance uneconomical. For some equipment installed 30-40 years ago, spare parts are no longer manufactured due to advance in technology. To cater for the new requirements and to strengthen the referral system, medical equipment will be provided to healthcare facilities.

1.3 Justification of the Proposed Project

For almost all government public healthcare facilities in Uganda no major rehabilitation or upgrade has been undertaken for over 30 years. Considering current advances in medical technology, this largely constrains national healthcare system in harnessing modern practices for provision of medical services. In addition, brick medical waste incineration facilities without emissions scrubbing (treatment) pose chronic local air pollution risk not only for patients supposed to be treated at these medical facilities but also neighboring dwellings.

This project aims to address these challenges and improve functionality of healthcare facilities for improved service delivery.
1.4 Outline of Implementation Phases

The proposed project will be executed in phases outlined below. Several of the impacts identified in this report will emanate mostly from execution of construction and operation stages. The foregoing notwithstanding, pre-construction stage once prudently carried out to incorporate environmentally sensitive designs (for example proper heights of incineration stacks), has potential to avert some of the potential impacts characteristic to this type of projects. The implementation stages are;

- **Construction:** For most facilities (except Moroto Hospital), construction will be limited to internal modification of the built environment hence entail demolition and reconstruction of walls. For Moroto Hospital that will be demolished and built anew, activities will involve preconstruction preparation like provision of alternative buildings where health services would be provided throughout the reconstruction period, followed by demolition and site clearing prior to erection of the new building.

- **Operation:** During this final stage, renovated facilities will provide medical services hence socio-economic benefits to society: in the process generating gaseous, liquid and solid waste that could have environmental impacts of varied characteristics in terms of spatial distribution, benefit, duration and reversibility. Regular monitoring and due diligence in carrying out activities during this phase are crucial to environmental friendliness and sustainability of the proposed project. Of specific focus is medical waste management (especially incineration and disposal) in a manner that poses no onsite and offsite air quality and environmental contamination risk.

1.5 Study Objectives

Aspects below comprised terms of reference of the study, the overall objective of which was to carry out an environmental and social impact assessment for the renovation/construction and equipping of health facilities to ensure that activities related to their construction and rehabilitation comply with national socio-environmental regulation requirements.

The specific objectives were:

- To assess environmental and social impact of activities for the construction/rehabilitation and equipping of selected health facilities.

- Establish land needs for expansion and develop a resettlement action plan, where necessary and to undertake a survey of non health related livelihood activities.

1.5.1 Study Scope

The scope of the study entailed two distinct requirements, namely:

a) Environmental Impact Assessment, EIA
b) Abbreviated Resettlement Action Plan, ARAP
These are described below:

1.5.1.1 Environmental Impact Assessment (EIA)

In the carrying out the EIA, the following tasks were undertaken:

a) Acquainted with proposed works at the various sites including but not limited to the following:
   - Expansion works
   - Reconstruction/re-modeling works
   - Specifications of the incinerators and their locations on sites
   - Equipment to be supplied

b) Inspected project sites to identify important existing features in surrounding areas, site specific potential impacts and prescribing site specific mitigation measures/environmental management plan.

c) Analyzed specifications of proposed incinerators including but not be limited to:
   - composition and quantity of the proposed input waste
   - capacity of the incinerator facility
   - composition of the output waste i.e. air emissions and residual solid wastes.

d) Analyzed operational concerns of incinerators including health aspects of air emissions, combustion practices and management of environmental impacts of the resulting ash.

e) Collected views and concerns of neighboring communities.

f) Identification of relevant regulations or clauses which are applicable to the project. The consultant determined whether proposed facilities meet minimum requirements of national environmental laws and regulations.

g) Outlined steps to be taken to obtain license to operate an onsite waste treatment plant (incinerator).

h) Assessed requirements for adequate and environmentally safe solid and liquid waste management at the facilities and made recommendations for inclusion in the health facility designs.

j) Prepared an Environmental Management Plan (EMP) for implementation of the proposed project. The EMP outlined: i) potential environmental and social impacts resulting from project activities; ii) proposed mitigation measures; iii) institutional responsibilities for implementation of the mitigation measures; iv) monitoring indicators; v) Institutional responsibilities for monitoring implementation of mitigation measures; vi) cost estimates for these activities; and vii) time horizons for implementation of the EMP.
1.5.1.2 Social Impact Assessment (leading to ARAP)

In determining social impact of the project, the consultant considered social issues not related to civil works (social issues related to civil works: rehabilitation/expansion were dealt with in the EIA) and this assessment entailed:

a) Visit to each site to enable assessment of land, resettlement and livelihood related issues.
b) Determination of social impact of the project on project sites and communities including:

i) Local employment
ii) Population changes
iii) Effects on land use
iv) Land acquisition

c) For each site where displacement was considered likely, an Abbreviated Resettlement Plan (ARAP) (see Chapter 9) was prepared. This provides information on land needs (required if any), a socioeconomic and census survey of affected people undertaking non-health related livelihood activities like operating kiosks, gardening, parking etc at health facility land/premises likely to be disturbed during the renovations and/or expansion. Further the ARAP gives a description of measures to compensate people that will be disrupted, the consultations with the affected people regarding the project and the measures, institutional responsibility for implementation of the resettlement, grievance mechanisms, monitoring arrangements, a time table for implementing the resettlement measures and a budget.

1.6 Categorization of Project Facilities

Due to the large number of healthcare facilities comprised in this study and their spatial spread in numerous Districts all over Uganda, it was considered necessary to categorize them in regions for purposes of ESIA report presentation, relevance and ease of review by respective local administrative structures (District Offices or local stakeholders). All facilities were categorized in four “regions” shown below and each region presented as a separate volume of the ESIA report:

- **Central Region**, *(Volume 1)*
- **Eastern Region** *(Volume 2)*
- **Northern Region** *(Volume 3)*
- **Western Region** *(Volume 4)*

Note that this categorization aimed not to be accurate geographically but provide convenience of ESIA report presentation and subsequent review by the regulatory agency and respective districts.

Based on the foregoing categorization, this report presents ESIA and ARAP for the “**Eastern Region**” comprising facilities in table below:
## Table 3: HCF in “Eastern Region” category

<table>
<thead>
<tr>
<th>District</th>
<th>HCF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mukono</td>
<td>Kawolo Hospital</td>
</tr>
<tr>
<td></td>
<td>Ntenjeru-Kojja Health Centre IV</td>
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<tr>
<td></td>
<td>Buvuma Health Centre IV</td>
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<tr>
<td>Jinja</td>
<td>Buwenge Hospital</td>
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<td></td>
<td>Budondo Health Centre IV</td>
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<tr>
<td>Iganga</td>
<td>Iganga Hospital</td>
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<td>Bugono Health Centre IV</td>
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<td>Bugiri</td>
<td>Bugiri Hospital</td>
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<tr>
<td></td>
<td>Nankoma Health Centre IV</td>
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<tr>
<td></td>
<td>Buyinja Health Centre IV</td>
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<tr>
<td>Budaka</td>
<td>Budaka Health Centre IV</td>
</tr>
<tr>
<td>Pallisa</td>
<td>Pallisa Hospital</td>
</tr>
<tr>
<td></td>
<td>Kibuku Health Centre IV</td>
</tr>
<tr>
<td>Bukwo</td>
<td>Bukwo Hospital</td>
</tr>
<tr>
<td>Moroto</td>
<td>Moroto Hospital</td>
</tr>
</tbody>
</table>

**Total:**
7 Hospitals, 9 HCIV.
2 Site Profiles and Existing Situation

Knowledge of existing population, infrastructure (such as roads and waste management facilities), available healthcare services and prevalent diseases, socio-economic profile and literacy levels of the project area is essential to understanding likely size of beneficiary population, potential project benefits to recipient communities and challenges likely to be met during project development and operation. For each HCF location, these aspects are briefly discussed in sections below.

2.1 Profiles of Project Areas and Sites

2.1.1 Budaka District

Before designating it a district status, Budaka part of Jinja District. The national census in 2002 estimated the population of Jinja district at about 413900, with an annual population growth rate of 3.0%.

Some of the major challenges of healthcare facilities in the district that need serious attention include;

- Shortage of beds and mattresses.
- Unreliable grid power supply
- Poor accommodation for staff impacting work morale.
- Lack of modern surgical equipment, operating beds, Ultra-sound.
- O.P.D is too small for the ever-increasing number of patients.
- Dental clinic lacks complete dental unit/ chair
- Lack of reliable means of transport to carry out community outreach and home visiting
- Rapid consumption of supplies / medicines due to many patients /clients.
- Shortage of testing kits in laboratories and blood transfusion services.

Nonetheless there is still high infant mortality rate (119/1000); high maternal mortality rate (600/100,000) and low safe water coverage (33%). The most common causes of morbidity in the district are malaria, upper respiratory infections, intestinal worms, trauma, diarrhea, skin diseases and Malnutrition.

No waste disposal services or facilities exist in Budaka District and prevalent waste disposal methods are burying in pits or open-air burning.

Piped potable water supply is only available in Budaka Town while the rest of the district relies on boreholes, spring wells and rainwater harvesting.

2.1.2 Bugiri District

Bugiri District was carved out of Iganga District, to which it used to belong. Bugiri district headquarters is located 75 kilometres (47 mi) east of Jinja.

The 2002 national census estimated the population of the district at approximately 426,500. The annual population growth rate in the district is estimated at 2.8%. Given those statistics, it is estimated that the population of the district in 2010 is approximately 532,000.
Agriculture forms the backbone of the district and main crops include low land rice, cassava, millet, coffee, sorghum, peas, matooke. There is also animal grazing and fishing on Lake Victoria.

Some of the major challenges of healthcare facilities in Bugiri district that need serious attention include:

- Shortage of beds and mattresses.
- Unreliable grid power supply.
- Poor accommodation for staff impacting work morale.
- Lack of modern surgical equipment, operating beds, Ultra-sound.
- O.P.D is too small for the ever-increasing number of patients.
- Dental clinic lacks complete dental unit/ chair.
- Lack of reliable means of transport to carry out community outreach and home visiting.
- Rapid consumption of supplies / medicines due to many patients /clients.
- Shortage of testing kits in laboratories and blood transfusion services.

The most common causes of morbidity in the district are malaria, upper respiratory infections, intestinal worms, trauma, diarrhea, skin diseases and Malnutrition.

No waste disposal services or facilities exist in Bugiri District and common waste disposal methods are burying in pits or open-air burning.

Piped potable water supply is only available in Bugiri Town while other parts of the district rely on boreholes, spring wells and rainwater harvesting.

Bugiri has grid electricity in all of its counties while wood (biomass) fuel is the major source of cooking energy. Paraffin stoves or candles are used for indoor lighting. Chronic respiratory ailments may therefore not be rare ailments in the district.

2.1.3 Bukwo District

Initially a County, Bukwo is a new District created on 1 July 2005. The District is bordered by Nakapiripirit District in the north, Kapchorwa District to the west, and the Republic of Kenya to the south and east. While still a County, the national census in 2002 estimated its population to be approximately 10828, with an annual population growth rate of 2%.

2.1.4 Iganga District

Iganga District is bordered by Kaliro District to the north, Bugiri District to the East, Mayuge District to the South-East, Jinja District to the South-West and Kamuli District to the West.

The 2002 national census estimated district population at about 708,690. The annual population growth rate in the district is estimated at 2.8%.
2.1.5 Jinja District

Jinja District is bordered Kamuli District to the north, Iganga District to the east, Mukono District to the west and Kayunga District to the northwest. The national census in 2002 estimated the population of the district at about 387,573, with an annual population growth rate of 3.0%. Based on those statistics, it is estimated that the population of the district in 2009 is approximately 509,100. The district has over 160 primary schools with 100 government, 35 private and 12 community schools but literacy levels are is slightly lower than national averages.

The primary activity is agriculture with a focus on food crops such as beans, groundnuts, sorghum, millet, cassava, and sweet potatoes. There are no properly engineered waste disposal facilities (landfills) in Jinja District and waste is disposed of in dumps.

2.1.6 Moroto District

Moroto is a district is bordered to the north by Abim District, Kotido District and Kaabong District, by the Republic of Kenya to the east, by Nakapiripirit District to the south, and to the west by Katakwi District and Amuria District.

The 2002 national census estimated the population of the district at 163,047 in 34,529 households (83,511 or 51% of this population were women). Basing on a population growth of 2-3%, its 2009 population is around 275,600 people.

Traditionally, livestock farming is the backbone of livelihood and local economy in the district. Recently, commercial cultivation of Jatropha plant has begun in the region for production of biodiesel. Bee keeping is another activity that is gaining popularity.

The district has one of the lowest literacy levels in Uganda, an attribute that may manifest in types and prevalence of diseases treated at Moroto hospital, mainly eye disease, intestinal worms, dental diseases, diarrhea, malaria, respiratory tract ailments, and pneumonia.

2.1.7 Mukono District

Home to Kawolo Hospital, Mukono District boarders the districts of Jinja in the East, Kayunga in the North, Luwero and Wakiso in the west and Kalangala in the south.

Kawolo Hospital located in Lugazi Town is the main hospital in the area and serves a large population in 21 Sub-counties. According to the 2002 national census figures, Mukono District had a population of about 807,900 of whom 49.8% were males and 50.2% were females. At that time the district was the 5th most populated district in the country with annual population growth rate of 4.1%. In December 2007, the Uganda Bureau of Statistics (UBOS), projected the district population to be 962,400 and 1,114,300 in 2010.

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1 Source: Population & Housing Census, 2002.
Agriculture is the mainstay economic activity in Mukono district with key cash crops including cotton, coffee, sugar cane and tea.

The district has a total of 634 primary schools with 330 government, 220 private and 84 community school and literacy levels are well within national averages.

The district has 9 Government dispensaries (II), 22 health centres (III), 4 health centres (IV) and one hospital. There also 12 private/NGO dispensaries, 83 clinics and 3 private hospitals. Government District Hospital includes Kawolo with 100 Beds, Nkokonjeru with 100 Beds, Nagalama with 150 and St. Francis Nyenga with 100 bed.

The piped potable water supply is only available in Mukono Town while the rest of the district relies on boreholes spring wells, rainwater harvesting. The district has grid electricity but prevalent use of wood (biomass) fuel for cooking and Paraffin stoves or candles for lighting especially are prevalent in especially rural areas.

2.1.8 Pallisa District

It was created in 1991 and was formerly part of the Tororo District. The district boarders the districts of Mbale in the east, Kumi in the north, Kamuli in the west, Tororo and Iganga in the south and Soroti in the north-west. The district has over 522,254 people, 269,224 are female and 253,030 are Male\(^1\).

In so far as good roads are essential for development (renovation phase) and use (operation phase) of this project, the district has a total of 2,955 Km of road network of which 200 km are trunk roads, 755 km are feeder roads and the remaining 2,800 are community roads. These are in fair condition of repair and mostly motorable in good weather.

The piped potable water supply is only available in Pallisa Town while the rest of the district relies on boreholes spring wells, rainwater harvesting. Grid electricity is also available but its coverage/use not widespread largely due to unaffordable tariffs.

\(^1\) Source: Population & Housing Census, 2002.
2.2 Observations at each HCF

2.2.1 Nankoma Health Centre IV

Nankoma HC IV is found in Bugiri district, Bukooli Central Health Sub-District, Nakoma Sub-county, Nakoma Parish and Nakoma village about 17 km from Bugiri District Headquarters.

The HC has three buildings: Outpatient Department (OPD), Wards (Maternity, Female, Male and Paediatric) and Theatre (which is incomplete and not functional). There are six staff buildings two of which are dilapidated with a leaking roof on the Doctor’s house. The Male, Female, Maternity Wards and theatre have grid electricity but the rest, including staff houses, do not have power supply. The health center has both a borehole and piped water stand pipes.

Plate 1: The building adjacent to the vehicle is a non-functional theatre constructed 5 years ago (left). An Outpatient Department building which was constructed by the community (right).

Similar to all other HCFs, the outpatient department manages common illnesses and offers following services:

a. Inpatients
b. Dental services
c. Reproductive Health Services - Antenatal, Delivering, Postnatal, PMTCT and Family planning
d. Immunizations
e. Ophthalmology services
f. Health education
g. Laboratory services
h. Health inspection and sanitation
The average outpatient attendance is 2000 per month while the average inpatient attendance is 100 per month. The ratio of medical staff to patients is about 1:130.

Plate 2: Patients at the waiting area with insufficient space for more than 12 people

Nankoma Health Centre IV lacks waste management facilities and disposal is mainly by open air burning. Sharps and non sharp other medical waste types are not adequately separated.

Plate 3: Open air burning of medical waste (left). An air slab supposed to store ash but now filled with unburnt waste (right)
2.2.2 Buyinja Health Centre IV

Buyinja Health Centre IV is found in Bugiri district, Bukooli South Health Sub-District, Buyinja Sub county, Buyinja Parish and Namayingo village about 27 Km from Bugiri District Headquarter. There are no records of total land holding but the facility occupies an estimated land area of 500x200 meters.

Open air combustion of medical waste depicts lack of facilities for its proper and safe management.

Plate 4: Air slab in which incineration ash (“cake”) should be dumped is instead used to filled with raw waste (Left). Apart from Kibuku HC IV at most healthcare facilities the correct function of this pit was unknown. Right is a placenta pit (without a cover).

There are two major buildings: OPD and another building housing a maternity Ward, Female, Male and Pediatric Wards and a Theatre (which is incomplete and not functional). Services offered include:

a. Inpatients
b. Dental services,
c. Reproductive Health Services - Antenatal, Delivering, Postnatal, PMTCT and Family planning.
d. Miner operational
e. Immunizations
f. ART Services
g. Ophthalmology Services
h. Health Education
i. Laboratory Services
j. Health Inspection and sanitation
k. Referrals Services

Common diseases treated were Malaria, Cough, Pneumonia, ENT Diseases, Intestinal worms, Dental Diseases, Trauma, Diarrhea, Lower abdomen pain syndrome and Eye disease.

The average outpatient attendance is 1800 per month while the average inpatient attendance is 80 per month. The ratio of medical staff to patients is 1:115.

2.2.3 Bugono Health Centre IV

Bugono Health Centre IV It is found in Iganga district, Kigulu North Sub -District, Nabitende Sub county, Bugono Parish and Bugono village. It about 17 Km from Iganga District Headquarter on an estimated property of size 750x200m.

It has three buildings OPD, Wards building (for Maternity, Female, Male and Pediatric) and a Theatre building but the theatre is not functional. There are five staff buildings which are old and dilapidated apart from Doctor’s house constructed recently. The facility has a borehole onsite for a water source. The HC relies on pit latrines and onsite septic system for high soil and sewage disposal. The facility also has one air slab supposed to be used for disposal of incineration ash but currently filled with unburnt waste filled with waste.

Plate 5: Clockwise top to bottom: the existing outpatient department. Existing maternity ward. A leaking ceiling in the ward.
The HCF receives an average outpatient number of about 1500 per month while inpatient is about 100 per month. The ratio of medical staff to patient is 1:118. The facility lacks proper waste management facilities characterized by open air burning.

### 2.2.4 Kiyunga Health Centre IV

Kiyunga Health Centre IV is found in Kiyunga village, Iganga district, Luuka Health Sub-District, Bulongo Sub-county, Kiyunga Parish on a property measuring about 10 acres.

All buildings apart from the theatre and maternity ward lack ceilings and are infested with bats. The theatre is not functional due to lack of a medical doctor. There are 12 staff houses all of which are dilapidated. An onsite borehole also used by neighboring community serves a water source for the healthcare facility. The average outpatient attendance is 2100 per month while the average inpatient attendance is 100 per month. The ratio of medical personnel to patients is 1:128.

Open air burning and lack of waste segregation at source connote improper healthcare waste management.

### 2.2.5 Kibuku Health Centre IV

Kibuku HCIV is found in Pallisa district, Kibuku Health Sub-district, Kibuku Sub-county, Kibuku Parish and Kobolwa village.

All wards and theatre have grid electricity but not the staff quarters. An onsite borehole and rainwater harvesting are the principle sources of water at this HCIV. The average outpatient attendance is 2000 per month while the average inpatient attendance is 100 per month.
Like most aforementioned HCFs in this region, Kibuku HCIV has inadequate HCW management practices characterized by open air burning (in a pit) and lack of waste segregation. Expired drugs are stockpiled in the open along a verandah of one building.

2.2.6 Budaka Health Centre IV

Budaka HCIV is found in Budaka district, Budaka Health Sub-district, Budaka Town Council, Budaka Parish and Nakiburu village on a 12 acre property.

There are 11 staff dwellings all of which are dilapidated except the recently built Doctor’s house. The HCF has connection to grid electricity, has a borehole and piped water.
The average outpatient attendance is 150 per month while the average inpatient attendance is 100 per month. The ratio of medical staff to patients is 1:110.

Unlike other health facilities where waste is burnt in open air, Budaka HCIV has an incinerator. The only shortcoming is its location close to residential dwellings of the neighboring community. Incineration ash (or “cake”) is collected in a concrete pit (air slab).
2.2.7 Moroto Hospital

As earlier mentioned, Moroto hospital will be demolished and rebuilt. According to the medical superintendent, the hospital sits on a 15-acre property sufficient for any major expansions.

Built for a small population in 1930s, the hospital has is characterized by small old buildings within structures currently standing are small based on the original plan. Maternity and male wards have 12 beds each while female and children wards have 20 beds and 13 beds respectively. On average 187 patients visit the hospital every day but due to limited capacity only a few can be admitted.

The staff quarters and Doctor’s house are all dilapidated with leaking roofs. With only two pit latrines that had no provision for children and disabled people, sanitation facilities at the hospital were inadequate and in a poor condition.

The hospital is not connected to grid electricity and relies on a diesel fuel generator which is normally switched on only from 7.00 pm to 10.30 pm.

The hospital has 4 doctors and 8 clinical officers as well as 96 health workers. Administrator and support staffs total to 36 in number. The ratio of patients to personnel is 1:11 and a total of 1089 patients are served per month.

The hospital has a medical waste incinerator but generally medical waste management was inadequate as depicted by lack of sorting of segregation.
2.2.8 Bukwo Hospital

Located on about 3 acres, this hospital is found in Sebei region 100 km from Kapchorwa near to Bukwo district headquarters in Bukwo Town Council. The hospital has sufficient land available since existing two buildings occupy only a small portion of the site.

Plate 11: (Clockwise from top).
- Entrance to Bukwo District;
- Due to lack of space in service areas, patients use a corridor as a waiting area;
- One of the existing buildings at the HC;
- Newly constructed walk ways with shades;
- Old structures on site;
- Existing children’s ward.

The hospital has average outpatient attendance of 278 per month while inpatient attendance is 80 per day. The ratio of medical staff to patient is 1: 80.
2.2.9 Buwenge Hospital

This is found in Jinja District in Buwenge Town Council in Kagoma County about 22 Km from Jinja Town on about 3 acre of land.

The HCF has an Outpatient Department, maternity ward, female ward, male ward, general ward, Pediatric/children ward, laboratory and an operating theatre. The theatre is incomplete and with no equipment hence not fully functional. It has grid electricity supply, a borehole and pipe water at stand pipes. Pit latrines and open air burning of medical waste constitute the healthcare facility’s waste management system. The health centre has 36 medical (and support) staff with average outpatient attendance of 647 per month.

2.2.10 Kawolo Hospital

This hospital is found in Lugazi Town Council, Buikwe west Parish, Mukono District about 56 Km along Kampala-Jinja Highway.

The hospital has an Outpatient Department, Wards (Maternity, Female, Male and Pediatric) and a Theatre. All buildings are old and overwhelmed by prevailing patient numbers. Being the only large hospital on the highway stretch between Mukono and Jinja, it commonly handles a large number of road accident emergency cases. However, due to its age and limited equipment, Kawolo Hospital increasingly has diminishing capability for its role.

As expected due to its age, Kawolo hospital is characterized by old buildings. The hospital has grid electricity and water supply.

The average outpatient attendance is 1710 per month giving 1:14 personnel patient ratio.

2.2.11 Budondo HCIV

Budondo HCIV is located in Jinja District, Budondo sub-county Kagoma County 14 km from Jinja town along Jinja-Butagaya road. Its importance to community is reflected in the wide area it services. It serves patients from parishes of Namizi, Buyala Ivunamba, Nawangoma,
Kibibi, Kyomya and also covers the subcounties of Budondo and Butagaya. This HC sits on a property measuring 3 acres (estimated by In-Charge of the HC). The HC does not have an Outpatient Department, Wards (maternity Female, male and Pediatric) and Dental department. The Eye Ward, Tb Ward, Theatre, Laboratory, General Ward and Administration Block are all squeezed in available buildings. There is no incinerator and medical waste is burnt in an open pit. The out patient records indicates a total 1256 patients served per month on average however critical conditions are referred to Jinja hospital due to lack of space.

Onsite sanitation was based on pit latrines which lacked provision for disabled people and children. The health facility is connected electricity and a borehole and piped water.

2.2.12 Ntenjeru-Kojja HCIV

This HC is found in Ntejeru, Kojja sub-county in Mukono district about 24 km from Mukono Town and serves patients in three sub-counties of Nkoma, Nakisigye and Ntejeru.

The HC sits on a five-acre property and has sufficient land for future expansion when required. Medical waste is burnt in open air, depicting lack of safe healthcare waste practices and facilities. Erratic power supply and inability to afford fuel for the generator hamper service delivery at this health center. Records the HC indicated that average outpatient visits are 3640 per month while inpatient numbers are is 130 per month.
2.2.13 Buvuma HCIV

Buvuma HCIV is found in Mukono district, called Buvuma Health Sub-District, Buvuma Sub-county. It is about 65 Km from Mukono District Headquarter on a property of about 5 acres. It has three buildings i.e. Outpatient Department, Wards (maternity Female and male) as well as a Theater. Apart from Doctor’s house all other 5 staff dwellings are dilapidated. Medical waste management is by open-air burning. The HC has no grid power supply and relies on a diesel generator. There is no mains supply and facility pumps water from the lake.

Average outpatient attendance is 1230 per month while inpatient number is 40 per month.

2.2.14 Bugiri Hospital

The hospital is found in Bugiri District 34 km from Iganga town along Tororo Highway on a property of about 9 acres (as told by Hospital Administrator). Land surveying was ongoing to ascertain actual acreage. The hospital has Wards (Maternity, Female, Male, Pediatric, Eye, TB), dental department. Theatre, Laboratory, general ward and the administration block. Buildings housing these facilities required repairs and limited remodeling to stymie leakages in roofs, replace broken doors, windows and plumbing. The sewerage system had broken down. However, the hospital has sufficient land for any expansion (if required in future). Outpatient records indicate an average of 3600 visits per month, but critical patients are referred to Jinja and Mulago Hospitals due to lack of facilities or space to admit them.

Onsite sanitation facilities were insufficient to match patient numbers and lacked provisions for the disabled people and children. The health facility is connected with electricity for lighting system in the hospital and other activities in the theatre. The hospital has a standby generator for emergency supply and water supply (borehole and mains water).

Bugiri Hospital lacked proper waste management practices and facilities: an old incinerator was not functional and medical waste is burnt in open air.
2.2.15 Pallisa Hospital

Pallisa Hospital is located at 95 km from Iganga town along Mbale-Tirinyi road in Palisa district on a property of 7 acres. The hospital has adequate land for expansion and in its masterplan is planned building of new wards and expansion of the OPD. Outpatient records indicated 3349 patient visits per month. Sanitation facilities at the hospital lacked provision for disabled people and children. The health facility has grid electricity supply and a backup diesel fuel generator.

As with other hospitals, a key shortcoming was lack of proper waste management practices and facilities.
2.2.16 Iganga Hospital

Iganga Hospital is found in Iganga District at 37 km along Jinja-Tororo highway in Nakavule village. It was constructed in 1968 serves 273 per day patients from as far as Mayuge, Bugiri, Tororo, Kamuli and Jinja districts. Property on which the hospital is located not surveyed yet but administration estimates it to be 20.8 acres. There is no incinerator and the hospital use open air burning for waste disposal and pit latrines for night-soil. Staff housing is inadequate and structures need repair. There are 5 houses for senior staff; 4 for middle level staffs and 8 blocks for lower level staff. The hospital has unreliable grid power and water supply.

Plate 17: L-R: Some old buildings at Pallisa Hospital and a section of the Male ward

Plate 18: L-R: A plastic water tank installed for rain water harvesting. Patients under a tree shade at Iganga hospital
2.3 HCW Incineration in Uganda: Concerns and Improvement Measures

Incineration is a high temperature dry oxidation process to reduce organic, combustible waste to significantly smaller quantities of inorganic, incombustible matter.

When improperly carried out, incineration can generate dioxins and furans which are known carcinogens with potent effect on human health. Other pollutants are organic (polyaromatic hydrocarbons (PAH), polychlorinated biphenyl (PCB), volatile organic compounds (VOC) and inorganic compounds (SOx, NOx, HCl, HF and heavy metals). These emissions and ash residues are always of high environmental concern in many countries and are the reason incineration facilities operate under strict regulatory conditions.

A study\(^1\) on healthcare waste management (HCWM) in Uganda and another on unintentionally formed persistent organic pollutants (UPOPS)\(^2\) identified major shortcomings in, design practices and functional efficiency (performance) of healthcare waste incinerators in Uganda.

Sections below provide a perspective of existing healthcare waste (HCW) incineration in Uganda, operational challenges and possible improvements suggested by studies on HCW and UPOPS in Uganda.

2.3.1 HCWM Improvement Study (Carl Bro, Jul 2005, revised Mar 2009)

This study identified the following shortcomings with incineration units at HCF in Uganda\(^3\):

i) **Poor design and construction**: many units were built from simple brick and mortar and had no refractory lining. Many could not achieve high enough temperatures (>800°C) necessary to destroy potent pollutants in emissions.

ii) **Improper location**: very close to healthcare buildings affecting them due to chronic plume downwash.

iii) **Poor operation by untrained staff**. Effective destruction of some constituents in air emissions necessitate combustion at a specific temperature or a given residence time within combustion chambers). Homogenization of waste is crucial to ensure efficient and complete combustion during incineration to avoid generation of dioxins for instance when wet waste batches quench flames and lower combustion temperature below levels at which such pollutants are destroyed.

iv) **Incineration units commonly not fenced off** and, being close to communities, these sites easily trespassed by people (posing a public health risk of secondary infection).

A study on improvement of healthcare waste management in Uganda conducted in 2005 concluded that use of centralized complex incineration facilities (“complex” in this case

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2. “Identification and Quantification of Dioxins and Furans in Uganda”, Final UPOPs Inventory Report, December, 2007. Study conducted for POPs Project Coordination Unit National Environment Management Authority (NEMA) NEMA House Plot 17, 19 & 21, Jinja Road, P.O. Box 22255, Kampala.
connoting ones with emissions treatment capability) was unattainable within the next 10 years due to economic and technological limitations. It therefore recommended continued use of brick incinerators until affordability and operational capability were attained.

Handling an average throughput\(^1\) of 1 kg/day existing onsite incineration units at health centers (and hospitals generally) are such small (“non-significant”) as not to trigger World Bank Group (WBG) Guidelines on air emissions and ambient air quality. According to these WBG Guidelines, significant sources of point and fugitive emissions are those which can contribute a net emissions increase of one or more of the following pollutants within a given airshed:

- **PM\(_{10}\)**: 50 tons per year (tpy);
- **NO\(_x\)**: 500 tpy;
- **SO\(_2\)**: 500 tpy; or
- With an equivalent heat input \(\geq 50\) MWth.

No single onsite brick incinerator at any healthcare facility in Uganda has the foregoing emissions generation rates and this could be the reason design and construction of such “non-significant” units does not provide for emissions control. Nonetheless WBG EHS Guidelines for healthcare facilities (Apr 2007, page 6) noted that controlled-air incineration (referred to as pyrolytic, starved-air, two-stage incineration, or modular combustion) is the most widely used healthcare waste incineration technology and single-chamber or drum/ brick incinerators should be used only as a last resort option. This is mostly due to their inability to achieve high enough temperature necessary for complete destruction of regulated air pollutants (especially dioxin destroyed above 850\(^\circ\)C) or ensure effective dispersion of stack plumes.

For improvement WBG guidelines provide advice on design of stacks for small incineration units to avoid plume downwash (which is illustrated in Section 4.4.1.1 of this report).

Considering that on a national scale, the combined quantity of untreated emissions from the numerous incinerators at hundreds of healthcare facilities can be significant. There is need for the Ministry of Health to start planning for financial and technical capability for centralized incineration facilities as one of the options suggested by the study to improve healthcare waste management in Uganda. Uganda’s HCWMP (2007/08- 2009/10) suggested that MoH through National Medical Stores (NMS) should regularly collect and destroy waste that must not be destroyed by individual healthcare facilities: such is waste that may contain heavy metals (lead, mercury) or radioactive materials. Although they cited cost and skills limitations, both studies recognized a need for centralized waste incineration in future. Some technical recommendations\(^2\) of the HCWM improvement study and inferences that this EIA made from them are presented below:

a) **Combustion chamber**: The study recommended construction of chamber in refractory materials able to withstand temperatures up to 1300\(^\circ\)C.

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1 Healthcare waste generated per day (Uganda): Health Centre Grade IV (HC IV)- 1.5 kg/day; HC III- 0.6 kg/day; HC II- 0.5 kg/day
2 Excerpted from Appendix 8: Bid documents, drawings and BoQ for two brick incinerators and district level (Technical Specifications, p30).
Inference: Refractory lining is an improvement from prevalent existing method of construction and weak materials (normal rather than fire cement and clay/earth bricks). A refractory lining avoids fugitive emissions, ensures long service life.

b) **Chimney (or stack):** A fixed stack height of 6 meters is prescribed.

Inference: Considering that some incinerators may be located in vicinity of buildings, with potential for plume downwash, a fixed height at all locations may not always be effective in safely dispersing incineration emissions in the air. A safe method to design stacks for small incineration units based on WBG Guidelines and good international industry practice (GIIP) is illustrated in section 4.4.1.1.

### 2.3.2 UPOPs Inventory Report (“NEMA Study”)

The UPOPs inventory study for Uganda conducted in 2007 aimed to develop the nation’s stock of dioxin and furans emissions to air, water and land. Incineration and open-air burning of waste were among the key sources of dioxins identified. This study is of particular interest because healthcare waste incineration was found to contribute 0.4% (or 4.1 grams TEQ/year) of the nation’s total annual POP emissions (1019 grams TEQ/year), with uncontrolled combustion processes contributing slightly over 70% of total releases. The study identified the main POPs emission release vector to be residues contributing 58% followed by air (38%) and least, land. In comparison, scenarios below from Germany and USA illustrate efficacy of emissions treatment in reducing dioxin levels in the environment.

In 2005, The Ministry of Environment of Germany, where there were 66 incinerators at that time, estimated that “…whereas in 1990, 33% of all dioxin emissions in Germany came from incineration plants, in 2000 the figure was less than 1 %. Chimneys and tiled stoves in private households alone discharge approximately twenty times more dioxin into the environment than incineration plants1.

According to United States Environmental Protection Agency (USEPA), incineration plants are no longer significant sources of dioxins and furans. In 1987, before government regulations required use of emission controls, there was a total of 10,000 grams of dioxin emissions from USA incinerators. Today, total emissions from the 87 incineration plants are only 10 grams yearly, a reduction of 99.9%. Studies conducted by the USEPA2 demonstrate that the emissions from just one family using a burn barrel produces more dioxin emissions than an incineration plant disposing of 200 metric tons of waste per day.

The UPOPs study noted that while most hospitals and some HC III and IV in Uganda had incinerators, about 20% of them were either not utilised or deficient not achieving high enough temperatures of over 800°C necessary for destruction of potent constituents such as dioxins in emissions. The study indicated that Uganda generated 1415 tons of healthcare waste in 2006 of which 161 tons were sharps; 858 tons infectious waste and 396 tons of

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1 http://en.wikipedia.org/wiki/Incineration
pathological waste. Pathological waste is normally buried and only about 10% is incinerated. HCW incineration generates POPs (including dioxins and furans) to air and water below:

Box 3: POPs (dioxins, furans) emissions from medical waste incineration in Uganda

<table>
<thead>
<tr>
<th>a) Emissions to air:</th>
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<tbody>
<tr>
<td>Total annual medical waste incinerated:</td>
</tr>
<tr>
<td>102 tons/year</td>
</tr>
<tr>
<td>Emission Factor (EF) for realise to air:</td>
</tr>
<tr>
<td>40,000 µg TEQ/tonne</td>
</tr>
<tr>
<td>Potential releases to air (using above EF) is:</td>
</tr>
<tr>
<td>102 * 40,000 = 4,080,000 µg TEQ/year</td>
</tr>
<tr>
<td>= 4.08 g TEQ/year</td>
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</table>

<table>
<thead>
<tr>
<th>b) Release to residues:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total annual medical waste incinerated:</td>
</tr>
<tr>
<td>102 tons/year</td>
</tr>
<tr>
<td>EF for release to residue:</td>
</tr>
<tr>
<td>200 µg TEQ/tonne</td>
</tr>
<tr>
<td>Thus, releases to residues (using above EF) is:</td>
</tr>
<tr>
<td>102 *200 = 20,400 µg TEQ/ year</td>
</tr>
<tr>
<td>= 0.02 g TEQ/year</td>
</tr>
</tbody>
</table>

**Total annual release from HCW incineration = 4.10 g TEQ/year**

Source: UPOPS study 2007, pg 34.

Since they lack provisions for emissions scrubbing (treatment), all existing onsite incineration units currently in use at HCF in Uganda including ones MoH plans to adopt (e.g. Maximaster MKII, MAK IV) will generate obnoxious stack emissions. Although incorporating emissions capture (e.g. adsorption) or treatment technologies on incineration units is good as the UPOPs report noted, this is not feasible for small brick units currently used at HCF in Uganda. Measures the report proposed to improve incineration are discussed in sections below.

2.3.2.1 BAT/BEP Recommendations to Improve HCW Incineration

The UPOPs study recommended two ways for reduction of unintentionally produced persistent organic pollutants (UPOPs), namely use of:

- **Best Available Technologies (BAT), and,**
- **Best Environmental Practices (BEP).**

The study identified open burning of waste as the key emission source of dioxins and furans in Uganda with over 70% of the total PCDD and PCDF release. Open air burning of medical waste was prevalently practised at many HCFs visited during this EIA study.

Understanding the principles of dioxin formation is important to identifying and implementing measures that counter their formation during incineration. Dioxins are formed as trace compounds during incomplete combustion in presence of a chlorine source.

The UPOPs study identified factors mentioned below as ones that influence formation of dioxins:

- i) Products of incomplete combustion (PIC) e.g. unburnt carbon/soot, polyaromatic hydrocarbons,
- ii) Chlorine in fly ash,
iii) Low combustion temperature 200 - 600°C (dioxins are destroyed at above 800°C).

It then recommended the following measures to minimise formation of PCDD/PCDF (including dioxins and furans) during incineration:

a) Combustion technology and practices

The most effective way to minimise formation of PCDD/PCDF is reduction of products of incomplete combustion (PIC) in flue gas, which means an optimised burn out. The report cited correlation between the amount of PCDD/PCDF formed during incineration with carbon monoxide, total hydrocarbon (THC) and particulate matter in the flue gas. Combustion variables influencing formation, destruction and furnace emission of PIC include combustion temperature and residence time, as well as the amount and distribution of combustion air.

Time required for destruction of gaseous pollutants are typically measured in milliseconds while time in order of seconds to minutes may be required for complete destruction of small solid particles. A combustion temperature of 850°C and residence time of 2 seconds are generally sufficient for thermal destruction of gas phase pollutants. These conditions should form the design criteria of incinerators to be installed at healthcare facilities under the proposed project.

UPOPs report noted that from an operation standpoint, maximum incineration temperature desired is about 1100°C since higher temperatures result in ash slagging and furnace wall damages reducing useful life and increasing maintenance costs. Additionally higher temperatures could lead to formation of higher thermal NOx.

b) Operation of the incinerator

Operational efficiency of an incinerator depends as much upon skill of the operator as on its design. Slight change in parameter such as air intake or temperature in combustion chamber can result in a several fold higher PCDD/PCDF emission. Incinerator operators should therefore have training commensurate with their roles.

c) Material input: waste quality and amount

UPOPs study noted that rapid changes in waste composition or properties may impair combustion. Quantities of PCDD/PCDF formed during or after disturbed combustion conditions (such as improper waste feeding conditions) can substantially exceed steady state emissions. Continuous steady combustion is the ideal operational condition basis for low POPs emission. Therefore it should be necessary to mix or homogenise waste prior to combustion to reduce variations in calorific value, volatility, and moisture content. Additionally, the waste batch should not exceed the designed “full load” quantity which guarantees optimum performance at normal waste burn rates.

It is important to note that mixing of medical waste must be done very carefully and with appropriate tools and protective gear to avoid risk of infection of incineration operators. Mixing of waste should not mean unpacking waste from containers, rather through judgement and skill/ knowing which waste types (or boxes) to incinerate in the same batch to ensure homogeneity. Having received requisite training, an incinerator operator can base this
decision on knowledge of waste types and physical characteristics such as their water/moisture content.

2.2.3 Evaluation of existing incinerator types

Incinerator types available for MOH to adopt at HCFs were evaluated basing on the following criteria (see Appendix 3):

a. Incineration temperature in main combustion zone
b. Number of combustion chambers
c. Capacity
d. Fuel/energy consumption
e. Heat insulation
f. Scrubbing ability
g. Stack height
h. Charge/feed operation
i. Limitation on materials to be incinerated

Among the incinerator options evaluated (see Appendix 3 for detailed evaluation), ranking in respect to performance was:

1. Maximaster MKII (best preferred option)
2. HWI-4
3. MAK IV (least preferred option)

Conclusion and recommendation

As long as medical waste incinerators are small-capacity units spread all over the country, fitting them with emissions treatment provisions would be technically and financially infeasible. Each individual incineration unit’s small size and low emissions output belies the overall big emissions impact of these units on a national scale. This besides the fact that areas around healthcare facilities are experiencing considerable habitation due to population increase, calls for MoH to start developing policy, regulatory and institutional framework for centralized incineration.

If MOH were to choose among the foregoing incinerator types, inspite of their technological shortcomings with regard to emissions scrubbing, the recommended choice is Maximaster MKII. However, as already indicated Maximaster has no scrubbing provision for flue gases, which means environmental and public health risk.

2.3.4 Securing Incineration License from NEMA

Securing a license to operate onsite incineration units would be in compliance The National Environment (Waste Management) Regulations, 1999 as shown by excerpts below from Section 13 of these regulations:

“13.(1) A person intending to operate a waste treatment plant or disposal site shall apply to the Authority for a license in Form V set out in the First Schedule and shall accompany the application with appropriate fee prescribed in the Sixth Schedule.
(3) A person who operates a waste treatment or disposal site or plant without a license issued under these Regulations commits an offence.”

Form V is obtained from NEMA (“Authority”) and fees involved in licensure process are as follows:

a) Application fee for license to own /operate a waste disposal site/ plant: UgShs50,000
b) Fee for annual license to own/ operate a waste disposal site/ plant: UgShs300,000

The annual license fee is paid upon grant of the license, not upon filing the application.

The license is granted at least 60 days from filing application (Section 14c).
3  ESIA Methodology

This chapter presents methods and practices used in preparation of the ESIA and approaches used to identify and analyze social-environmental impacts. The ESIA study was conducted on the premise that key project activities will entail:

- Renovation/construction of medical buildings and staff houses,
- Supply, installation and commissioning of medical equipment and medical furniture,
- Construction and/or supply and installation of incinerators at selected facilities (it is proposed to have incinerators at the RRH, GH and selected Health Centre IVs). Different types of incinerators have been proposed at the different levels.

Consequently, impact analysis was designed to follow a life-cycle approach, characterizing impacts right from construction phase through operation and decommissioning. A key construction-phase aspect of the ESIA study was the control of impacts of demolition debris generated during remodeling of facilities especially where asbestos-containing materials (e.g. roofing) exist.

3.1  Determination of Baseline Conditions

Baseline conditions were determined not only to provide an understanding of the prevailing socio-environmental status of the project areas and waste management practices, but also to provide a basis for future improvements and monitoring practices.

Quantifiable baseline conditions were established using field meters (Plate 17):

- Baseline noise was measured with EXTECH® digital sound level meter.
- Baseline dust levels were measured using a HVAS.
- Gases in ambient air quality were measured by a hand-held meter.

3.2  Clarifications by Client

In a meeting with MoH representatives on 7th Jan 2010, clarifications below were made:

Table 4: Issues clarified by client.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Clarification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Construction duration</td>
<td>12 months for each lot (hence in a lot comprising 4 healthcare facilities, each facility would take about 3 months to construct).</td>
</tr>
<tr>
<td>2  Impact of construction activities</td>
<td>No change would be made in patient admissions. Construction to be phased to ensure the same number of patients is handled during rehabilitation.</td>
</tr>
<tr>
<td>3  Nature of renovation activities</td>
<td>Apart from Moroto Hospital that would be demolished and rebuilt, at all other healthcare facilities, works would entail demolition and remodeling of internal built environment.</td>
</tr>
<tr>
<td>4  Proposed management of increased X-ray</td>
<td>X-ray waste is expected at GH and RRH but equipment installation would involve training staff in its management. The National</td>
</tr>
<tr>
<td>Issue</td>
<td>Clarification</td>
</tr>
<tr>
<td>-------</td>
<td>---------------</td>
</tr>
<tr>
<td>(radioactive) waste when more facilities obtain X-ray equipment</td>
<td>Healthcare waste management plan 2007/8-2009-2010 requires that MoH through National Medical Stores will regularly collect and destroy waste (e.g. radioactive waste, pharmaceutical waste and waste that must not be disposed of by healthcare facilities).</td>
</tr>
</tbody>
</table>
| Physical/ economic displacement and resettlement | Since the project entails modifications of internal built environment (except Moroto hospital to be demolished and rebuilt), physical displacement may not happen but economic displacement resulting from social outfall of facility modifications might arise at some facilities. This for example is in case of displacing people who might be eying a living by vending merchandise from corridors or verandas of health facilities.  
At each facility, the consultant should verify if displacement and resettlement would occur, number of persons affected, their social profile and where they could relocate to. |
| Scope/ extent of evaluation of incineration facilities | There are past studies conducted to evaluate incinerator types in use in Uganda and MoH selected five types it could adopt. Therefore evaluation during the ESIA should be limited to environmental aspects related to their siting/location on site, capacity in relation to expected quantity of waste generated. Other issues to investigate on incinerators can be:  
- High energy requirement, hence lack of sustainability:  
- Merits and practicability of centralized incineration units rather than small facility-located units.  
- Social impact of improper healthcare waste management. |
| World Bank additions | All facilities in the study should be visited to obtain a good understanding of specific onsite conditions.  
- Incinerators will be a challenge: high-tech costly units will not be easily or cheaply operated by healthcare facilitations. Hence they would offer little sustainability, yet small kilns without emissions treatment are a public health risk.  
- Review Uganda's HCWM Plan to see recommendations it made.  
- Include in ESIA general clauses on good construction practices. |
3.3 ESIA Methodology

3.3.1 Acquainting with proposed works

This stage involved getting familiarized with proposed expansion/ reconstruction works, specifications of incinerators, their locations and equipment to be supplied. To achieve the above, the following actions were undertaken:

i) Review of available project documents provided by client. (Since design of proposed modifications had not commenced, project information was mainly obtained from review of general engineering design terms of reference).

ii) Visual inspection of existing incinerators (where they exist) at each healthcare facility, their housing and identifying operational deficiencies.

3.3.2 Establishment of baseline socio-environmental conditions

Baseline air quality and noise levels were measured, not only to inform construction contractors about pre-construction conditions existing at proposed sites, but also the first annual environmental audit: subsequent baseline conditions would be the values measured in the first annual audit. Audits have been recommended and provided for in EMP (see Sec 6.3.1.4 of EMP).

These were determined through the following actions:

Plate 17: Field equipment used to measure baseline conditions
i) Ambient noise levels were measured using an EXTECH® Sound Level Meters.

ii) Ambient air quality was measured with a High Volume Air Sampler (HVAS) for dust measurements.

iii) A digital 6-gas iTX meter was used to measure ambient air quality (specifically oxides of nitrogen, NOx and oxides of sulphur, SOx).

iv) Consultation with the local communities and health facility staff to establish existing socio-economic and ecological conditions. Meetings with District (or town) Environment Officers, local leaders and the administrators of the different HC’s and hospitals visited.

3.3.3 Analyze specifications of incinerators, installation and operational concerns

i) Types of proposed incinerators where reviewed.

ii) Expected performance of incinerators, especially with regard to emissions/air quality was determined

iii) Waste streams to be combusted in incinerators (types and quantity).

iv) Establishment of capacity (mass/hour) of incinerator units in relation to proposed waste quantities.

v) Establishment of output waste i.e. air emissions and residual solid wastes/ashes based on nature of raw waste.

Assessment of existing incinerators and their performance is presented in Section 2.2.

3.3.4 Review of policy, regulations, institutional framework

This was done to determine if the proposed project was in line with national policies and met environmental laws and regulations, to achieve this, the following actions were undertaken:

i) Review of national environmental laws, policies and institutional framework.

ii) Review of World Bank Group (IDA is one of the 5 World Bank Group member organizations) guidelines on environment and resettlement.

3.3.5 Guidance on obtaining licenses to operate onsite waste treatment plant

In the context of the proposed project, the guidance was specifically in relation to onsite incineration units. Therefore procedures to obtain license from NEMA and documentation required were outlined in Section 2.2.

3.3.6 Assessment of requirements for adequate and environmentally safe solid and liquid waste management at healthcare facilities

This aimed to ensure that project design was based on best-practice healthcare waste management. The following aspects were analyzed with the aim to identify good practices that could be incorporated in project design:

i) Use of plastic trash bag liners in waste bins.

ii) Green procurement practices that reduce waste generation

iii) Packaging reuse.

iv) Patient-care supplies

v) Medical/Surgical Supplies

vi) Cafeteria/food waste
vii) Offices waste
viii) Feasible waste management techniques, including:
   - Safe handling of sharps, infectious waste, etc
   - Safe onsite medical waste storage and transportation
ix) Sewage and wastewater management options (including package sewage treatment plants and lagoons).

3.4 Impact Identification and Analysis

This ESIA study utilized a quantitative, defensible impact characterization method outlined below. The method enabled comparisons to be made between impacts and helped stakeholders to easily understand the process and rationale upon which potential impacts were assessed. The first stage of impact assessment was identification of renovation/construction and equipping project activities that generated impacts at the Health facilities. This was followed by identification of receptors which allowed understanding of possible impact pathways and receptor sensitivity to change (impact).

Significance of impacts was then assessed by rating each variable numerically according to defined criteria as outlined in Table 5. The purpose of the rating was to develop a clear understanding of influences and processes associated with each impact. The severity, spatial scope and duration of the impact together comprise the consequence of the impact and when summed can obtain a maximum value of 15. Activity frequency and frequency of the impact together comprise likelihood of the impact occurring and has a maximum value of 10. Impact significance is thus derived as shown in the rating matrix (Table 6).

The “Precautionary Principle” was applied in instances of uncertainty or lack of information by for example increasing impact ratings values. An environment monitoring plan (EMP) was also developed.
Table 5: Criteria for assessing impact significance

<table>
<thead>
<tr>
<th>SEVERITY IMPACT</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insignificant/non-harmful</td>
<td>1</td>
</tr>
<tr>
<td>Small/potentially harmful</td>
<td>2</td>
</tr>
<tr>
<td>Significant/slightly harmful</td>
<td>3</td>
</tr>
<tr>
<td>Great/ harmful</td>
<td>4</td>
</tr>
<tr>
<td>Disastrous/extremely harmful</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPATIAL SCOPE OF IMPACT</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity specific</td>
<td>1</td>
</tr>
<tr>
<td>Site specific (within the site boundary)</td>
<td>2</td>
</tr>
<tr>
<td>Local area (within 200 km of site boundary)</td>
<td>3</td>
</tr>
<tr>
<td>Regional</td>
<td>4</td>
</tr>
<tr>
<td>National</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DURATION OF IMPACT</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>One day to one month</td>
<td>1</td>
</tr>
<tr>
<td>One month to one year</td>
<td>2</td>
</tr>
<tr>
<td>One year to 10 years</td>
<td>3</td>
</tr>
<tr>
<td>Life span of operation</td>
<td>4</td>
</tr>
<tr>
<td>Post closure/permanent</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FREQUENCY OF ACTIVITY/ DURATION OF ASPECT</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annually or less/low</td>
<td>1</td>
</tr>
<tr>
<td>6 monthly/temporary</td>
<td>2</td>
</tr>
<tr>
<td>Monthly/infrequent</td>
<td>3</td>
</tr>
<tr>
<td>Weekly/life of operation/regularly/likely</td>
<td>4</td>
</tr>
<tr>
<td>Daily/permanent/high</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FREQUENCY OF IMPACT</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almost never/almost impossible</td>
<td>1</td>
</tr>
<tr>
<td>Very seldom/highly unlikely</td>
<td>2</td>
</tr>
<tr>
<td>Infrequent/ unlikely/ seldom</td>
<td>3</td>
</tr>
<tr>
<td>Often/regular/likely/possible</td>
<td>4</td>
</tr>
<tr>
<td>Daily/highly likely/definitely</td>
<td>5</td>
</tr>
</tbody>
</table>
Table 6: Significance rating matrix

<table>
<thead>
<tr>
<th>CONSEQUENCE (Severity + Spatial scope + Duration)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>16</td>
<td>18</td>
<td>20</td>
<td>22</td>
<td>24</td>
<td>26</td>
<td>28</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>15</td>
<td>18</td>
<td>21</td>
<td>24</td>
<td>27</td>
<td>30</td>
<td>33</td>
<td>36</td>
<td>39</td>
<td>42</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>20</td>
<td>24</td>
<td>28</td>
<td>32</td>
<td>36</td>
<td>40</td>
<td>44</td>
<td>48</td>
<td>52</td>
<td>56</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
<td>50</td>
<td>55</td>
<td>60</td>
<td>65</td>
<td>70</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>12</td>
<td>18</td>
<td>24</td>
<td>30</td>
<td>36</td>
<td>42</td>
<td>48</td>
<td>54</td>
<td>60</td>
<td>66</td>
<td>72</td>
<td>78</td>
<td>84</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>14</td>
<td>21</td>
<td>28</td>
<td>35</td>
<td>42</td>
<td>49</td>
<td>56</td>
<td>63</td>
<td>70</td>
<td>77</td>
<td>84</td>
<td>91</td>
<td>98</td>
<td>105</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>16</td>
<td>24</td>
<td>32</td>
<td>40</td>
<td>48</td>
<td>56</td>
<td>64</td>
<td>72</td>
<td>80</td>
<td>88</td>
<td>96</td>
<td>104</td>
<td>112</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>18</td>
<td>27</td>
<td>36</td>
<td>45</td>
<td>54</td>
<td>63</td>
<td>72</td>
<td>81</td>
<td>90</td>
<td>99</td>
<td>108</td>
<td>117</td>
<td>126</td>
<td>135</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>90</td>
<td>100</td>
<td>110</td>
<td>120</td>
<td>130</td>
<td>140</td>
<td>150</td>
<td></td>
</tr>
</tbody>
</table>

Table 7: Positive/negative mitigation ratings

<table>
<thead>
<tr>
<th>Significance color code</th>
<th>Significance Rating</th>
<th>Value</th>
<th>Negative impact management Recommendation</th>
<th>Positive impact management Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very high</td>
<td>126-150</td>
<td>Mitigate/ Improve current practice</td>
<td>Maintain current practice</td>
</tr>
<tr>
<td></td>
<td>high</td>
<td>101-125</td>
<td>Mitigate/ Improve current practice</td>
<td>Maintain current practice</td>
</tr>
<tr>
<td></td>
<td>Medium - high</td>
<td>76-100</td>
<td>Mitigate/ Improve current practice</td>
<td>Maintain current practice</td>
</tr>
<tr>
<td></td>
<td>Low- Medium</td>
<td>51-75</td>
<td>Maintain current practice</td>
<td>Improve current practice</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>26-50</td>
<td>Maintain current practice</td>
<td>Improve current practice</td>
</tr>
<tr>
<td></td>
<td>Very- Low</td>
<td>1-25</td>
<td>Maintain current practice</td>
<td>Improve current practice</td>
</tr>
</tbody>
</table>
4 Policy, Legal and Institutional Framework

Key legislation governing an ESIA study in Uganda includes the National Environmental Act (Chapter 153 of the laws of Uganda) and the Environmental Impact Assessment Regulations (1998). The National Environmental Act established NEMA and entrusts it with the cardinal responsibility of enforcing compliance with ESIA process and procedures in planning and execution of development projects. The procedures require that a project proponent prepares an EIS which presents a clear assessment of relevant potential impacts based on ToR developed from a scoping exercise.

Policies, legal and institutional framework relevant to the proposed project are outlined below. The construction/renovation and equipping of health faculties ESIA will also be benchmarked against international best-practice standards of the World Bank and WHO.

Various laws here reviewed relate to minimum acceptable renovation/construction operational requirements, environmental quality, landuse, public health, occupational safety, labor standards and international legal obligations. Policies and legislation considered relevant to this project are discussed in sections below.

4.1 Policy Framework

4.1.1 The National Environment Management Policy, 1994

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

4.1.2 The National Medical Equipment Policy, 2009

The objective of the policy is to ensure equipment and furniture are managed economically, efficiently, effectively and sustainably through guided;

- acquisition of medical equipment and furniture,
- utilization, regulation and quality assurance of medical equipment and furniture,
- maintenance of medical equipment and furniture,
- monitoring and evaluation of performance of medical equipment and furniture and
- disposal of medical equipment and furniture.
4.1.3 The National Health Policy, 1999

The overall objective of health sector policy is to reduce mortality, morbidity and fertility, and the disparities therein. Ensuring access to the minimum health care package is a central strategy to this goal.

4.1.4 National Policy on Injection Safety and Health Care Waste Management, 2004

The policy aims at ensuring safe injection practices and proper management of healthcare waste through appropriate procurement, distribution and monitoring of equipment/supplies and increased awareness.

4.2 Legal Framework

4.2.1 Constitution of the Republic of Uganda, 1995

The 1995 Uganda Constitution provides that every person has a right to own property [Section 26.1] and that no person shall be deprived of property or any interest in or right over property without payment of fair and adequate compensation. The same constitution gives government powers to acquire land (compulsory acquisition) in public interest [Article 273(a)].

The Constitution [Chapter 3, Article 17J] entrusts Government with the duty of ensuring that Ugandans enjoy a healthy environment.

4.2.2 National Environment Act, Cap 153

The National Environment Act (Chapter 153 of Laws of Uganda) establishes and defines functions of NEMA as a body responsible for management, monitoring and supervision of all environmental conservation activities (Section 4). This act provides for various strategies and tools for environment management, which also includes the EIA (Section 19) for projects likely to have significant environmental impacts. The Act also mandates NEMA with a leading role to review environmental impact statements. NEMA sets multimedia environmental standards (Sections 24-32) to prevent contamination of air, water and soil resources. The Act also mandates NEMA with responsibility for in-situ and ex-situ conservation of biological fauna and flora resources either on land or in water (Sections 42 and 43). Section 48 empowers NEMA, district environment committees and local environment committees to be responsible for monitoring of local land-use plans, which should be in conformity with national land-use plan. Section 106 outlines provisions to enable compliance with obligations of international environmental conventions.

Section 35 entrusts NEMA, lead agencies and local government environment committees with powers to protect the environment from human activities that could adversely affect it. Section 56 prohibits discharge of hazardous substances, chemicals, oil, etc. into the environment except in accordance with guidelines prescribed by NEMA.
The Act outlines principles of environmental management and rights to a decent environment and also sets out principles for:

- institutional arrangements;
- environmental planning;
- environmental regulations;
- environmental standards;
- environmental restoration orders and easements;
- records, inspection and analysis;
- financial instruments;
- offences;
- judicial proceedings; and
- international obligations.

The *Third Schedule* of the National Environment Act (Cap 153) does not specifically list healthcare facilities under scheduled projects, nonetheless, two sections thereof related to function or waste management mean that these facilities are not exonerated from the general EIA process. Section 12 on the Schedule requires that projects related to:

a) sites solid waste disposal  
b) sites for hazardous waste disposal  
c) sewage disposal  
d) atmospheric emissions  
e) offensive odors

should undertake a full EIA.

This Act also formed the basis for enactment of the Environmental Impact Assessment Guidelines, 1997 and Environmental Impact Assessment Regulations, 1998 which together prescribe the EIA process in Uganda. The process is schematically presented in NEMA’s Environmental Impact Assessment (EIA) Reference Manual as shown in figure below.
4.2.3 Land Act, Cap 227

The Land Act provides for tenure, ownership and management of land. Land is to be used in compliance with relevant national laws such as listed in Section 43 including the Water Act...
and National Environment Act. Section 44 reiterates the constitutional mandate for government or a local government to protect environmentally-sensitive areas for the common good of the people in Uganda. The Act describes land ownership types of tenure of and echoes requirement of the Constitution to equitably compensate persons losing land to a given development.

4.2.4 Local Governments Act, Cap 243

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

4.2.5 Public Health Act, Cap 281

Section 105 of the Public Health Act, 1964 requires local authorities to take measures to prevent pollution of public water resources. This Act aims at avoiding pollution of environmental resources that support health and livelihoods of communities.

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

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>National discharge standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD₅ (mg/l)</td>
<td>50</td>
</tr>
<tr>
<td>Suspended solids (mg/l)</td>
<td>100</td>
</tr>
<tr>
<td>Faecal coliforms</td>
<td>10,000 counts/100ml</td>
</tr>
<tr>
<td>Chlorine residual (mg/l)</td>
<td>1 mg/l</td>
</tr>
<tr>
<td>pH</td>
<td>6-8</td>
</tr>
<tr>
<td>Phenols (µg/l)</td>
<td>0.2 mg/l</td>
</tr>
<tr>
<td>Oil and grease (mg/l)</td>
<td>10 mg/l</td>
</tr>
<tr>
<td>Total Phosphorus (mg/l)</td>
<td>10 mg/l</td>
</tr>
<tr>
<td>Temperature</td>
<td>20-35°C</td>
</tr>
</tbody>
</table>


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

Part III Section 8 (1) requires facility operators, to use the best practicable means to ensure that the emission of noise does not exceed the permissible noise levels. The regulations require that persons to be exposed to occupational noise exceeding 85 dBA for eight hours in a day should be provided with requisite ear protection.
Table 9: Regulatory noise limits

<table>
<thead>
<tr>
<th>Facility</th>
<th>Noise limits dB (A) (Leq)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day*</td>
</tr>
<tr>
<td>Construction sites</td>
<td>75</td>
</tr>
</tbody>
</table>

*Time frame: Day 6.00 a.m -10.00 p.m; Night 10.00 p.m. - 6.00 a.m.


These regulations would be applicable during project construction activities.

4.2.8 National Environment (Waste Management) Regulations, 1999

These regulations require waste disposal in a way that would not contaminate water, soil, and air or impact public health. According to the regulations, waste haulage and disposal should be done by licensed entities.

4.2.9 Draft National Air Quality Standards, 2006

The draft national air quality standards provide the following regulatory limits (Table 10).

Table 10: Uganda’s regulatory air quality standards for selected pollutants

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Averaging time for ambient air</th>
<th>Standard for ambient air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide (CO₂)</td>
<td>8 hr</td>
<td>9.0 ppm</td>
</tr>
<tr>
<td>Carbon monoxide (CO)</td>
<td>8 hr</td>
<td>9.0 ppm</td>
</tr>
<tr>
<td>Hydrocarbons</td>
<td>24 hr</td>
<td>5 mg m⁻³</td>
</tr>
<tr>
<td>Nitrogen oxides (NOₓ)</td>
<td>24 hr 1 year arithmetic mean</td>
<td>0.10 ppm</td>
</tr>
<tr>
<td>Smoke</td>
<td>Not to exceed 5 minutes in any one hour</td>
<td>Ringlemann scale No.2 or 40% observed at 6m or more</td>
</tr>
<tr>
<td>Soot</td>
<td>24 hr</td>
<td>500 µg Nm⁻³</td>
</tr>
<tr>
<td>Sulphur dioxide (SO₂)</td>
<td>24 hr</td>
<td>0.15 ppm</td>
</tr>
<tr>
<td>Sulphur trioxide (SO₃)</td>
<td>24 hr</td>
<td>200 µg Nm⁻³</td>
</tr>
</tbody>
</table>

Note: ppm = parts per million; "N" in µg/Nm⁻³ connotes normal atmospheric conditions of pressure and temperature (25°C and 1 atmosphere).

4.2.10 Employment Act, 2006

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

i) Prohibiting forced labor, discrimination and sexual harassment at workplaces (Part II; Part IV).
ii) Providing for labor inspection by the relevant ministry (Part III).
iii) Stipulating rights and duties in employment (weekly rest, working hours, annual leave, maternity and paternity leaves, sick pay, etc. (Part VI).
iv) Continuity of employment (continuous service, seasonal employment, etc (Part VIII).
4.2.11 Historical and Monuments Act, 1967

This Act provides for the preservation and protection of historical monuments. The Act prohibits any person from carrying out activities on or in relation to any object declared to be preserved or protected. This applies to Kikamulo HC IV in Nakaseke District which is located near a war memorial.

4.2.12 Occupational Safety and Health Act (2006)

The Act replaces the Factories Act (1964). It departs from the original listing of “don’ts” and adopts a scientific approach in which technical measures required for protection of workers are prescribed, hence taking on a “preventive approach”.

The Act provides for prevention and protection of persons at all workplaces from injuries, diseases, death and damage to property. It covers not just the “factory” (as did the Factories Act) but also any workplace where persons are employed and its provisions extend not just to employees but to any other persons that may be legitimately present in a workplace and are at risk of injury or disease. Employers must protect workers from adverse weather and provide clean and healthy work environment, sanitary conveniences, sanitary and protective gear. For this project this Act is applicable relation to protection of health workers (and medical waste collectors) against secondary injuries during execution of their work.

4.3 Institutional Framework

4.3.1 National Environmental Management Authority (NEMA)

The National Environmental Act, Cap 153 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 (MoWE) 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 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.

4.3.2 Ministry of Health (MoH)

This project will be executed by MoH which is to undertake policy formulation, quality assurance, coordination, monitoring and evaluation of health service delivery in Uganda.
4.3.3 Ministry of Gender, Labor & Social Development

This ministry sets policy direction and monitoring functions related to labor, gender and general social development. Its OHS unit 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 healthcare facilities.

4.3.4 District Local Administration Structures

The proposed project is within a number of jurisdictions of a number of Districts headed by a Local Council 5 (LC5) 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, Wetlands Officer, Land Office, 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.

4.4 World Bank Group Guidelines

This project has been benchmarked against World Bank Group (WBG) standards since IDA is one of the 5 member organizations of the WBG.

These standards, practices or guidelines are discussed below.

4.4.1 World Bank Operating Policies

The World Bank requires environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. Environmental Assessment is one of the 10 environmental and social Safeguard Policies that WBG uses to examine potential environmental risks and benefits associated with Bank lending operations. The Bank's Environmental Assessment policy and procedures are described in Operational Policy/Bank Procedures - OP/BP 4.01.

Detailed advice and guidance on the conduct of environmental assessment is provided publicly by the World Bank in its Environmental Sourcebook and updates. During project preparation, the World Bank examines the implications of the proposed project for a series of policies below:

1. Environmental Assessment;
2. Natural Habitats;
3. Forestry;
4. Pest Management;
5. Cultural Property;

6. Indigenous Peoples;  
7. Involuntary Resettlement;  
8. Safety of Dams;  
9. Projects in International Waters;  
10. Projects in Disputed Areas.

From the nature of proposed project and the fact that project activities would largely entail internal modifications of existing buildings, only policy 1 and 7 would be triggered by this project. Moreover Policy 7 would trigger only in isolated situations and on a small scale involving displacement of people who obtain primary or secondary livelihood from vending retail goods or services at healthcare premises. For healthcare facilities comprised in this report, this impact has not been encountered.

4.4.2 WB Guidelines

Under its “General EHS Guidelines (April 30, 2007)”, The World Bank has several guidelines shown in table below, many of which are applicable to various components of the proposed project namely:

i) Air emissions from onsite waste combustion units (“incinerators”)  
ii) Hazardous waste management  
iii) Noise  
iv) Occupational health and safety (against biological and radiological hazards).  
v) Community health and safety including traffic safety such as during project construction or disease prevention (where incinerators emission waft into and affect not only local communities but also patients visiting healthcare facilities).

vi) Construction and decommissioning.

Table 11: WBG General EHS Guidelines (April 30, 2007)

<table>
<thead>
<tr>
<th>1. Environmental</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Air Emissions and Ambient Air Quality</td>
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<tr>
<td>1.2 Energy Conservation</td>
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<tr>
<td>1.3 Wastewater and Ambient Water Quality</td>
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<td>1.4 Water Conservation</td>
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<tr>
<td>1.5 Hazardous Materials Management</td>
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<tr>
<td>1.6 Waste Management</td>
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<td>1.7 Noise</td>
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<tr>
<td>1.8 Contaminated Land</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Occupational Health and Safety</th>
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</thead>
<tbody>
<tr>
<td>2.1 General Facility Design and Operation</td>
</tr>
<tr>
<td>2.2 Communication and Training</td>
</tr>
<tr>
<td>2.3 Physical Hazards</td>
</tr>
<tr>
<td>2.4 Chemical Hazards</td>
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<tr>
<td>2.5 Biological Hazards</td>
</tr>
<tr>
<td>2.6 Radiological Hazards</td>
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<tr>
<td>2.7 Personal Protective Equipment (PPE)</td>
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<td>2.8 Special Hazard Environments</td>
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<td>2.9 Monitoring</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Community Health and Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Water Quality and Availability</td>
</tr>
<tr>
<td>3.2 Structural Safety of Project Infrastructure</td>
</tr>
<tr>
<td>3.3 Life and Fire Safety (L&amp;FS)</td>
</tr>
<tr>
<td>3.4 Traffic Safety</td>
</tr>
</tbody>
</table>
While most of above WBG guidelines apply to the proposed project in one way or the other, in sections below are discussed four environmental, health and safety (EHS) guidelines, namely:

i) EHS Guidelines - AIR EMISSIONS AND AMBIENT AIR QUALITY  
ii) EHS Guidelines - WASTE MANAGEMENT  
iii) EHS Guidelines - HEALTH CARE FACILITIES  
iv) EHS Guidelines - HAZARDOUS MATERIALS MANAGEMENT  
v) EHS Guidelines - CONSTRUCTION AND DECOMMISSIONING

4.4.1.1 WBG EHS Guidelines: “Air emissions and ambient air quality”

a) General approach

These guidelines require projects with “significant” sources of air emissions, and potential for significant impacts to ambient air quality to prevent or minimize impacts by ensuring that emissions do not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards by applying national legislated standards (or in their absence, the current WHO Air Quality Guidelines, or other internationally recognized sources). Uganda currently has (draft) national air quality standards applicable to this project, specifically incinerator emissions. The standards however make no mention of dioxins which are potent cancer-inducing, expected in incineration emissions.

In these guidelines “significant” refers to sources which can contribute a net emissions increase of one or more of the following pollutants within a given airshed:

- Particulate matter of size 10 microns (PM$_{10}$): 50 tons per year (tpy);
- Oxides of nitrogen (NOx): 500 tpy;
- Sulphur dioxide (SO$_2$): 500 tpy; or as established through national legislation;
- Equivalent heat input of 50 MWth or greater.

Going by this classification, all onsite incineration units at existing healthcare facilities are “non-significant” sources since no unit at any of the project facilities had capacity to generate the foregoing levels of air pollutants. Two national documents on healthcare waste indicate that healthcare facilities, depending on their service level, generate the following average quantities of medical waste:

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1 **Significant** sources of point and fugitive emissions in these (WBG) guidelines are considered to be general sources which can contribute a net emissions increase of one or more of the following pollutants within a given airshed: PM$_{10}$: 50 tons per year (tpy); NOx: 500 tpy; SO$_2$: 500 tpy; or as established through national legislation; and combustion sources with an equivalent heat input of 50 MWth or greater. The significance of emissions of inorganic and organic pollutants should be established on a project-specific basis taking into account toxic and other properties of the pollutant.

- Hospital: 0.1 kg/bed/day (excluding pathological waste)
- Health center 4 (HC IV): 1.5 kg/day
- Health center 3 (HC III): 0.6 kg/day
- Health center 2 (HC II): 0.5 kg/day

The fact that onsite incineration units burn small waste volumes and generate low levels of emissions could be the reason such “non-significant” units are not provided with (and probably do not require) emissions control.

It should nonetheless be noted WBG guidelines advise that impact significance of emission of inorganic and organic pollutants should be established on a project-specific basis taking into account toxic and other properties of the pollutant. While emissions from such small combustion units are considered low and, with a sufficiently tall stack, would be easily dispersed in the atmosphere with little health risk, locating incineration units close to dwellings and healthcare buildings poses a risk of downwash and emissions wafting into indoor environment - a paradoxical situation for facilities supposed to heal the sick.

Plate 18: Typical incinerators at most existing healthcare facilities, commonly built with burnt clay or earth bricks, cement and mortal. A small diameter iron pipe can be fitted for a stack (right) but often (left) emissions are emitted at a height of about 3 meters which limits dispersion, promotes downwash and ingress into nearby buildings. In some cases paraffin is used to initiate combustion (left) and incineration ash dumped in either earth pits or closed masonry (cemented) pits.
Incineration emissions from healthcare facilities may contain significant amounts of particulate matter, heavy metals, dioxins, furans, sulfurdioxide and hydrochloric acid. Of key concern are dioxins which are potent cancer-inducing compounds\(^1\).

The temperatures needed to breakdown dioxin are typically not reached when burning waste in open air (200-400°C) causing high dioxin emissions. Dioxin can only be destroyed above 850°C, otherwise it remains in atmosphere emissions or in incineration ash where it can leach into groundwater when rain falls on ash piles.

\(b\) Emissions control recommendations

To control emission from small combustion sources, WBG guidelines provide several recommendations but in the context of this project, one factor that can be improved is incinerator stack height. Indeed the guidelines advise that stack height for all point sources of emissions, (whether “significant” or not\(^2\)) should be designed according to good international industry practice (GIIP) (see Figure 2) to avoid high ground-level pollutant concentrations due to downwash, building wakes or eddy effects and to ensure reasonable dispersion to minimize environmental or health impacts. These guidelines also recommend annual stack emission testing for NOx and SO\(_2\).

\(c\) Implication for this project

For this project, unless space is a critical limitation, this stack design approach should be adopted wherever incinerators are installed during renovation of healthcare facilities.

The guidelines discourage open-burning of solid wastes, whether hazardous or non-hazardous, is not considered good practice and should be avoided, as the generation of polluting emissions from this type of source cannot be controlled.

While small onsite incineration units handling minimal healthcare waste volumes might not require emission control according to these Guidelines, the management including disposal of healthcare waste has become an issue of growing concern in many places in Uganda. Infectious medical waste has been dumped indiscriminately, burned uncontrollably and buried irresponsibly posing considerable public health risk. To abate this impact, government should start to think of a medium-term approach where medical waste is incinerated at centralized (local, regional or national) facilities designed to offer the following social-environmental benefits:

- Total destruction of hazardous constituents (e.g. dioxins only destroyed >850°C).
- Destruction of Infectious Waste.
- Scrub or treat to remove obnoxious gaseous emissions (dioxins\(^3\), respirable particulates or PM\(_{2.5}\), mercury, etc).
- Assured process control.
- Cost-effective operation.

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\(^1\) Note that WBG EHS Guidelines: “Healthcare facilities” give air emission levels for hospital waste incineration facilities.

\(^2\) Non-significant sources of emissions or small combustion sources are those with a total rated heat input capacity of less than 50MWth.

\(^3\) In developed countries, incineration facilities are required to destroy or remove dioxins with efficiency 99.9999% (the four-9 efficiency requirement).
This approach would necessitate appropriate policy and regulatory framework to induce private sector involvement.

4.4.1.2 WBG EHS Guidelines: “Waste management”

4.4.1.2.1 General approach

These guidelines apply to both non-hazardous and hazardous waste. They advocate for waste management planning where waste should be characterized according to: composition, source, types, and generation rates.

This is essential for healthcare facilities comprised in this project since most of them neither expended effort to segregate medical from domestic waste nor maintain generation records.

These guidelines call for implementation of a waste management hierarchy that comprises prevention, recycling/reuse; treatment and disposal. The guidelines require segregation of conventional waste from hazardous waste streams and if generation of hazardous waste cannot be prevented (as is the case at healthcare facilities), its management should focus on prevention of harm to health, safety, and environment, according to the following principles:

- Understanding potential impacts and risks associated with management of any generated hazardous waste during its complete lifecycle.
- Ensuring that people handling, treating and disposing of hazardous waste are reputable and legitimate enterprises, licensed by the relevant regulatory agencies and following good industry practice.
- Ensuring compliance with applicable regulations.
b) Implication for this project

Other than a large hospital (Moroto in this “Eastern Region” category), all other healthcare facilities will generate relatively small quantities of (hazardous and non-hazardous) waste and for such small generators, the Guidelines recommend monitoring to include:

i) Regular visual inspection of all waste storage collection and storage areas for evidence of accidental releases and to verify that wastes are properly labeled and stored.

ii) Regular audits of waste segregation and collection practices.

iii) Tracking of waste generation trends by type and amount of waste generated, preferably by facility departments.

iv) Keeping manifests or other records that document the amount of waste generated and its destination.

v) Periodic auditing of third party treatment and disposal services including re-use and recycling facilities when significant quantities of hazardous wastes are managed by third parties. Whenever possible, audits should include site visits to the treatment storage and disposal location.

4.4.1.3  WBG EHS Guidelines: “Healthcare facilities”

a) Applicability

The EHS Guidelines for healthcare facilities include information relevant to management of EHS issues associated with healthcare facilities (HCF) which includes a diverse range of facilities and activities involving general hospitals and small inpatient primary care hospitals, as well as outpatient facilities. Ancillary facilities may include medical laboratories and mortuary centers.

These guidelines are applicable for planning new HCFs or renovation of existing facilities.

b) Healthcare facility design considerations

These guidelines advise that design and functional layout of HCFs should ensure the following:

- Separation of clean / sterilized and dirty / contaminated materials and people flows;
- Development and inclusion of adequate disinfection / sterilization procedures and facilities;
- Adequate space for the storage of recyclable materials (e.g. cardboard and plastic) for pickup;
- Ventilation systems that provide isolation and protection from airborne infections;
- Design of water systems to provide adequate supplies of potable water to reduce risks of exposure waterborne pathogens;
- Provision of hazardous material and waste storage and handling areas;
- Selection of easily cleaned building materials that do not support microbiological growth, are slip-resistant, non-toxic, and non-allergenic, and do not include volatile organic compound (VOC)-emitting paints and sealants.

1 Internationally recognized guidelines for design and construction of hospitals and HCFs include American Institute of Architects (AIA) and the Facility Guidelines Institute (FGI), the American Society for Healthcare Engineering (ASHE) of the American Hospital Association (AHA), and the Green Guide for Healthcare.
c) Waste management

Waste from health care facilities (HCF) can be divided into two groups:

- General waste similar in composition to domestic waste, generated during administrative, housekeeping, and maintenance functions.
- Specific categories of hazardous healthcare waste (see Table 12).

Health care facilities should establish, operate and maintain a health care waste management system (HWMS) adequate for the scale and type of activities and identified hazards but entailing:

i) Waste minimization, reuse, and recycling
ii) Waste segregation at the point of generation,
iii) On-site handling, collection, transport and storage based on safe practices below

- Seal and replace waste bags and containers when they are approximately three quarters full. Full bags and containers should be replaced immediately.
- Identify and label waste bags and containers properly prior to removal.
- Transport waste to storage areas on designated trolleys / carts, which should be cleaned and disinfected regularly.
- Waste storage areas should be located within the facility and sized to the quantities of waste generated.
- Unless refrigerated storage is possible, storage times between generation and treatment of waste should not exceed (in Warm climate) 48 hours during cool season, 24 hours during hot season.
- Store radioactive waste in containers to limit dispersion, and secure behind lead shields.
- Packaging containers for sharps should be puncture-proof.

These guidelines recognize incineration as a key source of air emission at healthcare facilities and pollutants emitted from incineration include:

i) Heavy metals
ii) Organics in flue gas
iii) Various organic compounds (dioxins and furans)
iv) Hydrogen chloride (HCl) and fluorides and potentially other halogens-hydrides (e.g. bromine and iodine)
v) Typical combustion products such as sulfur oxides (SOx), nitrogen oxides (NOx), volatile organic compounds, monoxide (CO), carbon dioxide (CO2), and nitrous oxide (N2O).
vi) Incineration residues such as fly ash and bottom ash may contain high concentrations of persistent organic pollutants (POPs).

For being ineffective in regard to emissions control, these WBG Guidelines caution against use of single-chamber and brick incinerators should be used only as a last resort option.

The Guidelines advise against mixing domestic and hazardous waste. Waste should be segregated at point of generation and non-hazardous waste, such as paper and cardboard,
glass, aluminum and plastic, should be collected separately for possible recycling. Food waste should be segregated and composted. Infectious and / or hazardous wastes should be identified and segregated according to its category using a color-coded system (see Table 12 which provides good reference information for especially HC facility operators). If different types of waste are mixed accidentally, waste should be treated as hazardous.

d) Occupational health and safety

HCF health and safety hazards may affect healthcare providers, cleaning and maintenance personnel, and workers involved in waste management handling, treatment and disposal. Typical hazards which should be prevented with proper safety gear and practices include:

- Exposure to infections and diseases (blood-borne pathogens, and other potential infectious materials (OPIM))
- Exposure to hazardous materials / waste
- Fire safety
- Exposure to radiation

Occupational radiation exposure may result from equipment emitting X-rays and gamma rays (e.g. CT scanners), radiotherapy machines, and equipment for nuclear medicine activities. HCF operators should develop a comprehensive plan to control radiation exposure in consultation with the affected workforce. This plan should be refined and revised as soon as practicable on the basis of assessments of actual radiation exposure conditions, and radiation control measures should be designed and implemented accordingly.

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1 According to US Occupational Safety and Health Administration (OSHA), blood-borne pathogens are pathogenic microorganisms that are present in human blood and can cause disease in humans, including human immunodeficiency virus (HIV), hepatitis B virus (HIB), and hepatitis C virus (HCV). Other potentially infectious materials (OPIM) refers to (1) The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids; (2) Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and (3) HIV-containing cell or tissue cultures, organ cultures, and HIV- or hepatitis B virus (HBV)-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.
<table>
<thead>
<tr>
<th>Type of waste</th>
<th>Summary of treatment and disposal options / notes</th>
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<tbody>
<tr>
<td><strong>Infectious waste</strong>: Includes waste suspected to contain pathogens (e.g., bacteria, viruses, parasites, or fungi) in sufficient concentration or quantity to cause disease in susceptible hosts. Includes pathological and anatomical material (e.g., tissues, organs, body parts, human fetuses, animal carcasses, blood, and other body fluids), clothes, dressings, equipment / instruments, and other items that may have come into contact with infectious materials.</td>
<td>Waste Segregation Strategy: Yellow or red colored bag / container, marked “infectious” with international infectious symbol. Strong, leak proof plastic bag, or container capable of being autoclaved. Treatment: Chemical disinfection; Wet thermal treatment; Microwave irradiation; Safe burial on hospital premises; Sanitary landfill; Incineration (Rotary kiln; pyrolytic incinerator; single-chamber incinerator; drum or brick incinerator) • Highly infectious waste, such as cultures from lab work, should be sterilized using wet thermal treatment, such as autoclaving. • Anatomical waste should be treated using Incineration (Rotary kiln; pyrolytic incinerator; single-chamber incinerator; drum or brick incinerator).</td>
</tr>
<tr>
<td><strong>Sharps</strong>: Includes needles, scalpels, blades, knives, infusion sets, saws, broken glass, and nails etc.</td>
<td>Waste Segregation Strategy: Yellow or red color code, marked “Sharps”. Rigid, impermeable, puncture-proof container (e.g. steel or hard plastic) with cover. Sharps containers should be placed in a sealed, yellow bag labeled “infectious waste”. Treatment: Chemical disinfection; Wet thermal treatment; Microwave irradiation; Encapsulation; Safe burial on hospital premises; Incineration (Rotary kiln; pyrolytic incinerator; single-chamber incinerator; drum or brick incinerator) • Following incineration, residues should be landfilled. • Sharps disinfected with chlorinated solutions should not be incinerated due to risk of generating POPs. • Needles and syringes should undergo mechanical mutilation (e.g. milling or crushing) prior to wet thermal treatment</td>
</tr>
<tr>
<td><strong>Pharmaceutical waste</strong>: Includes expired, unused, spoiled, and contaminated pharmaceutical products, drugs, vaccines, and sera that are no longer needed, including containers and other potentially contaminated materials (e.g. drug bottles vials, tubing etc.).</td>
<td>Waste Segregation Strategy: Brown bag / container. Leak-proof plastic bag or container. Treatment: Sanitary landfill; Encapsulation; Discharge to sewer; Return expired drugs to supplier; Incineration (Rotary kiln; pyrolytic incinerator); Safe burial on hospital premises as a last resort. • Small quantities: Landfill disposal acceptable, however cytotoxic and narcotic drugs should not be landfilled. Discharge to sewer only for mild, liquid pharmaceuticals, not antibiotics or cytotoxic drugs, and into a large water flow. Incineration acceptable in pyrolytic or rotary kiln incinerators, provided pharmaceuticals do not exceed 1 percent of total waste to avoid hazardous air emissions. Intravenous fluids (e.g. salts, amino acids) should be crushed and disposed of with sharps. • Large quantities: Incineration at temperatures exceeding 1200 °C. Encapsulation in metal drums. Landfilling not recommended unless encapsulated in metal drums and groundwater contamination risk is minimal.</td>
</tr>
<tr>
<td><strong>Genotoxic / cytotoxic waste</strong>: Genotoxic waste may have mutagenic, teratogenic, or carcinogenic properties, and typically arises from the feces, urine, and vomit of patients receiving cytostatic drugs, and from treatment with chemicals and radioactive materials. Cytotoxic drugs are commonly used in oncology and radiology departments as part of cancer treatments.</td>
<td>Waste Segregation Strategy: See above for “infectious waste”. Cytotoxic waste should be labeled “Cytotoxic waste”. Treatment: Return expired drugs to supplier; Chemical degradation; Encapsulation; Inertization; Incineration (Rotary kiln, pyrolytic incinerator); • Cytotoxic waste should not be landfilled or discharged to sewer systems. • Incineration is preferred disposal option. Waste should be returned to supplier where incineration is not an option. Incineration should be undertaken at specific temperatures and time specifications for particular drugs. Most municipal or single chamber incinerators are not adequate for cytotoxic waste disposal. Open burning of waste is not acceptable.</td>
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<tr>
<td><strong>Chemical waste</strong>: Waste may be hazardous depending on the toxic, corrosive, flammable, reactive, and genotoxic properties. Chemical waste may be in solid, liquid, or gaseous form and is generated through use of chemicals during diagnostic / experimental work, cleaning, housekeeping, and disinfection. Chemicals typically include formaldehyde, photographic chemicals, halogenated and nonhalogenated solvents, organic chemicals for cleaning / disinfecting, and various inorganic chemicals (e.g. acids and alkalis).</td>
<td>Waste Segregation Strategy: Brown bag / container. Leak-proof plastic bag or container resistant to chemical corrosion effects. Treatment: Return unused chemicals to supplier; Encapsulation; Safe burial on hospital premises; Incineration (Pyrolytic incinerator); • Facilities should have permits for disposal of general chemical waste (e.g. sugars, amino acids, salts) to sewer systems. • Small hazardous quantities: Pyrolytic incineration, encapsulation, or landfilling. • Large hazardous quantities: Transported to appropriate facilities for disposal, or returned to the original supplier using shipping arrangements that abide by the Basel Convention. Large quantities of chemical waste should not be encapsulated or landfilled.</td>
</tr>
<tr>
<td>Type of waste</td>
<td>Summary of treatment and disposal options / notes</td>
</tr>
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<td>---------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------</td>
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</tbody>
</table>
| **Radioactive waste**: Includes solid, liquid, and gaseous materials that have been contaminated with radionuclides. Radioactive waste originates from activities such as organ imaging, tumor localization, radiotherapy, and research / clinical laboratory procedures, among others, and may include glassware, syringes, solutions, and excreta from treated patients. | Waste Segregation Strategy: Lead box, labeled with the radioactive symbol.  
| **Waste with high content of heavy metals**: Batteries, broken thermometers, blood pressure gauges, (e.g. mercury and cadmium content). | Waste Segregation Strategy: Waste containing heavy metals should be separated from general health care waste.  
Treatment: Safe storage site designed for final disposal of hazardous waste.  
- Waste should not be burned, incinerated, or landfilled. Transport to specialized facilities for metal recovery. |
| **Pressurized containers**: Includes containers / cartridges / cylinders for nitrous oxide, ethylene oxide, oxygen, nitrogen, carbon dioxide, compressed air and other gases. | Waste Segregation Strategy: Pressurized containers should be separated from general health care waste.  
Treatment: Recycling and reuse; Crushing followed by landfill  
- Incineration is not an option due to explosion risks  
- Halogenated agents in liquid form should be disposed of as chemical waste. |
| **General health care waste** (including food waste and paper, plastics, cardboard): | Waste Segregation Strategy: Black bag / container. Halogenated plastics such as PVC should be separated from general health care facility waste to avoid disposal through incineration and associated hazardous air emissions from exhaust gases (e.g. hydrochloric acids and dioxins).  
Treatment: Disposal as part of domestic waste. Food waste should be segregated and composted. Component wastes (e.g. paper, cardboard, recyclable plastics [PET, PE, PP], glass) should be segregated and sent for recycling where available. |

Notes:  
a. Small quantities only
e) **Air emission levels for hospital waste incineration facilities**

WBG Guidelines advise the following emission levels of healthcare waste incinerators.

**Table 13: Air emission levels for hospital waste incineration facilities (WBG Guidelines)**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Unit</th>
<th>Guideline value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Particulate matter (PM)</td>
<td>mg/Nm³</td>
<td>10</td>
</tr>
<tr>
<td>Hydrogen Chloride (HCl)</td>
<td>mg/Nm³</td>
<td>10</td>
</tr>
<tr>
<td>Total organic carbon (TOC)</td>
<td>mg/Nm³</td>
<td>10</td>
</tr>
<tr>
<td>Hydrogen Fluoride (HF)</td>
<td>mg/Nm³</td>
<td>1</td>
</tr>
<tr>
<td>Sulfur dioxide (SO₂)</td>
<td>mg/Nm³</td>
<td>50</td>
</tr>
<tr>
<td>Carbon Monoxide (CO)</td>
<td>mg/Nm³</td>
<td>50</td>
</tr>
<tr>
<td>NOX</td>
<td>mg/Nm³</td>
<td>200-400*</td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>mg/Nm³</td>
<td>0.05</td>
</tr>
<tr>
<td>Sb, As, Pb, Cr, Co, Cu, Mn, Ni,</td>
<td>mg/Nm³</td>
<td>0.05</td>
</tr>
<tr>
<td>V Polychlorinated dibenzodioxin</td>
<td>ng/Nm³</td>
<td>0.1</td>
</tr>
<tr>
<td>and dibenzofuran (PCDD/F)</td>
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</tbody>
</table>

**Notes:**

- a. 200 mg/m³ for new plants or for existing incinerators with a nominal capacity exceeding 6 tonnes per hour; 400 mg/m³ for existing incinerators with a nominal capacity of 6 tonnes per hour or less.
- b. Oxygen level for incinerators is 7 percent.

4.4.1.4 **WBG EHS Guidelines: “Hazardous materials management”**

- **a) Application and approach**

These guidelines apply to projects that use, store, or handle any quantity of hazardous materials (Hazmats), defined as materials that represent a risk to human health, property, or the environment due to their physical or chemical characteristics. Hazmats can be classified according to the hazard as explosives; compressed gases, including toxic or flammable gases; flammable liquids; flammable solids; oxidizing substances; toxic materials; radioactive material; and corrosive substances.

- **b) General hazardous materials management**

Facilities which manufacture, handle, use, or store hazardous materials should establish management programs that are commensurate with the potential risks present. The main objectives of projects involving hazardous materials should be the protection of the workforce and the prevention and control of releases and accidents. These objectives should be addressed by integrating prevention and control measures, management actions, and procedures into day-to-day business activities.

4.4.1.5 **WBG EHS Guidelines: “Construction and decommissioning”**

These provide guidance, specific guidance on prevention and control of community health and safety impacts that may occur during new project development or due to expansion or modification of existing facilities. By thematic categories, they address three major aspects (environment, OHS and community health and safety) below.

- **i) Environment:**
Noise and Vibration: During construction and decommissioning activities, noise and vibration may be caused by the operation of pile drivers, earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and people.

Air Quality: Project will involve demolition of walls inside existing healthcare facilities and this could generate fugitive dust affecting adjoining rooms or service areas. A secondary source of emissions may include exhaust from diesel engines of earth moving equipment, as well as from open burning of construction and demolition waste on-site.

Solid Waste: During project implementation, non-hazardous solid waste generated at construction sites would include, scrap wood, glass cullet and metal and demolition rubble.

Hazardous Materials: Asbestos roofing might be encountered on old buildings.

ii) Occupational Health and Safety

Likely OHS risks during proposed renovation of HCFs include over-exertion, slips and falls, work at heights, hotworks (welding), electrocution, being struck by objects, injury by moving machinery and dust from demolition activities.

iii) Community Health and Safety:

The guidelines recommend implementation of risk management strategies to protect general community from physical, chemical, or other hazards associated with sites under construction and decommissioning. Key areas to consider are:

- General site hazards: where renovation activities can injure people in or near buildings under renovation or construction.
- Disease Prevention: ensuring that risk of disease from construction-related activities (e.g. from water ponding).
- Traffic Safety: Construction activities may result in a significant increase in movement of heavy vehicles for the transport of construction materials and equipment increasing the risk of traffic-related accidents and injuries to workers and local communities.

4.4.2 Comparison of Uganda Standards and WBG Requirements

All key principles of the World Bank Operation Policies have been incorporated into the new IFC Performance Standards. There are differences between Uganda’s guidelines and those of the WBG, not only about waste management and air quality but also resettlement as outlined in Table 14.
Table 14: Comparison of Uganda requirements and those of WBG including IFC

<table>
<thead>
<tr>
<th>Issue</th>
<th>Uganda requirement</th>
<th>IFC</th>
<th>World Bank requirement</th>
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<tbody>
<tr>
<td><strong>Social and Environmental Assessment and Management System</strong></td>
<td>EIA process based on 13 categories listed in the Third Schedule of The National Environment Act (Cap 153) as projects that must have EIA undertaken.</td>
<td>Documentation and processes are driven by risks and impacts, not project categorization.</td>
<td>Driven by project categorization.</td>
</tr>
<tr>
<td>Involuntary Resettlement</td>
<td>Ugandan EIA guidelines/ regulations have no specific guidelines on resettlement action plans (RAP) apart from requiring analysis of social impact assessment.</td>
<td>Requires clients to establish a grievance mechanism.</td>
<td>No equivalent requirement in OP 4.01.</td>
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<tr>
<td>Healthcare Waste Management</td>
<td>Uganda has no specific environmental guidelines for healthcare sector.</td>
<td>Guidelines exist: (<a href="http://www.ifc.org/ifcext/enviro.nsf/Content/EnvironmentalGuidelines">www.ifc.org/ifcext/enviro.nsf/Content/EnvironmentalGuidelines</a>)</td>
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<tr>
<td><strong>Incineration and emissions control</strong></td>
<td>No national standards on design or general performance of incineration facilities. Emissions from incineration facilities expected to comply with national (draft) air quality standards. Uganda’s air quality standards make no mention of dioxins (known carcinogenic or cancer-inducing) compounds from combustion / incineration facilities.</td>
<td>Detailed guidelines on incineration at healthcare facilities provided in: “Environmental, Health and Safety Guidelines-HEALTHCARE FACILITIES”.</td>
<td>World Bank has air quality standards (World Bank Group EHS Guidelines: AIR EMISSIONS AND AMBIENT AIR QUALITY, April 2007) for continuous point source emissions sources. “Environmental, Health and Safety Guidelines-HEALTHCARE FACILITIES” detail air emission levels for hospital waste incineration facilities including dioxins.</td>
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</table>
| **Air quality standards** | Uganda’s national air quality standards do not specify size/ capacity of facility they apply to. | WBG Guidelines apply to significant emissions sources which are able to contribute a net emissions increase of one or more of the following pollutants within a given airshed:  
- PM$_{10}$: 50 tons per year (tpy);  
- NOx: 500 tpy;  
- SO$_2$: 500 tpy;  
- Combustion sources with an equivalent heat input of 50 MWth or greater. | |

Appendix 3 provides an evaluation of various incinerator types considered for adoption by Ministry of Health, none of which has emissions scrubbing (treatment) provisions.
5 Analysis of Alternatives

Analysis of alternatives presented here is aimed towards identification of practical options that would eliminate adverse impacts of the proposed project.

5.1 "No-Action" Scenario

The “no-action” option would eliminate the opportunity to improve healthcare services much needed by the Healthcare Sector especially for the poor, potential jobs creation, and secondary socio-economic benefits, which the proposed development would have created. Simply because there is no capability for a healthcare facility to handle surgery does not mean there are no patients in communities who require such series. Similarly, it is not true that a health center without capability to care for prematurely born babies does not encounter this need.

5.2 “Action” Scenario

The major benefits of the proposed project lie in improving availability and access to modern medical services apparently not available due to lack of equipment and dilapidated infrastructure or facilities at almost every healthcare facility in Uganda.

5.3 Power Supply

Due to irregularities of the national grid power supply, solar power supply or a diesel generator will be necessary at most rural healthcare facilities without grid supply. This would ensure effective use of, and maximum benefit from new equipment to be supplied to these facilities.

5.4 Stack Design for Small Incineration Units

To reduce air pollution from small onsite medical waste incineration units, there is need to alter design of stacks to avoid or reduce indoor air pollution and elevated ground level pollutant concentration due to plume downwash where such units are located close to healthcare facilities buildings. The recommended stack design based on WGB EHS Guidelines is shown in Figure 2 (Section 4.4.1.1).
6 Potential Socio-Environmental Impacts

6.1 Introduction

For the proposed development, potential positive and negative impacts were identified both for the construction phase and operation phases. Throughout this report, impacts have been characterized as;

a) “Positive” when they;
   - Enhance socio-economic welfare e.g. health, employment,
   - Enhance quality of existing environment.

b) “Negative” when they;
   - Reduce socio-economic welfare of people,
   - Reduce quality of existing environment,
   - Reduce economic value e.g. of surrounding property.

c) “First order” (or direct) impacts;
   - Are directly caused by a specific action as the primary effects.
   - Occur at the same time and location as the action.

d) “Second order” (or indirect) impacts result from effects of the first order impacts.

e) “Third order” impacts are result from incremental effects of second order impacts.

f) “Reversible” impacts can be completely reversed while “Irreversible” impacts cannot be completely reversed.

g) “Short-term” impacts last only a short duration probably a few days or months.

h) “Medium-term” impacts could last a few years.

i) “Long-term” impacts would persist for many years or decades.

6.2 Construction-Phase Impacts

6.2.1 Positive impacts

6.2.1.1 Income to material/ equipment suppliers and contractors

Proposed renovation of health centers will necessitate procurement of equipment, construction materials and service, providing income to suppliers and contractors. This is a positive but short-term and reversible impact. Considering that construction labor would be local or national but medical equipment procured internationally, this impact has local, national and international spatial extent.

This impact could be enhanced by measures proposed below.

Enhancement measure

Earth materials needed for construction e.g. murram, aggregate (stone, sand) are obtained from quarry operations. Conscious or unwitting purchase of these materials from unlicensed operations indirectly supports, encourages and promotes environmental degradation at illegal quarry sites and can cause medium- to long-term negative impacts. It should therefore be a contractual obligation for contractors to procure construction materials from legitimate or licensed sources (as advised by local authorities).
6.2.2 Negative impacts

6.2.2.1 Occupational health safety (OHS) Risks for Contractors

**Impact identification**

At all sites, renovation works will have the following occupational health and safety risks with potential to cause serious injuries to workers:

- Exposure to asbestos containing materials. The Maternity Ward at Kiyunga had an asbestos roof.
- Burns from welding (hot works)
- Falls from working at heights or wet surfaces
- Electrocution
- Noise and body vibration during demolition
- Injury from falling or flying debris when demolishing walls

**Impact evaluation**

OHS impacts will occur at every facility under renovation and while some accidents could be minor and not life threatening, others can be grave leading to permanent disability or loss of life of construction workers.

Ugandan and WBG Guidelines require that workers exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day wear hearing protection. Related OHS safeguards are comprised in (Uganda’s) Occupational Safety & Health Act (2006) and Employment Act, 2006.

**Impact severity**

Duration of the impact will be short-term occurring only during the construction phase. Extent of the impact will be local or national depending on origin of construction workers. The likelihood of the impact occurring is medium considering the usually low level of safety at construction sites in Uganda. Significance of this impact is therefore predicted to be high.

**Impact significance**

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**Impact mitigation**

- Contractors should provide all workers with requisite protective gear (Table 15).
- Contractor should provide onsite toilet and washing water for workers.
Table 15: Personal Protective Equipment According to Hazard

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<tr>
<th>Objective</th>
<th>Workplace hazards</th>
<th>Suggested PPE</th>
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<tr>
<td>Eye and face protection</td>
<td>Flying particles</td>
<td>Safety glasses</td>
</tr>
<tr>
<td>Head protection</td>
<td>Falling objects, inadequate height clearance, and overhead power cords</td>
<td>Plastic hard hats with top and side impact protection</td>
</tr>
<tr>
<td>Hearing protection</td>
<td>Noise</td>
<td>Ear plugs or muffs</td>
</tr>
<tr>
<td>Foot protection</td>
<td>Falling or rolling objects, pointed objects</td>
<td>Safety shoes and boots</td>
</tr>
<tr>
<td>Hand protection</td>
<td>Hazardous materials, cuts or lacerations</td>
<td>Gloves made of rubber or synthetic materials</td>
</tr>
<tr>
<td>Respiratory protection</td>
<td>Dust</td>
<td>Facemasks filters for dust removal</td>
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<tr>
<td>Body/leg protection</td>
<td>Hazardous materials, biological agents, cuttings and lacerations.</td>
<td>Overalls</td>
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<tr>
<td>Protection against falls</td>
<td>Working on slippery, wet floors</td>
<td>Rubber boots</td>
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<td></td>
<td>Fatal falls from working at heights</td>
<td>Safety latches (fall arrestors)</td>
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**Impact management**

Project supervising engineers (of MoH) should inspect contractors’ compliance with safety precautions during construction. A grievance mechanism to address complaints shall be in place (Section 7.2).

**6.2.2.2 Injury to patients or healthcare staff by construction activities**

**Impact identification**

Renovation works would not close off visits to healthcare facilities by patients neither would inpatients be required to vacate facilities being worked on. For facilities where renovation entails modification of internal built environment, it is planned to temporarily relocate patients and medical services to adjoining rooms to allow demolition and reconstruction of new or bigger service areas such as wards or operating theaters. Moroto Hospital will be demolished and reconstructed but similarly, no change would be made in patient admissions. Construction will be phased or temporary use made of adjacent buildings to ensure the same number of patients is handled during reconstruction. However, construction work undertaken in the same buildings having patients has potential to cause injuries to patients or health workers.

**Impact evaluation**

Impact on patients and health workers could be due to falling debris or tripping on strewn demolition rubble. These effects might either be minor or fatal if for example fatal falls were suffered by geriatric people or pregnant women.

Construction noise and vibration from manual or motorized demolition activities could affect patients and health workers especially those with heart disorders.

**Impact severity**

This impact will likely occur at every facility under renovation. Duration of the impact will be short-term occurring only during the construction phase. Extent of this impact will be local limited to buildings renovated (when at the same time occupied by patients or health workers). However secondary effects of this impact could be of wider spatial extent affecting
family and dependants of injured persons. Some injuries or loss of life are irreversible. The likelihood of the impact occurring is *medium* (or high) considering the usually low level of safety at most construction sites in Uganda. Significance of this impact is therefore predicted to be *high*.

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**Impact mitigation**

- Contractors should cordon off areas under construction.
- Ensure good housekeeping and clean operations always immediately removing rubble strewn outside construction areas.
- Construction workers should be aware of the sensitive nature of workplaces they are operating in and advised to limit verbal noise or other forms of noise. For example, metallic objects or tools can be passed on to a colleague below to be quietly laid down instead of dropping them on cement/ concrete floors with loud bangs.
- The contractor should ensure that noise levels emanating from machinery, vehicles and noisy construction activities are kept at a minimum for the safety, health and protection of people in buildings being renovated.
- Contractors should use screens or nets to avoid flying debris.

**Impact management**

Besides supervision by MoH engineers, contractors’ contracts can have a clause authorizing a senior healthcare administrator / superintendent at each facility to advise contractors against excessive noise when s(he) notices it.

Wherever space is available, instead of moving patients and service areas to rooms immediately adjoining construction areas, the ideal option should be to use free areas safely distant from construction effects.

A grievance mechanism to address complaints from community shall be in place (Section 7.2).

**6.2.2.3 Indoor air quality deterioration due to dust**

**Impact identification**

Demolition to modify internal built environment will lead to considerable levels of indoor cement dust which can affect workers and patients.
Impact evaluation

Deteriorated indoor air quality would be of critical effect to especially asthmatic construction workers, patients and health workers with either minor or severe health impact depending on level and duration of exposure.

Impact severity

Impact duration will be short-term occurring only during the construction phase. Extent of this impact will be local limited to interior of buildings being renovated. The likelihood of the impact occurring is high when control measures are not instituted but it is reversible. Significance of this impact is high especially if it affected already ailing patients.

This impact will potentially happen at every facility but especially at Budaka HCIV whose service areas has been partitioned into small rooms and Budondo HCIV.

Considering spatial extent and concentration level, dust impact would be more significant at Moroto Hospital. This is because not only is it the largest facility to be renovated in Eastern region category, but also rather than internal modifications, Moroto Hospital will be demolished and rebuilt.

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Impact mitigation

- Contractors should use dust screens or nets in windows, doorways and ventilators of rooms where demolition or other dusty construction activities are occurring.

- Ensure good housekeeping and clean construction operations where, among other necessary actions, dust should be quickly swept off cement floors and collected in covered containers.

Impact management

A senior healthcare administrator or superintendent at each facility should have authority to inspect and restrain contractors from generating excessive dust within healthcare buildings.

To minimize indoor dust, portable extraction systems are recommended but they might not be available among local contractors, or lack of electricity on site might limit their use. Water sprays are not practical and could lead to indoor flooding of surrounding rooms or service areas occupied by patients. A grievance mechanism to address complaints from community shall be in place (Section 7.2).
6.2.2.4 Traffic accidents

Impact identification

Construction activities may result in a significant increase in number of heavy vehicles during transport of construction materials and equipment, increasing community risk of traffic-related accidents or injuries to workers.

Impact evaluation

Traffic accidents would be a significant social impact and especially likely to involve children, women (who commonly cross roads slower than men), disabled and elderly people.

Impact severity

Impact duration will be short-term occurring only during the construction phase. Extent of this impact will be on all roads plied by project vehicles. The likelihood of the impact occurring is high when control measures are not instituted. The social cost and significance of this impact is high especially if it involved loss of human life which is also irreversible.

Specific HCF with potential road accident risk from construction traffic are Nankoma HC IV, Buyinja HC IV and Kibuku HC IV located in trading centers near primary schools.

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Impact mitigation

a) Adopt best transport safety practices with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public, as follows:

- Emphasizing safety aspects among project drivers. Specifically ensure drivers respect speed limits through built areas and urban centers.
- Adopting limits for trip duration and arranging driver rosters to avoid overtiredness
- Avoiding dangerous routes and times of day to reduce the risk of accidents
- Position traffic guides at children crossings to control diver speeds.
- Employ safe traffic control measures, including road signs and flag persons to warn of dangerous conditions and children crossings.

b) Ensure contractors regularly maintain vehicles to minimize potentially serious accidents such as those caused by brake failure commonly associated with loaded construction trucks.
**Impact management**

i) Ensure contractors compile a list of scheduled service schedules of all equipment deployed on site.

ii) Pedestrian interaction with construction vehicles can be minimized by:

- Collaboration with local communities and responsible authorities (e.g. police) to improve signage, visibility and overall safety of roads particularly along stretches located near schools or through trading centers. Collaborating with local communities on education about traffic safety (e.g. one road safety campaign at a nearby once a month).
- Using locally sourced materials, whenever possible, to minimize transport distances.
- Wherever they would be necessary, encourage contractors to locate associated facilities such as worker camps close to project sites.

iii) A grievance mechanism to address community complaints shall be in place (Section 7.2).

### 6.2.2.5 Improper management of demolition (and general construction) waste

**Impact identification**

At each healthcare facility, renovation activities will involve demolition and construction activities that might generate considerable waste comprising brick and concrete rubble, metal, glass cullet and timber waste. Considering that most facilities are over 40-50 years old, presence of lead in paint on walls to be demolished may not be ruled out.

**Impact evaluation**

Improper disposal of construction waste could have environmental and public health impacts. This is of particular concern if demolition rubble contains friable asbestos. This would especially be significant at Kiyunga some buildings had asbestos roofs.

Plate 19: An asbestos roof building at Kiyunga HCIV
Impact severity

Inappropriate disposal of construction waste can have medium or long-term environmental and public health impact. Extent of this impact will be local to areas where waste is dumped or their immediate neighbourhoods. Likelihood of the impact occurring is high considering prevalent lack of facilities (monofills\textsuperscript{1} or even general waste landfills) to handle construction waste in all areas comprising project facilities. Where inappropriately dumped construction waste contaminates environmental resources (soil and water) in communities or causes public health effects, significance of this impact would be high.

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Impact mitigation

- Contractors should undertake waste segregation at source to separate hazardous from non-hazardous waste.
- Identify an area where asbestos containing material can be buried (and marked).
- Waste (such as metal scrap or wood waste) that can be reused/recycled may be given to local people.
- Seek guidance of local environmental officers to identify acceptable disposal sites.

Impact management

Supervising engineers and local environmental officers should ensure that contractors do not illegally dump waste in non-designated areas. Local environmental officers (District, Town/Municipal Environmental Officers) should be facilitated to undertake active monitoring roles during construction period (expected to last 1 year for each lot). A grievance mechanism to address complaints from community shall be in place (Section 7.2).

6.2.2.6 Temporary disruption of healthcare services

Impact identification

Since facilities under renovation would not be closed, modifications of buildings in which medical services are provided may entail moving patients or equipment from one area or room to another. This may cause temporary disruption in delivery of health services to patients at facilities under renovation.

\textsuperscript{1} Monofills are landfills designed for disposal of only one type of waste.
Impact evaluation

Temporary rearrangement of service areas can have the undesirable consequence of slowing down emergency services or cause inability among health workers to efficiently offer necessary treatment for visiting patients. Movement of equipment may cause their damage.

Impact severity

This impact is short-term but can have long-term and irreversible impacts (such as where human life is lost). Extent of this impact will be mostly local to facilities under renovation although, due to the disturbance, some patients might choose to transfer to alternative healthcare facilities, leading to their congestion.

The impact will potentially occur at every facility in this project. Likelihood of the impact occurring is high and significance is therefore predicted to be medium-high.

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Impact mitigation

Plan pre-construction activities early to identify suitable rooms or adjoining buildings into which patients or service areas can be relocated with minimal inconvenience, especially to patients under intensive care.

Impact management

Contractors should work closely and harmoniously with healthcare facility administrators to find practical ways to minimize social cost of temporary disruption of services.

6.2.2.7 Social misdemeanor by construction workers

While most workers may originate from the local community where they have families, there might be others from distant places and working away from their families. Contractors might be lionized as being wealthy by local people especially for HCFs in rural settings or trading centers. With some disposable income to spend, this might induce illicit sexual relationships, with attendant risk for spread of HIV/AIDS.

Impact evaluation

Irresponsible sexual relationships in project communities can break families and heighten risk of contracting HIV/AIDS. This is likely in Lugazi town which was noted to have high population of prostitutes.
Impact severity

Illicit sexual relationships can be short-term but have long-term and irreversible effects (HIV/AIDS). If this impact occurred, extent of disease spread would be local or national depending on origin and next destination of infected persons. The impact will potentially occur at every facility in this project. Likelihood of the impact occurring is high if contractors do not adequately sensitize workers about responsible and safe behaviour. Although it is a cumulative impact, its significance is predicted to be high.

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Impact mitigation

- As a contractual obligation, contractors should be required to have an HIV/AIDS policy and a framework (responsible staff, action plan, etc.) to implement during project execution.
- All construction workers should be orientated and sensitized about responsible sexual behavior in project communities.

Impact management

Where a contractor has a centralized camp for construction workers, posters about HIV/AIDS prevention should be displayed in communal areas. Free condoms should be provided in private areas such as toilets. Where construction workers live in a camp, a strict “No fraternization” policy should be maintained and workers restricted to leave or enter camp after 6 PM to discourage prostitution.

6.2.2.8 Impact of material transport

Impact identification

Various materials required for renovation works (steel, sand, blocks/bricks, lumber, gravel, etc.) will be transported to sites from various suppliers. This poses impacts associated with spills or dusting during transportation.

Impact evaluation

In the case of fine materials (crushed stone aggregate, sand, murrum), dusting or spills on roadways can degrade local air quality or worsen driving conditions increasing risk of road accidents (e.g. shattering windscreens).
This impact will manifest for Kawolo Hospital, Budaka HC IV which are accessible by paved roads. This indirect, short-term but reversible impact will not be as significant on gravel roads as would be on these paved carriageways.

**Impact severity**

Impact duration is short-term only lasting the construction period, but secondary effects of road accidents will be long-term and possibly irreversible. Unless mitigation measures are instituted, likelihood of the impact occurring is high. Considering the relatively small quantities of materials needed during renovation of each facility (hence low traffic volume) impact severity is low, hence *low-medium* significance.

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**Mitigation**

Fine earth materials (sand, murram) should be covered during haulage to facilities under renovation to prevent spillage and dusting. Haulage trucks should have tailgates that close properly and tarpaulins to cover material being transported. The cleanup of spilled earth and construction material on the paved roads should be a responsibility of the Contractor and should be done in a timely manner (say within 2 hours) so as not to inconvenience or endanger road users. These requirements should be included as clauses in contractor’s contracts (see Appendix 5).

**Impact management**

The management of adverse impacts associated with materials haulage can be achieved not only through implementation above mitigation actions but also surveillance and supervision of construction contractors. Also see Section 6.2.3.4 (Traffic accidents). A grievance mechanism to address complaints from community shall be in place (Section 7.2).

**6.2.2.9 Temporary scenic blight**

**Impact identification**

Construction activities will require material, equipment and cordons at healthcare facilities. Since facilities under renovation would not be closed from access by public, presence of these activities and materials thereof will cause temporary visual blight at all sites.
**Impact evaluation**

Presence of construction activities will alter visual impressions accustomed to at existing healthcare facilities.

**Impact severity**

Duration of visual impact will be short-term only lasting only the construction period. Likelihood of the impact occurring is high but considering the dilapidated state of all existing healthcare facilities under this project, this impact will have low significance.

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**Mitigation**

Wherever possible, contractors should ensure minimal footprint of construction activities.

**Impact management**

All unnecessary equipment should be removed from site as soon as possible.

**6.3 Operation Phase Impacts**

6.3.1 Positive impacts

6.3.1.1 Improved medical services at healthcare facilities

The project will positively impact health of Ugandans through easing access to quality medical care currently nonexistent at these facilities. Renovation of facilities and installation of medical equipment will enable currently ineffective healthcare facilities provide new or improved services to patients.

A key benefit to women is opportunity to safely deliver children in a medical environment where existing healthcare facilities did not have maternity wards or capability to handle complicated deliveries through medical / theatre operations.

Renovation of HCF will save money for poor people when it is no longer necessary to travel to distant medical facilities for healthcare services. This is a long-term secondary benefit.
Enhancement measures

i) Renovation of healthcare facilities should be matched with commensurate staffing with medical personnel adequately trained in use of newly installed equipment. Equipment that cannot be operated to benefit improved service delivery would not have significant merit to recipient communities.

ii) Some rural healthcare facilities lacked grid electricity relying on solar or onsite diesel generators to operate equipment but mostly for lighting. At some facilities (e.g. at Budaka HCIV and Bugono HCIV) patients had to purchase fuel to run an onsite electricity generator.

A key necessity therefore is to ensure power supply, not only for lighting but also to operate equipment, so as to derive maximum value from installed equipment and renovated healthcare facilities. Although they do not provide a steady power supply required by some sensitive medical equipment, diesel generators are necessary at healthcare facilities which have no grid power supply. Where generators exist, this ESIA study established, most HCF do not afford fuel required to run them when required, the reason solar power should also be considered in the energy options.

6.3.1.2 Improvement in livelihoods and local economies

Improved healthcare will reduce morbidity, improve labor productivity and household incomes leading to the long-term benefit of improved local economies.

Enhancement measure

Mostly same as in 6.3.1.1 but additionally, local leaders and microfinance institutions should be instrumental in identifying, supporting and promoting viable economic opportunities in which local people can participate.

6.3.1.3 Employment opportunities

Equipping healthcare facilities with modern equipment, enabling provision of new healthcare services and resultant increase in visiting patients may create additional long-term technical and non-technical job opportunities for medical professionals, janitors, security guards, etc.

6.3.1.4 Reduced public risks due to improvement in healthcare waste management

Proper management of medical waste involving segregation of hazardous from non-hazardous streams and safe disposal would mitigate existing public health risk associated with improper disposal of healthcare waste.

Properly designed healthcare waste incineration units without stack plume downwash would avoid offsite health risk associated with incineration emissions.

Enhancement measure

- Healthcare facilities should undertake regular monitoring of waste management practices including incineration.
Within 12-36 months after construction works, healthcare facilities should undertake annual environmental audits for completed facilities according to Section 31 (2) of national “Environmental Impact Assessment Regulations, 1998” excerpted below.

31. (2) Within a period of not less than 12 months and not more than 36 months after completion of a project or commencement of its operations, whichever is earlier, the developer shall undertake an initial environmental audit of the project.

Audits have been recommended and provided for in EMP (see 6.3.1.4 of Table 20)

6.3.1.5 Improved aesthetics and life of healthcare facilities

Some buildings at Bulisa HC IV, which are generally not different from ones commonly found at other healthcare facilities, have for example been condemned as unfit for occupation. Renovation will improve aesthetics of healthcare facilities which, in present state, look dilapidated. Renovation will also give healthcare buildings and equipment extended life.

Enhancement measure

Engineering design for proposed renovation works should incorporate a plan for routine maintenance.

6.3.2 Negative impacts

Key negative impacts during operation of renovated healthcare facilities will arise from:

i) Community risk due to improper waste management (including medical waste, emissions to air and wastewater discharges,
ii) Misuse or inability to use installed equipment for improved service delivery,
iii) Lack of maintenance, hence facilities degenerating to decay again,
iv) Occupational risk to health workers,
v) Fire risk.

If they occurred, the above would mostly be cumulative impacts since they were observed at almost all facilities comprising the proposed project.

6.3.2.1 Air pollution from onsite incinerators

Impact identification

Incineration of hospital waste if carried out in inappropriate facilities could result into localized pollution of air with pollutants such as respirable ash, furans and dioxins. Dioxins are known to promote cancers in humans.

Impact evaluation

Downwash of incinerator emissions has potential to degrade indoor air quality of healthcare buildings or those of nearby offsite buildings.
Impact severity

Duration of onsite and offsite air pollution would be long-term lasting entire life on incineration units unless the deficient units are either decommissioned or improved. Likelihood of the impact occurring is high unless incinerator stack design proposed in WBG EHS Guidelines: “Air emissions and ambient air quality” (see Section 4.4.1.1) is adopted. Considering the gravity of potential air pollution on health of patients and nearby communities, this impact will have high significance especially at Budaka HC IV where the incinerator was located close to residential dwellings in nearby community and staff housing.

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Mitigation

- Adopt stack design herein recommended (see Section 4.4.1.1).
- Ensure operator of incineration unit is adequately trained to ensure efficient operation.
- Consultations with potentially affected people should be done by design consultant to inform siting of incinerator at each site.

Impact management

- **Engineering design** of stacks on onsite brick incinerators should follow good international industry practice (GIIP) as outlined in World Bank’s EHS Guidelines: Air emissions and ambient air quality, April 2007.
- **Inspection/ monitoring**: Healthcare administrators should undertake regular visual inspection of incinerator stack for incidents of downwash and undertake annual monitoring of air quality or a general environmental audit of entire healthcare facility.
- **Training** of incinerator operators is important for them to be familiar with basic principles and routine practices. For example homogenization of waste is crucial to ensure efficient and complete combustion during incineration to avoid generation of dioxins for instance when wet waste batches quench flames and lower combustion temperature below levels at which such pollutants are destroyed.

6.3.2.2 Community health risk due to improper waste management

Impact identification

Improper waste disposal can cause public health risks due to environmental pollution: impaired air quality, stormwater contamination of water courses or when people and children rummage through raw waste stockpiles. Wastewater did not seem to pose considerable disposal challenge since all facilities either had onsite septic systems or sewage lagoons.
Impact evaluation
As already indicated, plume downwash leads to chronic exposure of nearby communities to potent air pollutants including dioxins.

Infections (e.g. Hepatitis B) sustained when people or children rummage through improperly dumped infectious waste can be life-threatening.

Impact severity
Unless mitigation recommendations are implemented, this impact will occur at all healthcare facilities. Likelihood of the impact occurring is high if incinerator stack designs are flawed or proper solid medical waste management practices are not instituted. Although it is a local cumulative impact, public health due to improper healthcare waste management has high impact significance.

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Impact mitigation
Ensure proper waste management practices as recommended in the study on improvement of healthcare waste management in Uganda\(^1\).

Impact management

- Undertake annual environmental audit of entire healthcare facility including waste management practices
- Ensure regular monitoring of solid, liquid waste management practices and incineration.
- Ensure proper management of pharmaceutical waste by engaging a consultant to come develop measures and guidelines in accordance with the national healthcare waste management plan.
- To ensure proper sewage management lagoons should be constructed where they do not exist.
- MoH should develop measures for proper management of expired pharmaceutical drugs

\(^1\) MoH 2005 (revised march 2009): Improvement of healthcare waste management in Uganda (conducted by Carl Bro)
6.3.2.3  Occupational health and safety risks

Impact identification

Medical facilities are a potential source of infectious waste in gaseous, liquid or solid forms. These could pose unsafe conditions for healthcare staff. Of particular concern are janitors handling infectious waste (including sharps) without adequate protective gear, storage of sharps in containers that are not puncture-proof and management of radioactive waste at healthcare facilities where x-ray equipment will be installed. While some OHS risks will be new borne by equipment or services introduced after renovation or upgrade of facilities, most other effects are existing (hence cumulative) and would only be acerbated by increased scale of healthcare services.

Below is a list of OHS risk sources for healthcare staff:

i) Lack of adequate lighting in workplaces
ii) Lack of safe access particularly for disabled employees
iii) Inadequate ventilation in rooms
iv) Lack of adequate training (or neglect of safety precautions/ guidelines) in use of medical equipment
v) Misuse of equipment and materials for functions they are not designed
vi) Lack of safety signage in specific areas (e.g. X-ray rooms)
vii) Electrical hazard
viii) Eye hazards such as splashes in laboratories and operating rooms
ix) Chemical hazards (acids, alkalis, expired drugs, oxidizing and reactive chemicals)
x) Radiological Hazards
xi) Biological Hazards (blood or other body fluids with potential to cause diseases).

Biological agents can be classified into four groups\(^1\):

1: Biological agents unlikely to cause human disease;

2: Biological agents that can cause human disease and are likely to require additional controls, but are unlikely to spread to the community;

3: Biological agents that can cause severe human disease, present a serious hazard to workers, and may present a risk of spreading to the community, for which there usually is effective prophylaxis or treatment available and are thereby likely to require extensive additional controls;

4: Biological agents that can cause severe human disease, are a serious hazard to workers, and present a high risk of spreading to the community, for which there is usually no effective prophylaxis or treatment available.

During routine facilities maintenance or repair, burns from welding / hot works or falls from working at heights might also occur.

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\(^1\) World Health Organization (WHO) Classification of Infective Microorganisms by Risk Group (2004).
**Impact evaluation**

A considerable number of healthcare workers get life threatening infections in the course of their normal duties. This is a negative and in some cases irreversible health impact.

**Impact severity**

Likelihood of the impact occurring is *high* unless control measures are instituted. Although it is a cumulative impact, the risk to human health has *high* significance.

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**Impact mitigation**

The primary measure to mitigate OHS impacts is *prevention* which entails identification of risks and instituting pro-active measures to avoid them. In part this can be achieved by following GIIP or national guidelines. For unavoidable risks, personal protective equipment (PPE) should be provided to workers.

Places of work involving occupational exposure to ionizing radiation should be provided with requisite protection established and operated in accordance with recognized international safety standards and guidelines. The acceptable effective dose limits appear in Table 16.

**Impact management**

Each healthcare facility should have a systemic risk management plan comprising risk prevention, evacuation of accident victims, evaluation and improvement measures.

**6.3.2.4 Fire risk**

**Impact identification**

Without provisions for fire safety, there is a risk of fire outbreak at healthcare facilities with disastrous life and financial impact. Fires can start from ignitable materials in laboratories, cigarette smoking in non-designated places or old electrical connections.
**Impact evaluation**

A large fire at healthcare facilities would have significant human and financial impact. Nankoma HCIV, Budaka HCIV, Budondo HCIV have no sufficient space even in stores and this could pose a fire risk.

**Impact severity**

Likelihood of the impact occurring is *medium-high* since almost all healthcare facilities lacked fire extinguishers. The impact would be local in spatial extent affecting onsite facilities, patients, health workers and neighbouring communities with possibly irreversible impacts. Impact significance is therefore *high*.

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**Impact mitigation**

- Provide fire extinguishers to healthcare facilities during their renovation.
- Key healthcare staff should have basic training in fire control
- Fire emergency telephone numbers should be displaced in communal areas

**Impact management**

- Each healthcare facility should have a fire emergency management plan.
- Undertake fire drills at healthcare facility, at a minimum once a year.

6.3.2.5  Misuse or inability to use installed equipment

**Impact identification**

This project would be in vain if healthcare staff had no requisite training and skill to use installed equipment for improved service delivery. This would be a significant, negative medium-term but reversible impact.

**Impact mitigation**

Provide requisite training during equipment installation.

**Impact management**

Through regular supervision, ensure only trained authorised personnel operate equipment.
6.3.2.6 Not maintaining improved facilities

When improved facilities are not continually maintained, they would quickly degenerate to pre-project condition. This would be a negative, significant medium-term impact of local spatial extent but reversible.

**Impact mitigation**

Facility renovation should entail a maintenance plan.

**Impact management**

Provide a maintenance budget and Local conditions should be considered in the plan. For instance Buvuma Island has a big challenge of termites infestation that quickly destroys wooden structures. This is the reason they recommend renovation works to utilize metallic door, windows and fixtures to reduce replacement and maintenance costs.
7 Impact Monitoring & Management Plan

This environmental-socio management plan, ESMP (Table 20) for proposed renovation works of healthcare facilities, identifies potential environmental and social aspects that should be monitored. It identifies parties responsible for monitoring actions, associated costs, indicators and training or capacity building needs and reporting. Various aspects of the ESMP are detailed in sections below

7.1 Institutional arrangements

a) Institutional structure and responsibilities

Institutional responsibility of implementing this ESMP will rest with the Project Coordination Unit, PCU (or Task Team) at MOH. A key role of the unit would be among others, to review consultants’ reports for compliance with the ESMP. Other roles will be:

- Monitoring implementation of mitigation actions by contractors
- Coordinating training and capacity building where planned
- Periodically report to IDA about implementation of the ESMP

The Project Coordination Unit is led by a Project Coordinator (PC), assisted by a Deputy Project Coordinator (DPC) under whom are 9 Component Coordinators (CC) each for areas such as Human Resource, Health Infrastructure, Leadership & Management, etc. Under CCs are 11 Focal Persons (FP) who have supervisory roles and are responsible for collecting information about respective components. Supervision of implementing this ESMP will under the Health Infrastructure component by the “Senior Engineer-Sanitary” in the Environmental Health Division.

MoH affirmed that all its personnel to be involved in implementation of this ESMP are adequately qualified and were appointed based on their qualification and suitability for respective roles. There is thus no training provided for them under this ESMP.

Oversight to ensure mitigation actions are implemented will rest with the Health Infrastructure Division (HID) at Ministry of Health but health workers at facility level, Project Coordination Unit, In-charge Officials of each facilities and Clerk of Works will have similar responsibility.

MoH shall require contractors to comply with this ESMP and where a contractor has an Environmental Officer (he) will undertake environmental supervision during construction. However, since construction duration is short (1 year) where a contractor does not have an Environmental Officer the supervising engineer or site manager/contract manager should be given environmental orientation relevant to this ESMP so as to execute required environmental supervision roles. This might not be necessary if the supervising engineer has working environmental knowledge (most civil engineers do). Additionally a “Clerk of Works” should be employed to represent client’s environmental objectives and interests during construction phase. As a hiring criterion, such a person
should have a background in environmental issues, particularly associated with construction projects.

In each District is found a District Environmental officer (DEO) responsible for overseeing environmental protection on behalf of NEMA. However in town councils and municipalities, this role is undertaken by Town- and Municipal Environmental Officers respectively. These will have implementation and monitoring roles during execution of this ESMP. Usually, these officials lack adequate facilitation so the project will need to provide auxiliary financial assistance for them to have effective participation in this project. This has been provided in the ESMP (Sec 6.2.2.5). Based on their professional knowledge or recommendations in this ESIA, local environmental officers may have role in project design as advisors to engineering consultants on aspects such as location of onsite incineration units.

b) Monitoring and reporting arrangements

Monitoring will verify if predicted impacts have actually occurred and check that mitigation actions recommended in the ESIA are implemented and their effectiveness. Monitoring will also identify any unforeseen impacts that might arise from project implementation.

**Who monitors and how:** Monitoring will be undertaken by MoH (PCU) and Environmental Officers who represent NEMA at local administrative. Monitoring by NEMA in this case can be considered “third party monitoring” but this is its regulatory mandate according to Sections 6 and 7 of the National Environment Act (Cap 135).

Another government agency that may undertake “third party monitoring” is the Occupational Health & Safety Department in Ministry of Gender, Labor & Social Development (MGLSD). This unit has authority to inspect any facility for compliance with national requirements on safety in workplaces. The project shall make no funding to MGLSD since this is provided for in its annual budget.

Monitoring will be done through site inspection, review of grievances logged by stakeholders and *ad hoc* discussions with potentially affected persons (construction workers, residents near HCFs, patients and healthcare staff). At each monitoring, a discussion with a chairperson of environment committee of the area’s local council (LC) could provide insight into views and grievances community has about the project.

**Frequency:** Monitoring will be undertaken monthly over the 1 year construction period.

**Audits:** Audits will be necessary both during construction and project operation. While construction audits will aim to verify compliance to impact mitigation requirements, post-construction audits are a regulatory requirement within 12 months and not more than 36 months after completion of construction, according to national EIA Regulations, 1998 Section 31(2).

Since construction duration is estimated to be 1 year, this ESMP has included a budget for 1 year’s construction audit and a separate provision so that from year 2 to 5th (4 audits) audits done are a full environmental audits as per Uganda requirements.
Both construction and post-construction audits can be conducted internally (by MoH) or by a consultant hired by MoH. If undertaken by a hired consultant, a budget has been proposed for both in this ESMP.

**Reporting:** Concise monthly monitoring reports should be compiled by MoH’s Project Coordination Unit (PCU) and shared with IDA or other interested stakeholders.

Construction- and post-construction phase auditing should culminate in reports that MoH shall share with IDA, NEMA or other interested stakeholders. Note that while MoH is under no obligation to disclose construction phase audits, annual post-construction audits must be submitted to NEMA as a regulatory requirement as per Section 31(2) of National EIA Regulations, 1998.

### 7.2 Grievance mechanism

This section describes avenues for affected persons to lodge a complaint or express a grievance against the project, its staff or contractors during project implementation. It also describes the procedures, roles and responsibilities for addressing grievances and resolving disputes. Every aggrieved person shall be able to trigger this mechanism to quickly resolve their complaints.

The objectives of the grievance process are:

i) Provide affected people with avenues for making a complaint or resolving any dispute that may arise during the course of land and asset acquisition, including during the process of moving homes;

ii) Ensure that appropriate and mutually acceptable corrective actions are identified and implemented to address complaints;

iii) Verify that complaints are satisfied with outcomes of corrective actions;

iv) Avoid the need to resort to judicial proceedings.

The grievance mechanism at each healthcare facility will be fed from three main sources:

- Community residents, patients or health workers.
- Supervising engineer, clerk of works or contractor.
- Monitoring team who will forward issues/concerns identified in the field.

Steps of the grievance process are described below. A flow chart outlining the main actions and decision points is shown in Figure 3.

**Step 1: Receipt of complaint**

A verbal or in written complaint from a complainant will be received by the Clerk of Works and recorded in a complaints log (s/he) keeps on site. The log will indicate grievances, date lodged, action taken to address complaint or reasons the grievance was not acted on; information provided to complainant and date the grievance was closed. Grievances should be lodged at any time, either directly to the Clerk of Works’ office or through the Local Council Chairperson. The process for lodging a complaint is outlined below:
i) Clerk of Works receives complaint(s) from complainant and records it in log (in English).

ii) Clerk of Works reads the recorded complaint translating it into local language for the complainant to confirm correct detail of complaint has been documented.

iii) Complainant signs the log to confirm grievance was accurately recorded.

**Step 2: Determination of corrective action**

If in his view, a grievance can be solved at this stage, the Clerk of Works will determine a corrective action in consultation with the aggrieved person. A description of remedial action(s) and time within which they must be accomplished and the party responsible for implementing them will be recorded in the complaint log.

Grievances will be resolved and status reported back to complainants within 5 days. If more time is required this will be communicated clearly and in advance to the aggrieved person. For cases that are not resolved within the stipulated time, detailed investigations will be undertaken and results discussed not more than 1 month from lodging a grievance.

**Step 3: Meeting with the complainant**

The proposed corrective action and the timeframe in which it is to be implemented will be discussed with the complainant within 5 days of receipt of the grievance. Consent to proceed with the corrective action will be sought from the complainant and witnessed by a local council chairperson (LC Chairman).

**Step 4: Implementation of corrective action**

Agreed corrective action will be undertaken by the project or its contractor within the agreed timeframe. The date of the completed action will be recorded in the log against the complainant's grievance.

**Step 5: Verification of corrective action**

To verify satisfaction, the aggrieved person will be asked to return if not satisfied with the corrective action.

**Step 6: Action by MoH and project contractors**

If the Clerk of Works cannot solve the grievance, he will refer it to MoH (and contractor) through the Supervising Engineer. It is believed all possible grievances can be solved at this level.

The grievance process to be followed is depicted in Figure 3 below.
Figure 3: Grievance management mechanism
### Table 17: Socio-Environmental Monitoring & Management Plan.

<table>
<thead>
<tr>
<th>Text Reference</th>
<th>Impact and Mitigation/Enhancement commitments</th>
<th>Desired Outcomes</th>
<th>Monitoring: Performance Indicators/Targets or Acceptance Criteria</th>
<th>Timing</th>
<th>Responsibility</th>
<th>Incremental Costs (USD) for all HCFs sites</th>
<th>Capacity Building and Training Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>6.2 CONSTRUCTION PHASE</strong></td>
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</tr>
</tbody>
</table>

#### 6.2.1 Income to equipment ad material suppliers

**Positive impact**

| Project will promote local procurement where technically or commercially reasonable and feasible. | Ensure that local communities and businesses benefit from procurement process | Number of local businesses benefiting from construction related procurement | Before and during commencement of construction/renovation | MoH and Contractor | Negligible | None |
| For earth materials, procure from legitimate sources to avoid encouraging environmental degradation | Project’s material demand does not encourage environmental degradation | All quarries from which materials (sand, stone) are obtained are licensed by the local authorities. | Before and during construction/renovation | MoH and Contractor | Negligible | None |

#### 6.2.2 Negative impacts

**OHS risks to construction workers**

| Contractor should provide PPE to all workers | Reduce health and safety risks to construction workers | Zero injuries in any month of construction phase | Before construction/renovation commences | MoH and Contractor | $2000 for a team of 50 workers at 1 HCF (hence $32,000 for 16 HCFs). | Application of various types of PPE and their proper use. |
| Contractor should provide onsite toilet and washing water for workers where they cannot use existing ones at healthcare facilities (either being inaccessible or razed during reconstruction) | Workers have adequate sanitary provisions | Ablution facilities exist on site | During construction/renovation | MoH | Negligible (should be part of contractor’s bid) | None |

#### 6.2.2.2 Injury to patients or healthcare workers by construction activities

<p>| Contractors should cordon off areas under construction and provide signage to warn of ongoing construction works. | Construction works do not cause injury to patients and health workers | Zero injuries in any month of construction phase | During construction/renovation | MoH and Contractor | Negligible | None |
| Ensure good housekeeping and clean | No demolition rubble is dangerously strewn | No demolition rubble strewn in | During construction/renovation | MoH and Contractor | Negligible | Good construction practices |</p>
<table>
<thead>
<tr>
<th>Text Reference</th>
<th>Impact and Mitigation/Enhancement commitments</th>
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<th>Monitoring: Performance Indicators/Targets or Acceptance Criteria</th>
<th>Timing</th>
<th>Responsibility</th>
<th>Incremental Costs (USD) for all HCFs sites</th>
<th>Capacity Building and Training Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>operations always removing immediately removing rubble strewn outside construction areas.</td>
<td>around healthcare facilities</td>
<td>rooms outside construction area</td>
<td>renovation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction workers should limit verbal noise or other forms of noise during renovation works inside medical buildings</td>
<td>No excessive construction noise</td>
<td>Patients and health workers do not complain about noise during renovation</td>
<td>During construction/renovation</td>
<td>MoH and Contractor</td>
<td>Negligible</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Contractors should use screens or nets to avoid flying debris and dust</td>
<td>No debris noted outside construction areas</td>
<td>No complaints about flying debris from construction areas (this should be verified by perusal of records in complaints log)</td>
<td>During construction/renovation</td>
<td>MoH and Contractor</td>
<td></td>
<td>$ 500 at 1 HCF (hence $8,000 for 16 HCFs)</td>
<td></td>
</tr>
<tr>
<td><strong>6.2.2.3</strong> Indoor air quality deterioration due to dust</td>
<td>Contractors should use dust screens or nets in windows, doorways and ventilators of rooms where demolition or other dusty construction activities are occurring</td>
<td>No excessive dust emissions noted outside construction areas</td>
<td>No complaints about excessive dust from construction areas (this should be verified by perusal of records in complaints log)</td>
<td>During construction/renovation</td>
<td>MoH and Contractor</td>
<td>Comprised in above cost (for control of flying debris)</td>
<td>None</td>
</tr>
<tr>
<td><strong>6.2.2.4</strong> Traffic accidents</td>
<td>Ensure drivers respect speed limits through built areas and urban centers.</td>
<td>No road accident by project traffic</td>
<td>No accident occurs in each month of construction duration</td>
<td>During construction/renovation</td>
<td>MoH and Contractor</td>
<td>Negligible</td>
<td>Contractor needs speed awareness through built areas and urban areas</td>
</tr>
<tr>
<td>Employ safe traffic control measures, including temporary road signs and flag persons to warn of dangerous conditions and children crossings</td>
<td>No road accident by project traffic</td>
<td>No accident occurs in each month of construction duration</td>
<td>During construction/renovation</td>
<td>MoH and Contractor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Text Reference</td>
<td>Impact and Mitigation/Enhancement commitments</td>
<td>Desired Outcomes</td>
<td>Monitoring: Performance Indicators/Targets or Acceptance Criteria</td>
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<td>Incremental Costs (USD) for all HCFs sites</td>
<td>Capacity Building and Training Requirements</td>
</tr>
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<td>--------------------------------------------</td>
</tr>
<tr>
<td>6.2.2.5</td>
<td>Improper management of demolition (and general construction) waste</td>
<td>Seek guidance of local environmental officers to identify acceptable disposal sites</td>
<td>Contractor has records of proper waste disposal indicating quantities dumped and location of dumping site,</td>
<td>No report of illegal waste dumping in non-designated areas</td>
<td>Throughout construction/renovation</td>
<td>MoH ; Contractor; Local Environmental Officer.</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contractors should undertake waste segregation at source to separate hazardous from non-hazardous waste</td>
<td>Hazardous waste separated from non-hazardous waste on site and each waste stream disposed of according to NEMA requirements in designated sites.</td>
<td>Separate containers on site for hazardous and non-hazardous waste on site</td>
<td>Throughout construction/renovation</td>
<td>MoH ; Contractor; Local Environmental Officer.</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Waste (such as metal scrap or wood waste) that can be reused/ recycled may be given to local people.</td>
<td>Amount of waste disposed of minimized by reuse, wherever feasible</td>
<td>Record of material types and estimated quantity diverted for reuse</td>
<td>Throughout construction/renovation</td>
<td>Contractor;</td>
<td>Negligible</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seek guidance of local environmental officers to identify acceptable disposal sites.</td>
<td>Waste disposed of at designated sites</td>
<td>No complaint of waste dumped illegally in non-designated sites</td>
<td>Throughout construction/renovation</td>
<td>Local Environmental Officer.</td>
<td>Negligible</td>
<td></td>
</tr>
</tbody>
</table>

6.2.2.6 Temporary disruption of healthcare services
<table>
<thead>
<tr>
<th>Text Reference</th>
<th>Impact and Mitigation/Enhancement commitments</th>
<th>Desired Outcomes</th>
<th>Monitoring: Performance Indicators/Targets or Acceptance Criteria</th>
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<th>Incremental Costs (USD) for all HCFs sites</th>
<th>Capacity Building and Training Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2.2.7 Social misdemeanor by construction workers</td>
<td>As a contractual obligation, contractors should be required to have an HIV/AIDS policy and a framework (responsible staff, action plan, etc) to implement it during project execution. Awareness training on HIV/AIDS should be provided to construction workers</td>
<td>No illicit sexual relationships among construction workers and local community</td>
<td>All construction workers are aware of HIV/AIDS risk and responsible living. All construction workers living in a camp adhere to a “No fraternization” and comply with latest entry time into camp (6PM) set to avoid prostitution.</td>
<td>Throughout construction/renovation</td>
<td>MoH</td>
<td>$ 600 for 500 HIV/AIDS posters/fliers and free condoms (hence $9600 for 16 HCF sites)</td>
<td>None</td>
</tr>
<tr>
<td>6.2.2.8 Impact of material transport</td>
<td>Fine earth materials (sand, murram) should be covered during haulage to facilities under renovation to prevent spillage and dusting Road dust should be controlled through bowssing or speed control</td>
<td>No material spills on roads during haulage to sites</td>
<td>No accidents caused by construction material split on road</td>
<td>Throughout construction/renovation</td>
<td>MoH; Contractor; Police</td>
<td>Negligible (this should be part of contractor’s bid)</td>
<td>None</td>
</tr>
<tr>
<td>Text Reference</td>
<td>Impact and Mitigation/Enhancement commitments</td>
<td>Desired Outcomes</td>
<td>Monitoring: Performance Indicators/Targets or Acceptance Criteria</td>
<td>Timing</td>
<td>Responsibility</td>
<td>Incremental Costs (USD) for all HCFs sites</td>
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<td>---------------------------------------------------------------</td>
<td>--------</td>
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<td>------------------------------------------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>6.2 (all subsections)</td>
<td>Impact of construction activities</td>
<td>Construction activities do not cause adverse socio-environmental impacts</td>
<td>Annual construction audits do not indicate adverse impacts not mitigated</td>
<td>1 time per year (NB. Estimated construction duration = 1 year per lot, see Table.4)</td>
<td>MoH (construction audit may be undertaken by MoH or consultant it hires)</td>
<td>USD4000 per location (hence USD64,000 for 16 sites)</td>
<td>Environmental auditing of construction projects</td>
</tr>
</tbody>
</table>

### 6.3 OPERATION PHASE

#### 6.3.1 Positive impacts

**6.3.1.1 Improved medical services at healthcare facilities**

Renovation of healthcare facilities should be matched with commensurate staffing with medical personnel adequately trained in use of newly installed equipment  

<table>
<thead>
<tr>
<th>Capacity Building and Training Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff training in operation of newly installed medical equipment</td>
</tr>
</tbody>
</table>

6.3.1.4 Reduced public risks due to improvement in healthcare waste management (including incineration)
<table>
<thead>
<tr>
<th>Text Reference</th>
<th>Impact and Mitigation/Enhancement commitments</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reduced public risks due to improvement in healthcare waste management</td>
<td>Medical waste and incinerator emissions do not cause offsite public health risk</td>
<td>Annual environmental audits find no plume downwash from incinerators. Incinerators stacks designed based on GIIP / WBG EHS guidelines No un-incinerated medical solid waste on premises or waste dumps</td>
<td>Undertake full environmental audit once per year</td>
<td>MoH</td>
<td>Environmental audit cost: USD10000 (for each of HCIV-IV); USD15000 for Hospital. Hence $90000 for 9 HCIV in this lot and $105000 for 7 hospitals in this lot. ⇒ total for 4 annual audits: USD780,000</td>
<td>Operation of incineration units</td>
</tr>
</tbody>
</table>

### 6.3.2 Negative impacts

#### 6.3.2.1 Air pollution due to improperly designed incinerator stacks

- **Incinerator stacks designed according to GIIP or WBG guidelines**
  - No offsite air pollution from incineration (such as due to plume downwash).
- **Visual observation reveal no plume downwash of stack emissions**
- **From start of use of new incinerators**
- **MoH; Healthcare facility administrator**
- **Negligible**
- **None**
- **USD 1000 per site (hence $16,000 for 16 training sites)**
- **Operation of incineration unit/facility**
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>Consulations with potentially affected people should be done by design consultant to inform siting of incinerators at each site</td>
<td>Consent obtained from nearby property owners about location of incinerator</td>
<td>Record of consultation with property owners near to proposed incinerator site</td>
<td>At design stage</td>
<td>MoH</td>
<td>Negligible (part of design role)</td>
<td></td>
</tr>
<tr>
<td>6.3.2.2</td>
<td>Community health risk due to improper waste management</td>
<td>Ensure proper waste management practices as recommended in the study on improvement of healthcare waste management in Uganda</td>
<td>No community health risk due to improper waste management</td>
<td>No raw medical waste is dumped at public dumps</td>
<td>Daily</td>
<td>Healthcare facility administrator/ Superintend</td>
<td>Negligible</td>
</tr>
<tr>
<td>6.3.2.3</td>
<td>Occupational health and safety risks</td>
<td>Provide PPE to all workers</td>
<td>Places of work involving occupational exposure to ionizing radiation should be provided with requisite protection established and operated in accordance with recognized international safety standards and guidelines.</td>
<td>Minimal work-related injuries or infections</td>
<td>All healthcare staff have necessary PPE</td>
<td>Daily</td>
<td>Healthcare facility administrator/ Superintend</td>
</tr>
<tr>
<td>6.3.2.4</td>
<td>Fire risk</td>
<td></td>
<td></td>
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</thead>
<tbody>
<tr>
<td></td>
<td>Provide fire extinguishers to healthcare facilities</td>
<td>Key healthcare staff should have basic training in fire control.</td>
<td>Each HC has a minimum of 2 medium-size fire extinguishers (one of which should be for electrical fires)</td>
<td>During equipment installation upon completion of renovation works</td>
<td>MoH</td>
<td>$100 per extinguisher (Provide 2 units per HCIV hence $1800 for 9 HCs and 6 units per hospital (or 4200) for 7 hospitals). ⇒ Total: $6000</td>
<td>Basic fire fighting skills</td>
</tr>
<tr>
<td></td>
<td>Fire emergency telephone numbers should be displaced in communal areas.</td>
<td>Each healthcare facility should have a fire emergency management plan. Undertake fire drills at healthcare facility, at a minimum once a year.</td>
<td>Atleast 2 medical staff have certificate of basic fire fighting. Fire emergency telephone numbers displaced in atleast 2 communal areas. A documented fire emergency plan. A documented fire drill.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Every HC has basic capacity to fend off a small or average fire outbreak</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fire drill and emergency plan to be developed by hospital administrators under guidance of Health Infrastructure Division, HID of MoH</td>
</tr>
<tr>
<td>6.3.5.2 Misuse or inability to use installed equipment</td>
<td>Provide requisite training during equipment installation. Medical equipment not misused and operated by trained staff</td>
<td>Each HC has staff to operate installed medical equipment</td>
<td>1 month upon completion of renovation works</td>
<td>MoH</td>
<td>Negligible (assumed part of procurement cost)</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL COST** $923,000
8 Conclusion

The proposed project has potential to significantly improve quality of healthcare services and efficiency of service provision in Uganda with socio-environmental benefits such as reduced morbidity and increased productivity of labor hence higher household incomes (especially for rural agrarian communities); opportunity to have access to healthcare services hitherto unavailable at HCFs due to lack of equipment or facilities (e.g. operating theaters). Besides, project development and operation will provide considerable economic opportunity for material/equipment suppliers, construction contractors and medical professionals.

A key significant negative impact will arise from healthcare waste management, especially incineration. When incinerator stacks adopt a standard height irrespective of density of habitation and nature of nearby buildings, there is a risk of chronic exposure to incineration emissions due to plume downwash. This impact would be acerbated by inadequately trained operators. Where raw medical waste continues to be improperly dumped at public dumps he project would aggravate public health risk when children or people rummage through potentially infectious waste.

All potential adverse impacts are litigable when measures proposed (Chapter 6) are implemented, in which case benefits of this project to the nation would by far outweigh potential negative effects.
Abbreviated Resettlement Action Plan (ARAP)

From site observations and interviews with healthcare facility administration, the ESIA study never identified anybody likely to be displaced physically or economically at all proposed healthcare facilities for the reasons below:

Except for Mubende and Moroto Hospitals that would be completely demolished and rebuilt, at all other healthcare facilities, proposed renovation work would entail remodeling of internal built environment. Both Mubende and Moroto Hospitals had large tracts of land available for the proposed redevelopment without need for acquisition of land outside that they currently own.

At some hospitals (e.g. Mubende, Mityana hospitals) there were a few kiosks most of them owned by hospital staff, which sold retail consumer goods to patients and medical staff. Due to adequate space at Mubende Hospital, administration indicated that these kiosks would not be banished but could be found an alternative location on site when construction commences. Being light wooden movable structures, moving such kiosks to a new location would not take more than a few hours or a day, hence no economic loss during the transition.

At all other healthcare facilities there were not found non-hospital people who earned a living by working inside or on verandahs of healthcare facilities. Therefore during renovations, no physical or economic displacement would result.

Several HCFs such as Bugiri Hospital, Kiyunga HCIV and Nankoma HCIV had no title deeds for land they own but were in the process of surveying land to secure land titles for property on which they are located. All hospitals in the proposed project were located on land owned by respective local government and administered by District Land Boards.

Since no involuntary resettlement was envisaged at any healthcare facility in this project, no ARAP was prepared.
Bibliographies

## Appendix 1: Record of stakeholder consultations

### Stakeholder meetings at Nankoma Health Centre IV

<table>
<thead>
<tr>
<th>NAMES</th>
<th>DESIGNATION</th>
<th>TIME &amp; DATE</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isabirye Kyakulaga</td>
<td>MCO</td>
<td>10 - 12 AM</td>
<td>• Staff supported the project that it is a good innovation for the improvement of service delivery.</td>
</tr>
<tr>
<td>Kasula Kezia</td>
<td>PHDO</td>
<td>25/02/2010</td>
<td>• All the staff were concerned about poor drainage during rain seasons and suggested the project should also address this aspect.</td>
</tr>
<tr>
<td>Bwire James</td>
<td>NO</td>
<td></td>
<td>• For good security and lighting system, all buildings including staff quarters should be connected to electricity supply.</td>
</tr>
<tr>
<td>Babirye Florence</td>
<td>NO- Nursing</td>
<td></td>
<td>• The facility has limited staff accommodation which sometimes leads to inefficiency (late coming and absenteeism) in performance.</td>
</tr>
<tr>
<td>Nandoso Madina</td>
<td>NO- Midwife</td>
<td></td>
<td>• Probably the biggest concern was lack of an incinerator for proper waste management.</td>
</tr>
<tr>
<td>Kasowolo Easther</td>
<td>EN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nansubuga Lukiya</td>
<td>EN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Onyakyi Tabisa</td>
<td>EM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Igumba Kevin</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Musitwa Clovis</td>
<td>LA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bamwoze Moses</td>
<td>LA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tumwebaze S</td>
<td>TA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Byansi Steven</td>
<td>HI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Akite Margret</td>
<td>HA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agwang Harriet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nyange</td>
<td>Chairman LC</td>
<td>12:15 - 01:00pm</td>
<td>• The community supported the project seen to improve healthcare services but indicated a need for improved medical waste management,</td>
</tr>
<tr>
<td>Mugwere Abdulla</td>
<td>Resident</td>
<td>25/02/2010</td>
<td></td>
</tr>
<tr>
<td>Othieno Phillip</td>
<td>Resident</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Katai Moses</td>
<td>Resident</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wayale Dawson</td>
<td>Resident</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ngobi Mwodha</td>
<td>Chief</td>
<td>01:00 - 1:20 pm</td>
<td>He supported but suggested a complete redesigning of the health facility and renovation of the staff quarters.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25/02/2010</td>
<td></td>
</tr>
</tbody>
</table>

1. MCO = Medical Clinical Officer; NO = nursing officer; EN = Enrolled nurse; EM = Enrolled Midwife; NA = nursing Assistant; LA = Laboratory Assistant; TA = Theater Attendant; HI = Health Inspector; HA = Health Assistant.
Stakeholder meetings at Buyinja HCIV

<table>
<thead>
<tr>
<th>NAMES</th>
<th>DESIGNATION</th>
<th>TIME &amp; DATE</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Masiale Christo</td>
<td>MCO</td>
<td>02 - 04 PM 25/02/2010</td>
<td>• All staff supported the project but desired all the staff quarters to be connected to electricity supply.</td>
</tr>
<tr>
<td>Mr. Okongo David</td>
<td>MCO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Awanya Robert</td>
<td>OCO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaliba Charles</td>
<td>SNO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sr. Kasira Zebbie</td>
<td>NO- General</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mukyala Voronica</td>
<td>NO- Pead/Mid</td>
<td></td>
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</tr>
<tr>
<td>Kasoga Aida</td>
<td>EN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Betty Akello</td>
<td>PN</td>
<td></td>
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</tr>
<tr>
<td>Etyanga N</td>
<td>EM</td>
<td></td>
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<tr>
<td>Kirabira Dina</td>
<td>EM</td>
<td></td>
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<tr>
<td>Otieno Lucy</td>
<td>EN</td>
<td></td>
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</tr>
<tr>
<td>Betty Yogera</td>
<td>TA</td>
<td></td>
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</tr>
<tr>
<td>Taakuwa Esther</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yalila Naume</td>
<td>LT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lwanga Sam</td>
<td>Entomology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ojambo Edward</td>
<td>HA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wambaile Tom</td>
<td>HI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mutumba Robert</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kirunda Muzimiru</td>
<td>Chairman LC</td>
<td>04 - 05PM 25/02/2010</td>
<td>Residents suggested provision of a water borne toilet because the pit latrine fill up quickly, generating offensive odour at the health care facility.</td>
</tr>
<tr>
<td>Ojambo Willson</td>
<td>Resident</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Makamazibu Jim</td>
<td>Resident</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Michael Itazi</td>
<td>Resident</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Stakeholder meetings at Bugogo HC IV

<table>
<thead>
<tr>
<th>NAMES</th>
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<th>RESPONSES</th>
</tr>
</thead>
</table>
| Zironda James               | MCO         | 12 - 3PM 27/02/2010 | • All the staffs interviewed supported the project.  
• Limited accommodation for staff as cited as a key cause of late-coming at workplace, inefficiency and absenteeism especially during rain seasons.  
• Lack of an incinerator was a key challenge cited by staff in regard to proper medical waste management. |
| Kaswa James                 | MCO         | 12 - 3PM 27/02/2010 |                                                                                                                                                                                                          |
| Namusoke                     | NO          | 12 - 3PM 27/02/2010 |                                                                                                                                                                                                          |
| Edith                        | EM          | 12 - 3PM 27/02/2010 |                                                                                                                                                                                                          |
| Tabingwa Ruth                |             | 12 - 3PM 27/02/2010 |                                                                                                                                                                                                          |
| Sansa David                  | Chairman LC | 3 - 03:30pm 27/02/2010 | The chairperson supported the project and desired to see a functional operating theatre at the healthcare facility.                                                                                         |
Stakeholder meetings at Kiyunga Health Centre IV

<table>
<thead>
<tr>
<th>NAMES</th>
<th>DESIGNATION</th>
<th>TIME &amp; DATE</th>
<th>RESPONSES</th>
</tr>
</thead>
</table>
| Isabirye Jacob      | MCO         | 10 - 12 AM 2/03/2010 | - All the staffs interviewed supported the project.  
- Lack of ceilings in the buildings was noted to cause excessive heat and discomfort the patients and healthcare workers.  
- The facility has adequate accommodation for staff however there all in poor state and not fit for occupation.  
- Lack of an incinerator at the health facility was cited as a major gap in proper medical waste disposal. |
| Kadelo Ruth         | MCO         |                   |                                                                                                                                            |
| Bikaba Francis      | MCO         |                   |                                                                                                                                            |
| Mirembe Justine     | MCO         |                   |                                                                                                                                            |
| Mukama James        | Chairman LC | 12 - 12:30pm 2/03/2010 | The chairperson supported the project and urged Government to give motivation to doctors to come, work and stay at the health center.                                                                  |
## Stakeholder meetings at Kibuku HCIV

<table>
<thead>
<tr>
<th>NAMES</th>
<th>DESIGNATION</th>
<th>TIME &amp; DATE</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kairania Fred</td>
<td>SMCO</td>
<td>2:30 - 4:30PM</td>
<td>• All the staffs supported the project and looked forward to incineration facilities that enable proper waste management</td>
</tr>
<tr>
<td>Kigave Steven</td>
<td>SMCO</td>
<td>2/03/2010</td>
<td></td>
</tr>
<tr>
<td>Mpulumba William</td>
<td>MCO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mugwere Phillip</td>
<td>LC 1 executive</td>
<td>4:30 - 4:50pm</td>
<td>The chairperson supported the project and urged Government to enhance conditions for medical workers as a motivation to work in small healthcare facilities.</td>
</tr>
<tr>
<td>NAMES</td>
<td>DESIGNATION</td>
<td>TIME &amp; DATE</td>
<td>RESPONSES</td>
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<tr>
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<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Wajega Sam</td>
<td>CO</td>
<td>4 - 5:30PM</td>
<td>• All the staffs interviewed support the project that it is a good innovation for improvement of healthcare service delivery.</td>
</tr>
<tr>
<td>Kiirya Barian</td>
<td>NA</td>
<td>4/03/2010</td>
<td>• The facility has no adequate accommodation for staff hence a need for the project considers staff for better accommodation.</td>
</tr>
<tr>
<td>Lwogose Monica</td>
<td>NA</td>
<td>4/03/2010</td>
<td></td>
</tr>
<tr>
<td>Wanane Magret</td>
<td>NA</td>
<td>4/03/2010</td>
<td></td>
</tr>
<tr>
<td>Mutembeyi James</td>
<td>LCI Executive</td>
<td>5:30 - 6:00pm</td>
<td>• He supported and welcomed the project that would improve health services in the community.</td>
</tr>
</tbody>
</table>
## Stakeholder meetings at Moroto Hospital

<table>
<thead>
<tr>
<th>NAMES</th>
<th>DESIGNATION</th>
<th>TIME &amp; DATE</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Andema Alex</td>
<td>M S</td>
<td>09 - 12 AM 01/03/2010</td>
<td>• All staff supported the project and decried the poor state of existing buildings and facilities.</td>
</tr>
<tr>
<td>Dr William Oyang</td>
<td>MO</td>
<td></td>
<td>• For purposes of efficiency, staff desired to have accommodation at the hospital.</td>
</tr>
<tr>
<td>Dr Seruli Haroon</td>
<td>MO[SURGEON]</td>
<td></td>
<td>• Staff raised concern of the lingering aspect of the Karimonjong culture which discourages patients from taking medical drugs or visiting healthcare facilities.</td>
</tr>
<tr>
<td>Dr Okao Patrick</td>
<td>P C O</td>
<td></td>
<td>• Lack of enough maternity beds was a big concern yet the demand is high.</td>
</tr>
<tr>
<td>Eyamu Ben</td>
<td>S P N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oluka Alungant</td>
<td>P N O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kokor M</td>
<td>S C O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluka Jasper</td>
<td>S C O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ayaa Betty</td>
<td>S C O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lokut Loyce</td>
<td>S CO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aciro Julia</td>
<td>S C O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ojula James</td>
<td>S C O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wepukhulu Zeah</td>
<td>S C O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olar Stella</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abito Betty</td>
<td>C O Psychiatry.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logiel Anna</td>
<td>S N O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Akello Aropet</td>
<td>S N O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Achuu Venny</td>
<td>S N O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muron Vincent</td>
<td>N O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Komol Magdalena</td>
<td>Ophthalmic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr Adupa Robert</td>
<td>Nursing officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ngorok Maria G</td>
<td>Nursing officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avilli Lilly</td>
<td>Enrolled</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atim Jane</td>
<td>Nursing officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lemu Alex</td>
<td>Chairman LC</td>
<td>9 -10am 2/0/2010</td>
<td>All these residents supported the proposed project.</td>
</tr>
<tr>
<td>Achoko Jumbe</td>
<td>Chair man LC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imalanyi Isaiah</td>
<td>Resident</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lopor Philip</td>
<td>Record officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lope yon Richard Aleper</td>
<td>Personnel</td>
<td></td>
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</tr>
</tbody>
</table>
## Stakeholder meetings at Bukwo Hospital.

<table>
<thead>
<tr>
<th>NAMES</th>
<th>DESIGNATION</th>
<th>TIME &amp; DATE</th>
<th>RESPONCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Mwanga Michael</td>
<td>Senior medical officer</td>
<td>04 - 06 PM 4-5th/03/2010</td>
<td>• All staff supported the project and improvements it would bring to how healthcare services are delivered to patients.</td>
</tr>
<tr>
<td>Mr Barasa Martin</td>
<td>SCO</td>
<td></td>
<td>• Staff however cited low facilitation especially lack accommodation leading to low motivation.</td>
</tr>
<tr>
<td>Mr Siwa Borit Alfred</td>
<td>SCO</td>
<td></td>
<td>• A key suggestion about the proposed renovation project was provision of a generator and solar system that could be used 24hrs a day not only to improve security but also for efficiency and reliability of medical services delivery.</td>
</tr>
<tr>
<td>Cherista Kaprunge</td>
<td>SCO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satya Colins</td>
<td>SCO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chelimo Esther</td>
<td>Stenographer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemusto Justine</td>
<td>Enrolled midwife</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chebet patricia</td>
<td>Enrolled midwife</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chebet valentine</td>
<td>Enrolled midwife</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kiprotich Denis</td>
<td>Enrolled Nurse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malinga Ismael</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alia Seraphine</td>
<td>COA</td>
<td>04 - 05PM 05/03/2010</td>
<td>• Residents supported the project and desired to have Wards improved to have 100 beds from the current 50 beds.</td>
</tr>
<tr>
<td>Cheelimo Paul</td>
<td>LC V Information Officer</td>
<td></td>
<td>• They also proposed the project to consider waterborne toilets since pit latrines filled up quickly leading to unsanitary conditions (odour) at the health facility.</td>
</tr>
<tr>
<td>Khatiya joshwa</td>
<td></td>
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</tbody>
</table>
## Stakeholder meetings at Buwenge HCIV

<table>
<thead>
<tr>
<th>NAMES</th>
<th>DESIGNATION</th>
<th>TIME &amp; DATE</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Dhirumuka Ronald</td>
<td>MCO</td>
<td>11- 09 AM</td>
<td>• Medical staff welcomed the project and desired that it also leads to higher staffing levels at the facility. Staff were concerned about the overwhelming number of women who seek antenatal services when existing number of staff cannot handle all of them.</td>
</tr>
<tr>
<td>Semugabi Samuel</td>
<td>Senior Clinical</td>
<td>26/02/2010</td>
<td></td>
</tr>
<tr>
<td>Toola Juma</td>
<td>Officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balikowa Ronald</td>
<td>Clinical Officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seghebwa Monica</td>
<td>PH Clinical Officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wampalu G</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Babuza Molly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nakagolo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anyout Christine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Ilyenka Sylvia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tenywa Moses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ouma David</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mukyala Rose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Babirye Florence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ouma</td>
<td>Chairman LC</td>
<td>12:15 - 01:00pm</td>
<td>• The local community leaders welcomes the project and suggested that it should lead to consider redesigning the outpatient department to provide shade for waiting patients.</td>
</tr>
<tr>
<td>Nakagolo Zawuja</td>
<td>Resident in community</td>
<td>26/03/2010</td>
<td>• People also proposed a shade for their bicycles.</td>
</tr>
<tr>
<td>Muzaale Mirium</td>
<td>Resident in community</td>
<td></td>
<td>• They looked forward to a fully functional theatre equipped with what is required to carry out the medical operations.</td>
</tr>
<tr>
<td>Balikowa Ronald</td>
<td>OPH Eye Unit</td>
<td>01:00-1:20 pm</td>
<td>He was of the view that the project should look at complete redesigning of the health facility and renovation of the eye unit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>26/03/2010</td>
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</tr>
</tbody>
</table>
Stakeholder meetings at Kawolo Hospital.

<table>
<thead>
<tr>
<th>NAMES</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Kamya David Ivan</td>
<td>Principal Medical Officer, PMO</td>
<td>10 - 12 AM</td>
<td>• All staff supported the project they viewed would improve of delivery of medical services in the community.</td>
</tr>
<tr>
<td>Kiberu Joshua H</td>
<td>Senior Medical Officer (S M O)</td>
<td>24/02/2010</td>
<td>• Staffs decried lack of equipment and gear (gloves, cotton wool, syringes, etc) necessary to ensure safe working conditions considering the huge number of accident victims delivered to Kawolo Hospital.</td>
</tr>
<tr>
<td>Bachwa Pepher</td>
<td>M O</td>
<td></td>
<td>• Staff looked forward to improved laboratory facilities to improve services.</td>
</tr>
<tr>
<td>Kisito Musanya Julius</td>
<td>M O</td>
<td></td>
<td>• Also of concern was lack of a mortuary of adequate capacity and a medical waste incinerator.</td>
</tr>
<tr>
<td>Bbosa Richard</td>
<td>Dental surgeon</td>
<td></td>
<td>• Medical personnel indicated that since 1968 no new building has been constructed at the hospital yet old designs do not match the increasing number of patients seeking medical care.</td>
</tr>
<tr>
<td>Anundru Amos</td>
<td>Public health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nabudde Mildred</td>
<td>Dispenser</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iga Charles</td>
<td>Dispenser</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Namiro Zoe Prossy</td>
<td>Senior nursing officer (SNO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kiryowa Sarah</td>
<td>SNO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alinda Susan</td>
<td>SNO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nankabirwa T</td>
<td>SNO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abiria Scovia</td>
<td>SNO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nakanabi Harriet</td>
<td>nursing officer (N O)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Josephine Zawuk</td>
<td>N O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ojanduru Joyce</td>
<td>N O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muhindo Isaiah</td>
<td>Clinical officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basemberya Robert</td>
<td>Clinical officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kiyungi Reginald</td>
<td>Clinical officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wasswa Joseph</td>
<td>Residents of community</td>
<td>01:00-1:20 pm</td>
<td>• Residents supported the project and proposed it should consider constructing a permanent bicycle shade at the health facility and a kiosk to enable the clients and staff to buy essential items from within.</td>
</tr>
<tr>
<td>Olando Vincent</td>
<td></td>
<td>25/02/2010</td>
<td>• They also proposed extension and equipping the theatre</td>
</tr>
<tr>
<td>Achema Geoffrey</td>
<td></td>
<td></td>
<td>• Community members also proposed that the project should look at a complete redesigning of the health facility as well as full renovation of the Kawolo Hospital.</td>
</tr>
<tr>
<td>Nakajjo Eva</td>
<td></td>
<td></td>
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</tbody>
</table>
Stakeholder meetings at Budondo HCIV

<table>
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<tr>
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<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Kalumuna C</td>
<td>MO</td>
<td>09 - 11 AM</td>
<td>• Medical staff supported the project decrying inadequate and poor conditions of staff housing.</td>
</tr>
<tr>
<td>Dr Sendija Rogers</td>
<td>MO</td>
<td>26/03/2010</td>
<td>• A key concern was lack of adequate funds to run the health centre, impacting service delivery.</td>
</tr>
<tr>
<td>Mr. B. Steven</td>
<td>C O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Balidawa John</td>
<td>DO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Mumira Fred</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Numie L</td>
<td>LA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ms Mbwali Prosy</td>
<td>EM W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ms Kaitaita R</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Baligeya S</td>
<td>C O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Isabirye Dan</td>
<td>D I SP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M. Suzet senyonga</td>
<td>C O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ms Bugonzi F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ms Kalikwani S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. M. Tibekana Ivan Ayubu</td>
<td>Chairman LC111</td>
<td>09.10am</td>
<td>• Local leaders supported the project and proposed a generator should be provided for emergency power services.</td>
</tr>
<tr>
<td></td>
<td>Vice chairman</td>
<td>26/03/2010</td>
<td>• Kiosk/canteen should be constructed to enable the clients and staff to buy essential items within the facilities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• They also desired to have a fully functional theatre.</td>
</tr>
</tbody>
</table>
Stakeholder meetings at Ntenjeru-Kojja HCIV

<table>
<thead>
<tr>
<th>NAMES</th>
<th>DESIGNATION</th>
<th>TIME &amp; DATE</th>
<th>RESPONSES</th>
</tr>
</thead>
</table>
| Dr. Kabanda R                |             | 03 - 49PM 26/03/2010 | • All staff supported the project and desired to have improved accommodation for improved staff efficiency and timeliness.  
• Provision of an incinerator was desired to improve HCW management. |
| Mr. Mugolo Fredrick         | P . H.D.O   |                   |                                                                                                     |
| Mr. Gingo Yahaya            | MCO         |                   |                                                                                                     |
| Ms. Akirapa Winfred         | M theater   |                   |                                                                                                     |
| Mr. kato Joshua Nanduddu Deborah Namakula Sarah Dr. Kirunda | N O Driver N O N O MO  |                                                                                                     |
| Mr. Kateega Abubakari       | Chairman LC 1| 04 - 05PM 26/03/2010 | • Local leaders supported and requested the project to provide a mortuary.  
• The health facility serves 9 Parishes and 3 Sub-counties of Nakisigye, Nkome, and Ntejeru which generates a large population of patients at the health facilities. In such circumstances, they noted, waterborne toilets rather than pit latrines would be more suitable. |  
|                             |             |                   |                                                                                                     |

Stakeholder meeting at Bugiri Hospital

<table>
<thead>
<tr>
<th>NAMES</th>
<th>DESIGNATION</th>
<th>TIME &amp; DATE</th>
<th>RESPONSES</th>
</tr>
</thead>
</table>
| Dr. Nambozo Sarah Ms Naziwa Sarah Mr. Nabulime Sarah Mr. Ojob Patrick Mr. Sejuba Fredrick | Medical Officer Nursing Officer Hospital Administrador Lab Technician Pharmacist | 4.25 pm 08/04/2010 | • All staff supported the project viewed as one to significantly improve quality of health services.  
• Staff indicated lack of housing as one of key issues affecting their performance and efficiency. Lack of laboratory equipment was another major shortcoming cited. |
| Mr. mukooba Ivan Ms Namusubo Mary | Residents of community | 5.03pm 08/04/2010 | • They welcomed the project and looked forward to having adequate space so that inpatient female and male patients are not mixed. |
## Stakeholder meetings at Buvuma HCIV

<table>
<thead>
<tr>
<th>NAMES</th>
<th>DESIGNATION</th>
<th>TIME &amp; DATE</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muwanguzi Emma</td>
<td>MCO</td>
<td>10 - 12 AM</td>
<td>• Medical staff supported and welcomed the project seen to improve working conditions and staff morale. In the prevailing state, low morale was imputed to lack of facilities. For example it was indicated that nurses are not provided with uniforms and use their salaries to purchase them privately.</td>
</tr>
<tr>
<td>Nasuna Christine</td>
<td>LT</td>
<td>1/04/2010</td>
<td></td>
</tr>
<tr>
<td>Zainabu Mansoor</td>
<td>LA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kayanja Peter</td>
<td>TA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tibaaga Jane</td>
<td>HI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lwanga</td>
<td>EN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immaculate</td>
<td>NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mutesi Joy</td>
<td>NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Namaala Christine</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Residents in community**

<table>
<thead>
<tr>
<th>TIME &amp; DATE</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:15 - 01:00pm</td>
<td>• The entire community supports the project that it is a good innovation for the improvement of service delivery in the community.</td>
</tr>
<tr>
<td>1/04/2010</td>
<td>• The community members also proposed that the incoming project should consider constructing and permanent bicycle shade at the health facility and a kiosk to enable the clients and staff to buy essential items.</td>
</tr>
<tr>
<td></td>
<td>• They also proposed that the project should also avail the unit with a vehicle to promote immunization activities.</td>
</tr>
<tr>
<td></td>
<td>• He was of the view that the project should look at complete redesigning of the health facility and renovation of the staff quarters.</td>
</tr>
</tbody>
</table>
Stakeholder meetings at Pallisa Hospital

<table>
<thead>
<tr>
<th>NAMES</th>
<th>DESIGNATION</th>
<th>TIME &amp; DATE</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Kitimbo Charles</td>
<td>MO SNO C O NO</td>
<td>02- 3-25 pm 08/04/2010</td>
<td>• Staff welcomed and supported the project and decrying the poor housing and working conditions.</td>
</tr>
<tr>
<td>Ms. Okanya Lindy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Walega John</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ms. Nangulu Irene</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ms. Waga Adita</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Mr. Mudenya            | Chairman LC1 Vice chairman | 3 .10pm 08/04/2010 | • Local leadership supported and suggested that the project renovates all wards.  
  • Also suggested was that a kiosk/canteen be constructed for patients and staff to buy essential items within the hospital campus. |


## Stakeholder meetings at Iganga Hospital

<table>
<thead>
<tr>
<th>NAMES</th>
<th>DESIGNATION</th>
<th>TIME &amp; DATE</th>
<th>RESPONCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Kiyemba Charles</td>
<td>Os</td>
<td>09 - 49am 08/04/2010</td>
<td>• All hospital staff supported the project but like at other HCF reiterated a need for improved housing and working conditions to improve safety, performance and efficiency.</td>
</tr>
<tr>
<td>Mr. Kabusere Julius</td>
<td>Sen. Hosp Administrator</td>
<td>08/04/2010</td>
<td></td>
</tr>
<tr>
<td>Dr. Lubega Muhamend</td>
<td>M O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dr. Bamudaziza GW</td>
<td>S M O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Naigwe V</td>
<td>Medical Social Worker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ms. Okotel B</td>
<td>N O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ms Baita Milly</td>
<td>N O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Kismbira Yasin</td>
<td>Resident of community</td>
<td>09 - 05am 08/04/2010</td>
<td>• He welcomed the project and desired to see improvement of the mortuary.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 2: Measured baseline (air quality, noise) conditions

<table>
<thead>
<tr>
<th>District</th>
<th>Healthcare facility</th>
<th>Noise measurement (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min</td>
</tr>
<tr>
<td>Mukono</td>
<td>Kawolo Hospital</td>
<td>55</td>
</tr>
<tr>
<td>District</td>
<td>Ntenjeru-Koja Health Centre IV</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>Buvuma Health Centre IV</td>
<td>56</td>
</tr>
<tr>
<td>Jinja</td>
<td>Buwenge Hospital</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Budongo Health Centre IV</td>
<td>55</td>
</tr>
<tr>
<td>Iganga</td>
<td>Iganga Hospital</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>Kiyunga Health Centre IV</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>Bugono Health Centre IV</td>
<td>53</td>
</tr>
<tr>
<td>Bugiri</td>
<td>Bugiri Hospital</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>Nankoma Health Centre IV</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>Buyinja Health Centre IV</td>
<td>58</td>
</tr>
<tr>
<td>Budaka</td>
<td>Budaka Health Centre IV</td>
<td>60</td>
</tr>
<tr>
<td>Pallisa</td>
<td>Pallisa Hospital</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>Kibuku Health Centre IV</td>
<td>56</td>
</tr>
<tr>
<td>Bukwo</td>
<td>Bukwo Hospital</td>
<td>58</td>
</tr>
<tr>
<td>Moroto</td>
<td>Moroto Hospital</td>
<td>56</td>
</tr>
</tbody>
</table>

Table A2: Levels of toxic gases measured at the different healthcare facilities

<table>
<thead>
<tr>
<th>District</th>
<th>Healthcare facility</th>
<th>Air quality measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>CO (µg/m³)</td>
</tr>
<tr>
<td>Mukono</td>
<td>Kawolo Hospital</td>
<td>0</td>
</tr>
<tr>
<td>District</td>
<td>Ntenjeru-Koja Health Centre IV</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Buvuma Health Centre IV</td>
<td>0</td>
</tr>
<tr>
<td>Jinja</td>
<td>Buwenge Hospital</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Budongo Health Centre IV</td>
<td>0</td>
</tr>
<tr>
<td>Iganga</td>
<td>Iganga Hospital</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Kiyunga Health Centre IV</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Bugono Health Centre IV</td>
<td>0</td>
</tr>
<tr>
<td>Bugiri</td>
<td>Bugiri Hospital</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Nankoma Health Centre IV</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Buyinja Health Centre IV</td>
<td>0</td>
</tr>
<tr>
<td>Budaka</td>
<td>Budaka Health Centre IV</td>
<td>0</td>
</tr>
<tr>
<td>Pallisa</td>
<td>Pallisa Hospital</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Kibuku Health Centre IV</td>
<td>0</td>
</tr>
<tr>
<td>Bukwo</td>
<td>Bukwo Hospital</td>
<td>0</td>
</tr>
<tr>
<td>Moroto</td>
<td>Moroto Hospital</td>
<td>0</td>
</tr>
</tbody>
</table>

CO= Carbon monoxide; NO₂ = nitrogen dioxide; LEL lower explosive limit a measure of explosive gases; H₂S= Hydrogen sulphide

Respective WHO Guidelines are shown below:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>WHO guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particulate matter, PM₁₀</td>
<td>20 µg/m³; annual mean</td>
</tr>
<tr>
<td></td>
<td>50 µg/m³; 4-hour mean</td>
</tr>
<tr>
<td>Oxides of nitrogen, NOₓ as NO₂</td>
<td>40 µg/m³; annual mean</td>
</tr>
<tr>
<td></td>
<td>200 µg/m³; 1-hour mean</td>
</tr>
<tr>
<td>Oxides of sulphur, SOₓ</td>
<td>20 µg/m³ 24-hour mean</td>
</tr>
<tr>
<td></td>
<td>500 µg/m³ 10-minute mean</td>
</tr>
</tbody>
</table>

PM₁₀: Particulate matter of size range 2.5-10 µm
### Appendix 3: Evaluation of incinerator types

<table>
<thead>
<tr>
<th>Incinerator</th>
<th>HWI-4</th>
<th>Maximaster MKII</th>
<th>MAK IV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Criteria</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main combustion zone (Incineration temperature)</td>
<td>About 1250°C, incineration of toxins can be achieved.</td>
<td>800 - 1050°C</td>
<td>600 - 1000°C</td>
</tr>
<tr>
<td>Number of combustion chambers</td>
<td>Dual</td>
<td>Dual chambers with integral burners.</td>
<td>Dual</td>
</tr>
<tr>
<td>Capacity</td>
<td>25 kg every 2 hrs.</td>
<td>45 kg/h based on energy content of 17MJ/kg.</td>
<td>Not indicated</td>
</tr>
<tr>
<td>Fuel/Energy consumption</td>
<td>Diesel burners, 3l/h</td>
<td>Not mentioned</td>
<td>Need 2 Kg wood fuel for start-up only.</td>
</tr>
<tr>
<td>Heat insulation</td>
<td>Ceramic lining</td>
<td>Composite lining</td>
<td>Steel plate, lining not indicated.</td>
</tr>
<tr>
<td>Scrubbing ability</td>
<td>No scrubbing</td>
<td>Not mentioned</td>
<td>No scrubbing.</td>
</tr>
<tr>
<td>Stack/chimney height</td>
<td>6 m high.</td>
<td>8 m high</td>
<td>Seems variable, not well indicated in the manual</td>
</tr>
<tr>
<td>Charge/Feed operation</td>
<td>Batch feed, 4 hourly.</td>
<td>Batch type</td>
<td>Batch feeds</td>
</tr>
<tr>
<td>Limitation on materials to be incinerated</td>
<td>PVC, chemicals, apparatuses, radioactive materials</td>
<td>Not mentioned</td>
<td>Not limited</td>
</tr>
</tbody>
</table>

### Evaluation

- Incinerator has no scrubber, so if cases of some toxins are not burnt completely they can escape to the environment. Particulate Matter (PM) is also not catered for.
- Cannot be used to burn PVC, Radioactive materials, chemicals, some of which make the fuel/energy consumption rates not given.
- Fuel/energy consumption rates not given. No scrubbing unit, however, the typical environment emission requirements are met according to the data in the manual.
- Incineration temperature is a bit low; some toxic gases may escape unburnt. Incinerator has no scrubber, so if cases of some toxins are not burnt completely they can escape to the environment. Particulate Matter (PM) is also not catered for.
- Incinerator has no insulation lining; the steel plate can get worn very quickly.
- Capacity specification not stated, so it is very difficult to assess its performance capabilities.
<table>
<thead>
<tr>
<th>Incinerator</th>
<th>HWI-4</th>
<th>Maximaster MKII</th>
<th>MAK IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>bulk of medical waste. This requires sorting...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• A stack of 6 m is high enough, but this should normally depend on the highest building in the environs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• If this incinerator is incorporated with a scrubber unit, and all medical waste especially to include PVC and chemicals can be burnt, then it can a recommended model.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Final Assessment**

Among the incinerator options, the ranking in respect to suitability can be: 1. Maximaster MKII; 2. HWI-4; 3. MAK IV. If MOH were to choose among the foregoing incinerator types, inspite of their technological shortcomings with regard to emissions scrubbing, the best choice is Maximaster MKII. However, as already indicated Maximaster although ranked number one, has no scrubbing for flue gases, which means environmental and public health risk.

HWI-4 has the basic requirements like dual chamber (ensuring enough resident time for combustion of flue gases) and recommended incineration temperature and this limits it to certain materials as mentioned above.

For MAK IV, the manual does not provide clearly outlined capabilities of what the incinerator can do apart from the test results on the first models (MAK II -III). In addition, the recommended incineration temperature of 1100±50°C cannot be achieved hence increasing the risk of toxic flue gases polluting the environment.
Appendix 4: Sketch maps of HCFs
Appendix 5: Environmental clauses for construction contracts

General Environmental Management Conditions for Construction Contracts

General

1. In addition to these general conditions, the Contractor shall comply with any specific Environmental Management Plan (EMP) or Environmental and Social Management Plan (ESMP) for the works he is responsible for. The Contractor shall inform himself about such an EMP, and prepare his work strategy and plan to fully take into account relevant provisions of that EMP. If the Contractor fails to implement the approved EMP after written instruction by the Supervising Engineer (SE) to fulfill his obligation within the requested time, the Owner reserves the right to arrange through the SE for execution of the missing action by a third party on account of the Contractor.

2. Notwithstanding the Contractor’s obligation under the above clause, the Contractor shall implement all measures necessary to avoid undesirable adverse environmental and social impacts wherever possible, restore work sites to acceptable standards, and abide by any environmental performance requirements specified in an EMP. In general these measures shall include but not be limited to:

   (a) Minimize the effect of dust on the surrounding environment resulting from earth mixing sites, asphalt mixing sites, dispersing coal ashes, vibrating equipment, temporary access roads, etc. to ensure safety, health and the protection of workers and communities living in the vicinity dust producing activities.

   (b) Ensure that noise levels emanating from machinery, vehicles and noisy construction activities (e.g. excavation, blasting) are kept at a minimum for the safety, health and protection of workers within the vicinity of high noise levels and nearby communities.

   (c) Ensure that existing water flow regimes in rivers, streams and other natural or irrigation channels is maintained and/or re-established where they are disrupted due to works being carried out.

   (d) Prevent bitumen, oils, lubricants and waste water used or produced during the execution of works from entering into rivers, streams, irrigation channels and other natural water bodies/reservoirs, and also ensure that stagnant water in uncovered borrow pits is treated in the best way to avoid creating possible breeding grounds for mosquitoes.

   (e) Prevent and minimize the impacts of quarrying, earth borrowing, piling and building of temporary construction camps and access roads on the biophysical environment including protected areas and arable lands; local communities and their settlements. In as much as possible restore/rehabilitate all sites to acceptable standards.

   (f) Upon discovery of ancient heritage, relics or anything that might or believed to be of archeological or historical importance during the execution of works, immediately report such findings to the SE so that the appropriate authorities may be expeditiously contacted for fulfillment of the measures aimed at protecting such historical or archaeological resources.

   (g) Discourage construction workers from engaging in the exploitation of natural resources such as hunting, fishing, collection of forest products or any other activity that might have a negative impact on the social and economic welfare of the local communities.

   (h) Implement soil erosion control measures in order to avoid surface run off and prevents siltation, etc.

   (i) Ensure that garbage, sanitation and drinking water facilities are provided in construction workers camps.

   (j) Ensure that, in as much as possible, local materials are used to avoid importation of foreign material and long distance transportation.

   (k) Ensure public safety, and meet traffic safety requirements for the operation of work to avoid accidents.

3. The Contractor shall indicate the period within which he/she shall maintain status on site after completion of civil works to ensure that significant adverse impacts arising from such works have been appropriately addressed.

4. The Contractor shall adhere to the proposed activity implementation schedule and the monitoring plan / strategy to ensure effective feedback of monitoring information to project management so that impact management can be implemented properly, and if necessary, adapt to changing and unforeseen conditions.

5. Besides the regular inspection of sites by the SE for adherence to the contract conditions and specifications, the Owner may appoint an Inspector to oversee the compliance with these environmental conditions and any proposed mitigation measures. State environmental authorities may carry out similar inspection duties. In all cases, as directed by the SE, the Contractor shall comply with directives from such inspectors to implement measures required to ensure the adequacy rehabilitation
measures carried out on the bio-physical environment and compensation for socio-economic disruption resulting from implementation of any works.

Worksite/Campsite Waste Management

6. All vessels (drums, containers, bags, etc.) containing oil/fuel/surfacing materials and other hazardous chemicals shall be bunded in order to contain spillage. All waste containers, litter and any other waste generated during the construction shall be collected and disposed off at designated disposal sites in line with applicable government waste management regulations.

7. All drainage and effluent from storage areas, workshops and camp sites shall be captured and treated before being discharged into the drainage system in line with applicable government water pollution control regulations.

8. Used oil from maintenance shall be collected and disposed off appropriately at designated sites or be re-used or sold for re-use locally.

9. Entry of runoff to the site shall be restricted by constructing diversion channels or holding structures such as banks, drains, dams, etc. to reduce the potential of soil erosion and water pollution.

10. Construction waste shall not be left in stockpiles along the road, but removed and reused or disposed of on a daily basis.

11. If disposal sites for clean spoil are necessary, they shall be located in areas, approved by the SE, of low land use value and where they will not result in material being easily washed into drainage channels. Whenever possible, spoil materials should be placed in low-lying areas and should be compacted and planted with species indigenous to the locality.

Material Excavation and Deposit

12. The Contractor shall obtain appropriate licenses/permits from relevant authorities to operate quarries or borrow areas.

13. The location of quarries and borrow areas shall be subject to approval by relevant local and national authorities, including traditional authorities if the land on which the quarry or borrow areas fall in traditional land.

14. New extraction sites:
   a) Shall not be located in the vicinity of settlement areas, cultural sites, wetlands or any other valued ecosystem component, or on on high or steep ground or in areas of high scenic value, and shall not be located less than 1km from such areas.

   b) Shall not be located adjacent to stream channels wherever possible to avoid siltation of river channels. Where they are located near water sources, borrow pits and perimeter drains shall surround quarry sites.

   c) Shall not be located in archaeological areas. Excavations in the vicinity of such areas shall proceed with great care and shall be done in the presence of government authorities having a mandate for their protection.

   d) Shall not be located in forest reserves. However, where there are no other alternatives, permission shall be obtained from the appropriate authorities and an environmental impact study shall be conducted.

   e) Shall be easily rehabilitated. Areas with minimal vegetation cover such as flat and bare ground, or areas covered with grass only or covered with shrubs less than 1.5m in height, are preferred.

   f) Shall have clearly demarcated and marked boundaries to minimize vegetation clearing.

15. Vegetation clearing shall be restricted to the area required for safe operation of construction work. Vegetation clearing shall not be done more than two months in advance of operations.

16. Stockpile areas shall be located in areas where trees can act as buffers to prevent dust pollution. Perimeter drains shall be built around stockpile areas. Sediment and other pollutant traps shall be located at drainage exits from workings.

17. The Contractor shall deposit any excess material in accordance with the principles of these general conditions, and any applicable EMP, in areas approved by local authorities and/or the SE.
18. Areas for depositing hazardous materials such as contaminated liquid and solid materials shall be approved by the SE and appropriate local and/or national authorities before the commencement of work. Use of existing, approved sites shall be preferred over the establishment of new sites.

Rehabilitation and Soil Erosion Prevention

19. To the extent practicable, the Contractor shall rehabilitate the site progressively so that the rate of rehabilitation is similar to the rate of construction.

20. Always remove and retain topsoil for subsequent rehabilitation. Soils shall not be stripped when they are wet as this can lead to soil compaction and loss of structure.

21. Topsoil shall not be stored in large heaps. Low mounds of no more than 1 to 2m high are recommended.

22. Re-vegetate stockpiles to protect the soil from erosion, discourage weeds and maintain an active population of beneficial soil microbes.

23. Locate stockpiles where they will not be disturbed by future construction activities.

24. To the extent practicable, reinstate natural drainage patterns where they have been altered or impaired.

25. Remove toxic materials and dispose of them in designated sites. Backfill excavated areas with soils or overburden that is free of foreign material that could pollute groundwater and soil.

26. Identify potentially toxic overburden and screen with suitable material to prevent mobilization of toxins.

27. Ensure reshaped land is formed so as to be inherently stable, adequately drained and suitable for the desired long-term land use, and allow natural regeneration of vegetation.

28. Minimize the long-term visual impact by creating landforms that are compatible with the adjacent landscape.

29. Minimize erosion by wind and water both during and after the process of reinstatement.

30. Compacted surfaces shall be deep ripped to relieve compaction unless subsurface conditions dictate otherwise.

31. Revegetate with plant species that will control erosion, provide vegetative diversity and, through succession, contribute to a resilient ecosystem. The choice of plant species for rehabilitation shall be done in consultation with local research institutions, forest department and the local people.

Water Resources Management

32. The Contractor shall at all costs avoid conflicting with water demands of local communities.

33. Abstraction of both surface and underground water shall only be done with the consultation of the local community and after obtaining a permit from the relevant Water Authority.

34. Abstraction of water from wetlands shall be avoided. Where necessary, authority has to be obtained from relevant authorities.

35. Temporary damming of streams and rivers shall be done in such a way avoids disrupting water supplies to communities downstream, and maintains the ecological balance of the river system.

36. No construction water containing spoils or site effluent, especially cement and oil, shall be allowed to flow into natural water drainage courses.

37. Wash water from washing out of equipment shall not be discharged into water courses or road drains.

38. Site spoils and temporary stockpiles shall be located away from the drainage system, and surface run off shall be directed away from stockpiles to prevent erosion.

Traffic Management

39. Location of access roads/detours shall be done in consultation with the local community especially in important or sensitive environments. Access roads shall not traverse wetland areas.

40. Upon the completion of civil works, all access roads shall be ripped and rehabilitated.

41. Access roads shall be sprinkled with water at least five times a day in settled areas, and three times in unsettled areas, to suppress dust emissions.
Blasting

42. Blasting activities shall not take place less than 2km from settlement areas, cultural sites, or wetlands without the permission of the SE.

43. Blasting activities shall be done during working hours, and local communities shall be consulted on the proposed blasting times.

44. Noise levels reaching the communities from blasting activities shall not exceed 90 decibels.

Disposal of Unusable Elements

45. Unusable materials and construction elements such as electro-mechanical equipment, pipes, accessories and demolished structures will be disposed of in a manner approved by the SE. The Contractor has to agree with the SE which elements are to be surrendered to the Client’s premises, which will be recycled or reused, and which will be disposed of at approved landfill sites.

46. As far as possible, abandoned pipelines shall remain in place. Where for any reason no alternative alignment for the new pipeline is possible, the old pipes shall be safely removed and stored at a safe place to be agreed upon with the SE and the local authorities concerned.

47. AC-pipes as well as broken parts thereof have to be treated as hazardous material and disposed of as specified above.

48. Unsuitable and demolished elements shall be dismantled to a size fitting on ordinary trucks for transport.

Health and Safety

49. In advance of the construction work, the Contractor shall mount an awareness and hygiene campaign. Workers and local residents shall be sensitized on health risks particularly of AIDS.

50. Adequate road signs to warn pedestrians and motorists of construction activities, diversions, etc. shall be provided at appropriate points.

51. Construction vehicles shall not exceed maximum speed limit of 40km per hour.

Repair of Private Property

52. Should the Contractor, deliberately or accidentally, damage private property, he shall repair the property to the owner’s satisfaction and at his own cost. For each repair, the Contractor shall obtain from the owner a certificate that the damage has been made good satisfactorily in order to indemnify the Client from subsequent claims.

53. In cases where compensation for inconveniences, damage of crops etc. are claimed by the owner, the Client has to be informed by the Contractor through the SE. This compensation is in general settled under the responsibility of the Client before signing the Contract. In unforeseeable cases, the respective administrative entities of the Client will take care of compensation.

Contractor’s Health, Safety and Environment Management Plan (HSE-MP)

54. Within 6 weeks of signing the Contract, the Contractor shall prepare an EHS-MP to ensure the adequate management of the health, safety, environmental and social aspects of the works, including implementation of the requirements of these general conditions and any specific requirements of an EMP for the works. The Contractor’s EHS-MP will serve two main purposes:

- For the Contractor, for internal purposes, to ensure that all measures are in place for adequate HSE management, and as an operational manual for his staff.
- For the Client, supported where necessary by a SE, to ensure that the Contractor is fully prepared for the adequate management of the HSE aspects of the project, and as a basis for monitoring of the Contractor’s HSE performance.

55. The Contractor’s EHS-MP shall provide at least:

- a description of procedures and methods for complying with these general environmental management conditions, and any specific conditions specified in an EMP;
- a description of specific mitigation measures that will be implemented in order to minimize adverse impacts;
- a description of all planned monitoring activities (e.g. sediment discharges from borrow areas) and the reporting thereof; and
- the internal organizational, management and reporting mechanisms put in place for such.

56. The Contractor’s EHS-MP will be reviewed and approved by the Client before start of the works. This review should demonstrate if the Contractor’s EHS-MP covers all of the identified impacts, and has defined appropriate measures to counteract any potential impacts.

HSE Reporting
57. The Contractor shall prepare bi-weekly progress reports to the SE on compliance with these general conditions, the project EMP if any, and his own EHS-MP. An example format for a Contractor HSE report is given below. It is expected that the Contractor’s reports will include information on:

- HSE management actions/measures taken, including approvals sought from local or national authorities;
- Problems encountered in relation to HSE aspects (incidents, including delays, cost consequences, etc. as a result thereof);
- Lack of compliance with contract requirements on the part of the Contractor;
- Changes of assumptions, conditions, measures, designs and actual works in relation to HSE aspects; and
- Observations, concerns raised and/or decisions taken with regard to HSE management during site meetings.

58. It is advisable that reporting of significant HSE incidents be done “as soon as practicable”. Such incident reporting shall therefore be done individually. Also, it is advisable that the Contractor keep his own records on health, safety and welfare of persons, and damage to property. It is advisable to include such records, as well as copies of incident reports, as appendixes to the bi-weekly reports. Example formats for an incident notification and detailed report are given below. Details of HSE performance will be reported to the Client through the SE’s reports to the Client.

Training of Contractor’s Personnel

59. The Contractor shall provide sufficient training to his own personnel to ensure that they are all aware of the relevant aspects of these general conditions, any project EMP, and his own EHS-MP, and are able to fulfill their expected roles and functions. Specific training should be provided to those employees that have particular responsibilities associated with the implementation of the EHS-MP. General topics should be:

- HSE in general (working procedures);
- emergency procedures; and
- social and cultural aspects (awareness raising on social issues).

HIV/AIDS

The contractors should have an HIV/AIDS policy and a framework (responsible staff, action plan, etc) to implement it during project execution.

Cost of Compliance

60. It is expected that compliance with these conditions is already part of standard good workmanship and state of art as generally required under this Contract. The item “Compliance with Environmental Management Conditions” in the Bill of Quantities covers these costs. No other payments will be made to the Contractor for compliance with any request to avoid and/or mitigate an avoidable HSE impact.

Example Format: HSE Report

Contract:

Period of reporting:

HSE management actions/measures:
Summarize HSE management actions/measures taken during period of reporting, including planning and management activities (e.g. risk and impact assessments), HSE training, specific design and work measures taken, etc.

HSE incidents:
Report on any problems encountered in relation to HSE aspects, including its consequences (delays, costs) and corrective measures taken. Include relevant incident reports.

HSE compliance:
Report on compliance with Contract HSE conditions, including any cases of non-compliance.

Changes:
Report on any changes of assumptions, conditions, measures, designs and actual works in relation to HSE aspects.

Concerns and observations:
Report on any observations, concerns raised and/or decisions taken with regard to HSE management during site meetings and visits.

Signature (Name, Title Date):
Contractor Representative
Example Format: HSE Incident Notification

Provide within 24 hrs to the Supervising Engineer

Originators Reference No:
Date of Incident:    Time:

Location of incident:

Name of Person(s) involved:

Employing Company:

Type of Incident:

Description of Incident:
Where, when, what, how, who, operation in progress at the time (only factual)

Immediate Action:
Immediate remedial action and actions taken to prevent reoccurrence or escalation

Signature (Name, Title, Date):
Contractor Representative
Appendix 6: Terms of Reference

ToR below were provided by client.

**TERMS OF REFERENCE FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT OF THE UGANDA HEALTH SYSTEMS STRENGTHENING PROJECT.**

1.0 Introduction

The Government of Republic of Uganda has applied for financing from the International Development Association (IDA) toward the cost of the Uganda Health Systems Strengthening Project.

The Government wishes to engage competent firms to provide Consultancy services for the Environmental and Social impact assessment for the renovation/construction and Equipping of selected health facilities in Uganda.

These Terms of Reference (TOR) are intended for the firm(s) which shall be engaged for this exercise. The Consultant will assemble pertinent expertise to undertake the assignment.

2.0 Project Objectives

The General Objective of the project is to improve physical functionality of existing infrastructure, strengthen planning and management of Human Resources and to strengthen management of Health Facilities in order to deliver the Uganda National Minimum Health Care Package (UNMHCP).

2.1 Specific objectives of the project

The proposed project contributes to the attainment of HSSP II objectives and has the following specific objectives:

i) To strengthen systems for human resource development and management in order to maintain an adequately sized, appropriately skilled and productive health workforce.

ii) To enhance the physical functionality of health facilities by improving Health Infrastructure to the required basic minimum standard for delivery of quality health care services.

iii) To strengthen the management systems for health care delivery with focus on Logistics and procurement, Health facilities management, and Health infrastructure maintenance.

3.0 Project components

The project components are derived from the specific objectives and include:

i) Human Resource Development and Management

ii) Health Infrastructure

iii) Leadership and Management Systems

iv) Project implementation and management

The strategy is to invest in capital development, particularly in improvement of Health Infrastructure, strengthening management systems and enhancement of Human Resource capacity. These are long term solutions that are a pre-requisite for the provision of UNMHCP, and yet are expensive and often of reach of the local governments.

The Health Infrastructure component will enhance the functionality of health facilities by improving Health Infrastructure to the required basic minimum standard for delivery of quality health care services.

This proposal is intended to consolidate physical functionality of existing health facilities at 27 HCIVs, 17GHs and 2RRHs.
The works shall include renovation/construction of Medical Buildings and Staff houses, Supply, installation and commissioning of Medical equipment and Medical Furniture, and Construction and/or supply and installation of incinerators at selected facilities. It is proposed to have incinerators at the regional referral hospitals, General hospitals and selected Health Centre IVs. Different types of incinerators have been proposed at the different levels.

4.0 Objectives of the Consultancy

The overall objective of the Consultancy is to carry out an environmental and social impact assessment for the renovation/construction and equipping of health facilities to ensure that activities related to their construction and rehabilitation are carried out in an environmentally and socially sustainable manner.

The specific objectives are:-

4.1 To assess the Environmental and Social impact of activities for the construction/ rehabilitation and equipping of selected health facilities

4.2 Establish land needs for expansion and develop a resettlement action plan, where necessary and to undertake a survey of non health related livelihood activities.

5.0 Detailed Scope of Services

The scope of services in this Consultancy shall comprise:-

A. Environmental Impact Assessment (EIA)

5.1 In the carrying out of the EIA, the consultants will carry out the following tasks

a) Acquaint himself with all the proposed works at the various sites including but not limited to the following

i) Expansion works
ii) Reconstruction/re-modelling works
iii) Specifications of the incinerators and their locations
iv) Equipment to be supplied

b) Survey all the identified sites including preparing a map/sketch of each site showing existing and future facilities in relation to important existing features in the surrounding areas, identifying site specific potential impacts and prescribing site specific mitigation measures/environmental management plan

c) Analyse the specifications of the proposed incinerators as well as the buildings in which they are to be installed. This analysis shall include but not be limited to:

i) The composition and quantity of the proposed input waste
ii) The capacity of the incinerator facility
iii) The composition of the output waste i.e. air emissions and residual solid wastes.

d) Analyse the operational concerns of the incinerators including the management of the environment and health aspects of air emissions, combustion practices and management of environmental impacts of the resulting ash.

e) The consultant shall record the views and concerns of the neighbouring communities. The consultant shall analyse these views and give a conclusion on whether they are genuine, if they are, the consultant shall propose solutions or acceptable mitigation measures.

f) Identify the relevant regulations and clauses in the National Environmental regulations and National Environmental Statute among other legislation and regulatory framework which are applicable to the facilities. In addition the consultant shall determine whether the proposed facilities meet the minimum
requirements of the environmental law and regulations. If the facility does not meet the requirements, the consultant shall recommend the measures required to bring the facility to acceptable and compliant standards. This recommendation shall be as a result of analysing several options of amending the facility design. These amendment options should be accompanied by cost estimates. This shall be done in full consultation with NEMA and other relevant authorities.

g) Give guidance as to the steps to be taken for the facilities to obtain licences to operate a waste treatment plant.

h) Assess the requirements for adequate and environmentally safe solid and liquid waste management at the facilities and make appropriate recommendations for inclusion in the health facility designs.

i) Consult with relevant stakeholders and incorporate their comments into the EIA as appropriate.

j) Prepare an Environmental Management Plan (EMP) for the implementation of the proposed project. The EMP should outline: i) potential environmental and social impacts resulting from project activities; ii) proposed mitigation measures; iii) institutional responsibilities for implementation of the mitigation measures; iv) monitoring indicators; v) Institutional responsibilities for monitoring the implementation of the mitigation measures; vi) cost estimates for these activities; and vii) time horizons for implementation of the EMP. The EMP will be included in the Project Implementation Manual.

B Social Impact Assessment

In determining the social impact of the project, the consultant will deal with social issues that are not related to the civil works. Social issues that are related to civil works/rehabilitation/expansion are dealt with in the EIA.

The consultant will carry out the following tasks:

a) Site visits (including a qualified social professional) to allow assessing of the land, resettlement and livelihood related issues and other relevant information.

b) Determine the social impact of the project on the project sites, communities including

   v) Local employment
   vi) Population changes
   vii) Effects on Land use
   viii) Land acquisition

c) For each site, the following will be required:

An Abbreviated Resettlement Plan (APRAP): This will provide information on land needs required if any, a socioeconomic and census survey of the people undertaking, (non health related). Livelihood activities like kiosks, gardening, parking etc on the health facility land/premises that are likely to be disturbed during the renovations and/or expansion. Further the APRAP will give a description of measures to deal with those that will be disrupted, the consultations with the affected people regarding the project and the measures, institutional responsibility for the implementation of the measures, grievance mechanisms, arrangements for monitoring and a time table for implementing the measures and a budget.

The health facilities have been grouped in view of the proximity to each other as indicated in the table below, and it is planned that the consultancy is undertaken by one Environmental and social consultancy firm.

<table>
<thead>
<tr>
<th>Hospitals</th>
<th>HCIVs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mubende, Nakaseke, Mityana</td>
<td>Kasanda, Kiganda, Ngoma, Mwera, Kyantungo, Kikamulo</td>
</tr>
<tr>
<td>Apac, Kiryandongo, Masindi</td>
<td>Aboke, Aduku, Bwijanga and Bullisa</td>
</tr>
<tr>
<td>Itojo, Kawolo, Entebbe, Buwenge</td>
<td>Kabuyanda, Mwizi, Kitwe, Rubare, Buvuma, Budondo and</td>
</tr>
</tbody>
</table>
6.0 Reports and Time Schedules

The Consultant shall submit both written (in English) and electronic copies at each stage for review and / or approval and the schedule of reporting shall be done as indicated below:

6.1 Draft inception report

The consultant shall submit a draft inception report before the end of the first week. This report shall outline the consultant's work plan, strategy, methodology and timetable for the assignment.

6.2 Final inception report

The consultant shall submit an inception report within a week after approval of the draft report. The employer will be given a week for review and approval.

6.3 Draft Environmental and Social Impact Assessment Report

The consultant shall submit a draft report after extensively covering all aspects of the scope of works. This is estimated to take not more than 7 weeks after submission of the final inception report, for review and comments by the employer and the World Bank. Review and comments will be given one week.

6.4 Final Environmental and Social Impact assessment report

The consultant shall submit a final report within 1 week after approval of the draft report by the employer and the World Bank. The final report will be disclosed by the employer and at the banks infoshop prior to appraisal of the proposed project.

At the end of the assignment, the Consultant shall not claim any right of authorship or design patent of the reports submitted during the assignment.

7.0 Staffing

The preparation of the Environmental and Social impact assessment report requires skills in environmental assessment and an understanding of the potential adverse environmental and social impacts of construction/rehabilitation and equipping of health facilities including waste management at the facilities.

The consultant's team will be led by a team leader. The Team Leader, in addition to holding a graduate degree in the basic sciences, engineering or the environment shall be an Environmental consultant registered with the National Environment Management Authority (NEMA) in Uganda or an equivalent body outside the country.

She/he should have skills in carrying out Environmental and social impact assessments, experience in assessing of the impacts of waste management facilities, experience in assessing impact of health related projects and leading a team of experts. Minimum years of experience for the team leader should be 7 years.

The consultant shall have the following experts on their team:

1. Environmental Consultant

The Environment consultant should have a basic degree in the basic sciences, engineering or the environment. He/she should have not less than 5yrs experience in the assessment of Environmental impacts, carrying out of environmental studies and audits, assessing impact of waste management facilities and any other relevant experience.
2. Sociologist

The sociologist should have a basic degree in Sociology, Social works and Social administration, Arts or any other relevant qualification. He/she should have not less than 5yrs experience in the assessment of social impacts, carrying out of socioeconomic surveys, studies and other relevant expertise. He/she must have experience with Bank safeguards Policies especially O.P.4.12 Involuntary Resettlement.

3. Environmental/Sanitary Engineer

The Environmental Engineer should have not less than 5yrs experience in undertaking environmental assessments related to their field. Particular experience in the assessment of incinerators will be an added advantage.

4. Any other relevant expertise such as Environmental specialist, social worker etc. He/she should have at least 5yrs of relevant experience in their field of expertise.

All the experts shall be highly skilled and experienced in environmental assessments in their respective fields of expertise.

8.0 Data, Services, Personnel and facilities to be provided by the Client

The Client shall provide the Consultant with the following pertinent information available to the Client and relevant to the assignment.

i) Health sector Strategic Plan II
ii) Health Facilities Inventory, 2006 and 2008 draft.
iii) National Health Policy
iv) Hospital Policy
v) Staffing Norms of Health facilities in Uganda (Health Centre II to General Hospital, 2002)
vi) Standard Designs for Health facilities, 2002
vii) Incinerator designs/Models for the different levels of facilities including specifications for the incinerators
viii) Construction drawings for the building where the incinerator will be installed if applicable.
ix) Draft National Health care Waste Management Plan
v) Standards for injection safety and healthcare waste management practices
vi) National Policy on injection safety and healthcare waste management practices.
vii) Study on improvement of Healthcare waste management in the country (2005)
viii) Minutes of the HCWM working group meeting of 5th March 2009.