

**ENVIRONMENTAL IMPACT ASSESSMENT FULL STUDY FOR THE PROPOSED
REDEVELOPMENT OF THE CHIROMO LANE MEDICAL CENTRE ALONG
MUTHANGARI ROAD, LAVINGTON, NAIROBI, L. R. NO. 3734/37**



Figure 1: The existing bungalow at the site that will be demolished to pave way for the new multi-storey building

This Environmental Impact Assessment (EIA) Report has been prepared and is submitted to the National Environment Management Authority (NEMA) in conformity with the requirements of the Environmental Management and Coordination Act, CAP. 387 (Revised 2015) and the Environmental (Impact Assessment and Audit) Regulations (2003)

Proponent

The Chiromo Lane Medical Centre, Nairobi
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ACRONYMS

CLMC	Chiromo Lane Medical Centre
CBD	Central Business District
EA	Environmental Audit
EHS	Environment Health and Safety
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management Plan
EMS	Environmental Management System
ISO	International Organization for Standardization
L. R. No.	Land Registration Number
NEAP	National Environmental Action Plan
NEC	National Environment Council
NEMA	National Environmental Management Authority
NET	National Environmental Tribunal
OHS	Occupational Health and Safety
PCC	Public Complaints Committee
PPE	Personal Protective Equipment
VAT	Value Added Tax
NCA	National Construction Authority
ADHD	Attention Deficit Hyperactivity Disorder

SUBMISSION

This Environmental Impact Assessment study report has been prepared by Green By Choice Ltd., a NEMA certified EIA/EA firm of experts. We, the undersigned, wish to certify that the particulars in this report are correct and true to the best of our knowledge.

PROPONENT: CHIROMO LANE MEDICAL CENTRE, NAIROBI

Designation:

Name:

Signature:

Date:

EIA/EA LEAD EXPERT

Elizabeth Nzani Wachira

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EXECUTIVE SUMMARY

In Kenya, an estimated three million mostly poor people live with intellectual and mental disabilities, according to NGO and United Nations figures. Additionally, the ratio of psychiatrists in Kenya to the population is dismal - with just one psychiatrist to half a million people. In fact, people who have had social, emotional, traumatic and other mental crises are believed to be insane, bewitched or suffering from a bad omen and therefore incapable of exercising their disability rights. This is the reason why the project proponent, Chiromo Lane Medical Centre (CLMC), is dedicated to helping mental health Clients by offering more equipped psychiatric treatment centres and consequentially raising awareness in a continent where mental health and wellness is often neglected and described as "un-African" and belonging to "people in the West."

The proposed action is to demolish the existing bungalow on Muthangari Drive, which has been in use as a psychiatric centre since 2007. The proposal entails erecting a four-storey building (ground + 3 levels and attic level) that will house consultation rooms and an in/outpatient department to meet the increasing demand for psychiatric treatment in Kenya. The project site is located in Lavington on plot L. R. No. 3734/37. The proposed project is intended to enhance psychiatric medical services offered at the Chiromo Lane Medical Centre by providing highly specialised care, modern treatments for Clients and a more spacious and comfortable environment. The plot measures approximately 0.752 acres and was until recently occupied by *Bustani* (Kiswahili for "garden"). *Bustani* is a branch of the original Chiromo Lane Medical Centre which is situated on Chiromo Lane. The bungalow on site, and ancillary facilities, will be demolished to pave way for the proposed development.

Staff and clients of *Bustani* have already been moved to a new location, not far from the site, and are fully operational there. To allow for seamless service to Clients, the proposed multi-level medical facility will be erected in two phases, phase I and II. After completion of the first phase the new *Bustani* will be able to accommodate 80 in Clients. With the second phase the number of inpatient beds will grow by an additional 60 beds, bringing the total to 140 beds.

Activities for the proposed project will include the following:-

- Demolition of the existing structures and excavation works
- Construction of Basement, Ground floor, First floor, Second ground floor, Third floor, and Attic floor
- Civil works for the storm water drainage and expansion of the sewerage network
- Solar power harvesting for environmental sustainability
- Additional parking space - both underground parking and surface parking.

- Landscaping etc.

This study was commissioned by the CLMC in Nairobi, to establish the potential environmental impacts of the proposed project. It is also intended that it shall provide baseline information on the project area for the purposes of decision making by NEMA during the project's evaluation process. The Environmental Impact Assessment (EIA) study report is expected to form the baseline for future Environmental Audits (EA) for the proposed project, identify possible impacts of the proposed project on the environment, predict likely changes, and propose mitigation measures for any significant negative environmental impacts of the proposed project on the environment. The report will also highlight environmental issues with a view to guide policy makers and planners, stakeholders and government agencies to make environmentally and economically sustainable decisions.

This study has found that the proposed undertaking will have both positive and negative impacts during different phases of project implementation. The positive impacts anticipated include creation of both temporary and permanent employment opportunities both directly and indirectly. The project will create direct employment for architects, engineers, EIA experts and casual workers who will be engaged in demolition and construction activities. It will also result in indirect employment for suppliers of goods and services used by construction workers such as building materials, food, transport etc.

The proposed project will be beneficial in that it will enhance psychiatric medical services offered at CLMC by providing highly specialised care, modern treatments for psychiatric Clients in a more spacious and comfortable environment. On decommissioning, various materials will be recovered and sold hence generating additional income for the Proponent. The reused and recycled materials will reduce demand for raw materials from the source.

Expected negative impacts of the project include dust and road traffic in the area from the transportation of raw materials to the site by trucks. Construction activities are expected to generate noise pollution and expose the public and workers to various occupational health and safety hazards. There will be increased demand for construction materials thereby affecting availability and sustainability of materials such as sand and stone blocks at extraction sites. Various categories of solid waste will be generated during the construction phase which will require proper disposal. During the operation phase, all waste will be managed appropriately as prescribed by environmental law.

In order to minimize the negative impacts and enhance positive ones, the environmental experts have proposed various mitigation measures. To protect the public and workers' health, the project manager and contractor must observe and enforce occupational health and safety (OHS) rules and requirements. To minimize air pollution, the contractor should use specified routes for project vehicles. To minimize

noise pollution, the contractor should restrict construction activities to daytime only and use attenuated equipment. Although several premises in the vicinity of the site are occupied by businesses, there are a few residences in close proximity to the site. To avoid soil and water contamination, the contractor should carry out vehicle and machinery maintenance away from the project site. In addition, solid waste excavated as well as construction debris expected during the construction phase should be disposed of at sites approved by the town engineer and in accordance with Waste Management Regulations (2006). To regulate traffic flow, the contractor is expected to put adequate signage on adjacent roads warning motorists to exercise caution, so as to avoid accidents on the road.

A public consultation exercise was carried out as required by EIA and EA regulations. The proposed site is adjacent to multiple residential developments both to the east and to the west. Neighbours in close proximity to the proposed site were interviewed. Generally, stakeholders had no objections to the proposed project. It should be borne in mind that the development is not bringing anything new to the neighbourhood; it is simply enhancing a service that is already being provided.

In conclusion, this EIA study found out that construction of the proposed project will be viable with minimal adverse impacts. Most of the negative impacts will be short term and will only occur during the construction phase. The project will be sustainable if the proposed mitigation measures are implemented. We therefore recommend that the Proponent be granted a license to undertake this development.

1. INTRODUCTION

1.1 Project Brief

The Chiromo Lane Medical Centre (CLMC) in Nairobi was established in July 1997. Currently the medical centre has two branches, one located in Westlands (the original Chiromo Lane Medical Centre on Chiromo Lane) and another one in Lavington which is referred to as CLMC – *Bustani*. CLMC is a reputable purpose built psychiatric in-patient registered Medical Institution, recognized by the Ministry of Health and National Hospital Insurance Fund with both general and private wards. CLMC is a leading treatment facility that specializes in diagnosis, treatment and management of adults, adolescents and children who suffer from a spectrum of mental health disorders such as depression, schizophrenia, anxiety disorder, adjustment disorder, bipolar, attention deficit hyperactive disorder and addiction. It is located in Lavington, off Muthangari Road in Nairobi, and has a 40-bed long-term care capacity including both general and private beds.

This EIA Full Study Report is for *Bustani* CLMC only.

CLMC prides itself in being host of the only ADHD support group meetings in Sub Sahara Africa. In this support group, persons diagnosed with ADHD and their family members come together and learn more about the condition in addition to supporting each other through the challenges that come with ADHD. The medical centre also partners and works with Kenya Psychiatric Association and University of Nairobi department of Psychiatry.

The Chiromo Lane Medical Centre participates in several activities in the community all aimed at improving mental health of the general Kenyan population. It has contributed, for example, by providing free mental-health clinics in under-served peri-urban settlements where members of the public are invited for a screening of various mental health conditions. When found to have a certain condition, clients receive brief counselling and, where necessary, are started on medication. They are also referred to mental health professionals for continued care.

Due to the growth in demand for psychiatric treatment and awareness, CLMC aims to continue offering high quality service to all Clients. To be able to do this effectively, it is necessary for the CLMC to expand its services and infrastructure due to the sheer increase in number of Clients in Kenya. As one of the leading and larger private

Psychiatric hospitals in Kenya, and with the market share increasing annually, the need to be able to efficiently service this growing number of Clients in the market cannot be over-emphasized.

1.2 Background and rationale of Environmental Impact Assessment

Section 58 (2) of the Environmental Management and Coordination (Amendment) Act, 2015 requires that the Proponent of a project shall undertake or cause to be undertaken at his own expense an EIA study before implementing the project and prepare a report thereof for submission to the National Environment Management Authority (NEMA).

Regulation 4 (1) of the Environmental (Impact Assessment and Audit) Regulations issued under Legal Notice No. 101 of 13th June 2003 states that no Proponent shall implement a project likely to have a negative environmental impact, or for which an EIA is required unless an EIA has been concluded and approved under these regulations.

EIA helps to minimize land use conflicts within surrounding areas and to ensure environmental sustainability.

In compliance with these legislations, and in application for an EIA licence for the proposed redevelopment at Chiromo Lane Medical Centre (Nairobi), situated in Lavington off Muthangari Road, the project Proponent has caused to be undertaken an EIA study of this project.

1.3 Project objectives

The overall objective of the proposed project is to construct a four storey building (ground + 3 levels and attic level) that will house a vast out/inpatient department and consultation rooms, as an extension to the original CLMC.

The Proponent's main objective is to improve psychiatric medical service delivery in keeping with a growing demand for psychiatric treatment in an increasingly discerning population and to be at par with top hospitals in the world offering modern and advanced psychiatric medical treatments.

Specific objectives are as follows:

- a) To increase efficiency in the hospital's service delivery
- b) To become the leading psychiatric hospital in this region of the world
- c) To enhance customer service
- d) To create employment and business opportunities
- e) To offer staff and Clients a comfortable environment to work, improve and heal.

1.4 Terms of Reference

The Terms of Reference for the EIA of the proposed project are:-

- To provide a detailed description of the proposed project in terms of location, objectives, design, activities, material inputs, outputs, products and waste
- To provide a detailed description of the baseline environmental and socio-economic conditions of the project area
- To review the relevant legal, policy and institutional framework applicable in the implementation of the proposed project
- To provide a detailed description of the potentially affected environment
- To identify, predict and analyse the environmental and social impacts of the project, including seeking neighbours and public views and concerns
- To provide an analysis of project alternatives in terms of site, design and implementation technologies and provide reasons for preferred options
- To provide a detailed Environmental Management Plan (EMP) proposing measures for mitigating negative environmental impacts, including the cost, timeframe, responsibility and monitoring indicators to implement the measures.

1.5 Scope of the study

- Literature review including identification of relevant data and articles about the proposed project
- To establish the baseline environmental conditions of the project area
- Definition of objectives and design of the project
- Analysis of legislative and institutional framework
- Evaluation of anticipated impacts
- Analysis of project alternatives
- Development of mitigation measures
- Public and stakeholders consultation and participation
- Preparation and submission of the EIA report to NEMA for purposes of seeking an EIA approval and license

1.6 Study Methodology

The general steps followed during the assessment were as follows:-

- Environmental screening, during which the project was identified as among those requiring EIA under Schedule 2 of EMCA, CAP. 387 (Revised 2015)
- Environmental scoping that identified the key environmental issues
- Site surveys and Photography
- Comparative study of the project with existing land uses in the neighbourhood
- Desktop studies
- Seeking public views via the use of questionnaires

1.7 Cost of the Project

The estimated cost of the proposed project is Kshs 526,991,386= (Inclusive of VAT).

1.8 Environmental Management Plan

The table below is a summary of the EMP for this project. A detailed EMP is given in another section of this report.

Table 1: *Summarised Environmental Management Plan*

Possible Environmental Impacts	Suggested Mitigation Measures
Air pollution, dust generation and noise pollution	<ul style="list-style-type: none"> • Spraying of water during construction work • Use of low-sulphur diesel for diesel-operated machinery • Use of ear protection aids by construction workers • No unnecessary hooting by project and occupants' vehicles • Use of attenuated equipment where possible • Temporarily fencing off the site • Use of dust shields. • Temporary shifting of Clients to wards away from the

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	<p>construction site due to noise and dust</p> <ul style="list-style-type: none"> • Restriction of construction activities to day time only
Clearing of vegetation and trees	<ul style="list-style-type: none"> • Maintaining trees and vegetation in areas not affected • Proper landscaping • If possible plant trees on approved public land
Generation of solid waste	<ul style="list-style-type: none"> • Reuse of soil, construction debris and other waste • Proper containment and disposal of solid waste • Contracting a licenced waste collection and disposal company at operation stage • Creation of awareness on proper solid waste disposal
Increased demand for water and electricity at construction stage	<ul style="list-style-type: none"> • Conserve water and electricity • Provision of adequate water storage facilities • Installation of rainwater harvesting structures • Reuse of water where possible, mainly at construction phase • Explore additional sources
Occupational health and safety risks	<ul style="list-style-type: none"> • Use of suitable personal protective equipment • Use of stable ladders and other climbing/support structures • Sensitize workers in construction safety measures • Cleanliness and organization at the construction site • Fencing or covering of risky areas such as deep pits • Safety signage • Engagement of skilled labourers
Fire hazards and accidents	<ul style="list-style-type: none"> • Acquire fire-fighting facilities • Sensitize workers on fire safety • No storage of flammable material onsite • Keep well stocked first aid box on site • Proper handling and use of tools and machinery
Generation of waste water at construction stage	<ul style="list-style-type: none"> • Proper connection of waste water and sewerage system to existing city county sewage system as per approved design • Provision of storm water drains

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	<ul style="list-style-type: none">• Proper decommissioning of waste water and sewerage system
Public health and safety	<ul style="list-style-type: none">• Proper handling and disposal of solid waste• Control of visitors to the site• Safe decommissioning of buildings and connections thereof• Installation of adequate water supply• Provision of clean toilets during construction
Security	<ul style="list-style-type: none">• Guarding of the site by a reputable security firm• Constant site patrol• Collaboration with the existing security machinery• Partnership with neighbours and police in community policing

2. DESCRIPTION OF THE PROPOSED PROJECT

2.1 Location and size of the proposed project site

The proposed project entails the redevelopment of the current psychiatric medical institute called *Bustani*, which is part of Chiromo Lane Medical Clinic, by decommissioning the current bungalow and putting up in its place a four storey building (ground + 3 levels and attic level) to offer similar, but enhanced services. The property on which the proposed project is located is in Lavington area off Muthangari Road, Nairobi County. The proposed project will be situated on plot **L.R. No 3734/37** which measures **0.752 Acres**. The proposed site is about 10 Km from Nairobi's CBD. The site Coordinates are: Latitude **1°17.292'S** and Longitude **3°646.303'E**. The site Altitude is **1788 Ft**.

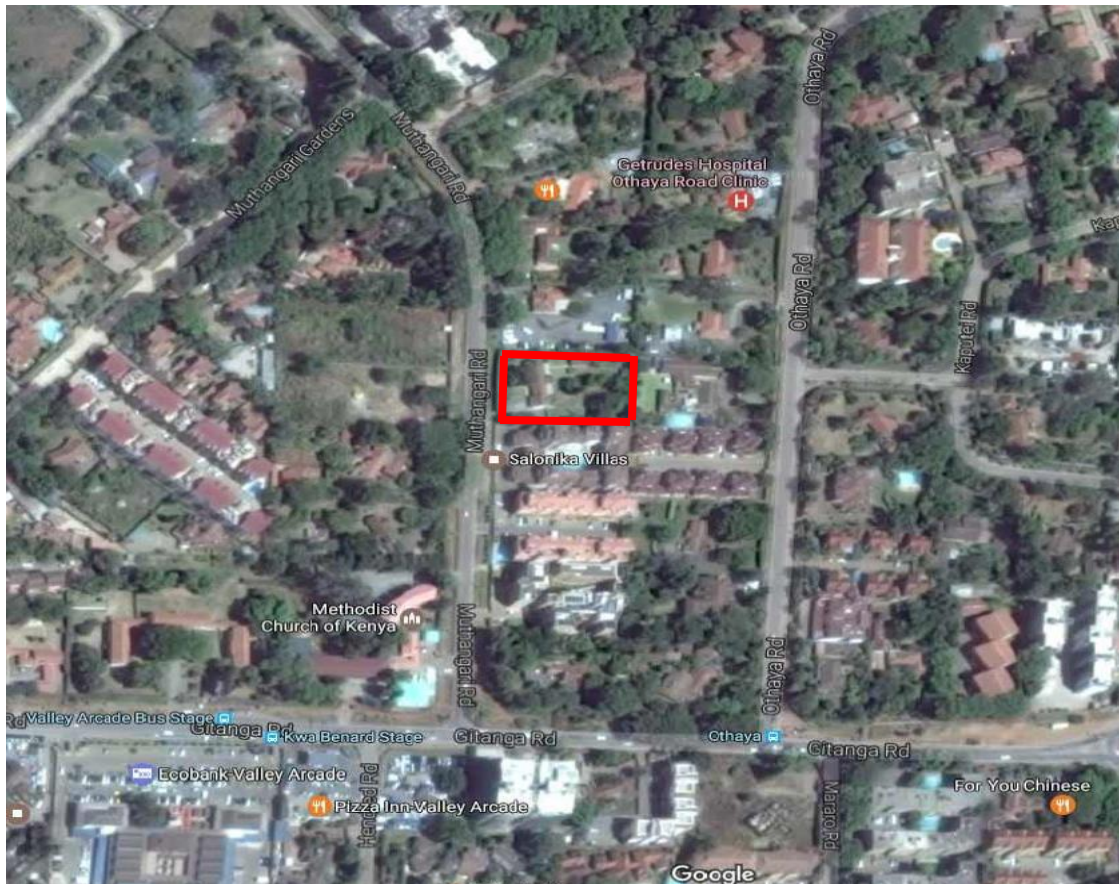


Figure 2: Location of the proposed project site

2.2 Key findings

The site boundary is a live fence. There is a bungalow that will be demolished to pave way for the proposed four-storey building. The bungalow, known as *Bustani*, has hitherto provided mental health services to local clientele, as well as clientele from the East African region. At the time of the field visit to the site, the staff and the Clients previously occupying the premises had been moved to another location in order to continue providing uninterrupted services. The proposed site is not developed as optimally as it could be. There is a lot of unutilised space. Several neighbouring structures are multi-storeyed, going up as high as 4 and 5 floors. The neighbourhood displays a mix of land uses including residential, commercial and light industrial. The dominant land uses are however residential and commercial owing to the proximity to the CBD. Other notable establishments within proximity to the proposed site are Pact Kenya Offices, Save the Children offices, Methodist Church of Kenya and Braeside School.

There are a number of trees on the site such as *Cupressus sempervirens*, *Rhus natalensis* (Muthigio), Nandi Flame (*Spathodea*), *Diospyros abyssinica*. The site has a garden (hence the name *Bustani*, Swahili for “garden”) and is home to a number of exotic plant species, mostly coral trees, and secondary vegetation such as *lantana camara*. It is highly recommended that trees in the areas that will not be affected be left intact. Approval for development has been granted by the City Council of Nairobi, City Planning Department.

Access to the site is via Muthangari Road. The site is bordered by furnished and serviced apartments, a kindergarten and offices. The site is supplied by electricity from the National Grid.





Figure 3: *Salonika serviced apartments 4 levels (ground + 3 levels and attic level), apartments 4 levels (ground + 3 levels and attic level) and a 9 storey building under construction bordering the site*

2.3 Project design

The proposed development entails the construction of a four (4) storey building (ground + 3 levels and attic level) that will house the vast in/outpatient department and consultation rooms with a capacity, when fully developed, to hold 140 beds.

The actual design components of the project include:-

- Construction of Basement, Ground floor, First floor, Second ground floor, Third floor, and Attic floor
- Ground level to Level 1 - will comprise outpatient facilities
- Level 2, 3 and Attic - will comprise inpatient facilities
- Development utilities such as water, drainage, clean energy etc.
- Parking slots - Underground parking with 81 bays and a surface parking with 5 bays
- Inpatient department - nurses stations, wards, observation rooms, therapy rooms and single and double patient rooms
- Outpatient department – office, consultants rooms, reception, storage room and waiting area for visitors
- Pharmacy
- laundry
- Kitchen, cafeteria and dining space.

Additional amenities for the project will include:-

- Main staircase for both buildings and an open staircase
- One pedestrian gate and two vehicular gates
- Two elevators
- Standby power backup (generator)
- Air-Conditioning Ventilation systems and Fire Fighting System
- Garden and Roof terraces
- Ramps for disabled persons

The design of the building clearly defines the external spaces. The southern side of the plot is dedicated to access and arrival. Staff, visitors and out-patient Clients are clearly guided to the parking and entrance(s). Deliveries shall take place at the dedicated delivery area. The northern side of the plot has been designed as a garden with exterior terraces for the cafeteria and therapy rooms. Here Clients and visitors can linger without the disturbance of access traffic. Moreover, this designed division of the plot leads to a naturally enclosed exterior space, the garden, for Clients, without the erection of a single fence. In modern psychiatry-architecture the feeling of being locked away should be avoided to allow and increase the rehabilitation process of the Clients.

An open staircase, overlooked by the reception, connects the main entrance with the consultant rooms on first floor. Outpatients and visitors can thus move freely through the building without disrupting the inpatient wards. The design of the building allows for optimal workflows, clear orientation and reduction of circulation space. All this is reflected in the optimized building costs allowing for maximum quality for the treatment of psychiatric Clients within the hospital. The friendly character of the building will offer staff and Clients a comfortable environment to work in and in which to undergo treatment respectively.

The development will be constructed with a facade design to enhance aesthetics. In general, the project will optimize use of the best available technology to prevent or minimize potentially significant environmental impacts associated with the project. The proposed development will highly consider maximum use of natural light and best use of natural ventilation. Water efficiency, conservation, harvesting and storage will all be considered.



Figure 4: A diagram showing a perspective of the proposed CLMC building

2.4 Project Activities

Project activities will be carried out simultaneously. The phases in implementation of a development project include project planning, site preparation and clearing, construction, operation and decommissioning of the project.

2.4.1 Planning and design activity phase

This phase entails planning, site zoning and preparation of the proposed project taking into consideration type and nature of materials to be used, while bearing in mind the physical conditions of the plot in line with total costs as well as economic value of the project.

2.4.2 Demolition of the existing structures

The proposed site is currently occupied by the one (1) storey transformed residential villa which will be demolished to pave way for the proposed building construction. Demolition activities and the decommissioning plan of the existing structure will include the following:

2.4.2.1 Pre-demolition survey and hazardous material abatement

Prior to commencement of building demolition, a thorough walkthrough and evaluation of the building shall be conducted to confirm that all structures can be demolished safely.

2.4.2.2 General Demolition/ Decommissioning Activities

In general, the tasks shall include a variety of procedures, some of which include:-

- Proper disconnection of electrical connections
- The Contractor procedures shall be limited to safe conditions and use of mechanized removal wherever possible
- Resizing of scrap materials such as steel and other material
- Processing activities shall take place at grade level, hauled offsite and recycled accordingly
- The walls of the existing building shall be taken down a section at a time and the rubble sorted and cleared
- General building/structure demolition shall be conducted in a manner that does not interfere with or encroach upon the existing surrounding pedestrian and vehicular traffic during normal activities
- The Contractor shall provide fencing around the project site and shall work within the confines of the site fencing whenever possible.

2.4.2.3 Material recycling and demolition debris disposal

Recyclable demolition debris shall be sold to recyclers while non-recyclable debris shall be loaded and hauled to a disposal facility for further recycling, or to a dumpsite. The vehicles used to transport the debris shall be properly covered to prevent spillage.

2.4.2.4 Dust control measures

Dust emissions shall result from activities during demolition and could be blown by wind to neighbouring residences. The demolition area shall be sprayed with water, and stockpiles shall be covered to contain dust and particulate matter. Demolition personnel shall be provided with dust masks and aprons and the area shall be fenced off using shade netting to prevent fugitive dust.

2.4.2.5 Vibration and noise reduction techniques

Vibration and noise from demolition activities can be annoying to neighbours, and excessive vibration can sometimes damage nearby structures. Attenuated equipment shall be used during demolition, and all demolition works shall be scheduled during daytime.

2.4.3 Construction phase

This phase will involve demolition and redevelopment of a new four-storey building of specified sections (ground level + 3 levels and an attic level), setting foundations and

filling works construction, masonry, roofing, electrical, plumbing and civil works.

During this stage, landscaping and drainage works, clearing the site of construction debris, connection to the existing sewer line will also be carried out.

2.4.4 Operational phase

During the operational phase, the proposed building will be occupied and the psychiatric inpatient and outpatient departments will be functional.

In general, the design of the project will essentially optimize the use of best available technology to prevent or minimize potentially significant environmental impacts associated with the project. The appropriate project design will also incorporate efficient operational controls together with trained staff, to ensure high level efficiency and environmental performance.

2.4.5 Materials and Equipment

Table 2: *Equipment and materials used*

Materials	Equipment
<ul style="list-style-type: none">• Stones/building blocks• Common burnt clay bricks• Sand• Concrete• Timber• Steel reinforcement bars• Cement• Tiles• Roofing material• Electrical wires etc.	<ul style="list-style-type: none">• Cranes• Excavator• Vibrators• Welding machines, cranes, wheelbarrows• Transportation vehicles• Concrete mixer etc.

All materials that will be used shall be as per Kenya Bureau of Standards (KEBS) specifications, and materials will be sourced from local manufacturers in the surrounding area where possible.

2.4.6 Waste and by-products

During the construction phase, waste and by-products generated will include the following:-

- a) Dust arising from demolition and construction activities and transportation of construction materials to the site
- b) Used cement bags, paint tins and other materials
- c) Construction debris (from concrete and broken stones)
- d) Excavated soil
- e) Waste metal cuttings from wires and rods

All the waste and by-products from the proposed development should be reused or recycled if possible, so as to minimize waste for disposal.

2.5.6 Solid Waste Management

Solid waste management will entail dustbins positioned in enclosed areas for protection from rain. It is recommended that the proponent separate different types of solid waste to make recycling and re-use easier. Waste containers for example can be provided for glass, plastics, tins/metal, paper, biodegradables etc. These could be colour-coded for ease of management. The waste will then be collected by a reputable NEMA approved waste collection and disposal company.

2.5.7 Storm water/run off

Storm water from a construction site can be a major cause of water pollution. Pollution in storm water can include:-

- Soil
- Sand
- Construction debris: (cement, woodchips, metal scraps etc.)
- Natural debris: (leaves, grass etc.)
- Chemicals: (paint, fuel, lubricants, oils etc.)

A storm water drainage system will be put in place to collect all the storm water and to make sure that there is no stagnant water on the site

3 BASELINE INFORMATION

This section describes the area where the proposed project is to be established. It will describe in detail the physical, biological and socio-economic environment of the project area.

3.1 Site Location

The site is located in Lavington, off Muthangari Road. The area is adequately serviced via Muthangari Road which is tarmacked. The site lies west of Nairobi's CBD. A larger part of Lavington hosts private residences, though it is also becoming increasingly popular with office developments.

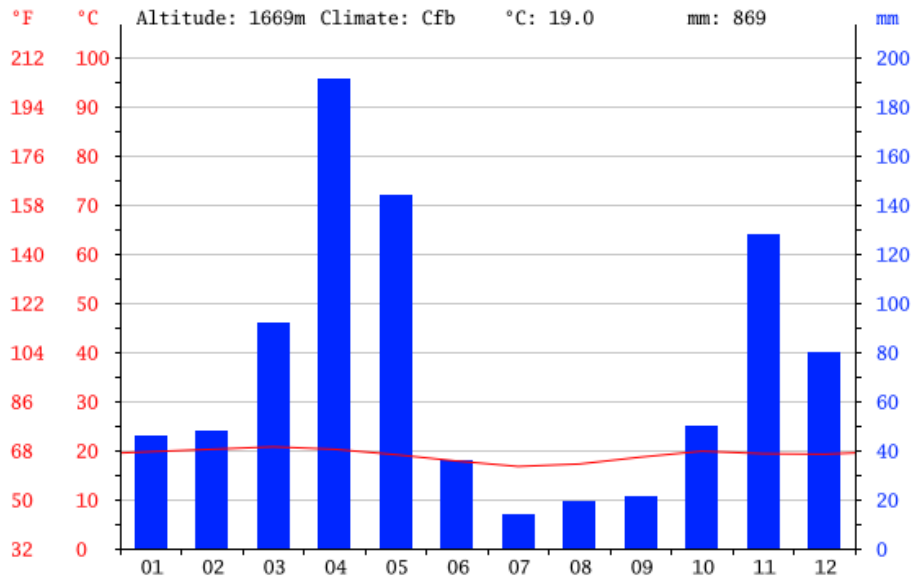


Figure 5: *The entrance of the proposed project site along Muthangari Road*

3.2 Physical Environment

3.2.1 Climate

Climatic conditions in the project area compare favourably to that of the wider Nairobi City. The average annual temperature in Nairobi is 19.8°C. About 835 mm of precipitation falls annually. The driest month is July, with 14 mm of rainfall. With an average of 191 mm, most precipitation falls in April.



Source: <http://en.climate-data.org/location/541/>

Figure 6: Climatic Conditions of Nairobi

Rainfall

The average annual rainfall in Nairobi is about 900 mm, but the actual amount in any one year may vary from less than 500 mm to more than 1500 mm. There are two rainy seasons - from mid-March to the end of May (the so-called "long rains"), and from mid-October to mid-December (the "short rains"). The dates on which these rainy seasons start and end are very variable.

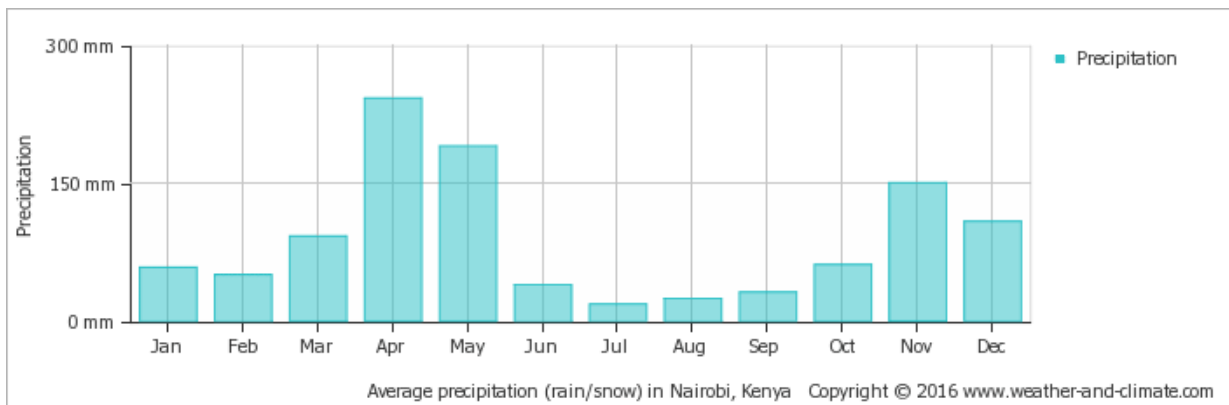


Figure 7: Average precipitation of Nairobi

Temperature

The warmest month of the year is February with an average temperature of 27°C. In July, the average temperature is 23°C. It is the lowest average temperature for the whole year.

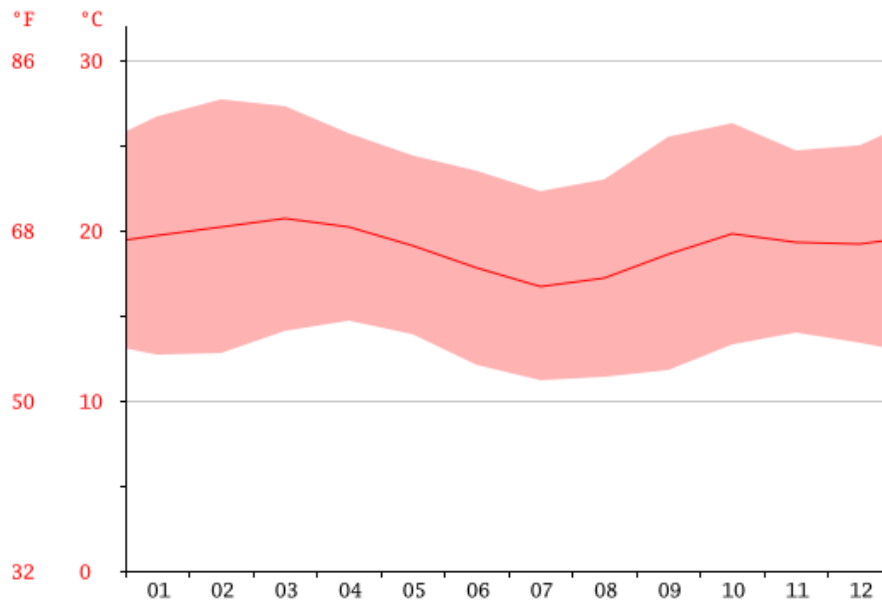


Figure 8: Average temperature in Nairobi

3.2.2 Geology and soils

The entire Lavington area, including the project site, is characterized by red volcanic porous soil while the underlying rock is soft volcanic rock. Nairobi County is covered by three broad categories of soils which are: high level upland soils, plateau soils and volcanic footbridges soils. The project site (Lavington), is covered by high level upland soils, which are from volcanic rocks, and are relatively fertile.

The site area is composed of volcanic rocks that originated in the rift region and flowed eastwards on to a warped and partly dissected, pre-Miocene erosion surface, cutting across the older crystalline rocks. The rocks of Nairobi area mainly comprise a succession of lavas and pyroclastic of Cainozoic age, overlying a foundation of folded Precambrian schists and gneisses of the Mozambique Belt.

3.2.3 Drainage and Topography

Generally, the area is well drained. This is because of vertical slopes and red volcanic soils which are porous and allow for infiltration. However, in the rainy season there is a problem of poor drainage on many of Nairobi's streets due to garbage-blocked storm water drains.

The project area is characterised as falling largely within the lower highland zone and is characterised by flat plains, plateaus, and high elevation plains. The site terrain is relatively flat. The proposed project area is 1788 metres above sea level.

3.2.4 Sunshine and Solar Radiation

Nairobi experiences a total of about 2500 hours of bright sunshine per annum, which is equal to an annual mean of approximately 6.8 hours of sunshine a day. July and August are characterized by cloudiness and during these months the average daily sunshine in Nairobi is 4 hours.

3.3 Biological Environment

3.3.1 Flora/Vegetation

The peripheral part of Nairobi, where the project is located, is characterised by dry semi-deciduous trees. Dominant tree species in the area include *Cupressus torulosa*, *Cupressus sempervirens*, *Diospyros abyssinica*, Indian Banyan, Red Stink Wood (*Prunus Africana*), Palm tree, Weeping Willow, Kassod tree (*Senna siamea*), Nandi Flame (*Spathodea*), She-dak (*Casuarina*), *Croton megalocarpus*, *Brachylaena hutchinsii*, *Calodendrum capense* (Cape Chestnut), *Teclea spp*, and *Strychnos henningsii*. Other exotic plant species encountered in the site area during the survey were *Lantana camara*, *Tithonia diversifolia*, *Caesalpinia decapellata*, and *Senna didymobotrya*. Generally, the area is built up but trees and vegetation have been conserved. Lavington is considered one of Nairobi's leafy suburbs.

It is recommended that all the vegetation and trees that do not lie in the area to be developed be conserved.



Figure 9: *Flora on site. This will only be cleared when necessary*

3.3.2 Fauna/Animals

There are no animals inhabiting the site though the existence of microorganisms that burrow in the earth and birds cannot be overruled. The proposed site is not a protected area nor is it inhabited by any endangered species.

3.4 Socio-economic environment

3.4.1 Demography

The project site is adjacent to multiple residential and commercial developments both to the East and West. The area is a residential area of medium density occupied by a high socio-economic income group. Due to proximity to the city centre, decentralisation from the city centre and a well-developed infrastructure, the project will offer employment opportunities to an increasing number of young medical psychiatrists, counsellors and psychotherapists. The population in the area has increased in the recent past owing to the increase in construction of high rise apartments.

3.4.2 Infrastructure

Public amenities - Medical care treatment services related to mental health, addiction and psychotherapy services in Kenya is unfortunately still the preserve of the higher income bracket. In Kenya, an estimated three million, mostly poor people, live with intellectual and mental disabilities, and the ratio of psychiatrists to the population is dismal, with just one psychiatrist to half a million people. It is hoped that the proposed project will be able to provide good and affordable healthcare to more adults and children with intellectual and mental health disorders.

Electricity - The area is served by 3-phase electric power supply from Kenya Power's main line. The main power supply has been sized for the site at 200 kVA 415V 50Hz and will be provided by Kenya Power at the Main distribution board.

The Proponent intends to have a 200 kVA 415V Standby Generator on site for backup power. A 2000 litre Diesel tank will be installed and will provide backup power for 36 hours at full capacity and shall include all the necessary fuel piping to and from the diesel tank. The generator shall be in a sound proof canopy with a Residential silencer and exhaust piping as required. The Main Distribution Board will house the incoming supply from Kenya Power, a 200 kVA Automatic Changeover between Kenya Power to Generator, an Automatic Voltage Stabiliser and a distribution section to the various sub distribution Boards in the building. Necessary guidelines and precautionary measures relating to the use of electricity shall be adhered to.

The area is adequately served with **telecommunication facilities** and wholesome water supply from respective utility companies.

Roads -The area is adequately serviced via Muthangari Road which is tarmacked. Muthangari Road is off Gitanga Road which is one of the major arteries feeding into Nairobi's CBD. The proposed project area is secure with easy access to public transportation networks.

Sewerage - The area is served by a public sewer system. The proposed development will be connected to the existing sewerage system.

Refuse disposal - There was no dumping site identified in the area and therefore it is assumed that neighbouring establishments manage their own waste or engage the services of private waste handlers.

Security - Security in the area is generally good. The project site area will be connected by a CCTV security system and a Nurse Call system in the wards.

Water – The area is served with piped water from the Nairobi City Water and Sewerage Company. Other supplies will include harvested rain water and recycled water. Water storage tanks will be installed to increase water capacity at the project site to the required amount. During the operation phase of the project, rain water will be harvested and stored.

4 LEGISLATIVE AND REGULATORY FRAMEWORK

4.1 Introduction

In this section the institutional and legal frameworks that govern a development of this nature in Kenya and some of the international legislations that may apply will be discussed. The construction of the proposed project will be guided by a number of laws and policies governing environmental management and land use in Kenya, and at the global level.

NEMA is the national body charged with coordinating matters and implementing policies relating to the environment. This body was established under the Environmental Management and Coordination Act (EMCA) CAP. 387 (Revised 2015). The National Environmental Council (NEC), the National Environmental Tribunal (NET) and the Public Complaints Committee (PCC) were also set up under the same Act.

Development activities have the potential to damage the natural resources upon which economies are built. EIA is a useful tool for protection of the environment. EMCA, CAP. 387 (Revised 2015) was enacted to comprehensively address environmental issues which have been scattered in many sectoral laws for a long time.

4.2 Environmental Management and Coordination Act (EMCA) CAP. 387 (Revised 2015)

The law is based upon the principle that everybody is entitled to a healthy and clean environment.

The Act requires that projects acquire approval before commencement. NEMA approves and issues an environmental license after the EIA depending on sound mitigation measures to counteract any negative impacts. This is also in compliance with the requirements of the Environmental Management and Coordination Act (EMCA) Part VI section 58 (1) and (2) which states:-

- Notwithstanding any approval, permit or license granted under this Act or any other law in force in Kenya, any person, being a Proponent(s) of a project, shall, before financing, commencing, proceeding with, carrying out, executing or conducting or causing to be financed, commenced, proceeded with, carried out, executed or conducted by another person any undertaking specified in the Second Schedule to this Act, submit a study report to the authority in the prescribed form, giving the prescribed information.
- The Proponent(s) of the project shall undertake or cause to be undertaken at his own expense an environmental impact assessment study and prepare a report thereof

where the Authority, being satisfied, after studying the report submitted under Subsection (1), that the intended project may or is likely to or will have a significant impact on the environment, so directs.

4.3 Public Health Act Cap. 242

This Act provides the impetus for a healthy environment and gives regulations to waste management, pollution and human health. Public Health Act protects human health, prevents and guards against introduction of infectious diseases into Kenya from outside, promotes public health and limits or suppresses infectious, communicable or preventable diseases within Kenya. The act aims to advise and direct government authorities in regard to matters affecting public health, promote or carry out research and investigations in connection with the prevention or treatment of human diseases.

4.4 The Health Act (No. 21 of 2017)

The Health Act, Section 88 (XIII) indicates that The Cabinet Secretary shall pursue strategies that are conducive to the development and regulation of private health services and their atonement to the needs of the population. Furthermore, the act stresses that the public and private health services and facilities shall complement each other in the provision of comprehensive and accessible health care to the people.

It is law that private entities shall be permitted to operate licensing of private hospitals, clinics, laboratories and other institutions in the health sector, subject to licensing by the appropriate regulatory bodies. The first schedule of the act states that a quality health Centre should provide out-patient care, provision of limited emergency care, maternity for normal deliveries, laboratories, oral health and referral services, provision of preventive and promotive services and in-patient observation. To achieve the requirements of the health act, the proposed project architectural plans have been designed to be in line with the requirements of the health act as they cover all the provisions of a health Centre as stated in the Act.

4.5 The Persons with Disabilities Act, 2003

The Persons with Disabilities Act, provides for the rights and rehabilitations of persons living with disabilities ranging from physical, sensory, mental or other impairment, including any visual, hearing, learning or physical incapability, which impacts adversely on social, economic or environmental participation. It is a comprehensive law covering rights, rehabilitation and equal opportunities for people with disabilities. It creates the National Council of Persons with Disabilities as a statutory organ to oversee the welfare

of persons with disabilities. The Act accords rights and privileges to persons with disabilities including employment, incentives, learning and health services. CLMC as a private psychiatric hospital therefore works with the National Council for People with Disabilities in provision of health services to people with mental disabilities. CLMC aims at early identification and rehabilitation of mental disability symptoms to allow prevention and management of clients with mental disabilities in Kenya.

4.6 Physical Planning Act, Cap. 286

This Act provides for the preparation and implementation of physical development plans for connected purposes. It establishes the responsibility for the physical planning at various levels of Government in order to remove uncertainty regarding the responsibility for regional planning.

It provides for a hierarchy of plans in which guidelines are laid down for the future physical development of areas referred to in specific plans. The ostensible intention is that the three-tier order plans, the national development plan, regional development plan, and the local physical development plan should concentrate on broad policy issues.

The Act also promotes public participation in the preparation of plans and requires that in preparation of plans, proper consideration be given to the potential for economic development, socio-economic development needs of the population, the existing planning and future transport needs, the physical factors which may influence orderly development in general and urbanization in particular, and the possible influence of future development upon the natural environment. The innovation in the Act is the requirement for EIA. Any change of use of the actual development without authority constitutes an offence.

4.7 The Counsellors and Psychologists Act (No. 14 of 2014)

This is an Act of Parliament that provides rules and guidelines pertaining to the training, registration, licensing, practice and standards of counsellors, psychiatrists and psychologists for connected purposes in Kenya. The Act stipulates that there is to be established a board to be known as the Counsellors and Psychologists Board which shall collaborate with training institutions, professionals, mental health providers, professional organizations and other relevant bodies in matters relating to training and professional development of counsellors and psychologists. Furthermore the board supervises the professional conduct and practice of counsellors and psychologists and takes the necessary disciplinary measures in cases of violations of professional conduct

and discipline. As such CLMC has therefore been collaborating with the Counsellors and Psychologists Board since it started its operations in 1997. CLMC operates within the Acts guidelines and ensures the staff are qualified and licensed by the Board

4.8 The Narcotic Drugs and Psychotropic Substances (Control) Act, (No. 4 of 1994)

The Act makes provision with respect to the control of the possession of, and trafficking in, narcotic drugs and psychotropic substances and cultivation of certain plants. It provides for the forfeiture of property derived from, or used in, illicit traffic in narcotic drugs and psychotropic substances, and for connected purposes.

The act states that any person who, in the course of treatment for any physical, dental or mental disorder is supplied with any narcotic drug or psychotropic substance, or a prescription thereof, by a medical practitioner or dentist treating him and who without disclosing that fact receives additional narcotic drugs or psychotropic substances, or a prescription thereof, from any other medical practitioner or dentist, shall be guilty of an offence and liable to a fine of not less than fifty thousand shillings and, in addition, to imprisonment for a term not exceeding ten years.

Additionally the Act insists that a medical practitioner or dentist shall not prescribe for, administer, sell or supply to, any person any narcotic drug or psychotropic substance; or sign any prescription or order for the supply of any narcotic drug or psychotropic substance to any person, unless the narcotic drug or psychotropic substance is required for the medical or dental treatment of the person. Therefore any person who contravenes the act without proper licensed documents from the Board shall be guilty of an offence and be liable to a fine of not less than two hundred and fifty thousand shillings or to imprisonment for a term not exceeding ten years or to both such fine and imprisonment. CLMC has therefore acquired a license for buying and administering narcotic drugs or psychotropic substances for treatment of psychiatric Clients with drug addiction problems.

4.9 The Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations (2009)

Part II, Section 3 of the regulations states that except as otherwise provided in these regulations, no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. Section 4 states that except as otherwise provided in the Regulations, no person shall make or cause to make excessive

vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others and the environment.

Part III, Section 11 states that any person wishing to operate or repair any machinery, motor vehicle, construction equipment or other equipment, pump, fan, air-conditioning apparatus or similar mechanical devices, or engage in any commercial or industrial activity, which is likely to emit noise or excessive vibrations shall carry out the activities within the relevant levels prescribed in the First Schedule of these Regulations.

Section 13 of these regulations prohibits construction at night, operation of any construction equipment outside construction or repair work so as to emit noise in excess of the permissible levels as set out in the Second Schedule to the Regulations.

The Proponent(s) and the contractor will abide by these regulations by ensuring that noise levels do not exceed the set limit, and that no construction activities go on during the night. The mitigation measures indicated in the EMP will be keenly observed.

4.10 Neighbourhood Associations and/or General Public

The proposed development project is likely to attract the interests of the area's neighbourhood association(s)/general public. An extensive public participation process will hence form a major component of the study. From the foregoing, particular reference is made to Section 17 of the Environmental (Impact Assessment and Audit) Regulations (2003) which states that:-

“.....The Proponent(s) shall in consultation with the authority seek the views of persons who may be affected by the project.....”

The above expression clearly underscores the concept of participatory environmental planning and management in the context of urban development. Questionnaires were distributed to the members of public/ neighbours for public participation and the feedback is appended to this report.

4.11 The Building Code

In recognition of the role of County Governments as planning agencies, the adoptive by-law compels any potential developer to submit their development application to the relevant planning office for approval. The planning offices are empowered to disapprove any plan submitted if it is not correctly drawn or does not provide sufficient information that complies with the by-law. Any developer, who intends to erect a building, must give

the concerned authority a notice of inspection, before erection of the structure.

4.12 Urban Areas and Cities Act, 2011

Part 2 of the Fourth Schedule of the Kenyan constitution repealed the Local Government Act Chapter 265 through the Urban Areas and Cities Act 2011, transferring the control of cities and municipalities to the County Governments. The constitution therefore empowers the County Governments to control or prohibit all places of work that by reason of smoke, fumes or chemical gases, dust, smell, noise or vibration or other cause that may be a source of danger, discomfort or annoyance to the neighbourhood and to prescribe the conditions subject to which businesses, factories and workshops shall be carried on. The constitution further empowers the County Governments to establish and maintain sanitary services for the removal and disinfection, or otherwise dealing with all kinds of refuse and effluent, such as spent oil, and where any such services are established, to compel the use of such services by persons to whom the service is available

4.13 The Water Act, 2002

The Water Act (2002) provides for management, conservation, use and control of water resources. The sections of the Water Act (2002) that are relevant to development of health care facilities are:-

a) Section 2(1) defines “pollution” in relation to water resources to mean any direct or indirect alteration of the water resources so as to make it less fit for any beneficial purpose for which it is or may reasonably be expected to be used; or harmful or potentially harmful to:

- The welfare, health and safety of human beings
- Any aquatic or non-aquatic life or property or
- The environment.

b) Section 94 (1) states that no person shall, without authority under the Act:

- Willingly obstruct, interfere with, divert or abstract water from any water course or any water resource or negligently allow any such obstruction, interference, diversion or abstraction or,
- Throw or convey or cause or permit to be thrown or conveyed any rubbish, dirt, refuse, effluent, trade waste or other offensive or wholesome matter or thing

into or near to any water resource, in such manner as to cause pollution of water resource.

- c) *Section 94 (2)* underscores that a person who contravenes the above section shall be guilty of an offence.

4.14 The World Commission on Environment and Development

This Commission commonly referred to as “the Brundtland Commission” focused on the environmental aspects of development, in particular the emphasis on sustainable development that produces no lasting damage to the biosphere, and to particular ecosystems. It was this Commission that came up with the whole concept of sustainable development which they defined as “development that meets the needs of the present, without compromising the ability of future generations to meet their own needs”.

4.15 The Rio Declaration on Environment and Development

Agenda 21 - a programme of action for sustainable development worldwide, the Rio Declaration on Environment and Development was adopted by more than 178 governments at the United Nations Conference on Environment and Development, known as the Earth Summit, held in Rio de Janeiro, Brazil, 3-14 June 1992.

Principle No. 10 of the Declaration underscored that environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided. The foregoing discussion is relevant to the proposed development because EMCA demands that the public must be involved before any development project that is likely to have adverse impacts on the environment is initiated by a Proponent. The Act has further established a PCC where the issues raised by the public in regard to any proposed development can be addressed.

4.16 The National Environmental Action Plan (NEAP)

The NEAP for Kenya was prepared in 1994. It was a deliberate policy to integrate

environmental considerations into the country's social and economic development process. Integration was achieved through multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and conservation of natural resources is an integral part of societal decision-making process.

4.17 Medical Examination Rules (Legal Notice No. 24 of 2005)

This is a subsidiary legislation to the Factories and Other Places of Work Act, CAP. 514 of the Laws of Kenya. These rules were made in early 2005 by the Minister for Labour and Human Resource Development. These rules apply to factories and other workplaces where workers are exposed to hazardous substances and processes. The categories of workers who require medical examinations is given in section 45 (B) of the Factories and Other Places of Work Act of 1990. The category of workers to be examined is also given in the first schedule of Legal Notice No. 24.

According to this Legal Notice, the type of examination required for workers is dependent on the hazards that one is exposed to. Examples of work deemed hazardous include spray painting, sanding, and handling used oil or grease. Such workers must also undergo skin tests in accordance with these regulations.

4.18 Noise Prevention and Control Rules (Legal Notice No. 25 of 2005)

This is also a subsidiary legislation to the Factories and Other Places of Work Act, CAP. 514 of the Laws of Kenya. These rules were made on the 10th of March 2005 by the Minister for Labour and Human Resource Development. These rules apply to factories, premises, places, processes and operations that are generating or are likely to generate noise.

The rules require factories generating over 85 dB (A) of noise to have in place Noise Prevention and Hearing Conservation Programmes specifying measures they have taken to prevent and control noise.

These rules have spelt out permissible noise levels as follows:-

- a) **90 dB (A)** exposure for a maximum of 8 hours per 24 hours in very noisy factories
- b) **140 dB (A)** peak sound level at any given time
- c) Maximum of **50 dB (A)** noise transmissible from the construction site to the neighbourhood during the day and **45 dB (A)** at night time.

These rules require employers to carry out noise measurements at least once every 12 months to determine the prevailing noise conditions. This must also be done whenever any facility, equipment, working process or method is being changed.

Under these rules, employers are required to install a visual warning system or other means of communication in areas where noise can give rise to difficulties in verbal or sound communication.

In areas with over 90 dB (A), employers are required to post a sign at the entrance and in every room or conspicuous place, clearly and prominently marked "DANGER! HEARING PROTECTION MUST BE WORN" in English, Kiswahili, and one local language commonly used where the workplace is situated. In such areas, the rules require that hearing protection be supplied to all persons entering such an area. In addition, employers are required to ensure that all workers in this area are provided with adequate protection.

The same rules also require employers to provide medical examinations and hearing tests for workers exposed to above 85 dB (A) noise limit as follows:-

- a) An initial test upon employment
- b) Annual tests thereafter or at such an interval as may be necessary

The examination reports are confidential. According to these rules, occupational hearing impairment (proved by an approved doctor) shall be compensated as an occupational disease.

4.19 International Conventions and Agreements that are applicable

4.19.1 Kyoto Protocol

The Kyoto Protocol is an international and legally binding agreement to reduce greenhouse gases emissions worldwide which came into force on 16 February 2005.

The Protocol encourages improvements in energy efficiency, reforming of the energy

and transportation sectors, promoting renewable forms of energy (wind and hydro and geothermal), phasing out inappropriate fiscal measures and market imperfections, limiting methane emissions from waste management and energy systems, and protecting forests and other carbon "sinks".

Under the Convention, both developed and developing countries are urged to:-

- Take measures to limit emissions and promote adaptation to future climate change impacts
- Submit information on their national climate change programmes and inventories
- Promote technology transfer
- Cooperate on scientific and technical research
- Promote public awareness, education, and training

The Protocol also reiterates the need to provide "new and additional" financial resources to meet the "agreed full costs" incurred by developing countries in carrying out these commitments.

4.19.2 Convention on Climate Change

The Convention on Climate Change sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases.

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

Under the Convention, governments are expected to:-

- Gather and share information on greenhouse gas emissions, national policies and best practices;
- Launch national strategies for addressing greenhouse emissions and adapting to expected impacts, and
- Provide financial and technological support to developing countries in preparing for adaptation to the impacts of climate change.

5 ENVIRONMENT, HEALTH AND SAFETY

5.1 Construction Phase

5.1.1 Commitment to Environment Health and Safety best Practices

The proposed project shall be committed to implementing the best practices in Environment, Health and Safety (EHS). The Contractor will be required to incorporate an EHS system in the entire process. The Contractor and senior management of the company shall demonstrate the EHS policy as stipulated by the company. The foreman shall ensure that no reused water is left to flow and the mixer is not left on when not in use. The company shall ensure efficient use of resources at all stages of construction phase is observed.

5.1.2 Provision of Protective Personal Equipment (PPE)

The contracting firm shall ensure that both casual and permanent employees on the construction site are provided with adequate PPE such as safety hats, safety boots, dust masks, ear muffs, gum boots, hand gloves and safety harnesses.

5.1.3 Provision of employee facilities

The requisite facilities for employees will be provided. These facilities will be temporary and shall be demolished during the operational phase. Such facilities include latrines, shower room, changing areas, a dining area and store.

5.1.4 Efficient use of resources

The Contractor will ensure efficient use of renewable and non-renewable resources. Use of natural lighting is encouraged wherever practical, to reduce pollution and high energy consumption. Resources such as water and construction materials will be used efficiently to reduce strain on the available resources.

5.1.5 Proper Disposal of Waste

Some of the waste that will be generated includes excavated soil, food waste, waste water, used oil and timber off-cuts.

The Contractor shall institute the following measures to manage waste on the construction site:-

- a. Minimise waste
- b. Maximise reuse and recycling of reusable construction materials

- c. Promote environmentally sound waste disposal and waste treatment, while being mindful of the neighbours.

5.1.6 Health and Safety of Workers

The Contractor will ensure all the workers are sensitized on safety procedures and precautions. The site shall have at least one trained first aider. A fully stocked first aid box shall be kept on site.

5.2 Operation Phase

5.2.1 Resource use efficiency

Upon completion, the project will ensure use of natural light as much as possible. Bulbs that conserve energy shall be installed. Alternative sources such as solar and wind energy shall be considered. All the light fittings will have LED lamps and will be selected to suit the requirements of the area/zone.

Toilets will be fitted with modern flushing systems that will ensure water conservation. Notices will be displayed bearing information on the conservative use of resources, for example, water conservation, switching off lights when not in use and using electrical equipment that is in good working condition.

5.2.2 Waste generation and disposal

5.2.2.1 Cleaning Materials and Equipment

The administration shall ensure that all purchases observe green policy. Only biodegradable detergents shall be used for cleaning and disinfection activities for the facility. Disinfectants will be selected based on environmental standards. All hospital waste will be disposed of appropriately in accordance with the Laws of Kenya.

5.2.3 Maintenance of Fire Fighting Equipment

The facility manager shall ensure installation of adequate fire-fighting equipment and periodic maintenance of the equipment. Emergency evacuation procedures will be laid down. Fire drills shall be conducted periodically to determine emergency response and preparedness. The proponent intends to put an Addressable Fire detection system in the building. This will include smoke and heat detectors in all rooms. Break Glass Units or Manual Call Points will be positioned at all fire exits on all floors. Sounders and Flashing lights will be included on all floors to provide evacuation warnings.

6 POTENTIAL ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

Potential impacts arising from the proposed project were examined under two categories, i.e. negative environmental impacts and positive environmental impacts. The various impacts in these two categories were then examined in order of their level of importance and significance. They are also examined in categories of their time of occurrence (i.e. construction or operational phase).

For impact identification, a checklist was employed to identify the possible impacts from the project development. A questionnaire with structured questions was used to get public opinions and concerns regarding the proposed project. The following possible impacts were identified.

6.1 Positive Impacts

6.1.1 Design Phase

6.1.1.1 Employment

The project will create short term employment opportunities for the architect and engineers. The same applies to all project consultants, including the environmental impact assessment consultant.

6.1.1.2 Generation of income and source of Government Revenue

Income will accrue to professionals for their activities in the design phase of the proposed project and this will attract taxes by the state. In addition, some fees will be levied for submission of plans to the County Planning Dept. for approval. This will be a source of government revenue which can be used to achieve various governmental goals and objectives.

6.1.1.3 Improved infrastructure

The redevelopment of CLMC will enable provision of better psychiatric health services for the Clients in Kenya, and from the region.

6.1.2 Construction Phase

6.1.2.1 Employment

The construction of the proposed project will generate short term employment, i.e. employees involved in the excavation of foundations, masons, suppliers of building

materials will benefit. The project will also create indirect employment through on-site demand of goods and services e.g. food for the casual labourers involved in construction.

6.1.2.2 Market for goods and services

For construction works to run smoothly, an effective supply of goods and services such as cement, building blocks and transportation services should be present. This therefore offers a market for the goods and services thus promoting a variety of sectors.

6.1.2.3 Economic growth

Through the use of locally available materials during the construction phase of the project including cement, structural steel, concrete, ballast and sand, the project will be contributing towards the gross domestic product (GDP) of the country. The consumption of these materials, fuel oil and others will attract taxes including Value Added Tax (VAT) which will be payable to the government hence increasing government revenue while the cost of these raw materials will be payable directly to the producers.

6.1.3 Operation Phase

Operation of the proposed project will enhance the availability of high quality mental and psychiatric medical services in Kenya, and the East African region.

6.1.4 Decommissioning Phase

6.1.4.1 Environmental conservation

There will be recycling of the waste materials generated during the decommissioning phase. These materials will be used as raw materials in other construction processes hence reducing the demand for raw materials. This in turn will reduce the potential impact on the environment that would have been felt if the demand for the raw materials had not reduced.

6.1.4.2 Income generation

The sale of debris and materials arising from decommissioning of the existing structure will generate additional income for the Proponent. These materials can be recycled and used in other construction processes thereby reducing the need for sourcing new construction materials.

6.1.4.3 Rehabilitation of the project site

Upon decommissioning of the proposed project, rehabilitation of the project site will be carried out to restore the site to its original status or to a better state than it was originally.

This will entail the replacement of the topsoil and re-vegetation which will lead to

improved visual quality of the area. This will also mean that alternative options can be utilized within the project site.

6.2 Negative Impacts

6.2.1 Construction Phase

6.2.1.1 Flora

Construction works will entail clearance of very minimal vegetation.

6.2.1.2 Fauna

Trees and vegetation act as habitats for various animals, birds and insects. They also serve as a source of food for these organisms. Therefore, clearance of vegetation will result in the destruction of fauna due to loss of food and habitat.

6.2.1.3 Dust and exhaust emissions

Vehicles bringing in materials to the site are expected to emit particulate matter into the atmosphere. Construction works will also result in the emission of dust and particulate matter into the surrounding air. Dust and particulate matter may also increase the risk of contracting respiratory diseases both by workers on site and the surrounding community. This will however depend on the weather conditions during the construction period. This is a negative impact expected to last during the construction period which can be mitigated.

6.2.1.4 Noise pollution

There will be an increase in noise levels around the construction site owing to the nature of machinery in use, workers and vehicles involved in material transportation to the site. Construction activities will add to background noise of the project location.

6.2.1.5 Soil compaction

Heavy machinery used will cause compaction of the soil thus increasing soil bulk density, reducing the infiltration rate of storm water and consequently affecting ground-water recharge.

6.2.1.6 Soil and surface water contamination

Moving vehicles at the site may require oil and lubrication changes. Possibilities of such oils spilling and contaminating the soil and water within the project site are likely. The excavated area, if linear, can act as a conduit to extend groundwater contamination to new areas. Spills of hazardous materials in excavated areas during construction could introduce contaminants to ground water.

6.2.1.7 Destruction of roads

Movement of trucks laden with heavy building materials in and out of the site might damage access roads in this area. These could create depressions that may contribute to the formation of road ridges and pot-holes.

6.2.1.8 Traffic

During the construction phase, the main roads leading to the proposed project site will serve additional vehicles used for transportation of materials to the site interfering with traffic along the roads leading to the project site.

Heavy trucks, when used, will impact on infrastructure through the destruction of the operational road network especially near the project site and turning points. The contractor or developer should ensure that access roads are properly rehabilitated after construction work.

6.2.1.9 Occupational hazards

Construction works will inevitably expose workers and the public to occupational health and public safety risks. In particular, working with heavy equipment, handling and use of tools entail certain risks. The construction workers are also likely to be exposed to the risk of accidents and injuries resulting from accidental falls, falling objects, injuries from hand tools and other equipment.

6.2.1.10 Increased demand for resources

Building materials such as hard core, ballast, cement, building blocks and sand required for construction of the project will be obtained from quarries, hardware shops and sand harvesters who extract such materials from natural resource banks such as rivers and the land. Since substantial quantities of these materials will be required for construction of the proposed project, the availability and sustainability of such resources at the extraction sites will be negatively affected as they are not renewable in the short term.

6.2.1.11 Solid waste generation

The excavation stage will result in large amounts of soil, murram and rock. If these materials are not disposed of according to the law, then the resulting stockpiles can be visually intrusive.

Other solid waste likely to be generated during the construction phase includes metal cuttings, rejected materials, surplus materials, surplus soil and cement bags. These materials will require disposal.

The workers on-site will generate faecal waste during their daily operations. The generated waste needs proper handling to prevent diseases such as cholera, typhoid and diarrhoea outbreak at the site. Unless this is addressed, it can prove to be an environmental and health hazard.

6.2.1.12 Increased water demand

Both workers and construction works will create additional demand for water in addition to the existing demand. Water will mostly be used in the making of concrete for construction works, wetting surfaces and cleaning construction equipment and completed structures.

6.2.2 Operation Phase

6.2.2.1 Biomedical waste

Mental health is vital for everyone's sense of general wellbeing. Waste generated from medical activities can be hazardous, toxic and even lethal owing to its high potential of disease transmission. Biomedical waste may be defined as any waste generated during diagnosis, treatment or immunization of human beings or animals in research activities. Biomedical waste may include: syringes and needles, scalpels and materials used in patient diagnosis and treatment.

Waste that is deemed potentially infectious will be treated prior to disposal by either disinfecting or sterilizing it. Waste will be classified and segregated before disposal. Appropriate PPE will be used while handling any biomedical waste.

6.2.2.2 Increased waste water

Liquid waste will emanate from washrooms, toilets and washing operations. During operation, waste water generated will be channelled into the municipal sewer line. Regular maintenance of the sewer line at the premises will be carried out by the Proponent.

6.2.2.3 Increased energy consumption

During the operation phase more electricity will be used for running certain medical equipment and for lighting. However, the Proponent intends to ensure efficient use of available energy. Notices will be placed indicating the need to conserve energy.

6.2.2.4 Increased storm water

Soil compaction and impervious surfaces left during the construction phase may increase surface run-off. Poor drainage systems in the area may result in stagnant water which in turn may become breeding ground for mosquitoes.

6.2.3 Decommissioning Phase

6.2.3.1 Solid waste generation

In the event that the project would be demolished, large quantities of solid waste would result. The waste is expected to comprise materials used in construction including concrete, metal, building blocks etc. which will either be recycled or require disposal.

6.2.3.2 Noise pollution

Decommissioning related activities will lead to significant deterioration of the sound environment within the project site and the surrounding areas. This will be as a result of noise and vibration that will be experienced during the demolition of the buildings.

6.2.3.3 Air pollution

Large quantities of dust will be generated during demolition works. Particulate matter pollution is likely to occur during demolition and transportation of the waste debris from site. There is a possibility of suspended and settle-able particles affecting the site workers and surrounding neighbours' health.

Exhaust emissions are likely to be generated during the demolition period by the various machinery and equipment to be used as well as motor vehicles used for the exercise. The impact will be short term and will last during the duration of the demolition process.

6.3 Mitigation of negative impacts

The following mitigation measures should be employed to ameliorate any potential anticipated impacts from the project activities. Other important mitigation measures are listed below.

6.3.1 Flora and Fauna

The contractor should minimize vegetation disturbance by excavating necessary areas only. Trees that are not in areas designated for proposed construction should be left intact.

6.3.2 Air pollution

Reduction of air pollution can be achieved through:-

- Limiting the traffic movement and operations to efficient and necessary activities during construction
- Carrying out routine maintenance of vehicles and other machinery to ensure minimized emission of nitrogen and sulphur oxides from vehicles and other machinery exhaust systems
- Setting a reasonable maximum on-site speed for construction vehicles
- Ensuring strict enforcement of onsite speed limit regulation
- Sprinkling water on graded access roads each day to reduce dust generation by construction vehicles
- Providing appropriate dust screens to reduce dust exposure
- Workers should always wear the appropriate PPE
- Providing dust masks for workers in extreme dust producing operations
- Maximizing the use of manual labour and hand tools
- Avoiding spillage of loose soil on the road where it will be disturbed and blown away by traffic
- Sensitizing drivers to avoid off-road driving

6.3.3 Noise pollution

Reduction of noise pollution can be achieved through:-

- Limiting the construction activities to day time only
- Replacing noisy machinery with attenuated machinery
- Lubricating and servicing machinery
- Providing ear muffs for workers that operate noisy machinery
- Displaying noise hazard signs where necessary
- Cordoning off the site from neighbouring plots

6.3.4 Soil and water contamination

Reduction of soil and water contamination can be achieved through:-

- Properly storing, handling and disposing of new oil and used oil waste
- Maintenance of construction vehicles and equipment should be carried out in the contractors' yard (away from the project site)

6.3.5 Solid waste generation

Solid waste generation can be reduced through:-

- Disposing construction debris and excavated materials at sites approved by the town engineer and in accordance with Waste Management Regulations (2006)
- Undertaking building material recycling where possible
- Giving used cement bags to waste paper recyclers
- Minimizing waste to avoid unsustainable construction practices
- Ensuring all waste is sorted before proceeding with disposal
- Providing adequate sanitary convenience for construction workers

6.3.6 Increased water demand

Reducing the amount of water used during the project activities can be done through recycling water at the construction phase where possible.

6.3.7 Occupational hazards

Occupational hazards can be mitigated by:-

- Providing suitable PPE for all workers
- Reserving one PPE for every worker to avoid sharing
- Providing sanitary convenience
- Providing wholesome drinking water and toilet facilities for workers
- Minimizing soil disturbance and sprinkling water regularly to reduce dust
- Providing a well-stocked first aid kit
- Training workers in safe practices

6.3.8 Visual intrusion

Mitigation against visual intrusion can be achieved through speeding up construction as far as is technically viable.

7 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

This chapter presents the EMP that will need to be implemented by the Proponent to prevent or reduce significant negative impacts to acceptable levels. All the project components had been considered when this comprehensive EMP was developed. Compensation to the affected parties for impacts which cannot be mitigated will need to be considered where applicable.

The following EMP has been structured in such a manner so as to provide a basis for implementation of the Environmental Management System (EMS) ISO 14001 principles for the life of the proposed development. It should be further noted that the proposed EMP is not static, as allowance has been made for it to evolve throughout the life of the project. Such a characteristic is seen to be important as key factors and processes may change through the life of the project. It is therefore necessary to alter proposed mitigation and monitoring methodologies in order to determine the best approach to deal with such changes. This EMP includes the necessary specialist input to determine, mitigate and manage any environmental impacts that the proposed development may have, relating to bio-physical and socio-economic aspects. Specific attention has been made to ensure that the EMP conforms to the following criteria:-

- Identifies specific quantifiable monitoring regimes
- Delineates key lines of accountability
- Associates mitigation and monitoring tasks to specific impacts
- Gives guiding costs of implementation
- Where practically possible, identifies key indicator which can be utilized for environmental performance monitoring
- Ensures flexibility to enable incorporation of additional monitoring and mitigation techniques as deemed necessary throughout the life of the project
- Conforms to all best practice principles by acknowledging the existence of both long term and immediate impacts and the resulting mitigation measures necessary to deal with such, and
- Identifies commitments made by the Proponent(s) with regard to its environmental performance.

The following table forms the core of this EMP for the construction and operational phases of the proposed project. The table provides details of all necessary mitigation measures as well as the person responsible for implementing and monitoring such measures. The table should be used as a checklist on-site. It shows the impacts,

mitigation measures, implementation, period, the required resources and the responsible persons to take action.

Table 3: *Environmental Management Plan for the Proposed Redevelopment of the Chiromo Lane Medical Centre (CLMC)*

Possible Environmental Impacts	Suggested Mitigation Measures	Responsibility	Monitoring Indicator (s)	Timing	Cost estimate (Kshs)
Construction and Operational Phase					
Air pollution and dust generation	<ul style="list-style-type: none"> • Spraying of water during construction work • Control of speed and movements of construction vehicles • Building a buffer fence around the construction site • Use of low-sulphur diesel for diesel-operated construction machinery • Materials being transported should be covered at all times 	<ul style="list-style-type: none"> • Project Proponent • Building contractor • Project drivers 	<ul style="list-style-type: none"> • Minimal dust from construction site • No complaints from neighbours on dust • No complaints from construction workers about dust 	Daily throughout construction stage	70,000
Noise Pollution	<ul style="list-style-type: none"> • No unnecessary hooting by project and building occupants vehicles • Use of ear protection aids by construction workers • Use of attenuated equipment 	<ul style="list-style-type: none"> • Project Proponent • Building contractor • Construction workers 	<ul style="list-style-type: none"> • No complaints from workers and neighbours about loud noise • No interference 	Daily throughout construction stage	75,000

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			with conversations at project site		
Generation of solid waste	<ul style="list-style-type: none"> • Reuse of soil for landscaping • Reuse of construction debris • Proper containment and disposal of solid waste • Contracting a licenced waste collection and disposal company at operation stage • Use of soil and construction debris for rehabilitation of quarry pits • Sensitizing construction workers and building occupants on proper waste disposal and material reuse • Reuse of timber offcuts and wooden supports for fuel 	<ul style="list-style-type: none"> • Project Proponent • Building contractor • Contracted waste collection and disposal company 	<ul style="list-style-type: none"> • Solid waste receptacles at site • Reuse of solid waste material • Proper disposal of waste • Waste collection contract at operation stage 	All stages of project cycle	40, 000 per month
Health and safety	<ul style="list-style-type: none"> • Construction workers to be provided with appropriate PPE • Site to be sprinkled with water to minimize dust • Use of stable ladders and other climbing/support structures 	<ul style="list-style-type: none"> • Project Proponent • Building contractor • Workers 	<ul style="list-style-type: none"> • 100 % use of appropriate PPE by workers • Zero accidents at the site • Insurance cover 	Daily throughout construction and at decommissioning phase	110,000

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	<ul style="list-style-type: none"> • Sensitize workers in construction safety measures • Cleanliness and organization at the construction site • Fencing or covering of risky areas such as deep pits • Safety signage • Use of permit-to-work authorizer for risky jobs • Engagement of skilled labourers • Insurance of workers 		<p>for construction workers</p> <ul style="list-style-type: none"> • Clean, organized workplace • Permit-to-work forms for risky jobs • Safety signage • Number of workers trained in safety 		
Fire hazards and accidents	<ul style="list-style-type: none"> • Acquire firefighting facilities • Sensitize workers in fire safety • Proper disposal of solid waste • No storage of inflammables on site • Keep well stocked first aid box • Proper handling and use of tools and machinery • Use of correct PPE 	<ul style="list-style-type: none"> • Project Proponent • Building contractor • Workers 	<ul style="list-style-type: none"> • Presence of firefighting facilities at the site • First aid box at site and a trained first aider • Absence of inflammables at site 	Daily throughout construction and at decommissioning phase	85,000
Security	<ul style="list-style-type: none"> • Ensure that the site is always guarded by a reputable 	<ul style="list-style-type: none"> • Project Proponent 	Zero cases of burglary or	24-hours a day throughout the	55,000per month

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	<p>security firm</p> <ul style="list-style-type: none"> • Constant site patrol • Adequate screening of visitors to the site • Collaboration with existing security machinery • Partnership with neighbours and police in community policing 	<ul style="list-style-type: none"> • Building contractor • Contracted security firm • Local security 	vandalism at the site	project cycle	
Public health and safety	<ul style="list-style-type: none"> • Proper handling and disposal of solid waste • Control of visitors to the site • Safe and comprehensive decommissioning of connections and structures thereof at decommissioning phase • Traffic control • Installation of adequate water supply • Enhanced site security • Proper safety signage at the site. 	<ul style="list-style-type: none"> • Project Proponent • Building contractor • Nairobi City county • Nairobi Water and Sewerage Company 	<ul style="list-style-type: none"> • Proper solid waste disposal • No incidences of disease outbreaks or accidents at the site • No unregulated developments around the facility 	All stages of project cycle	130,000

Decommissioning Phase					
Decommissioning (Demolition Waste)	<ul style="list-style-type: none"> • Use of an integrated solid waste management system • Where recycling /reuse of the machinery equipment, partitions and other demolition waste is not possible, the material should be taken to a licenced waste disposal • Implement an appropriate re-vegetation landscaping programme to restore the site to its original status. Consider planting of indigenous species when restoring the site to its original status 	<ul style="list-style-type: none"> • Contractor 	<ul style="list-style-type: none"> • No complaints from the neighbours 	Decommissioning phase	90,000

Table 4: *Health, Safety and Accident Prevention Action Plan*

Issue	Specific measures	Responsibility	Timing
Project design	<ul style="list-style-type: none"> • Incorporation of health and safety measures in project design 	<ul style="list-style-type: none"> • Project architect • Structural and civil engineers 	Design stage
Site organization and cleanliness	<ul style="list-style-type: none"> • Keep construction materials in correct place • Maintain cleanliness at the construction site 	<ul style="list-style-type: none"> • Contractor • Project Proponent 	Construction stage
Fire safety	<ul style="list-style-type: none"> • No storage of inflammables • Fire safety awareness • Keep firefighting facilities at the site • Safe handling of fire • No smoking on site 	<ul style="list-style-type: none"> • Contractor • Project Proponent • Visitors 	All stages of project cycle
Accident prevention	<ul style="list-style-type: none"> • Safe handling of tools and machinery • Use of appropriate personal protection equipment • Engagement of qualified personnel • Controlling visitor entry onto the site 	<ul style="list-style-type: none"> • Contractor • Project Proponent • Visitors • Security company 	Construction stage
Waste disposal	<ul style="list-style-type: none"> • Provision of adequate waste disposal facilities at the site • Engagement of licenced waste company • Reuse of certain waste materials 	<ul style="list-style-type: none"> • Contractor • Contracted waste disposal company • Building occupants 	All stages of project cycle

Issue	Specific measures	Responsibility	Timing
Tools and machinery safety	<ul style="list-style-type: none"> • Use of tools and machines for designated job • Regular servicing of machinery • Proper storage of tools 	<ul style="list-style-type: none"> • Contractor 	Construction stage
Emergency preparedness	<ul style="list-style-type: none"> • Keeping passages clear • Marking emergency exits • Training staff in emergency preparedness and response • Keeping a well-equipped first aid kit on site 	<ul style="list-style-type: none"> • Contractor • Project Proponent 	All stages of project cycle
Insurance	<ul style="list-style-type: none"> • Insuring all workers on the construction site 	<ul style="list-style-type: none"> • Contractor 	Construction stage
Site security	<ul style="list-style-type: none"> • 24-hour security on site • Control of visitor entry onto site 	<ul style="list-style-type: none"> • Contractor • Security company 	Construction and operation stage

8 CONSULTATION AND PUBLIC PARTICIPATION

This chapter describes the process of the public consultation that was followed to identify the key issues and impacts of the proposed redevelopment of CLMC in Lavington area, Nairobi County. Views from the general public, and neighbours, who in one way or the other would be affected by the proposed project, were sought through oral interviews and administering of questionnaires as stipulated in the Environment Management and Coordination Act, 1999.

A number of site visits has been made to the site to interview the residents. One of the key information sources used during the Environmental Impact Assessment exercise was public participation exercise. The exercise was conducted by a team of experienced registered environmental experts and associates via administration of pre-designed questionnaires and by interviewing neighbours surrounding the proposed project site. The neighbours were left with the forms to fill independently and at their own time. They were later collected by the EIA Consultant.

The purpose for such interviews was to identify the positive and negative impacts and subsequently promote and mitigate them respectively. It also helped in identifying any other issues which may bring conflicts in case project implementation proceeds as planned. The residents participated freely by giving some of their views and concerns.

While conducting the EIA, the Consultants widely consulted and involved various project stakeholders and members of the public. The aim was to inform stakeholders about the proposed project, gain local views and concerns and take account of public inputs. The process of consultation and public participation was also aimed at obtaining local knowledge, increasing public confidence and reducing conflicts.

8.1 Public Meeting

Public participation during the EIA process took the form of an open public meeting with the general public and neighbours, business neighbours around the project site, the project proponent, the project architect and the environmental consultant. An open public meeting was carried out on 10th February 2018 at 10.00 am at the project site. Public invitation letters and notices were distributed to the neighbours a week prior to the meeting. This was done to seek the neighbours' views and opinions regarding the proposed development.

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Figure 10: Some of the public notices inviting public members to CLMC CPP meeting along Muthangari Road, Gitanga Road and Othaya Road

There was good representation among those who attended the meeting, with residential neighbours, business neighbours, project proponents and the majority of project consultants all represented. The project was presented to meeting attendees after which the floor was opened for questions, observations and comments. A wide range of views were expressed which reflected different interests and positions in the community. (*The minutes of the meeting are appended at the end of this document*).



Figure 11: Mrs. Elizabeth Wachira and the project proponents, Dr. Njenga and Dr. Okonji addressing members of the public

8.2 Issues raised by the affected community

While carrying out the public participation exercise, neighbours expressed a variety of concerns with regard to the proposed project. Some of the concerns raised were as follows:-

Positive Issues

1. Economic Growth and availability of quality psychiatric services
2. Employment opportunities. Both temporary and permanent jobs
3. Increase in security. There will be security guards who will safeguard the materials, machines and equipment during the construction phase and also protect the residents during the operation phase.
4. Increased aesthetic value of the area. The residents were positive about the increase in art and beauty of structural buildings within the area. The overall landscape of the area will have beautiful scenery from the mix of vegetation and the building structures

Negative Issues

The neighbours raised several concerns that they would wish to be addressed by the proposed project developers. Some of these included:

- Traffic congestion along Muthangari Road
- Insecurity during the construction phase
- Air pollution (Dust during the construction stage)
- Pressure on the available water supplied by NWSC
- Noise and Vibrations. The neighbours adjacent to the project site raised the issue of noise and dust pollution that is likely to occur when the project is commenced
- Waste water management. The residents were concerned about the measures that will be taken to manage the liquid effluents generated

Suggestions to the Proponent

Those interviewed and consulted, made the following suggestions to the proponent:

- Give priority to local youths in employment opportunities
- They suggested that dust covers to be used during the construction and transportation of materials like cement and sand
- Re-planting of any trees and/or vegetation that has been cut down
- Appropriate measures should be taken to reduce pressure on the existing water from NCWSC
- Security, during the construction and the operational phase, security should be given the utmost level of propriety.
- A proper solid waste management plan to be put in place during the construction and the operational phase

The neighbours expressed mixed reactions about the project because on the one hand it brings a development to the area that would serve the local well and on the other hand it would change the character of the neighbourhood. However, there was unanimous support for the proposed project. This was as a result of clear explanation of what is proposed and the way forward in the implementation process. The community understood that the project is feasible in all aspects. The community has no objections towards the project since there are similar projects in other parts of the country that have benefitted the residents.

Generally, all stakeholders consulted had no objections to the proposed project. They

however requested the Proponent to implement the appropriate mitigation measures outlined in the EIA report to minimize the negative impacts of the proposed project. Consequentially, the proponent is putting sustainable development into practice as much as possible to ensure minimal air pollution and conservative use of energy and water.

9 ANALYSIS OF PROJECT ALTERNATIVES

This section analyses the project alternatives in terms of socio-economic implications, technology, location and environmental implications.

9.1 No Action Alternative

The 'no development' option entails leaving the current status of the proposed project site as it is. Environmental effects of the proposed development will be avoided making the option desirable considering the state of the environment. As such, reasons for developing this site will not be realized. It would mean a large section of the population would have no access to mental health care.

9.2 Alternative Site

A change of site would require that the project be implemented at an alternative site other than the one already acquired. The Proponent already owns the proposed site. Change of site would mean the Proponent has to purchase an alternative piece of land. The result would be an increase in time and resources required. The unpredictability of financial resources and the lag time required in acquiring and completing official transactions on it may take a long period. Besides, there is no guarantee that an appropriate piece of land will be available at the expected cost, or suitable for the intended use.

9.3 Alternative construction materials and technology

The proposed project will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. Equipment that saves energy and water will be given first priority without compromising on cost or availability factors. The columns and wall will be made using locally sourced stones, cement, sand (washed and clean), metal rods that meet KEBS requirements. Heavy use of timber during construction is discouraged because of destruction of forests. Exotic species would be preferred to indigenous species in the construction where need will arise.

10 CONCLUSION AND RECOMMENDATIONS

10.1 Conclusion

This study has found out that the proposed project construction is viable with minimal adverse impacts. Most of the negative impacts are short term and will only occur during the construction phase. These impacts can be easily mitigated if the proposed mitigation measures are implemented allowing the project to be environmentally sustainable.

10.2 Recommendations

The Project Proponent is committed to adhering to the proposed EMP. The Proponent has qualified and adequate personnel and a class A contractor licensed by NCA to do the project as proposed.

We therefore recommend that the Proponent be granted an EIA license to implement this project subject to adherence to the Environment and Social Management plan proposed in this report, and other statutory requirements.

In addition, the Proponent and contractor should ensure the safety of workers as well as the neighbours during the construction phase of the proposed project, by implementing the suggested safety measures in place. These measures highlight noise and dust emissions, project safety features and visual impacts.

REFERENCES

1. Government of Kenya (1994), *The National Environment Action Plan*, Government printer, Nairobi
2. Kenya Gazette Supplement Acts 2000, Environmental Management and Coordination Act Number 8 of 1999. *Government printer, Nairobi*
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4. Kenya Gazette Supplement Acts, *Water Act, 2002*, Government printer, Nairobi
5. Kenya Gazette Supplement number 56, *Environmental Impact Assessment and Audit Regulations 2003*. Government printer, Nairobi
6. Kenya Gazette Supplement Acts, *Occupational Safety and Health Act, 2007* government printer, Nairobi
7. Kenya Gazette Supplement, *Sessional Paper No. 6 on Environment and Development (1999)* government printer, Nairobi.
8. UN Habitat (2008), *State of The World's Cities 2010/2011 : Bridging the Urban Divide*

APPENDICES

Appendix 1: Project Budget

The total estimated budget for the proposed project is Kshs 526,991,386= (Inclusive of VAT).

Appendix 2: CPP Minutes

Appendix 3: Land Registration Documents

Appendix 4: Project's Architectural Drawings

Appendix 4: NEMA Approved Terms of Reference for Full EIA Study