



ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT

FOR

THE CONSTRUCTION OF STUDENTS' HOSTELS AT LILONGWE UNIVERSITY OF AGRICULTURE AND NATURAL RESOURCES AT BUNDA CAMPUS

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This Environmental and Social Impact Assessment (ESIA) report is for construction of students' hostels at Lilongwe University of Agriculture and Natural Resources (LUANAR) at Bunda Campus under the Public, Private Partnership ("PPP") Agreement. The ESIA report has been prepared with the support of many people. The Consultant is grateful to all of them. The Consultant would like to recognize in a special way the support rendered by Management and Staff of Old Mutual Investment Group; Environmental Affairs Department; Lilongwe District Council; Management and Staff of the Ministry of Lands, Housing and Urban Development; and Management and Staff of LUANAR, Bunda Campus, where the project will be implemented. The information provided by officials from these institutions is highly appreciated as it assisted the Consultant to prepare this ESIA report.

LIST OF ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
DC	District Commissioner
DEC	District Executive Committee
DESC	District Environmental Sub Committee
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMA	Environment Management Act
EMP	Environmental Management Plan
ENRMC	Environment and Natural Resources Management Consultants
ESCOM	Electricity Supply Corporation of Malawi
ESIA	Environment and Social Impact Assessment
ESMP	Environmental and Social Management Plan
GDP	Gross Domestic Product
GIS	Geographic Information System
Ha	Hectare
HIV	Human Immunodeficiency Virus
LCC	Lilongwe City Council
LUANAR	Lilongwe University of Agriculture and Natural Resources
MGDS	Malawi Growth and Development Strategy
NAP	National Agriculture Policy
NCHE	National Council for Higher Education
NCIC	National Construction Industrial Council
NGO	Non-Governmental Organization
NSO	National Statistical Office of Malawi
OP	Operational Policy
PPP	Public Private Partnership
STI	Sexually Transmitted Infection
ToRs	Terms of Reference
WB	World Bank
WSP	Wastewater Stabilization Pond

EXECUTIVE SUMMARY

1.0 Introduction

Old Mutual Investment Group would like to construct students' hostels at Lilongwe University of Agriculture and Natural Resources (LUANAR) at Bunda Campus under the Public, Private Partnership ("PPP") Agreement. The decision to construct these hostels follows the realization that there is generally a critical shortage of modern and adequate students' hostels in both public and private universities in Malawi and LUANAR is no exception. Shortage of modern and adequate hostels at LUANAR is negatively affecting students' enrolment and their academic performance. LUANAR does not have enough bed spaces to accommodate an increased number of students, which it enrolls. As a result, the institution is not able to enrol many students. Again, most of the students that are enrolled at LUANAR stay off campus and travel long distances to access university facilities. It is therefore anticipated that the proposed project will assist to increase students' enrolment and will enhance students' academic performance at LUANAR, Bunda campus as the project will help to create more bed spaces which will in return assist to provide accommodation for more students.

Considering that construction activities for the proposed project will generate a number of impacts on the bio-physical and socio-economic environment in the project area and beyond, Old Mutual Investment Group commissioned an Environmental and Social Impact Assessment study to identify potential environmental and social impacts related to the activities of the project; to assess the extent and significance of both positive and negative impacts; and to come up with measures to enhance the positive impacts and measures to mitigate the negative impacts.

2.0. Nature and scope of the students' hostels

The project will construct students hostels at LUANAR, Bunda campus, access roads and car parks. To avoid space wastage, the hostels will be high rising buildings with a minimum of three storeys. The hostels will be fitted with elevators to allow students move freely to and from different floors. The different categories of students will be accommodated in different hostels. In all there will be 1 Postgraduate (PhD) students' hostel with 3 storeys, 2 Postgraduate (Masters) students' hostels with 3 storeys and 10 undergraduate students' hostels with 5 storeys. In all, the 13 hostels will have a total capacity of 4,698 bed spaces broken down into 3,388 bed spaces for undergraduate students, 480 bed spaces for Master of Science Students, and 132 bed spaces for PhD students.

Construction activities for the project will take 36 months starting from June 2019 to May 2022. Some of the materials that will be used to construct the hostels shall include Steel structural frame; nominally reinforced concrete floor slabs, sand/cement hollow blocks or solid blocks depending on application, fiber cement boards for non-structural applications, pressed metal door frames, masonite faced flush panel solid core doors, and natural anodized aluminum windows with top hung opening sections and permanent louvre ventilation. Old Mutual will require about US\$ 25,000,000.00, which Old Mutual Investment Group has already secured from investors in a form of equity and debt. Over 250 people will be employed to work at the site when construction activities begin. Once construction activities are completed, LUANAR will use the hostels to accommodate students on campus.

3.0 Stage of the project

The project is at planning and design stage. Activities under planning and design stage include obtaining different permits and approvals for the project; conducting perimeter and topographic surveys; conducting feasibility studies, detailed engineering designs and environmental and social impact assessment studies.

4.0 Methodology for the study

The ESIA study process followed the following steps:

- a) Site visits and meetings with the University's management;
- b) Desk study of literature materials pertinent to the project and its location;
- c) Field survey to collect baseline information through direct observations, interviews with relevant stakeholders; and
- d) Preparation of the ESIA study report as per the Environmental Impact Assessment Guidelines of 1997.

5.0 Key environmental and social issues

The study identified a number of bio-physical and socio-economic impacts that will be generated by the activities of the project. A summary of the positive and negative impacts of the project are outlined below:

5.1 A summary of the key positive impacts identified in this ESIA report include:

The following is a summary of the main positive impacts:

- a) Provision of modern and adequate and affordable student accommodation facilities at LUANAR, Bunda campus;
- b) Increased enrolment of university students;
- c) Reduced demand for rented out-of-campus accommodation;
- d) Increase in performance of students academically as most students will leave close to the campus and easily access college facilities
- e) Creation of Employment;
- f) Increase in market for local construction materials;
- g) Increase in business activities within the project area;
- h) Improve security in the area;
- i) Increase in economic activities;
- j) Increase in revenue by government through taxes; and
- k) Improved aesthetic value.

5.2 Summary of key negative impacts

The following is a summary of the main negative impacts:

- i) Labour influx;
- ii) Increased generation of waste;
- iii) Injuries due to construction works;
- iv) Increased risk of dust emission and air pollution;
- v) Risk of social conflict;
- vi) Increased risk of illicit behavior and crime;
- vii) Impacts on community dynamics;
- viii) Increased burden on and competition for public service provision;
- ix) Increased risk of communicable diseases;
- x) Increased cases of accidents;
- xi) Possible disruption of public service utilities;
- xii) Disruption of flow of traffic and public mobility;

- xiii) Visual Intrusion;
- xiv) Increased demand for sanitary facilities; and
- xv) Noise Pollution;
- xvi) Increase in the spread of HIV/AIDS and other sexually transmitted diseases;
- xvii) Increased energy demand; and
- xviii) Increased Water demand

6.0 Conclusion and recommendations of the ESIA study

From the ESIA study that has been conducted, it has been concluded that construction of the hostels at LUANAR, Bunda campus will generate significant socio-economic benefits to the students, people in the project area and the country. The study has also identified a number of negative environmental and social impacts that will arise as a result of the project. However, if the mitigation measures that have been proposed in this ESIA report will be properly implemented, the negative impacts will be mitigated by either avoiding, minimizing or even eliminating some of the negative impacts completely.

It is therefore recommended that Old Mutual Investment Group should implement the project and should adopt the recommendations advanced in this report. Implementation of different mitigation measures will ensure that the negative impacts that the project will generate will be mitigated by either avoiding, minimizing or even eliminating some of the negative impacts completely.

CHAPTER 1 INTRODUCTION AND BACKGROUND

1.1 Introduction

Old Mutual Investment Group would like to construct students' hostels at Lilongwe University of Agriculture and Natural Resources (LUANAR) at Bunda Campus under the Public, Private Partnership ("PPP") Agreement. Old Mutual will operate the hostels after construction activities are completed for 35 years, during which period, the developer will recover all its capital investment and the associated profits. After 35 years of operating the hostels, Old Mutual will hand over the hostels to LUANAR, Bunda campus to become property of the University.

The decision to construct these hostels at LUANAR follows the realization that there is generally a critical shortage of modern and adequate students' hostels in both public and private universities of Malawi and LUANAR is no exceptional. Shortage of modern and adequate hostels at LUANAR is negatively affecting students' enrolment and students' academic performance. LUANAR does not have enough bed spaces at Bunda campus. As a result, the institution is not able to enrol many students. Again, most of the students that are enrolled at LUANAR stay off campus and travel long distances to access university facilities. It is therefore anticipated that the project will assist to increase students' enrolment and will enhance students' academic performance at LUANAR as the project will help to create more bed spaces which will accommodate more students on campus.

Considering that construction activities for the project will generate a number of impacts on the bio-physical and socio-economic environment in the project area and beyond, Old Mutual Investment Group contracted Environment and Natural Resources Management Consultants to undertake an Environmental and Social Impact Assessment study and to prepare an Environmental and Social Impact Assessment report and the associated Environmental and Social Management Plan and the Environmental and Social Monitoring Plan for the project. The Environmental and Social Impact Assessment study identified potential environmental and social impacts related to the activities of the project; assessed the extent and significance of both positive and negative impacts and came up with measures to enhance the positive impacts and measures to mitigate the negative impacts.

1.2 Background information

Lilongwe University of Agriculture and Natural Resources (LUANAR) is a university outside the City of Lilongwe, which was formed in 2011 by a merger between Bunda College of Agriculture, then a constituent college of the University of Malawi and Natural Resources College (NRC). Other constituent colleges of the University of Malawi then were College of Medicine, Chancellor College, Kamuzu College of Nursing and The Polytechnic. Bunda College of Agriculture housed the Faculty of Agriculture, which was established in 1967. The College used to offer BSc's, MSc's and PhD degrees in Agriculture, Environmental Sciences and Development Studies. Its mission was to advance and promote knowledge, skills, self-reliance and sound character for "sustainable food production and utilization; improving income, food security and nutrition; and conservation and management of biodiversity, the environment and natural resources. Nearby was the College farm which was serving commercial, practical, academic and research purposes.

1.2.1 Vision, Mission and Aims of the University

LUANAR was established to address the problems of limited University access and to increase the pool of well-trained human resource in the country that will accelerate socio-economic development of Malawi. LUANAR as a new university had its first intake in 2012. The vision of LUANAR is "to be a world class University".

Its mission is to advance knowledge and produce relevant graduates with entrepreneurship skills for agricultural growth, food security, wealth creation and sustainable natural resources management, through teaching, training, research, outreach consultancy and sound management.

The University aims to:

- a) provide quality education and training in agricultural and natural resources sciences, engineering and irrigation technologies, agro-processing, entrepreneurship, trade, climate change adaptation, sustainable utilization of natural resources and environmental preservation for socio-economic development;
- b) encourage the advancement, dissemination and commercialization of research;
- c) promote industrial growth through research and dissemination of knowledge and skills;
- d) establish and support science and technology innovation Centre of excellence for industrial production and manufacturing of value added agricultural and natural resource products;

develop partnerships with relevant industries for the generation, transfer, adoption and application of technologies;

- a) develop into an institution of excellence in teaching, learning, training Information Communication Technology (ICT), e-learning and research in science, technology and biotechnology;
- b) promote practical university education, research and training so as to respond to the needs of Malawi, Africa and the world;
- c) demonstrate and promote entrepreneurship among its students;
- d) provide specialist training in such subjects as may be found desirable by the University Council and the nation; and
- e) provide opportunities and facilities for accessing information in support of the programs of the University.

1.2.2 Faculties of the University

The University has five faculties namely Faculty of Agriculture, Faculty of Development Studies, Faculty of Food and Human Sciences, Faculty of Natural Resources, and Faculty of Postgraduate studies.

1.2.2.1 Faculty of Agriculture

The Faculty of Agriculture is the oldest of the five faculties at LUANAR. It was established on 26 November 1967. It has five departments namely; Agricultural Engineering, Crop and Soil Sciences, Animal Science, Horticulture and Veterinary Medicine.

1.2.2.2 Faculty of Development Studies

The Faculty of Development Studies was established in 2004 at LUANAR. The faculty has five departments namely; Agriculture Education and Development Communication, Agricultural and Applied Economics, Extension and Rural Development and Agribusiness Management.

1.2.2.3 Faculty of Food and Human Sciences

Established on 1 November 2013, the Faculty of Food and Human Sciences is comprised of three departments; Food Science and Technology, Human Nutrition and Health and Human Ecology.

1.2.2.4 Faculty of Natural Resources

The Faculty of Natural Resources was established on 1 July 2001. It comprises of Aquaculture and Fisheries Science, Environmental Sciences and Management and Forestry departments.

1.2.2.5 Faculty of Postgraduate studies

The Faculty of Postgraduate Studies at Bunda campus has been operating over 20 years then under Bunda College of Agriculture and now under LUANAR. The faculty has been offering post-graduate training in various disciplines, which boast regional excellence. The programmes have attracted students sponsored by many reputable institutions, including GTZ/SACCAR, DANIDA, Department of Animal Health and Livestock Development (Malawi), IDRC, ARDEP, ALO, the Scottish Government, NOMA, SADC/SCARDA, the Ministry of Agriculture (Malawi), NORAD, and RUFORUM. The faculty has trained students from many countries such as Ethiopia, Uganda, Tanzania, Swaziland, Lesotho, Zimbabwe, Botswana, Zambia, Kenya, Mozambique and Malawi. The cultural diversity of the postgraduate students, coupled with their seniority calls for the need to provide modern and adequate student hostels facilities at LUANAR, Bunda campus which will assist to increase postgraduate students' enrolment and to enhance their academic performance.

The Faculty of postgraduate studies at LUANAR offers the following postgraduate training programmes in different disciplines, in response to national, regional and international needs:

- a) Doctoral Programmes;
- b) Masters Programmes; and
- c) Postgraduate Diploma Programmes.

1.2.3 Campuses of the University

The University's main campus is at Bunda. Figure 1.1 provides an overview picture of the LUANAR campus at Bunda.



Figure 1. 1 An Overview picture of LUANAR campus at Bunda

LUANAR has a second campus at NRC campuses. Figure 1.2 provides an overview picture of LUANAR campus at NRC.



Figure 1. 2 An overview picture of the NRC Campus

The other campus is City Campus. Besides, LUANAR has satellite centres in Lilongwe City, Blantyre and Mzuzu for Open and Distance Learning. As of 2017, the university had a student body of 8000 to 8500.

1.2.3.1 Bunda campus of LUANAR

The university intake has increased over time from 800 students per year to 5,000 students per year. The increase in the student intake has put so much pressure on student hostels, and teaching and learning facilities. Currently the campus only has 1,000 bed spaces implying that over 4,000

students stay off campus either with their relatives in town or find their own hostels around Bunda campus. Furthermore, most of the available bed spaces are of shared room type with shared bathrooms and toilets, which is not suitable for graduate students. The off-campus hostels in most cases is not decent and conducive for university education. It is therefore anticipated that the project will increase students' enrolment both at undergraduate and graduate levels and will enhance students' academic performance as the project will create modern and adequate hostels facilities at the campus.

1.3 Nature and scope of the students' hostels

The project will construct students hostels at LUANAR, Bunda campus, access roads and car parks. To avoid space wastage, the hostels will be high rising buildings with a minimum of three storeys. The hostels will be fitted with elevators to allow students move freely to and from different floors. The different categories of students will be accommodated in different hostels. In all, there will be 1 Postgraduate (PhD) students' hostel, 2 Postgraduate (Masters) students' hostels and 10 undergraduate students' hostels. In all the 13 hostels will have a total capacity of 4,698 bed spaces broken down into 3,388 bed spaces for undergraduate students, 480 bed spaces for Master of Science Students, and 132 bed spaces for PhD students.

Hostels for undergraduate students will have 5 floors with rooms with 2 beds and built in furniture such as book shelves, reading desks, reading lumps, lockers/wardrobes and other storage facilities. The students will use common shower rooms, toilets and laundry facilities. Each hostel wing will be self-contained with each wing having its own set of combined toilets/bathroom, kitchen and laundry facilities. The ground floor for the hostels for the undergraduate students will consist of a lounge and a purposely-built hygiene communal area (like food court). The food court will be in a form of a combination of self-catering services and spaces which will be demarcated into several lockable kiosks (which will be let out) and provide various foods to students.

Hostels for Masters' of Science students will have rooms with single beds with built in furniture such as book shelves, reading desks, reading lumps, lockers/wardrobes and other storage facilities. Some rooms will be self-contained while others will not. The hostels will have 3 floors with shared common lounge area on every floor. Each wing of the hostels will be self-contained with its own set of combined toilets/bathrooms, kitchen and laundry facilities.

Hostels for PhD Students will comprise of a combination of single studio flats each with kitchenette and will be en-suites, and 2-bedroomed family flats with lounge/dining, kitchenette and family bathroom. The hostels will have 3 floors with shared common room/lounge area on ground floor only. The lower ground floor will accommodate offices and stores for the facilities manager.

Activities for the project will be implemented in four phases namely planning, construction, demobilization, and operation and maintenance phases. Activities under **planning phase** include obtaining different permits and approvals for the project; conducting perimeter and topographic surveys; conducting feasibility studies, detailed engineering designs and environmental and social impact assessment studies.

Activities under **construction phase** shall include site establishment; mobilization of workers; transportation of equipment (bull dozers, caterpillars, heavy duty vehicles, etc); transportation of

construction materials (e.g. stone aggregates, steel, cement blocks, sand, cement, gravel, fiber cement boards, pressed metal door frames, masonite faced flush panel solid core doors, and natural anodized aluminium windows etc); construction of workers' camp; clearing of access roads and diversions; excavation and stockpiling of excavated materials (gravel and aggregate stone); cordoning; fencing the area within which access will be limited to construction workers and people working at the campus; construction of the camp structures; and construction hostel facilities.

Construction will generally be of plain concrete strip footing, load bearing cement blocks walls in foundations, load bearing cement blocks walls, reinforced concrete ground slab, steel frame structure, steel roof structure, steel door frames and windows, timber doors, ceramic tiles to some floors and glazed tiles to walls in toilets, lime putty plaster and paint to the rest of the walls internally, fair face pointed externally, painted ceiling, joinery fittings, sanitary, plumbing and electrical services.

Construction activities will take 36 months starting from June 2019 – May 2022 and will require about U\$ 25,000,000.00, which Old Mutual Investment Group has already secured from investors in a form of equity and debt. Over 250 people will be employed to work at the site when construction activities begin. Once construction activities are completed, the college will use the facility to accommodate students on campus.

Activities under **demobilization phase** will include laying off workforce employed during construction phase; demobilization of equipment; demolition of workers and Contractor's camp; rehabilitation/restoration of access roads; closure and restoration of materials storage yards; removal of construction wastes; re-vegetating areas that were cleared by the Contractor along the access roads and restoration of damaged areas; and places occupied by the project construction facilities to other beneficial uses.

Activities during **operation and maintenance phase** will include commissioning the use and regular maintenance of the constructed hostels facility for the intended purpose.

1.4 Project Proponent

The project proponent is Old Mutual Investment Group. Details of the project proponent are provided as follows:

Project Developer:	Old Mutual Investment Group
Project details:	Construction of a Hostel facility at College of Medicine, Lilongwe Campus
Postal Address:	Old Mutual Investment Group, Old Mutual Building, 30 Glyn Jones Road, P.O. Box 393, Blantyre
Contact Person:	Ms. Linda Kumsinda
Email:	lkumsinda@oldmutual.co.mw
Phone Number:	0999953970

1.5 Project Location

Bunda campus of LUANAR is located 30 km from Lilongwe City along the Lilongwe – Mitundu road about 15 km from off Lilongwe-Blantyre. Figure 1.3 provides the location details of the campus while Figure 1.4 provides site specific map for the hostels.

Figure 1. 3 Location Map for hostels project at LUANAR at Bunda campus

Figure 1.4 Map of existing establishments in the project area at LUANAR

1.6 Current status of the Project

The project is at design stage. Activities at this stage include obtaining different permits and approvals; conducting perimeter and topographic surveys; conducting feasibility studies, detailed engineering designs and environmental and social impact assessment study. It is expected that the environmental and social management measures that have been prescribed in this ESIA report will be incorporated into the project activities during construction phase.

1.7 Project objectives

The hostels that will be constructed will assist to increase enrolment and enhance students' academic performance at LUANAR, Bunda campus. Once construction activities are completed, the LUANAR will use the hostels to accommodate more students on campus who will then have easy and an increased access to different learning facilities at LUANAR. Besides, the new hostels will provide conducive amenities to facilitate learning.

1.8 Objective of Environmental and Social Impact Assessment study

The objective of the ESIA study was to ensure that environmental concerns are integrated in all project activities in order to contribute to sustainable development. The specific objectives of conducting the Environment and Social Impact Assessment study with respect to the project was to:

- a) Examine in detail the likely adverse environmental impacts;
- b) Propose appropriate mitigation measures for the significant negative impacts; and
- c) Develop an Environmental and Social Management Plan with mechanisms for monitoring and evaluating compliance and environmental performance.

1.9 Scope of the ESIA study

The ESIA study was prepared as per the guidelines provided under the Environmental Impact Assessment Guidelines of 1997. The ESIA contains Introduction and background to the project in Chapter 1, Project Description in Chapter 2, Consideration of Alternatives in Chapter 3, Biophysical and Socio-Economic Environment in Chapter 4, Malawi's Environmental Regulatory Framework in Chapter 5, Impact Identification and their Management Measures in Chapter 6, Environmental and Social Management and Monitoring Plans in Chapter 7 and Conclusion and Recommendations in Chapter 8.

1.10 Potential Users of the ESIA report

The ESIA and the associated ESMP has been prepared for use by different stakeholders to be involved in the planning, implementation, management and monitoring of the project activities. Some of the users will include the Developer; Contractor; Lilongwe District Council; LUANAR Bunda Campus; Environmental Affairs Department; and Ministry of Lands, Housing and Urban Development. The report contains useful information on policies and procedures to be adhered to, implementation modalities, analysis of potential environmental and social impacts and suggested mitigation measures at various stages of the project activities.

1.11 Methodology

The ESIA study for the project was carried out in accordance with the Terms of Reference that were provided by Old Mutual Investment Group as provided in Annex 1. The study was undertaken between August and November 2018 and included the following methodology:

- a) Literature review;
- b) Site visits; and
- c) Stakeholder consultation.

1.11.1 Literature Review

Literature review involved acquisition and review of project documents, reports, maps and drawings relevant to the project. Other documents reviewed included different pieces of national legislation, policies, guidelines and regulations as well as international policies and guidelines and procedures. Examples of information obtained from different documents include project design and planned project activities.

1.11.2 Site visits

The objectives of site visits were to observe and capture baseline data on the existing biophysical and socio-economic environment of the project area. In addition, the visits provided an opportunity to consult stakeholders and senior government officials on their views regarding the project and its potential impacts.

1.11.3 Stakeholder consultations

Stakeholder Consultations formed an important feature of the ESIA study. The consultation meetings provided an opportunity for stakeholders, particularly community members around the project area to express their views on the project as well as to raise any issues of concern relating to the Project. The methodology employed for stakeholder consultations included:

- a) Public meetings (where general information about the project was delivered, Questions and Answers conducted);
- b) Focus Group Discussions with only those people who will be potentially affected by the project; and
- c) Key Informant Interviews (KII) which covered different individuals in the project area.

Stakeholder consultation meetings were conducted in the project area to:

- a) inform different stakeholders about the project;
- b) provide an opportunity for the stakeholders to discuss their opinions and concerns;
- c) manage stakeholders' expectations and misconceptions regarding the project;
- d) verify the significance of environmental, social and health impacts identified;
- e) disseminate concepts of the Project activities with a view to provoking Project interest amongst the stakeholders;
- f) promote sense of ownership for the Project; and
- g) inform the process of developing appropriate mitigation measures.

Details of the people consulted and comments provided are presented in Annex 2 while details of Consultants who conducted the ESIA studies are provided in Annex 3.

1.12 Existing Land Uses in the Project Area

Land for the project belongs to LUANAR, Bunda Campus. The campus has 1,482 ha of land out of which 100,640 m² will be used to accommodate the hostels, service areas, covered walkways and terraces, drying yards and storm drains. The project therefore will not require any additional land out of the campus hence no issues of land take, resettlement and compensation will arise as the project will only use land that belongs to LUANAR, Bunda campus.

CHAPTER 2 PROJECT DESCRIPTION

2.1 Project design considerations

The overall design of the hostels will promote use of construction materials, which are environmentally friendly, durable, and vandal-proof and those which require minimal periodic maintenance. The general design considerations will incorporate aspects of modern architecture, the current local government building policy guidelines and the latest standards developed by NCIC and the National Council of Higher Education (NCHE) Architectural Metric Handbook which will include:

- a) **Ventilation:** The design will cater for natural ventilation with features that encourage natural air circulation (including use of permanent air vents above all doors and windows);
- b) **Lighting:** The design caters for various types of energy efficient luminaries including fluorescent lamps and natural lighting through glass windows and doors as appropriate for both security and lighting;
- c) **Sanitary accommodation:** The number of toilets and wash hand basins will be selected according to the number of students in each hostel;
- d) **Waste water management:** Waste water will be managed through wastewater stabilization ponds
- e) **Sustainable resource use:** The design of the hostels will incorporate landscaped gardens which will be planted with suitable species of trees / shrubs and grass to prevent ecological deterioration and improve aesthetic value of the site. Part of the excavated soil will be used for landscaping therefore reducing the amount of soil to be transported away from the site;
- f) **Solid waste management:** The campus management will be required to contract a waste handler for proper waste disposal; and
- g) **Fire protections:** The design of the hostels will incorporate fire- fighting equipment to be installed in each building.

2.2 Description of main project activities

Activities for the project shall be implemented in four phases namely planning, construction, demobilization, and operation and maintenance phases. Details of each of the phases are provided in the sections that follow.

2.2.1. Planning phase

Planning phase for the project commenced in August 2017 and will be concluded in April 2019. Activities during planning phase include identification of land for the project; land surveying; preparation of a master plan; preparation of detailed lay out plans; preparation of building designs, tender processing, obtaining approvals under the Physical Planning Act No 17 of 2016 and the Bye-Laws and obtaining different approvals necessary for construction and operation of the project facilities. Environmental and Social Impact Assessment study is part of the planning phase.

2.2.2. Construction phase

2.2.2.1 Consideration for constructing different structures

Different considerations will be given when constructing different project structures. These will aim to provide stability and durability of the structures. Some of the considerations are discussed in the sections that follow.

a) Founding conditions

The hostels will require foundation on a good and uniform soil to avoid differential settlement. A full geotechnical investigation shall be conducted to ascertain the exact founding conditions of the structures for the hostels. A soil raft of min 300mm thick G5 material will be used as pioneer layer.

b) Durability of the concrete

Durability of any concrete is dependent on the cement being used, aggregates, admixtures, concrete mix design and curing. Ordinary Portland Cements (OPC) shall be used to construct the hostels. Rapid hardening cements will be avoided due to greater evolution of heat which can lead to increased shrinkage cracking.

Local quarries will be inspected and aggregates which will be used will be tested and certified. Care shall be taken not to use admixtures containing calcium or chlorides, as these will increase the risk of reinforcement corrosion. Plasticizers will be considered, as increased workability is advantageous when working with complex shaped structures and structural forms.

Construction activities will take 36 months starting from June 2019 – May 2022. Over 250 people will be employed to work at the site when construction activities begin. Construction activities will involve land clearing; landscaping; grading; excavation; compacting; trenching; construction of service infrastructure such access roads and a car park, construction of a workers' camp which will provide hostels to workers, storage facilities and an office facility; backfilling with compaction consolidation; levelling and earth marking; transportation of building materials; and construction of different infrastructures and other related buildings. Other infrastructure such as drainages and utility reticulation shall also be constructed. Details of facilities that will be constructed are provided in Table 2.1 and Figure 2.1 provides a site plan, which provides the location of the hostels in relation to other facilities on the project site.

Table 2. 1 Details of the hostels to be constructed

Beds	No. of buildings	Type	Block area (m²)	Total gross area (m²)
3,388	10 x 5 storeys	Undergraduate students	8000	80,000
480	2 x 3 storeys	Postgraduate (MSc students)	6620	13,240
132	1 x 3 storeys	Postgraduate (PhD students)	7400	7400
4000	13			100,640m²

Note: Gross Area includes service areas, covered walkways and terraces, drying yards.

Figure 2.1 Lay out plan for the proposed hostels at LUANAR, Bunda campus

2.2.2.2 Construction activities

a) Site Preparation

Activities under site preparation will include land clearing, grading and excavation, construction of auxiliary structures where necessary such as access roads etc., leveling and earth marking.

b) Construction of the workers' camp

The project contractor will build a workers' camp at the project site which will be used to provide residence for workers as well as act as project administration offices, storage facilities for different building materials and equipment, workshop for servicing the vehicles and construction machinery. A number of factors will be considered when selecting the camp site. The factors shall include topography of the site, proximity of the site to the project site, availability of water and other considerations.

Toilets as well as bath rooms shall be constructed on the site for use by the workforce. The ground shall be covered with aggregate stone to minimize dust and prevent mud when it rains. Retention bunds shall be constructed around fuel and oil storage areas and all drainages and effluents from the workers' camp shall be treated before being discharged into the drainage system.

c) Construction of new hostels

Some of the activities to be undertake will include excavation of foundation footing, laying down a brick base; pouring a concrete slab, installation of framework, installation of plumbing workers, putting a wall frame, roofing and finishing.

2.2.2.3 Construction workers

In all, about 250 people will be employed during construction phase. The people to be employed will include a minimum of 40% women in the workforce. The people will include supervisors, skilled and unskilled laborers. For the semiskilled and unskilled workers, the Contractor will employ people from the communities which live around the project area as a way of making sure that the project benefits the people community members in the project area.

2.2.2.4 Construction equipment

Different machinery will be used to construct the project facilities. These will include:

- a) Bull Dozers for clearing the site, removal of top soil and vegetation materials, and pushing out stumps;
- b) Graders for grading and levelling land for buildings and access road formation;
- c) Tippers/lorries for transporting construction materials and workers;
- d) Light machinery like pedestrian rollers for access road compaction;
- e) Heavy rollers for access roads compaction;
- f) Front end loader for loading materials onto tippers and lorries;
- g) Several light equipment like wheel burrows, shovels, picks;
- h) Concrete mixers;
- i) Earth mover;
- j) Compactor;
- k) Wheelbarrow; and

- 1) Hammers and bolt and nut fasteners, hand saw, electric and gas welders, electric saws and grinders, load roller, trucks, hand drills and drill bits, wire cutters, concrete mixer trucks, wheel loader, fork lift, excavator etc.

2.2.2.5 Construction materials

Different raw materials will be required during construction phase. Materials such as sand, gravel and quarry stone will be obtained from approved sources in the surrounding areas. Quarry stone will be obtained from Terrastone and Kautsi Quarries. Sand will be obtained from Salima while water for construction activities will be obtained from Gomani Dam which is located 4 km away from the campus. The sites where quarry stone, gravel and sand will be collected from are approved sites.

Use of concrete blocks for construction of different infrastructures will be more environmentally friendly than use of burnt bricks, which contribute to deforestation. The concrete blocks are stronger and long lasting, do not lead to deforestation as burnt bricks do and that procurement of large quantities of cement for making the concrete blocks will contribute to increased growth of the local economy.

Other materials such as cement, paints, timber, roofing materials, windows, doors and other joinery, tilt and roller doors, wallboard and plasterboard, light fittings, fuel and oil, electricity, water, ceramic tiles, polythene, steel, steel pipes, PVC pipes, adhesives, copper wires, gas (acetylene and oxygen), cardboard will also be sourced for the project. Construction materials will be sourced depending on the construction stage.

Construction will be done by a private contractor and the client will hire a supervising engineer to supervise the construction phase of the project to ensure that the contractor complies with the design standards. The developer together with the Ministry of Transport and Public Works Officials (Buildings Department) will closely be involved in supervising the works and monitoring process. Construction will require various input materials to produce several outputs. Table 2.2 outlines the inputs and outputs during the construction phase.

Table 2. 2 Overview of the main inputs and outputs from the project

Category of developments on the site	Main inputs into the activities	Main outputs from the activities
Construction of service infrastructure		
Land preparation activities		
Land surveying	Excavators, graders and surveying equipment	Lay out plan for the infrastructure
Site development activities		
Land harrowing and land levelling	Excavators and graders	Levelled land

Construction of an access road	Graders, caterpillars, compactors, gravel	Earth access road upgraded to gravel standard
Reticulation of water facilities	Water pipes and accessories	Underground reticulation of water facilities
Reticulation of electricity facilities	Wooden poles, a transformer, Electrical wires and tubes	Installation of electricity facilities in the new and rehabilitated structures
Telecommunication	Poles, wires, radio receivers, dual channel lines	Installed telecommunication network
Construction of hostels and other facilities		
Construction of the hostels, access roads and car parks	Cement blocks, cement, quarry, planks, iron sheets, steel, steel windows, steel doors, window panes, sand, gravel and water	Completed hostels, access roads and car parks
Construction of waste water management systems		
Construction of man holes for connecting to sewer line to waste water treatment plant.	Pipes, channels and trenches	Manholes for connecting to the sewer line to waste water treatment plant

2.2.3 Demobilization Phase

Decommissioning of the hostels is not expected to occur under the project, and potential future issues can be minimized by avoiding use of hazardous materials in the initial construction of different hostel structures. Decommissioning of auxiliary facilities such as quarries/ borrow pits could be an issue, but these are unlikely to be opened specifically for the construction of the hostels hence construction works will use existing quarries/borrow pits to obtain aggregate stone and gravel.

The main activities to be undertaken during demobilisation phase shall include laying off construction workers, removal of construction equipment and left-over materials, rehabilitating degraded areas within the construction site, levelling the site and landscaping. Demobilization will take place from June – August 2022. Rubble from construction activities and demolished workers' camp and other waste from construction activities will be used as fillers to level off all the degraded areas within the project site and within the surrounding communities in collaboration with Project Engineer.

2.2.4 Operation and maintenance phase

Activities during operation and maintenance phase will include commissioning use and regular maintenance of the student hostels. The effect of this is that large volumes of different wastes both solid and liquid will be generated and will require to be managed properly.

CHAPTER 3 CONSIDERATION OF ALTERNATIVES

Alternatives to projects are different ways to achieve the same purpose that the project intends to achieve. Environmental and Social Assessments require looking into alternatives to the projects in order to make prudent decisions.

3.1 Factors considered

3.1.1 Existing policies, legislation and standards regarding construction industry in Malawi

A review of available policies, legislation and standards for construction industry in Malawi was carried out to ensure that construction of hostels at LUANAR, Bunda campus conforms with required standards. This was done to ensure safety of the buildings.

3.1.2 Environmental considerations

Environmental factors were also considered when choosing building materials, citing of other facilities such as wastewater treatment facilities and choice of wastewater treatment technologies. This was done in order to ensure that the project does not cause irreparable damage to the environment.

3.1.3 Cost benefit analysis

An analysis of technologies to be used was made to ensure that the amount of money that was budgeted for the project is adequate. However, this was done without compromising the quality or safety of the buildings.

3.1.4 Location and layout alternatives

The location and layout alternatives were not considered since the hostels will be built within the premises where other structures for Bunda campus exist and therefore alternative sitting and layout was not an option.

3.2 Project alternatives

The project alternative is defined as a possible course of action, in place of another that will meet the same purpose and needs. The role of project alternatives is to find the most effective way of meeting the need and purpose of the project, either through enhancing environmental benefits of the proposed activity, and or through reducing or avoiding potentially significant negative impacts. The assessment has therefore analyzed the following alternatives: Do-Nothing /‘Without Project’ Option; Develop the project; Technologies alternatives; Alternatives to building materials; and environmental and social considerations of alternatives.

3.2.1 Do-Nothing /‘Without Project’ Option

The “Do Nothing alternative” sometimes referred to as the ‘no-action’ alternative’ assumes that the project does not go ahead, implying that construction of the hostels and other support facilities will not be undertaken. Table 3.1 presents the advantages and disadvantages of this alternative. It is important to note that this Do-Nothing alternative is the baseline against which all other alternatives and the development proposal have been assessed. The Do-Nothing alternative will not register any of the impacts (both positive and negative) associated with project. The Do-nothing alternative will entail continued absence of modern and adequate hostels facilities at the campus. Failure to build the new hostels at the campus will affect students’ intake at LUANAR,

Bunda campus as the campus will not be able to accommodate many students. Besides, the absence of modern and adequate hostels facilities at the campus will negatively affect students' performance as most students will continue to stay off campus and far away from Bunda campus there by having difficulties to access university facilities.

Table 3.1 Advantages and Disadvantages of the “Do-Nothing alternative”

Advantages	Disadvantages
The natural resources meant to be used for construction works at the site such as sand, water, and quarry will be saved.	The new hostels at the campus will not be constructed. Instead, the hostels problems being experienced at the campus will continue and will continue to affect students' enrolment and their academic performance.
The different social and economic impacts the project would cause in the project area will not occur.	Access roads to new hostels will not be constructed.
	Loss of employment opportunity for both skilled and unskilled workers expected to be employed during construction of the new hostels.
	Lack of a modern and adequate hostels at the campus which will continue to affect students' enrolment and their academic performance.

The Do-Nothing alternative means that the new hostels will not be constructed at the campus. Without constructing the modern and adequate hostels facilities at the campus, LUANAR will not be able to increase its intake and students' performance will not be improved as the students who stay off campus will continue to walk long distances to access the university facilities. The alternative was therefore not a preferred alternative.

3.2.2 Develop the project alternative

The alternative was considered assuming that construction of the new hostels will proceed as proposed. The alternative will induce several environmental and socio-economic impacts both positive and negative. Table 3.2 provides the positive impacts (advantages of the alternative) and the negative impacts (disadvantages of the alternative).

Table 3. 2 Advantages and disadvantages of the "Develop the project alternative"

Positive impacts (advantages of the alternative)	Negative impacts (disadvantages of the alternative).
Increased employment opportunities at local and national level especially during construction phase	Loss of vegetation due to land clearance during construction
Creation of market for goods and services	Increased waste generation (solid and liquid) from construction camps and construction sites
Increased economic activities within the project area	Population influx due to migration of construction workers to the site
Skills transfer to different people at local and national level	Social disruption and family instability due to influx of people to the area
Increased students enrolment	Generation of construction waste
Improved students' performance	Construction related accidents
	Increased risk of illicit behavior and crime
	Influx of additional population ("followers")
	Impacts on community dynamics
	Increased burden on and competition for public service provision

The alternative will generate both positive and negative impacts once the project activities are implemented as proposed. However, the anticipated negative impacts can be easily mitigated during construction and operation phase. The "Develop the Project" alternative is therefore a preferred alternative since it will lead to socio- economic development of the country through increased students' intake and improved students' performance.

3.3 Alternative building technologies

In the construction industry, there are a number of choices on the building materials. The choice of building materials can determine the durability of the structures to be built, the beauty of the structures, the cost of building the structures and the damage that can be impacted on the environment. Four options, use of burnt bricks, use of eco bricks, stabilized soil blocks and concrete bricks were considered as follows:

3.3.1 Use of burnt bricks

In Malawi, use of burnt bricks is generally perceived as cheap because they are locally made and can be close to the project sites. The traditional fired/burnt bricks are made from soil that is mixed with water, dried in the sun there after baked using wood fuel.

Disadvantage of burnt bricks

For a large project, a large amount of firewood and soil will be required to produce adequate amount of bricks. This can lead to destruction of natural forests and land degradation due to formation of borrow pits.

Advantages of burnt bricks

- a) Bricks are strong and durable;
- b) They are made locally;
- c) They don't require special skills to make;
- d) They can be obtained closer to project sites;
- e) They require low maintenance cost;
- f) Have excellent thermal mass i.e. in winter they keep the buildings warmer while in summer they keep the buildings cooler; and
- g) They are fire resistant.

3.3.2 Stabilised soil blocks (SSB)

Stabilised soil blocks are made by mixing soil and cement in appropriate proportions. The process requires skilled labour because the strength of the bricks depends on the mixture and quality of soil used.

Disadvantage of SSB

The use of soils for a large project can lead to borrow pits which can lead to ponding and creation of breeding grounds for disease vectors. However, the cost is lower than the cement blocks.

Advantages of SSB

- a) SSB allows users to produce uniform blocks of greater strength than typical fired blocks that provide better thermal insulation;
- b) The total cost of building a structure with SSB is 20%-30% cheaper than building with fired bricks because far less mortar is required;
- c) SSB can be made on site so transportation costs are minimized;
- d) SSB are environmentally friendly because they are cured in the sun as such do not contribute to deforestation as compared to fired/burnt bricks; and
- e) The bricks have an appealing aesthetic with an elegant profile and uniform size that doesn't require plastering.

3.3.3 Concrete blocks

Concrete blocks are made from a mixture of quarry dust and cement to which water is added. Like SSB, the mixture is compacted using a manual machine to ensure strength and quality.

Disadvantage of concrete blocks

The bricks are usually expensive due to increased costs of cement.

Advantages of Concrete blocks

- a) Like SSB, concrete blocks allow users to produce uniform blocks of greater strength;
- b) Concrete blocks can be made on site so transportation costs are minimized; and
- c) Because Concrete blocks are cured in the sun, there is no fuel needed thereby helping to curb deforestation as such they are environmentally friendly like SSB;
- d) Concrete blocks are strong and durable; and
Concrete blocks are fire resistant.

3.3.4 Eco bricks

The main building materials in Malawi in both urban and rural setting are burnt bricks, which are made from soil that is mixed with water, dried in the sun thereafter baked using wood fuel. Two major concerns in the Malawi brick sector are increased deforestation due to use of fuel wood and poor brick quality resulting in poor construction quality. All the brick making activities use fuel wood fired in clamps. It has been calculated that the brick industry in Malawi alone consumes around 850,000 metric tonnes (MT) of fuel wood per year. At this rate of fuel wood consumption, the entire country will be deforested within 25-30 years only from the brick industry. In Malawi, because more fuel wood is consumed than re-grown, the combustion of wood results in an increased amount of carbon dioxide emission in the atmosphere which adds to the greenhouse gas effect. In the clamp around 20MT wood is consumed to fire 40,000 bricks. For smaller diameter wood, the consumption is more. With the kind of wood being used the average specific energy consumption in clamps is around 3.66 MJ/kg. This is expected to be much higher since the required temperature and quality is not achieved.

Eco bricks are made using the Vertical Shaft Brick Kiln (VSBK) Technology for firing the green bricks. The VSBK (Eco Kiln) technology is based on vertical shaft principles and is the most energy efficient and environmentally friendly burnt brick production technology available globally. The technology does not use fuel wood. Instead it uses waste material containing carbon to fire green bricks. Thus, if VSBK is adopted to replace clamps, then it will result in:

- a) Saving of 850,000 tonnes of fuel wood annually;
- b) Saving of 1,500,000 tonnes of CO₂ annually;
- c) Recurring income of USD 9 million worth of foreign exchange annually;
- d) Creation of more than 1,000 small to medium scale enterprises in the SME sector and ancillary industries;
- e) Creation of more than 20,000 sustainable “Green Jobs” thereby helping in reducing poverty;
- f) Use of more than 90,000 tonnes of industrial waste (e.g. boiler ash and leftovers of tobacco industry, duff coal) supporting the Malawi’s contribution towards reducing pollution;
- g) Recurring use of 50,000 tons of coal creating a business of USD 10 million within the country thereby promoting inclusive growth;
- h) Improving the quality of housing in Malawi and incurring a saving of around 40% from bricks and mortar alone;
- i) Reducing the embodied energy in housing, thereby pioneering the path of energy saving in Africa;
- j) Greenhouse gas emissions are also enviably less making it an obvious choice for the carbon market;
- k) VSBK is versatile and can be adapted to any scale of production;
- l) It produces consistent quality bricks with higher returns than clamp brick production; and
- m) Is cheaper than SSB and concrete blocks.

After analysing advantages and disadvantages of using SSB, concrete blocks, burnt bricks, and eco bricks, it was found that not only are eco bricks environmentally friendly since they do not use wood fuel for curing but also their use is cost effective since they do not use cement, which raises the cost of producing SSB and concrete blocks. Considering all these, Eco bricks are the preferred building materials compared to SSB, burnt bricks and concrete blocks and are followed by SSB as

one saves on transport costs when using SSB since these can be made on site. The walling material for construction of the project facilities should therefore be made of SSB and Eco bricks.

3.4 Alternative sewage disposal methods

It is expected that during operation phase more than 400,000 liters of wastewater will be generated on daily basis. This volume was calculated based on assumption that for the additional 4,000 bed spaces, one individual generates about 100 liters of wastewater per day. As such, there is need to consider how to properly manage and dispose of this volume of wastewater. Considering that most areas in Lilongwe are not connected to any sewerage for wastewater treatment, options such as use of septic tanks and use of wastewater stabilization ponds were considered and are discussed as follows:

3.4.1 Use of septic tanks

Use of septic tanks to manage wastewater was one of the options that were considered. Advantages of using septic tanks over wastewater stabilization ponds (WSP) include:

- a) Septic tanks are easier to operate than WSP as such they do not require personnel to manage its operations except when there are blockages;
- b) Septic tanks do not generate odor as they are usually under cover;
- c) Septic tanks do not require a lot of space as compared to WSP; and
- d) Septic tanks are not left open as the case is with WSP which become breeding ground for vector insects and pose as potential hazards to the general public and children in case of drowning.

The main disadvantage of using septic tanks is that they need periodic emptying, and this could raise the operation cost over time. With the large volume of effluents that will be discharged from the project during operation, the septic tanks will need to be emptied time and again making the alternative not viable.

3.4.2 Discharging liquid waste to wastewater stabilization ponds

LUANAR, Bunda campus is connected to waste water stabilization ponds, which exist at the campus. The facility assists the campus to discharge liquid waste in an environmentally friendly manner.

Disadvantages of discharging liquid waste to the wastewater stabilization ponds are:

- a) Space will be required at the campus for treating waste water;
- b) If not properly managed, wastewater stabilization ponds result into breeding grounds for mosquitoes;
- c) There will be odor at the campus; and
- d) No need for periodic emptying as the case is with septic tanks.

The advantage of discharging liquid waste to the waste water stabilization ponds is that the waste water is contained properly with no potential to pollute recipient water body.

3.4.3 Use of wastewater stabilization ponds

Use of wastewater stabilization ponds is one of the commonly used methods of treating wastewater in the tropics. Although this is one of the cheapest ways of treating wastewater, the method requires

more space than the other wastewater treatment facilities. Since space is a limiting factor for the project, this is not a preferred option.

Disadvantages of using WSP include:

- a) WSP require more space than other wastewater treatment facilities;
- b) If not properly managed, wastewater stabilization ponds result into breeding grounds for mosquitoes;
- c) Can generate odour if the system is not operating effectively; and
- d) Has the potential to pollute recipient water body if there is system failure as such it needs personnel to manage to ensure that it operates effectively and efficiently;

Advantages of using WSP include:

- a) As compared to septic tanks, WSP do not require emptying of wastewater as it is discharged into the environment after its treatment;
- b) Cheap and easy to operate;

Considering that the campus already has the waste water stabilizing ponds away from other structures such as class rooms, hostels and the administration block, the alternative was a preferred alternative.

3.5 Alternative solid waste disposal methods

3.5.1 Food Waste

With the increased number of students at the campus, it is expected that food waste will be generated on daily basis and an analysis of alternative disposal methods was made as follows:

3.5.1.1 Use of rubbish pits

The use of rubbish pits at the campus to dispose of food waste was considered as one of the alternatives. However, this option was not favoured because this could lead to breeding of houseflies and could attract scavengers such as dogs and cats. Despite this, advantages include low cost in terms of operation because there will be no costs related to transportation and handling of the waste.

3.5.1.2 Use of waste disposal site operated by Lilongwe District Council

This method involves arranging with Lilongwe District Council to collect waste food for disposal at designated dumping site for the council. However, in an event that the council fails to collect the waste food, the waste food can produce bad odour which can attract flies, dogs etc. As such for this arrangement to work properly, the college needs to have a standby vehicle to assist when such a situation arises. In addition, in order to reduce the volume of waste food, an arrangement will be made with people/institutions that are in piggery business to come and collect waste food to feed their stock. This alternative was considered to be favourable for the disposal of waste food.

3.5.2 Waste paper

The teaching and learning activities at the college are likely going to generate waste paper that will need to be disposed of. There are a number of disposal alternatives that were analyzed and these include:

3.5.2.1 Use of rubbish pits

This alternative was not favored because waste paper could easily be blown off by wind from the rubbish pit and litter the college campus. An advantage to this alternative include low cost in terms of operation because there will be no charges related to transportation and handling of the waste.

3.5.2.2 Recycling of wastepaper

The college will either embark on waste recycling project or arrange with paper waste recycling companies to come to collect paper waste periodically. It was envisaged that this initiative will not only benefit the college but also the whole of Lilongwe City because the volume of waste paper will be reduced. As such this was the favored option in the management of paper waste.

CHAPTER 4 BIOPHYSICAL AND SOCIO-ECONOMIC ENVIRONMENT

A baseline study of the existing environment has been carried out on the physical, biological and socio-economic features in the project area. The study provides a measure of the existing state of the environment against which future changes imposed by the construction of the hostels could be measured and monitored. The physical and biological baseline factors considered include climate, air quality, topography, drainage, vegetation, fauna, geology and soils, existing road traffic, and socio-economic factors. The sections which follow provide the detailed explanations of these factors.

4.1 PHYSICAL ENVIRONMENT

4.1.1 Topography and Geology

The project site at LUANAR has an elevation of 1200 m above the sea level. Isolated higher raised areas in Lilongwe district are at 1500 and 1600m above sea level. These points are hills such as Bunda and Ngala to the south. To the east, Lilongwe plain becomes increasingly isolated and merges with Dedza hills and Dedza Scarp Zone. On the south west of the district lie the Dzalanyama mountain ranges. Largely, various gneisses, granulites and schist and pegmatite rocks comprise the geology of the surrounding. The topography of the project area is characterized by relatively flat land and the rock outcrop consisting of granite.

4.1.2 Soils

The project area is surrounded by sandy clay loam soils as shown in Figure 4.1. The campus is in T/A Chadza where sandy clay loam soil is predominant. The soils are generally deep and fertile and suitable for farming as is the current land use. The predominant soil types are derived from weathering of granitic rocks and alluvial processes. Moist clay soils are common along seasonal water-logged areas.

The *Lilongwe Catena* is representative of the ferruginous soil pattern covering the central part of the Lilongwe plain. Basically, dark red sandy clay or clay, possessing typical properties of ferruginous soil dominate the district's flat lying plain, commonly known as the *Lilongwe Series*. The *Lilongwe series* has several members that are variable:

- a) Kandiani series - yellowish red profile with a sandy clay sub layer;
- b) Mwanjema series - A deep subsoil of dark brown colour;
- c) Monde series-A coarse sandy, ferallitic soil, with the lower horizons mottled, and impeded site drainage; and
- d) The Mbabzi series- Black hydromorphic clay, subject to seasonal water logging also known as dambo clays.

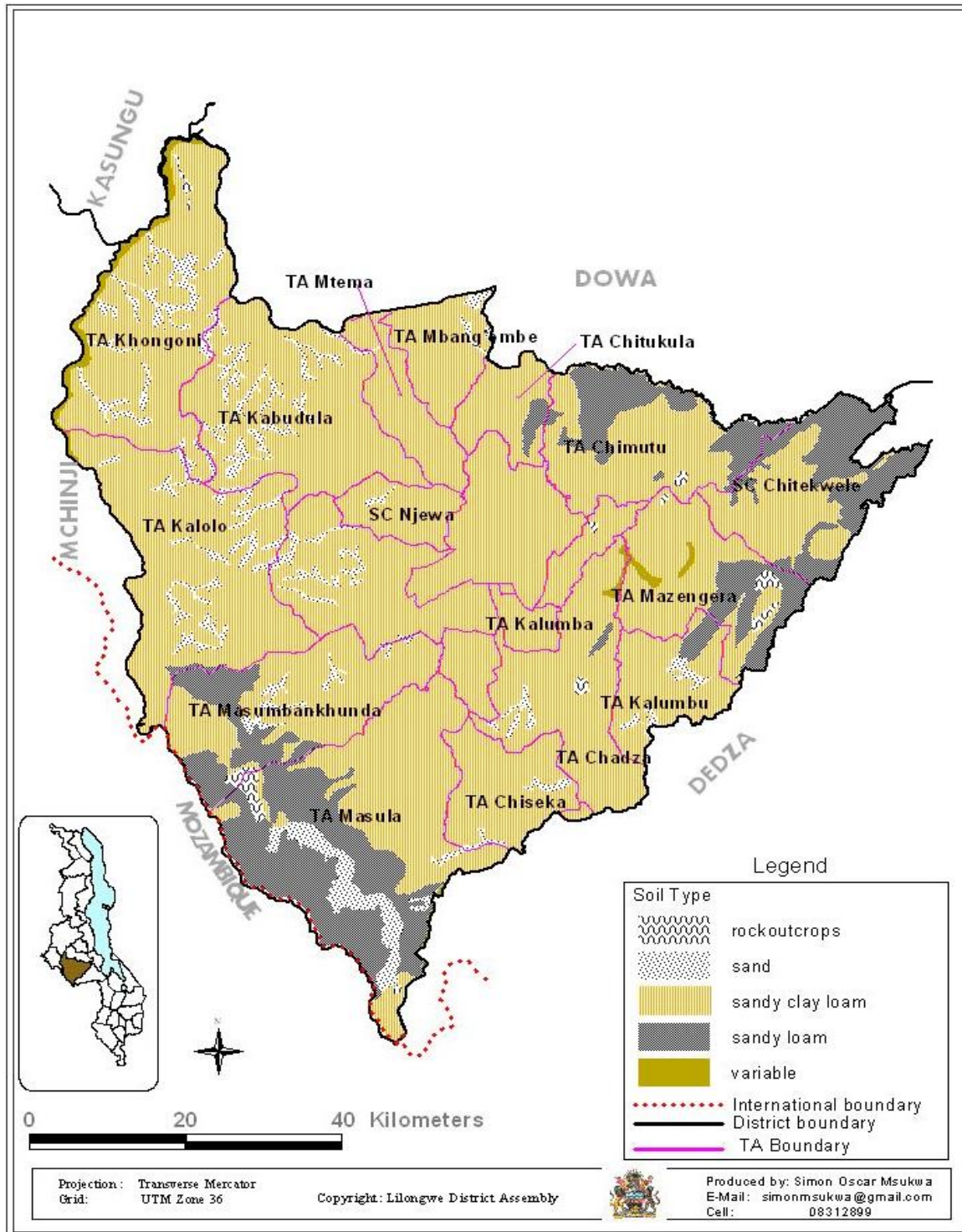


Figure 4.1 Map of Lilongwe showing soil types in the district

4.1.3 Climate

Bunda area has a tropical climate and falls into two main seasons. The wet (rain) season starts from November and ends in April while the dry (hot) season starts from May and ends in October. The highest amount of rain falls between December and March and the average annual rainfall is about 900 to 1200 mm (GoM, 2012).

The mean annual temperature is about 25 degrees Celsius. The hottest months are September, October, and November with temperatures ranging from 25 to 30 Degrees Celsius. May, June, and July are the coldest months with temperatures ranging from 8 to 12 Degrees Celsius.

4.1.4 Water resources

There is no river within the project area. The nearest water resource is within Goman Dambo where there is Gomani dam about 4 km from the site.

4.2 BIOLOGICAL ENVIRONMENT

4.2.1 Vegetation

The site earmarked for the construction of the hostels is largely bare as it has lost its natural vegetation due to intensive existing agricultural activities being practiced now as shown in Figure 4.2.



Figure 4.2 Vegetation of the site for construction of hostels

However, at the broader scale of the Campus, there is Bunda Forest Reserve. The forest has both natural and exotic trees. The natural trees are dominated by *Brachystegia* species while the exotic vegetation comprises malina and blue gum as shown in Figure 4.2. However, the actual construction site was long time ago cleared of trees, although remnant shrubs and common grass continue sprouting. The piece of land under construction has been idle for the past years. Information obtained during field surveys and consultations indicates that the area was previously used for maize cultivation for over 10 years and much of the trees planted over 30 years ago were uprooted during the cultivation of maize however the maize cultivation was no longer practiced on the land.



Figure 4. 3 Vegetation of the Bunda Forest Reserve

4.2.2 Fauna

The project site has for a long time primarily been used for agriculture purposes, hence fauna is scarce, except for rodents especially mice. Other wildlife forms observed at the site include moths, birds, grasshoppers and lizards.

4.3 SOCIO-ECONOMIC ENVIRONMENT

4.3.1 Socio-economic conditions

(a) Poverty

Poverty levels are featuring high in the villages around Bunda area with no access to other sources of income apart from employment in the agriculture sector. The majority of the people in the area are poor living in thatched and mud houses.

(b) Electricity

Electricity in Bunda is supplied by Electricity Supply Commission of Malawi (ESCOM). In the recent years, supply of electricity in Bunda and Malawi. To offset the black outs, small generators are used in different departments to supplement electricity demand. The Bunda Forest Reserve has been one of the most important sources of energy. Villages around the campus and staff members access wood from the forest causing a serious threat to its extinction.

(c) Economy

Agriculture, trade and charcoal production for sale are the driving force of economic activities in the area. The farmers in the area operate at a subsistence level. Livestock and some crops are sold at the markets at Mitundu, Nathenje and Lilongwe for cash to buy clothes, shoes, soap and other essentials.

(d) Population

Bunda Campus hosts about 4000 out of which 3,000 are residents while the rest operate from outside the Campus. There are about 1200 members of staff working within Bunda Campus. The surrounding communities comprise three major adjacent villages including Mkwinda, Kamowa and Chilowa all in Traditional Authority Chadza.

TA Chadza, where the project will be implemented is the third highly populated Traditional Authority in the district and has a population of 143,216 (Table 4.1). The highest populated Traditional Authority in Lilongwe district is TA Kalolo with its population at 177,087; seconded by TA Chiseka whose population is at 148,672.

Table 4. 1 Population in the area

	Population		
	Total	Male	Female
TA Chadza	143,216	68,799	74,417
TA Kalolo	177,087	86,572	90,515
TA Masula	76,666	36,942	39,724
Masambankhunda	86,580	41,699	44,881
TA Chiseka	148,672	72,146	76,526
TA Mazengera	116,352	55,348	61,004
STA Chitekwele	48,184	23,035	25,149
TA Khongoni	140,536	68,498	72,038
TA Chimutu	112,118	54,873	57,245
TA Chitukula	25,482	12,497	12,985
TA Mtema	52,442	25,660	26,782
TA Kalumbu	68,527	32,586	35,941
TA Njewa	49,769	24,926	24,843
TA Malili	115,931	56,519	59,412
STA Mbang'ombe	72,071	5,912	6,159
T/A Tsabango	63,076	31,302	31,774

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(e) Education facilities

There are a number of education facilities that offer primary and secondary education in the area. The primary schools include Bunda Primary School within Bunda Campus, Machenchele Primary School near Chiseka, and Nkhombe Primary School. Secondary schools in the area include Chiseka Community Day Secondary School (CDSS), Mitundu Secondary School, and Mitundu Community Secondary school.

(f) Health facilities

Health services in Lilongwe district are provided at three levels i.e primary, secondary and tertiary levels. At primary level, services are delivered through rural hospitals, health centers, health posts, outreach clinics and village health clinics. District and Christian Health Association of Malawi (CHAM) hospitals provide secondary level health care services to back up the activities of the primary level while tertiary hospitals provide services similar to those at secondary level, along with a range of specialist surgical and medical interventions. Health care resources are unevenly and inadequately distributed. Only 46% of the population has access to formal health facility within a 5km radius, and only 20% of the population lives within 25 km of a health facility.

Bunda Campus has a health facility that is being operated by the University in liaison with Government. The facility is basically serving all students and staff at the campus. However, surrounding communities also access services from this clinic. In addition, there is Mitundu Hospital located about 8 km from Bunda Campus. Apart from that other nearest health facilities are Mitundu and Mlare.

(g) Transportation and communication

The project area is accessible using LUANAR Bunda Campus Road. Mini-buses and bicycles are the main mode of transport in the area. The town has Malawi Telecommunications Limited (MTL) lines and mobile phone service provider's networks such as Airtel Malawi, Telecom Networks Malawi (TNM), Access and internet services as well as Post Offices.

4.3.2 Water supply

Source of water at Bunda campus is supplied by Central Region Water Board and the capacity is 450 m³ per day. However, the Central Region Water Board water supply is erratic and not sufficient. To partially ensure that water is constantly available at the campus, LUANAR, Bunda campus also abstracts underground water (150 m³ per day) for supply to the campus. For the campus to be water sufficient, it needs a non-interrupted supply of 800 m³ per day and management is working towards installing more pumps to abstract water from the ground and this will require a water abstraction permit from the National Water Resources Authority. There is no piped water in the surrounding villages. The villagers use water from unprotected wells and boreholes.

4.3.3 Farming system

(a) Land use

Crop production is the major current land use in the villages around the project area. Crops are rain-fed. Land preparation is done by hand and the major operation is ridging before planting. A few farmers use animal drawn power.

Livestock production is another important component of land use system in the area. This includes cattle and goats. The livestock act as security for the families and are mainly sold in times of hardships and purchasing of farm inputs. They also provide meat and milk (cattle) and cattle are also used for transportation purposes. Apart from grazing in the uncultivated lowlands, they also graze in the rain-fed upland fields after harvest.

(b) Land tenure

All the land is under customary land rights and the people practise matrilineal system of marriage whereby the husband stays at the wife's place. Thus women have got total control of the land. Ownership is therefore passed on to female children from generation to generation. The average land holding size was indicated to be 0.5 ha.

(c) Existing agriculture

The farmers grow a number of crops in the area, which include tobacco, maize, ground nuts, soya, beans, sweet potatoes, cassava and green vegetables. On average most farmers in the area produce about 1000kg of maize per ha.

With the exception of leafy vegetables and sweet potatoes, all the other crops are inter-cropped with maize as the main crop. A number of farmers use fertilisers, pesticides and improved seed varieties mainly on maize and potatoes.

4.3.4 Cultural Environment

Records have it that there is mixing of cultures in Lilongwe as a result of co-existence of the major tribes (Chewa, Ngoni, Senga and Yao especially the Mitundu/Bunda area). Typical Ngoni in Malawi follows a patrimonial system of marriage in which a man pays a bride price (lobola) and the wife belongs to the man's household. Similarly, the Chewas practice Chitengwa. This is a system where a man gives some kind of a token (dowry) to the wife's uncle and settles with her in the man's village. Other times the Chewas predominantly practice matrilineal system where the husband settles at wife's village. In the case of Chitengwa, the woman returns to her village upon death of the husband or divorce/separation, while the man returns to his village in the matrilineal system.

The Yao follow a matrilineal system in which a man settles in a wife's village. These systems are now apparently mixed up. The patrilineal system now predominates with some modifications, which include a couple settling at own place away from villages of origins of either partner. The Chewa and the Yao have their own initiation ceremonies for both boys and girls where society norms are passed on to the young ones. The Chewa have dambwe for boys and chinamwali for girls whereas the Yao have Jando for boys and chiputu/msondo for girls. The Ngoni on the other hand pass cultural norms along to children in their homes, as they grow older. Gulewamkulu dance is the symbol of culture among the Chewa while Ingoma, a war dance, is the district cultural symbol of the Ngoni.

Two tribal groups are predominant among the communities in the project area. These are the Chewa and the Ngonis. Most people speak Chichewa.

4.3.5 Religion

Over 90% of the people in Mitundu are Christians with Catholics as the majority; other major Christian denominations include Church of Central African Presbyterian (CCAP) Seventh Day Adventist (SDA) African Church of Abraham and Jehovah's Witnesses. There are fewer Moslems and they are concentrated in trading centres and the tobacco estates where the Yao people are commonly found.

4.3.6 Employment opportunities for local people

Casual labour and subsistence farming are the main sources of income for people living in the villages around the project area. Other income sources include wages from public works income generating activities programs. Some people work in established institutions such as LUANAR and the secondary and primary schools in the project area and from wages from piece work at Mitundu Trading Centre. Wages for public works programs has been K500.00 per day per person, and period of work ranged depending on the works. This acts as a cushion to rural population due to economic hardship facing the country. Cash transfer is another programme.

4.3.7 Economic activities in the area

Harvesting rain-fed agriculture crops is the main occupation in the people living in the villages around the project area, with groundnuts, tobacco, soya, cassava, Bambara, sweet potato and beans being the primary cash crops. Maize, velvet beans, cassava, sweet potato and pumpkin are prominent food crops. During the dry season, secondary activities are pursued, such as brick-making, charcoal making and firewood selling.

The economic development of the area and the livelihood of the greater population depend on natural resources. For the area to experience economic growth and deal with issues of poverty there is need to ensure that the environment is conserved and used sustainably. The recent change in rainfall patterns that occur in the district which solely depends on agriculture and resulted in low yields and unreliable livelihood sources gives even more reason for Lilongwe District to give more attention to conserving the environment for economic growth and assurance of people's well-being.

4.3.8 Commercial activities of the area

Mitundu is the main trading centers in near the project area. Commercial facilities found at the trading center include produce markets retail and wholesale shops, telephone bureaus, rest houses, motorcycle and motor vehicle garages, restaurants, bars and bottle stores, welding shops and salons.

The project area is close to Mitundu trading center where micro, small and medium enterprises are prominent as the commercial and industrial business. Retail trading of several merchandises such as groceries, clothes, food items, and agricultural produce are major business occupations at the trading center. Most people are engaged in petty trading because of limited working capital as well as business and credit management skills.

Some of the organizations that are working around the project area include DAPP, NASFAM, Export Trading Company, Peoples trading center, Farmers world, Kulima Gold, Chipiku, Donnas Eggs, Lafarge, Smallholder Farmer Fertilizer Revolving Fund of Malawi (SFFRFM) and other

private agro-dealers. These companies contribute to the livelihood of the people within the communities as some of them are employed by these institutions.

CHAPTER 5 REVIEW OF RELEVANT POLICIES, LEGAL AND INSTITUTIONAL FRAMEWORK

5.1 Malawi's environmental regulatory framework

Malawi has over the years, developed a number of policies and legislation to guide environmentally and socially sustainable development in various sectors of the economy through mainstreaming of environmental and social issues in project planning and implementation. These include the Constitution of the Republic of Malawi of 1995; different policies and pieces of legislation. Besides, Malawi also uses different international procedures, policies and guidelines where national laws, policies, procedures, guidelines and legislation are falling short to guide sustainable development.

This chapter therefore outlines the policies, legislative and administrative frameworks relevant to guide implementation of activities of the project.

5.2 Policy framework

Over the years Malawi has developed various national policies to guide implementation of different project activities in the country. Some of the policies relevant to the activities of the project are discussed below.

5.2.1 National Environmental Policy, 2004

The National Environmental Policy of 2004 is based on the principles of National Environmental Action Plan, and provides a policy framework on environmental planning in development programmes including undertaking environmental and social impact assessments for different development projects. The overall goal of the Policy is to promote sustainable social and economic development through sound management of the environment in Malawi. The policy among other things seeks to:

- a) promote efficient utilisation and management of the country's natural resources and encourage, where appropriate, long-term self-sufficiency in food, fuel wood and other energy requirements; and
- b) facilitate restoration, maintenance and enhancement of ecosystems and ecological processes essential for functioning of the biosphere and prudent use of renewable resources;

Activities for the project shall among other things involve clearing, excavation and levelling of soil, extraction of gravel and quarry, transportation of materials, compaction of sub-base material and construction of hostels and different infrastructure at Bunda campus, which will have the potential to cause occupational harm and pollution of the environment and water bodies. The implication of the policy is that the project has to put in place measures to reduce adverse impacts arising from the activities of the project and that implementation of the activities of this project has to take sustainability issues on board.

The Policy has implications on the project as the project will cause negative impacts in the project area and beyond. Some of the impacts will include increased generation of waste; injuries due to construction works; increased risk of dust emission and air pollution; risk of social conflict; increased risk of illicit behavior and crime; impacts on community dynamics; increased risk of

communicable diseases; increased cases of accidents; possible disruption of public service utilities; increased demand for sanitary facilities; and increased disruption of activities at LUANAR, Bunda campus. As a requirement under the environmental policy, the developer will therefore prepare an environmental and social management plan, which will be implemented during project construction and operation phases.

In line with this policy and through this ESIA, the project developer will integrate the environmental and social concerns into their planning processes and will promote public participation, enhance public awareness, and cooperation with other institutions.

5.2.2 National Land Policy, 2002

This is the principal policy that guides land management and administration issues in Malawi. The policy introduces major reforms intended in land planning, use, management and tenure. It provides clear definition of land ownership categories (Section 4), and addresses the issue of compensation payment for land (Section 4.6).

The policy also has provisions for environmental management covering issues related to both urban and rural management of solid and liquid waste, protection of sensitive areas, agricultural resource conservation and land use, community forests and woodland management, over-dependence on fuel wood, forest programs, co-ordination of multiple land use, water resources and wetlands, lakeshore environmental management and mining and minerals. Of particular importance is Section 9.8.1 (c) which states that development activities in fragile ecosystems such as wetlands, game reserves, forest reserves and critical habitats will only be permitted after the appropriate authority has conducted an environmental and social impact assessment.

The project will not cause loss of land and property by the people in the project area as the project will be implemented on land that already belongs to LUANAR, Bunda campus. Issues of resettlement and compensation will therefore not arise as a result of the project. Furthermore, the ESMP in the ESIA report will cover all issues to do with waste management, deforestation, conservation and land use and protection of sensitive areas.

5.2.3 National Construction Industry Policy, 2015

Construction of the hostels at LUANAR will trigger the Construction Industry Policy in that the project developer must ensure that the contractor protects the environment, in line with national and international policies for environmental sustainability. Areas of focus include occupational health and welfare; gender; and HIV and AIDS.

5.2.4 National Water Policy, 2005

The policy aims at providing comprehensive and integrated water resources conservation and management. It addresses all aspects of water including resource management, development, and service delivery conforming to the current global and regional trends and the requirements as reflected under the Sustainable Development Goals. The overall policy goal is sustainable management and utilization of water resources in order to:

- a) Provide water of acceptable quality and of sufficient quantities;
- b) Ensure availability of efficient and effective water and sanitation services that satisfy the basic requirements of every Malawian; and

- c) Enhance the country's natural ecosystems.

One of the objectives of the policy is promotion of public and private sector participation in water resources management, development, supply and conservation. The principles that will guide the implementation of the project in relation to the policy include the following:

- a) Management, protection and conservation of water resources to be undertaken in an integrated manner;
- b) All people to have access to potable water and sanitation services in order to reduce incidences of water related diseases;
- c) Water resources shall be optimally, equitable and rationally allocated and regulated to ensure sustainable optimal economic returns and social enhancement;
- d) Water resources management will be based on the concept of decentralization and will promote local participation with the catchment as the unit of water management;
- e) Promote the empowerment of user communities to own, manage and invest in water resources development; and
- f) Pollution of water resources shall follow the "Polluter Pays" principle in order to ensure water user responsibility.

Activities of the project have the potential to negatively affect the water resources. It is therefore recommended that implementation of the activities of the project should minimize pollution of the public water thereby promoting public health and hygiene and environmental sustainability.

5.2.5 Malawi National HIV and AIDS Policy, 2003

The Malawi National HIV and AIDS policy was adopted by government in 2003. Its main goal is to prevent HIV and AIDS infections, to reduce vulnerability to HIV and AIDS, to improve the provision of treatment, care and support for people living with HIV and AIDS and to mitigate the socio-economic impact of HIV and AIDS on individuals, families, communities and the nation.

Chapter 7 of the Policy observes that in workplaces unfair discrimination against people living with HIV and AIDS has been perpetuated through practices such as pre-employment HIV and AIDS testing, dismissal for being HIV and AIDS positive and the denial of employee benefits if known to be infected. HIV and AIDS affects every workplace. Absenteeism and death impact on productivity, employee benefits, production costs and workplace morale.

The project will have the potential to cause labour influx in the project area which will likely cause spread of HIV and AIDS. As a way of implementing the Malawi National HIV and AIDS policy, the proponent will implement an HIV and AIDS workplace policy and prevention, treatment, care, support and impact mitigation programmes as one way of effectively reducing and managing the impact of HIV and AIDS in the work place.

5.2.6 Guidelines of Environmental Impact Assessment in Malawi, 1997

The Guidelines are a key tool in providing guidance on how the ESIA study should be carried out in Malawi. It includes a list of all prescribed projects for which ESIA's are required. The Guidelines provide further advice on the procedures to be followed in getting approval for the various projects. In particular, the developer will submit the report to the Environmental Affairs Department where the Technical Committee on the Environment will provide the necessary input to allow the

National Committee on Environmental to make an informed decision on the submitted ESIA Reports.

5.2.7 National Land Resources Management Policy and Strategy, 2000

Malawi Government developed the National Land Resources Policy and Strategy to promote efficient diversified and sustainable use of land based resources both for agriculture and other sustainable socio-economic developments. This was because for a long time different development processes in the country have been accompanied by unprecedented infrastructure development. A considerable proportion of these development projects have been carried out without special coordination within the context of the policy thereby resulting into land use conflicts and unsustainable land use management practices.

The project at hand is a development project and will involve construction of new hostels for students at LUANAR, Bunda campus to increase students' enrolment and improve students' academic performance hence all principles of the policy will be followed.

5.2.8 Gender Policy, 2008

Malawi Government appreciates that gender inequality is a significant constraint to socio-economic growth and poverty reduction. The policy specifies that Government has a responsibility to integrate gender into the development, design, implementation, and monitoring of different development programs.

According to this Policy, Government of Malawi is expected to implement a constitutional obligation of building a society where men, women, boys and girls equally and effectively participate in and benefit from different development processes. The project will ensure that wherever there are any employment opportunities, women will be given equal chances as men for employment. Deliberate effort will also be made to ensure that among the employees, 30% should be women.

5.3 Regulatory Framework

The section provides a review of key national legislation pertinent to development and operation of the project. The project proponent intends to develop and operate the project in line with all relevant national laws. Details of the legal frameworks considered are presented in the sections that follow.

5.3.1 The Constitution of the Republic of Malawi, 1995

The Constitution of the Republic of Malawi (1995) is the supreme law of the land. It contains, among other things, principles of national policy in Section 13. The section sets out a broad framework for sustainable environmental and social management at various levels in Malawi. Among other issues, the section provides for environmental and social issues under Principles of National Policy. Section 13 (d) of the Constitution provides that the state shall actively promote the welfare and development of the people of Malawi by progressively adopting and implementing policies and legislation aimed at managing the environment responsibly in order to:-

- a) Prevent the degradation of the environment;
- b) Provide a health living and working environment for the people of Malawi;

- c) Accord full recognition to the rights of future generations by means of promoting environmental and social protection and sustainable development of natural resources;
- d) Conserve and enhance the biological diversity of Malawi; and
- e) Enhance the quality of life in rural communities with the ultimate aim of attaining sustainable development.

The Constitution further provides for a framework for the integration of environmental and social consideration into any development programs. The implication of this provision is that Government, its cooperating partners and the private sector have a responsibility of ensuring that development programs and projects are undertaken in an environmentally and socially responsible manner.

5.3.2 Environment Management Act, 1996

The Environment Management Act (1996) makes provision for the protection and management of the environment and the conservation and sustainable utilization of natural resources. Sections 24, 25 and 26 of the EMA provide the legal framework for managing the Environmental Impact Assessment (EIA) process. - Section 24 outlines activities that require an EIA before they can be implemented. A prescribed list of Projects for which EIA is mandatory is provided in Malawi's Guidelines for EIA, 1997. The Project is a prescribed Project under the Environment Management Act and therefore requires an ESIA study before it can be implemented.

Section 26 (3) of the EMA provides that "a licensing authority shall not issue any licence under any written law with respect to a project for which an environmental and social impact assessment is required under EMA unless the Director has certified in writing that the project has been approved by the Minister under EMA or that an environmental and social impact assessment is not required under EMA." In this way, the developer for the project will have to obtain an ESIA Certificate first before construction activities of the project are undertaken.

5.3.3 Land Act 2016

The Land Act, 2016, which repealed the Land Act of 1965, is the principal legislation dealing with land tenure, land use and land transfer. The Commissioner of Lands is responsible for the administration of the Act. Section 7 of the Act recognizes two categories of land namely; public land and private land. Public land is defined as land as held in trust for the people of Malawi and managed by Government, a local government authority and a Traditional Authority. Private land is defined as all land which is owned, held or occupied under a freehold title, leasehold title or as a customary estate or which is registered as private land under the Registered Land Act. The Act recognizes that every person has a natural dependency on land and that it is therefore important that Government provides for secure and equitable access to land as a multipurpose resource and an economic asset by defining issues of security of tenure.

The Land Act outlines some procedures to be followed for land acquisition by individuals or Government including issuance of formal notices to persons with existing land interests to payment of compensation however most provisions relating to acquisition of land are in the Land Acquisition Act as amended.

The project will not require any land take from the general public. As a result, issues of compensation and resettlement will not arise.

5.3.4 The Lands Acquisition Act, 2017

The Lands Acquisition Act of 2017 has amended some provisions of the Lands Acquisition Act, the main one being that the Amendment Act now provides for the acquisition and compensation of land in the citation.

Section 3 of the Act read with the Amendment Act empowers the Minister responsible for lands whenever he is of the opinion that it is desirable or expedient in the interests of Malawi, to acquire land for public utility, either compulsorily or by agreement, and pay compensation as may be agreed or determined under the Act.

Sections 5-7 of the Act provide for the issuing of notices upon the persons who are possessed of an interest in the land. According to section 12 of the Amended Act when a notice to acquire land has been issued and published, the land shall revert to the Government as public land within 2 months of the publication of the notice.

Section 9 as amended provides for the payment of compensation. It provides that where any land is acquired by the Minister under this Act the Minister shall pay in respect thereof appropriate compensation agreed or determined in accordance with the provisions of this Act. The Amendment Act further provides that compensation shall be paid in one lump sum; therefore, the assumption is that compensation shall only be monetary.

Amended provisions relating to assessment of appropriate compensation provide that an assessment is to be done by an independent valuer appointed by the Minister, unless the parties agree otherwise. The Amendment to the Act also provides information on the grounds on which compensation can be calculated which include; loss of occupational rights, loss of land, costs of professional advice and disturbances which are a natural and reasonable consequence of the disposition of land. The Amendment has inserted substantive provisions on matters to be taken into consideration in assessing compensation for alienated land under section 10A.

Section 11 of the Act deals with the effect of payment of the compensation and states that a person who has been paid compensation for land cannot make further claims in respect of the land. However, this does not prevent any subsequent proceedings against the person to whom the same was awarded by any person claiming to have a better right to the compensation or the right to a share thereof.

However, the project will not have any implications on the project considering that the project will not require any land take from the general public. As a result, issues of compensation and resettlement will not arise.

5.3.5 Customary Land Act 2016

The Customary Land Act No.19 of 2016 provides for the management and administration of traditional land. Customary land consists of land within the boundaries of a Traditional Land Management Area other than Government or reserved land, land designated as customary land

under the Land Act of 2016, land, the boundaries of which have been demarcated as traditional land under any written law or administrative procedure in force at the time before the Act came into operation and land the boundaries of which have been agreed upon by a land committee claiming jurisdiction over that land.

A certificate is issued by the Commissioner of Lands for each Traditional Land Management Area in respect of which the boundaries to the area have been demarcated or agreed. Such certificate, issued in the name of the Traditional Authority, confers upon the land committees in that area the function of management of customary land and affirms the occupation and use of customary land by the persons in the Traditional Land Management Area in accordance with the customary law applicable to land in that area.

The Act established customary land committee in section 5 of the Act. These committees are supposed to be at Group Village Headman level and their main function is to manage customary land within its area of jurisdiction, on trust, as if the committee were a trustee of the land and the villagers were beneficiaries. The Act provides that the customary land committee may not allocate land or grant a customary estate without the prior approval of the relevant Traditional Authority.

The project will not require any land take from the general public. As a result, issues of compensation and resettlement will not arise.

5.3.6 Local Government Act, 1998

The Act, as read with Section 146 of the Constitution, provides the mandate to the local assemblies in planning, administration, and implementation of various development programs in their areas. It further provides for environmental functions, which include urban management, local planning, local afforestation programs, control of soil erosion, and appropriate management of solid and liquid waste. Lilongwe District Council where the project will be implemented was consulted with respect to their mandate at the district level and how the project would comply with their planning requirements.

5.3.7 Public Health Act, 1982

The Public Health Act requires developers to provide sanitary and health facilities in work places to promote health and well-being of the primary occupants and to avoid harmful effects of waste on public health.

The Environmental and Social Management Plan recognizes the importance of practicing improved hygiene and use of improved sanitary facilities for sustainable livelihood. The developer will comply with the requirements of this Act by constructing sanitary facilities and waste disposal facilities and will ensure good hygiene practices, some of which have been mainstreamed in this Environmental and Social Management Plan (ESMP).

5.3.8 Occupational Safety, Health and Welfare Act, 1997

The Act regulates work conditions with respect to safety, health, and welfare of workers. During construction phase, there will be a number of workers working on the site using different types of machinery and facilities.

Construction activities in general pose a number of occupational health and safety risks and probable risk to workers and the surrounding communities at large. Furthermore, increased movement of vehicles and equipment during construction can pose a risk of accidents to the surrounding communities as well as the construction workers.

The Act therefore places a duty of care on contractors throughout the project construction phase and similarly, the workers have a duty to take reasonable care for their own safety and health. The duty of ensuring safety, health, and welfare of workers is on the employer. However, every employee is required to take reasonable care for his/her own safety and that of other workers. The key provisions relevant to the project under discussion are as follows:

- i) Section 13(1) places a duty on every employer to ensure the safety, health and welfare of all his employees at work;
- ii) Section 51(1) mandates that manufacturers, importers and suppliers of hazardous substances used at workplaces shall provide sufficient information on such substances as well as the precautions to be taken; and
- iii) Section 81 (7) stipulates that where the use of hazardous chemicals is likely to penetrate the skin and cause rash, skin contact with hazardous chemical shall be avoided and personal hygiene and the type of clothing worn shall be such as to enable rapid removal of any chemical from skin contact.

Considering that the construction phase of the project will require a lot of labour force and use of heavy machinery, the Occupational Safety, Health and Welfare Act is important in safeguarding the health and welfare of all workers. The contractor will ensure that there is adequate protection for the workers who will be on site as required by the Act.

Section 66 of the Act defines the procedure to be followed in case of the occurrence of an accident which either can cause loss of life or disables a person from carrying out the normal duties at which he is employed. Furthermore, it stipulates measures that relate to work in confined spaces (section 55), matters relating to bulk storage of dangerous materials, matters dealing with noise (section 63) and general matters relating to health and safety.

This Environmental and Social Impact Assessment study has examined all aspects of occupational health, safety and welfare of all the persons involved in the project to determine compliance of the outlined sections of the law. In this effect the proponent will allow the Ministry of Labour to assess the facility and make determinations of the adequacy of the mitigation measures towards occupational safety of the workers.

5.3.9 Water Resources Act, 2013

Section 39 (1) of the Water Resources Act prohibits the abstraction and use of water unless authorized to do so under this Act. The Developer will therefore, in compliance with provisions of this Act, apply for water abstraction from under the ground for use at the project site since the site is not connected to water provided by the Central Region Water Board. Further, Part VIII, Section 89 (1) of the Act prohibits any person who owns, controls, occupies or uses land on which an activity or process is or was performed to pollute water resources and which, unless authorized under this Part, causes, has caused or is likely to cause pollution of a water resource, shall take all such measures as may be necessary to prevent any such pollution from occurring, continuing or recurring.

The Developer will therefore apply for a water abstraction permit from the National Water Resources Authority whose establishment is being provided for in this Act. In addition, the Developer will ensure that activities at the station do not pollute water in the nearby streams and rivers. Measures to minimize pollution of the water include proper disposal of both domestic, chemicals from laboratories and effluent from all the stations activities.

5.3.10 Gender Equality Act, 2013

The Act was developed to ensure that men, women, boys and girls equally and effectively participate in and benefit from different development processes. The Act was put in place to assist to:

- a) promote gender equality, equal integration, influence, empowerment, dignity and opportunities for men and women in all functions of society;
- b) prohibit and provide redress for sex discrimination, harmful practices and sexual harassment; and
- c) provide for public awareness on promotion of gender equality.

Considering that the project will employ a number of people both during construction and operation phases of the project, both the Developer and the Contractor will be expected to apply provisions of this Act. The project will ensure that wherever there are any employment opportunities, women will be given equal chances as men for employment.

5.3.11 National Construction Industry Act, 1996

The Act provides for the establishment of the National Construction Industry Council of Malawi (NCIC), for the promotion and development of the construction industry, registration of persons engaged in the construction industry in Malawi, co-ordination of training of persons engaged in the construction industry and general matters incidental thereto. The NCIC is responsible for regulating the construction industry in Malawi through among others: registering consultants and construction firms, standardizing quality control, codes of practice, procurement process; and legal contractual procedures in liaison with other organization. In accordance with the Act, the NCIC must be involved in identifying the contractors, ensuring that a quality contract is in place, resolving conflicts between contractor and client and ensuring that quality structures are developed.

5.4 Institutional Framework

The Environment Management Act and the EIA Guidelines provide for the administrative framework of the EIA process. The EIA process is managed by the Director of Environmental Affairs. The Director of Environmental Affairs works with other line Ministries/agencies and stakeholders.

Under section 26 of the Environment Management Act, a prescribed project cannot receive the required authorization to proceed from the relevant licensing authority unless the Director has issued a certificate that an EIA is not required or that he has approved the project on the basis of an EIA report. The Director is empowered under the Act to require changes to a project in order to reduce environmental impact and to reject a project, if, in his view, the project will cause

significant and irreparable injury to the environment. A person not satisfied with the decision of the Director may appeal to the Environmental Appeals Tribunal.

The Director relies upon the advice of the Technical Committee on the Environment established under section 16 of the Environment Management Act in order to make his determination. Through this committee, member agencies are informed about projects being appraised; participate in reviews of project briefs, ESIA ToRs and ESIA reports; develop project approval terms and conditions; develop and monitor project auditing conditions; and recommends courses of action to the Director. The Director is not bound by the advice of the Committee to arrive at any action that may be considered necessary.

Institutional responsibilities for the co-ordination, planning, administration, management and control of development and environmental issues are fragmented among a number of agencies, ministries and organizations. The major institutions to be involved in this project shall include:

- a) Environmental Affairs Department;
- b) Ministry of Lands, Housing and Urban Development;
- c) Central Region Water Board;
- d) Ministry of Labour, Youth, Sports and Manpower Development;
- e) Ministry of Natural Resources, Energy and Mining;
- f) Ministry of Agriculture, Irrigation and Water Development;
- g) Ministry of Local Government and District Administration; and
- h) Lilongwe District Council.

During the preparation of the Environmental and Social Management Plan, these major institutions and/or their documents were consulted for their technical advice, expert knowledge and concerns or future programs as related to the project.

5.5 Summary of approvals and licences which the proponent has to obtain

There are a number of statutory and regulatory approvals or licences that developer need to get in the courses of project implementation to ensure that the project is in line with sound environmental management practices and is in compliance with other relevant pieces of legislations. These have been summaries in Table 5.1 below:

Table 5.1 List of statutory approvals and licences required

List of statutory approvals or licences to be obtained	Legal and regulatory framework	Responsible institution for processing approval or licence
Environmental Impact Assessment Certificate	Environment Management Act (1996)	Environmental Affairs Department
Water Abstraction Permit	Water Resources Act (2013)	National Water Resources Authority
Planning Permission	The Physical Planning Act No 17 of 2016	Regional Physical Planning Office (Centre)

Approval to dispose of waste	Local Government Act (1998) Waste Management Licence	Lilongwe District Councils Environmental Affairs Department
Registration Certificate for generation of electricity on a heavy duty generator	Energy Regulatory Act No. 20 (2004)	MERA
Effluent discharge Permit. Regulate the quality of waste water, means and of discharge into surface drainage system	Water Resources Act (CAP 72.03)	Water Resources Authority
Work Place Registration Certificate. To guide on procedures on workers' environmental health, safety during project implementation and operations.	Occupational Health, Safety and Welfare Act (Cap 55:01)	Ministry of Labour, Youth and Manpower Development
Consent to discharge effluent into public water	Water Resources Act (2013)	Water Resources Authority
Consent to supply portable water	Water Works Act (1995)	Central Region Water Board

6.1 Identification of potential impacts

Construction and operation of the hostels at LUANAR, Bunda Campus is expected to generate a range of impacts in the project impact area. The anticipated impacts will be on a range of biophysical and socio-economic aspects of the environment. Some of the impacts are expected to be positive while others may be negative. The main purpose of this chapter is to identify the potential environmental impacts associated with the project from planning and design, construction, demobilization and operation and maintenance phases; assess their extent and significance; and propose mitigation and enhancement measures to manage the impacts. The positive measures if properly enhanced will contribute towards social and economic development of the area and Malawi as a whole. The negative impacts will have to be managed to prevent environmental degradation of both the social and physical environment in the project area. Specifically, the chapter is aimed at the following:

- a) Predict the potential environmental and social impacts arising from implementation of the project;
- b) Assess the possible extent /severity of the predicted impacts (both positive and negative);
- c) Assess the significance of the predicted impacts; and
- d) Recommend measures for managing the impacts.

6.1.1 Methodology of impact identification

Impact identification was done by analyzing the project activities and determining their influence on the baseline environmental and social characteristics of the project area. The environmental characteristics of the project include biophysical (topography, soils, climate, rainfall, water resources, flora and fauna) and social characteristics (demography, settlement, land administration and tenure, economic activities, infrastructures and services, water supply and sanitation, healthy and HIV and AIDS). Public consultation complemented the field investigations and literature review. Identification of potential impacts and physical assessment of the following environmental components likely to be impacted was also conducted:

- a) physical /chemical;
- b) biological /ecological;
- c) social /cultural; and
- d) economic /operational.

Based on the project activities, the approach followed included:

- a) Analysis of topographical maps, in order to identify the main environmental and social components of topography, land under cultivation, existing industrial establishments, infrastructure and water resources;
- b) Site investigations, focusing particularly on the areas of project influence especially the neighbouring designated institutions to identify critical environmental and social elements to be affected including soils, physical developments, social infrastructure, water and sanitation, health, flora and fauna, soils and local economy;
- c) Screening of the anticipated potential and significant impacts of the project, in accordance with the project stages of planning and design, construction, operation and maintenance and decommissioning; and

- d) Assessment of environmental impacts in order to describe the positive and negative impacts, both direct and indirect as identified at each stage of the project cycle.

The methodology adopted for impact identification mainly considered the environmental impacts at various phases of the project and the activities to be undertaken at each phase. The following phases were considered:

- a) **Planning Phase** – Activities during planning and design phase include land surveying; preparation of a master plan; preparation of detailed lay out plans; preparation of building designs, tender process, obtaining approvals under the Town and Country Planning Act and the Bye-Laws and obtaining all the approvals necessary for the construction and operation of the students’ hostels. It is expected that the environmental management measures, which will be proposed for the project will be incorporated into the engineering design of the project.
- b) **Construction Phase** – For this phase, the main activities are land clearing; landscaping; grading; excavation; compacting; trenching; construction of service infrastructure such as access roads, construction of a workers’ camp which will provide hostels to the workers, storage facilities and an office facility; backfilling with compaction consolidation; levelling and earth marking; transportation of building materials; and construction of the students hostels infrastructures and other related buildings. Other infrastructure such as drainages and utility reticulation shall also be constructed.
- c) **Demobilization Phase** - The term demobilization is used to describe the range of actions necessary to remove or make safe components of a project, and to restore the area occupied by the project to other beneficial uses once construction activities are over. Decommissioning of the students’ hostels is not included in this ESIA at this stage. However, a Decommissioning Plan is to be prepared two years prior to decommissioning the students’ hostels should that need arise. The main activities to be undertaken during demobilization phase are:
 - i) Demobilization of Contractors workforce;
 - ii) Revegetating areas that were cleared by the Contractor around the project impact area;
 - iii) Removal of construction waste from project site; and
 - iv) Rehabilitation of borrow pits created during construction of access roads and project buildings and other associated infrastructure.
- d) **Operation Phase** – During operation phase, the structures will be occupied and used for hostels for undergraduate and postgraduate students. The impacts were identified by considering project activities including inputs and outputs in the various project phases outlined above and how these would affect various components of the environment. The steps undertaken were:
 - a) **Assessment of baseline conditions**

The purpose of assessing baseline conditions was to understand the existing situation as this is the basis for determining changes that may occur as a result of the project.

b) Assessment of project inputs associated with the project

Project inputs were examined to determine the potential changes and impacts that would be created through the application of project inputs.

c) Assessment of project activities that will be undertaken

Project activities were examined to identify the impacts that the activities would bring on the environment.

d) Assessment of project outputs associated with the project

Project outputs were examined to determine the potential changes and impacts that would happen as a result of the outputs.

e) Determination of environmental impacts

Based on the above steps, the environmental impacts of the project were identified.

6.2 Impact Evaluation and Scoring Matrix

After identifying the positive and negative environmental impacts the project will have on the environment, further analysis was conducted to determine the extent and significance of the impacts. The aspects that were considered were magnitude, significance, probability of occurrence and duration of impacts which have been properly explained.

6.2.1 Magnitude

Magnitude is a measure of the general degree, extensiveness, or scale of impacts. The magnitude was scored at four levels i.e. household level, local level, regional level and national level.

6.2.2 Significance

This is a measure of the importance of a particular action on the environmental factor in the specific instance under consideration. This was scored using values ranging from +3 to - 3 with a score of 1 representing a low/minimal impact, 2 moderate impact and 3 representing a high impact. Negative impacts were assigned a minus (-) sign and positive impacts are given a plus (+) sign.

6.2.3 Probability of occurrence

Provides an estimate of the probability of an impact occurring before mitigation is applied. The impacts were considered as:

- a) Possible (impact may occur but it is not probable);
- b) Probable (the impact is very likely to occur); and
- c) Definite (impact is unavoidable).

6.2.4 Duration

Refers to the period of time over which an impact may occur, from once-off to continuous for the life of the project. Duration of impacts was considered as 1 for a low/ minimal impact and the score of 5 for a high impact. Each impact is given a score from 1 to 5 against each of the four attributes. The scores for each impact are added to give a total score for the four attributes, indicating the overall severity of the impact. A high score (5) represents a high impact and a low score (1) represents a low impact. Negative impacts are assigned a minus sign and positive impacts

are given a plus sign. Table 6.1 shows the scoring scale used for evaluation of the impacts. The four rows allow evaluation of impacts in terms of the magnitude, significance, probability and duration. The columns outline the scoring scale; with a score of 1 for a low/ minimal impact and the score of 5 for a high impact. Each impact is given a score from 1 to 5 against each of the four attributes. The scores for each impact are added to give a total score for the four attributes, indicating the overall severity of the impact. A high score (5) represents a high impact and a low score (1) represents a low impact. Negative impacts are assigned a minus sign and positive impacts are given a plus sign. For purposes of this analysis an impact matrix was prepared and is provided in Table 6.1.

Table 6.1 Impact scoring matrix with significant levels

Impact	Spatial extent of the impacts	Significance of the impact	Probability of occurrence of the impact	Duration of the impact	Total Score	
IMPACTS DURING PLANNING AND DESIGN						
POSITIVE IMPACTS						
1	Creation of employment	1	1	3	1	6
IMPACTS DURING CONSTRUCTION						
POSITIVE IMPACTS						
1	Creation of employment	5	5	5	3	18
2	Creation of a market for local construction materials	3	4	5	2	14
3	Promotion of small scale businesses	3	3	3	2	11
NEGATIVE IMPACTS						
1	Air Pollution	-3	-3	-3	-2	-11
2	Noise	-1	-2	-2	-3	-8
3	Soil erosion	-2	-3	-3	-3	-11
4	Soil contamination	-1	-2	-2	-3	-8
5	Increase in accident incidences	-1	-3	-2	-3	-9
6	Increase in the spread of HIV/AIDS and other sexually transmitted diseases	-1	-4	-5	-3	-14
7	Increase in Criminal Acts	-1	-3	-3	-3	-10
8	Poor waste management	-1	-3	-3	-2	-9
9	Poor sanitation	-2	-3	-4	-2	-11

Impact		Spatial extent of the impacts	Significance of the impact	Probability of occurrence of the impact	Duration of the impact	Total Score
10	Land and river bank degradation	-2	-3	-4	-5	-14
IMPACTS DURING DEMOBILIZATION						
POSITIVE IMPACTS						
1	Reduced noise levels	1	2	2	3	8
NEGATIVE IMPACTS						
1	Loss of employment	5	5	5	3	18
2	Poor waste management	1	3	3	2	9
3	Loss of business opportunities	3	4	5	2	14
IMPACTS DURING OPERATION AND MAINTENANCE						
POSITIVE IMPACT						
1	Provision of modern and adequate and affordable student hostels facilities at LUANAR Bunda Campus	5	5	5	4	19
2	Increase in performance of students academically as most students will leave close to the campus and easily access college facilities	5	5	5	5	20
3	Improvement of the infrastructure	4	4	5	3	16
4	Improve security in the area	5	4	4	3	16
5	Creation of employment	5	4	5	3	17
6	Increase in economic activities in the project area	3	3	3	3	12
7	Increase in government revenue through taxes	4	5	4	5	18
NEGATIVE IMPACTS						
1	Increase in the spread of HIV/AIDS and other sexually transmitted diseases	-1	-4	-5	-3	-14

Impact		Spatial extent of the impacts	Significance of the impact	Probability of occurrence of the impact	Duration of the impact	Total Score
2	Increase in Criminal Acts	-1	-3	-3	-3	-10
3	Poor waste management	-1	-3	-3	-2	-9
4	Poor sanitation	-2	-3	-4	-2	-11

Negative impacts with a high total score as presented in Table 6.2 are considered severe and should be accorded serious attention by the developer.

6.3 Description of environmental impacts and their management measures

6.3.1 Impacts from Design and Planning Phase

The planning and design phase will involve surveying, preparation of maps, detailed layout plans and building plans.

Positive Impacts

a) **Creation of Employment:**

The planning and design phase provided employment to consultants for the preparation of location plan, detailed layout plan site plan and building plans for students' hostels and ancillary buildings. Another team was engaged to carry out an Environmental and Social Impact Assessment.

Enhancement Measures

The project developer employed local consultants who carried out some of the works during the planning and design phase.

6.3.2 Impacts from Construction Phase

Activities that will be carried out during this phase will include, land clearing, platform preparations, digging foundations, construction of buildings, and drainage works. There will also be lots of construction vehicles that will be bringing construction materials on the site.

Positive Impacts

a) **Creation of Employment**

Construction activities for the students' hostels and ancillary structures will include: land clearing and levelling using excavators and graders, construction of hostels, car park, septic tanks and drainage systems. A total of 250 people will be employed during this phase.

Enhancement Measures:

- i) Employing more people as much as possible from communities surrounding the project area; and

- ii) Giving women equal employment opportunities as men.

b) Increase in market for local construction materials

The construction of the students' hostels and ancillary facilities will entail the purchase of construction related materials such as cement, sand, quarry, timber iron sheets. This will create an opportunity for traders to sale their products.

Enhancement Measure:

- i) Purchasing materials from as many local suppliers; and
- ii) Hiring trucks to transport construction materials like sand, quarry and cement to the project site.

c) Increase in business activities within the project area

The presence of construction workers at the project site will create an opportunity for small scale business men and women to sale food stuffs, refreshments and to open barbershops and grocery shops.

Enhancement Measure: Designating an area as a market close to the project site.

Negative Impacts

a) Air pollution

Dust particles will be emitted into the atmosphere through clearing of the land, levelling and platform preparation for the construction of buildings.

Mitigation Measures

- i) Applying water regularly to civil works and earth roads to suppress dust; and
- ii) Controlling the speed of construction vehicles to reduce generation of dust.

b) Noise Pollution

Operation of heavy construction machineries and vehicle movements would generate a lot of noise which could be a nuisance to workers and people staying close to the project site. Noise can create stress and can be a hazard within the project site since it can make it difficult for workers to communicate or hear warning signs.

Mitigation Measures

- i) Fitting construction vehicles with silencers to reduce the noise;
- ii) Servicing machinery so that they can be in good condition at all times; and
- iii) Providing ear protection materials for the workers in noisy areas.

c) Soil erosion

The soil will be exposed once the vegetation has been cleared resulting in soil erosion. The other sources include top soil stripping during land preparation and construction works.

Mitigation Measures

- i) Carrying out construction works during the dry season from May to September;
- ii) Creating drainage channels to direct storm water movement;

- iii) Creating stone pitching where soils have been excavated; and
- iv) Clearing only those places where buildings will be constructed

d) Soil Contamination from oil and fuel spills

Construction works will involve use of heavy machines such as graders, tractors, tippers and vehicles. Oil and fuel spills from these machines could contaminate soils within the project site.

Mitigation Measures

- i) Construction vehicles should be in good condition to avoid fuel leaks; and
- ii) Servicing areas for vehicles should have impermeable surfaces and be bunded to contain the spills.

e) Increase in accident/incidences

The road that will be used by vehicles bringing construction materials is also used by other road users. People crossing the roads may be hit by such vehicles. Workers handling heavy equipment and machinery may get hurt.

Mitigation Measure:

- i) Introducing humps on the road to help reduce the speed of the vehicles;
- ii) Erecting warning signs showing that there is heavy machinery and construction vehicles using that road for people to be alert;
- iii) Providing workers with protective clothing;
- iv) Following health and safety regulations;
- v) Training workers in the proper use and handling of heavy equipment and machinery; and
- vi) Maintaining a first aid kit at the project site.

f) Increase in the spread of HIV/AIDS and other sexually transmitted diseases

The project will bring migrant workers, traders as well as local workers with more money from the wages and sales in the project area. This can promote unacceptable unions that will contribute to the increase in the spread of HIV/AIDS and other sexually transmitted diseases in the project area.

Mitigation Measures

- i) Sensitizing local people and workers on the dangers of unacceptable unions;
- ii) Encouraging girls to go to school to avoid early marriages;
- iii) Distributing condoms to both men and women working at the site;
- iv) Providing women with loans for small scale businesses so that they can be self-sufficient; and
- v) Develop an HIV/AIDS workplace policy.

g) Increase in criminal Acts

The influx of people to the project area may attract people with bad intentions who can create havoc within the project surrounding areas. There may also be conflicts between the migrant workers and the locals that may culminate into violent acts.

Mitigation Measures

- i) Employ people from the surrounding areas to reduce number of migrant workers;
- ii) Sensitizing the community members on the ownership of the project;
- iii) Introduce community policing in conjunction with Mitundu Police station; and

h) Poor waste management

Construction rubble, scrap metal, used oils and domestic wastes will be produced and accumulate within the project site.

Mitigation Measures:

- i) Provision of dust bins or rubbish pits for the wastes produced;
- ii) Segregation of wastes by providing different bins for each type of waste;
- iii) Identification of a dumping site within the project area for various types of wastes; and
- iv) Disposing of wastes at Area 38 designated dumpsite regularly.

i) Poor sanitation

Construction workers may be relieving themselves in the bushes or nearby gardens which is very unhygienic if not provided with proper sanitary facilities. They may also be drinking from poor water sources in the absence of potable water. This may contribute to the spread of communicable diseases like cholera and bilharzia in the project area.

Mitigation Measures:

- i) Provision of pit latrines for workers and drivers on the construction site;
- ii) Provision of potable water within the site; and
- iii) Sensitization of workers on the importance of good hygiene practices.

j) Land and river bank degradation

The prospect of a ready market for sand and quarry stone may promote unauthorized quarry and sand mining by local artisans. This may contribute to the degradation of land and river banks being the source of these resources.

Mitigation Measures:

- i) Buying sand and quarry from registered local artisans;
- ii) Carrying out sensitization of local artisans on good mining practices;
- iii) Designating places for sand and quarry mining; and
- iv) Assisting communities with afforestation programs for river banks.

k) Traffic Density

The project will come along with increased (vehicle) traffic along the connecting routes especially during construction phase.

Mitigation measures

- i) Notify the motorists about the project once implementation is started. It is important that warning/ informative signs (bill boards) be erected at the site. The signs should be positioned in a way to be easily viewed by the public and mostly motorists.

- ii) The traffic along the connecting roads should be controlled especially during construction phase and mostly when trucks are turning into the site, say when delivering of materials.
- iii) Employ traffic marshals to control traffic along the adjacent roads and in and out of the site.
- iv) Rehabilitate the access road leading to the property. In case the major road is damaged by the heavy trucks and machinery, the proponent should embark on repair after completion of construction phase.

6.3.3 Impacts during demobilization

There will be need to demolish the temporary structures that will be used for storage, hostels by skeleton staff and pit latrines for the construction workers. The construction rubble and construction wastes will have to be cleared from the site in readiness for the operation phase of the project.

Positive impacts

a) Reduced noise levels

The heavy machinery and the 250 construction workers will leave the site thereby reducing the amount of noise from the project site.

Enhancement measures: The contractor and the developer should ensure that all working and damaged construction equipment is removed from the site

Negative impacts

a) Loss of employment

All construction workers will be laid off once construction works are completed. This will mean loss of income and source of livelihood for 250 workers.

Mitigation measures:

- i) The construction workers should be made aware of the duration for the construction phase so that they can make other plans in time;
- ii) Educating the labour force on the need to save part of their income; and
- iii) Paying severance benefits to all laid off workers according to the provisions of the labour laws.

b) Poor management of Construction wastes

The construction rubble and wastes that will be generated from demolition of construction works and temporary houses for skeleton construction workers will have to be removed from the site. Rehabilitation works will be carried out on the site upon completing the construction works.

Mitigation measures

- i) Disposing of construction wastes at the dumping sites that will be identified in liaison with Lilongwe District Council during construction phase;
- ii) Scrap metals will have to be sold or disposed of at a dump site that will be designated specifically for such wastes; and

- iii) Trees and grass should be planted in bare areas of the project site as a way of restoring the area.

c) Loss of business opportunities

Local traders selling construction materials will lose their source of income and livelihood. The small scale business men and women selling foodstuffs, and fruits to construction workers will also lose their source of income.

Mitigation measures:

- i) Informing local traders of the project duration in time; and
- ii) Paying for all materials that were obtained on loan in time.

6.3.4 Impacts from Operation Phase

The main activity during the operation phase will be the hostels of students at the college.

Positive Impacts

a) Provision of modern and adequate and affordable student hostels facilities at LUANAR Bunda Campus

The students' hostels will provide modern, adequate and affordable hostels facilities to the enrolled students which will also be near the learning facilities.

Enhancement Measure:

- i) Sourcing funds for maintenance so that the hostels should be in good condition and be in operation for a long time; and
- ii) Provide affordable rates for accommodation to the students.

b) Increase in performance of students academically as most students will leave close to the campus and easily access college facilities

Due to the close proximity of the students hostels to the learning facilities, there will be an increase in performance of students academically. The travel time will be used for learning and reading

Enhancement Measure: Sourcing funds for maintenance so that the hostels should be in good condition and be in operation for a long time

c) Improve security in the area

Security will improve in the area due to the coming in of the hostels as the site was idle and outgrown with vegetation.

Enhancement Measures

- i. The project site will be enclosed using suitable walls to beef-up security and to control movement within the site.
- ii. Guard houses will be in place at the gate. Security guards should always monitor the gate of the facility to keep away the intruders and to control movement within the site.

- iii. The guards stationed at the gates should document movements in and out of the site/property.

d) Creation of employment

A total of 50 people will be employed in various sections during the operation of the students' hostels. There will be employment opportunities for both skilled and unskilled labourers during the operation phase.

Enhancement Measures:

- i) Employing more people from the communities surrounding the project area and other areas within the country for both unskilled and skilled jobs; and
- ii) Giving equal employment opportunities for both men and women.

e) Improved access to social services by the local community

The operation phase of the project will facilitate introduction of electricity, potable water and access to an improved road network. The community can have access to these facilities and improve their living standards.

Enhancement measures: Providing extra social services that can be accessed by the communities.

f) Increase in economic activities

The operation of the students' hostels will provide local traders to sale food stuffs like fruits, sugarcane, groundnuts, fresh, cooked and roasted maize, and vegetables to students and workers. There will also be an opportunity to supply food stuffs for student meals.

Enhancement Measures

- i) Designating a place where the local traders will be selling their merchandise; and
- ii) Traders from the project area to be given the opportunity to supply food stuffs for student meals.

g) Increase in revenue by government through taxes

Employees and the people supplying goods and services at the project site will be paying taxes that will be remitted to MRA.

Enhancement Measure: Remitting taxes to MRA from wages and service provisions in time

Negative Impacts

a) Increase in the spread of HIV/AIDS and other sexually transmitted diseases

Interaction among male and female students as well as workers may result in unacceptable unions that may increase the spread of HIV/AIDS and sexually transmitted diseases.

Mitigation Measures:

- i) Carry out sensitization meetings for students, workers and local communities from time to time;
- ii) Empowering the community through outsourcing of non-core activities;

- iii) Develop an HIV/AIDS workplace policy; and
- iv) Distribution of condoms and Education, information and communication materials on HIV and AIDS to students and workers.

b) Increase in criminal acts

The students' hostels may attract thieves trying to steal student property. These may also end up stealing from the surrounding communities. Conflicts may arise between students and the surrounding communities that may culminate into violent acts.

Mitigation Measures:

- i) Sensitize the communities and students on how they can live in harmony;
- ii) Introduce community policing in conjunction with Sanctuary Police station;
- iii) Sensitizing the community on the ownership of the students' hostels; and
- iv) Request for a police unit within the project area.

c) Poor solid waste management

There will be a total addition of 5000 students and 50 employees when the college is operating at full capacity. These will generate a lot of trash in form of paper, used bottles, and domestic waste.

Mitigation Measures:

- i) Provision of dust bins or rubbish pits for the wastes produced;
- ii) Segregation of wastes by providing different bins for each type of waste;
- iii) Maintaining the dumping site that will be identified during construction;
- iv) Collecting and disposing of wastes at Area 38 designated dumpsite regularly; and
- v) Used chemicals should be disposed in consultation with EAD.

d) Liquid Waste

Effluent/sewage resulting from areas such as sanitary facilities and kitchen is of significant concern with respect to the environment. It should never come into contact with the surrounding i.e. water, soil, air etc. to avoid disease outbreak such as cholera, diarrhoea. It should always drain effectively into the sewerage systems via well designed (closed) and laid pipe networks. For this particular project, the proponent will construct a septic tank.

Mitigation measures

- i) Discharge all the liquid waste into a waste treatment plant. The design of the internal sewerage system should consider the estimate discharges from individual sources and the cumulative discharge of the entire project i.e. it should have the capacity to consistently handle the loads even during peak volumes;
- ii) All drain pipes passing under building, driveway or parking should be of heavy duty PVC pipe tube encased in concrete surround. All manholes on drive ways and parking areas should have heavy-duty covers set and double sealed airtight; as approved by specialists;
- iii) Sanitary facilities should be kept clean always, through regular washing/cleaning;
- iv) Frequent monitoring of the internal drainage system; and
- v) Blockages and damages should be fixed expeditiously.

e) Poor sanitation

The students and members of staff will be using water borne toilets and some ground laborers may continue using the pit latrines that were meant for the construction workers. Poor management of liquid wastes and sewerage disposal systems may result in poor sanitation and contribute to pollution of the air at the site.

Mitigation Measures:

- i) Provision of adequate toilets for students and members of staff;
- ii) Construction of double chambered septic tanks for disposal of liquid wastes;
- iii) Regular Inspection and maintenance of the septic tank network;
- iv) Use of improved pit latrines for easy maintenance;
- v) Provision of potable water within the site; and
- vi) Sensitization of students and members of staff on the importance of good hygiene practices.

f) Surface drainage

The drainage of the general site comes in handy to enhance effective flow of the much anticipated surface run-off emanating from the roof catchments and other impermeable areas within the site. The subject plot lies on gentle slope; during operation phase there is a risk of flooding on the lower part of the plot since a large section will be covered by hardscape.

Mitigation measures

- i) Rain water harvesting gutters and storage tanks should be installed to reduce the amount of rainfall reaching the surface.
- ii) Semi permeable materials should be used for construction of pavements.
- iii) After completion of construction, the proponent should embark on comprehensive landscaping to increase softscape cover on the plot.

g) Fire

Fire outbreaks are common in Malawi and they are usually subject to detrimental effects to the environment. Fire causes both economic and social drawbacks. It is therefore important to consider the issue of fire.

Mitigation measures

- i) Hire competent and properly authorized electrical contractor to do the wiring and other electrical works.
- ii) Install fire alarm system for entire project
- iii) Install smoke detectors in kitchens.
- iv) Installation of firefighting equipment following Country Fire requirements.
- v) Conduct regular firefighting drills within the site.
- vi) Develop and adapt an (fire) emergency response plan for the project during and occupation stage.
- vii) Ensure that all firefighting equipment are regularly maintained and serviced.
- viii) Provide fire hazard signs such as “No Smoking sign”, Direction to exit in case of any fire incidence and emergency numbers.

h) Increased energy demand

There will be increased use of energy operation phase (electricity used by the occupants of the housing project). Energy conservation is thus fundamental. Energy conservation involves optimum use of petroleum products (diesel and gasoline), electrical appliances (equipment), lighting systems and other electric machinery as used for different purposes. It also includes use of renewable energy sources.

Mitigation measures

- i) Put off all lights immediately when not in use or are not needed.
- ii) Use energy conserving electric lamps for general lighting.
- iii) Make use of alternative source of energy such as solar power. Solar panels proposed in the project should be fully utilized and timely repaired in case of damage.

i) Increased Water demand

Water is an integral material for construction hence during this phase, a high amount of water will be required. During the occupation phase, the demand for water will also be high; mostly for domestic use. Lack of adequate water during occupation phase may result to dirty surfaces exposing the residents to disease. The subject plot will be served by the conventional water supply system.

Mitigation measures

- i) Install water conserving taps that turn-off automatically when water is not in use.
- ii) Encourage water reuse/recycling during occupation phases.
- iii) Roof catchments of building blocks should be provided with rainwater harvesting systems (gutters, down pipes and water storage facilities) to enhance collection and storage of the resulting run-off. Such water can be used in watering flower gardens, general cleaning etc
- iv) Provide notices and information signs to sensitize on means and needs to conserve water resource i.e. Keep/Leave the Tap Closed etc. This will awaken the civic consciousness of the workers and residents with regard to water usage and management

CHAPTER 7 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLANS

7.1 Environmental and Social Management Plan

An Environmental and Social Management Plan (ESMP) outlines how the environmental impacts of a project are going to be managed, enhanced, minimized and mitigated. The ESMP is also an environmental management tool that is used to monitor implementation of environmental management measures.

This EMSP outlines environmental impacts and their management measures, assigns implementation responsibilities to stakeholders within a given time frame and estimates costs of implementing the measures. The ESMP for the construction, operation and decommissioning phases of Students' hostels is provided in Table 7.1.

Table 7.1 Proposed Environmental and Social Management Plan

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
IMPACTS FROM PLANNING AND DESIGN PHASE				
POSITIVE IMPACTS				
1	Creation of employment	Employment of local consultants	<ul style="list-style-type: none"> • Old Mutual • Ministry of Labour 	N/A
IMPACTS DURING CONSTRUCTION PHASE OF THE PROJECT				
POSITIVE IMPACTS				
1	Creation of employment	<ul style="list-style-type: none"> • Employing unskilled labours as much as possible from the project area • Giving women equal employment opportunities as men. 	<ul style="list-style-type: none"> • Client/ Project manager • Ministry of Labour 	N/A
2	Increase in market for local construction materials	<ul style="list-style-type: none"> • Purchasing materials from as many local suppliers. • hiring trucks to transport construction materials like sand, quarry and cement to the project site. 	Contractor Project manager	NA
3	Increase in business activities within the project area	<ul style="list-style-type: none"> • Designating an area as a market within the project site 	Contractor	NA
NEGATIVE IMPACTS				
1	Air pollution	<ul style="list-style-type: none"> • Applying water regularly to civil works and earth roads to suppress dust • Controlling the speed of construction vehicles to reduce generation of dust. 	Contractor/EDO	1,000,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
2	Noise Pollution	<ul style="list-style-type: none"> • Fitting construction vehicles with silencers to reduce the noise • Servicing machinery so that they can be in good condition at all times • Providing ear protection materials for the workers in noisy areas 	Contractor	850,000
3	Soil erosion	<ul style="list-style-type: none"> • Carrying out construction works out from May - September • Clearing only those places where buildings will be constructed • Creating drainage channels to direct storm water movement • Creating stone pitching where soils have been excavated 	Contractor/EDO	850,000
4	Soil Contamination	<ul style="list-style-type: none"> • Construction vehicles should be in good condition to avoid fuel leaks • Servicing areas for vehicles should have impermeable surfaces and should be bunded 	Contractor Project Manager	
5	Increase in accident/incidences	<ul style="list-style-type: none"> • Introducing humps on the road to help reduce the speed of the vehicles • Erecting warning signs showing that there is heavy machinery and construction vehicles using that road for people to be alert • Providing workers with protective clothing • Training workers in the proper use and handling of heavy equipment and machinery 	Contractor Project Manager	700,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
		<ul style="list-style-type: none"> • Maintaining a first aid kit at the project site • Following health and safety regulations 		
6	Increase in HIV and AIDS and other diseases	<ul style="list-style-type: none"> • Sensitizing surrounding communities and workers on the dangers of unacceptable unions • Encouraging girls to go to school to avoid early marriages • Providing women with loans for small scale businesses so that they can be self sufficient • Develop an HIV and AIDS workplace policy; • Distribute condoms to both women and men working at the site 	Contractor Local leaders Min. of Education	1,000,000
7	Increase in criminal Acts	<ul style="list-style-type: none"> • Employ people from the surrounding areas to reduce number of migrant workers • Introduce community policing in conjunction with Mitundu Police station • Sensitize the community on the ownership of the project 	Developer	1,500,000 N/A
8	Poor waste management	<ul style="list-style-type: none"> • Provision of dust bins or rubbish pits for the wastes produced • Segregation of wastes by providing different bins for each type of waste • Identification of a dumping site within the project area for various types of wastes 	Contractor EDO	1,350,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
		<ul style="list-style-type: none"> Disposing of wastes at the designated places regularly 		
9	Poor sanitation	<ul style="list-style-type: none"> Provision of pit latrines for workers and drivers on the construction site Provision of potable water within the site Sensitization of workers on the importance of good hygiene practices. 	Contractor Project Manager	Included in project cost
10	Degradation of land and river banks	<ul style="list-style-type: none"> Buying sand and quarry from registered local artisans Carrying out sensitization of local artisans on good mining practices Assisting communities with afforestation programs for river banks Introducing alternative income generating activities in the area. 	Old Mutual Mines Local communities	1,250,000
11	Traffic Density	<ul style="list-style-type: none"> Notify the motorists about the project once implementation is started. Put in place warning/ informative signs (bill boards) at the site. The signs should be positioned in a way to be easily viewed by the public and mostly motorists. The traffic along the connecting roads should be controlled especially during construction phase and mostly when trucks are turning into the site, say when delivering of materials. 	Contractor	950,000.00

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
		<ul style="list-style-type: none"> Employ traffic marshals to control traffic along the adjacent roads and in and out of the site. 		
12	Risks of child labour on the construction site	<ul style="list-style-type: none"> Recruitment of workers through district labour office Erect sign board “ NO CHILD LABOUR” on site 	<ul style="list-style-type: none"> Contractor Old Mutual 	750,000.00
13	Use of lead-based paint products.	<ul style="list-style-type: none"> The Contractor shall ensure that paints with toxic ingredients or solvents or lead-based paints will not be used 	<ul style="list-style-type: none"> Contractor Old Mutual 	450,000.00
14	Risks of inappropriate contacts between workers and students	<ul style="list-style-type: none"> Periodic sensitization of workers and students on zero tolerance against the malpractices 	<ul style="list-style-type: none"> Contractor Old Mutual 	500,000.00
IMPACTS FROM DEMOBILIZATION PHASE				
POSITIVE IMPACTS				
1	Reduced noise levels	<ul style="list-style-type: none"> Removing all working and damaged construction machinery and equipment 	Contractor Project Manager	N/A
NEGATIVE IMPACTS				
1	Loss of employment	<ul style="list-style-type: none"> Informing workers of project duration when employing them Educating the labour force on the need to save part of their wages Paying severance benefits to all laid off workers according to the provisions of the labour laws. 	Contractor Project manager Min. of Labour	Part of project costs
2	Poor waste management	<ul style="list-style-type: none"> Disposing of construction wastes at the dumping sites that will be identified during construction phase. 	Contractor Project manager EDO	1,000,000.00

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
		<ul style="list-style-type: none"> Scrap metals will have to be sold or disposed at a dumping site that will be designated specifically for such wastes. 	Min. Of Education	
3	Presence of bare areas	<ul style="list-style-type: none"> Trees and grass should be planted in bare areas of the project site as a way of restoring the area. 	Contractor Project manager DFO	500,000.00
3	Loss of business opportunities	<ul style="list-style-type: none"> Informing local traders of the project duration in time Paying for all materials that were obtained on loan in time Incorporate TEVET training in the project; Outsourcing some services for non-core activities for the college 	Contractor Project Manager	N/A
4	Dilapidated access roads	<ul style="list-style-type: none"> Rehabilitate the access road leading to the property. In case the major road is damaged by the heavy trucks and machinery, the proponent should embark on repair after completion of construction phase. 	Contractor Project Manager	900,000.00
IMPACTS FROM OPERATION PHASE				
POSITIVE IMPACTS				
1	Provision of modern and adequate and affordable student hostels facilities at	<ul style="list-style-type: none"> Sourcing funds for maintenance so that the hostels should be in good condition and be in operation for a long time; and Providing equal enrolment opportunities for male and female students. 	Old Mutual	5,000,000.00

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
	LUANAR Bunda Campus			
2	Increase in performance of students academically as most students will leave close to the campus and easily access college facilities	<ul style="list-style-type: none"> • Sourcing funds for maintenance so that the hostels should be in good condition and be in operation for a long time 	Old Mutual LUANAR Bunda Campus	2,500,000.00
3	Improve security in the area	<ul style="list-style-type: none"> • The project site will be enclosed using suitable walls to beef-up security and to control movement within the site. • Guard houses will be in place at the gate. Security guards should always monitor the gate of the facility to keep away the intruders and to control movement within the site. • The guards stationed at the gates should document movements in and out of the site/property. 	Old Mutual	3,500,000.00
4	Creation of employment	<ul style="list-style-type: none"> • Employing more people from the communities surrounding the project area and other areas within the country for both unskilled and skilled jobs • giving equal employment opportunities for both men and women 	Old Mutual Ministry of Labour	N/A

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
5	Improved access to social services by the local community	<ul style="list-style-type: none"> • Providing extra social services that can be accessed by the communities. 	Old Mutual	N/A
6	Increase in economic activities	<ul style="list-style-type: none"> • Sourcing funds for operation and maintenance cost for the students' hostels to be in operation for a long time. • Traders from the project area to be given the opportunity to supply food stuffs for student meals. • Outsourcing non-core functions 	Old Mutual	N/A
7	Increase in revenue by government through taxes	<ul style="list-style-type: none"> • Remitting taxes to MRA from wages and service contracts in time 	Old Mutual	N/A
NEGATIVE IMPACTS				
1	Poor solid waste management	<ul style="list-style-type: none"> • Provision of dust bins or rubbish pits for the wastes produced • Segregation of wastes by providing different bins for each type of waste • Maintaining the dumping site that will be identified during construction • Collecting and disposing of wastes at Area 38 designated dumpsite regularly • Used chemicals should be disposed in consultation with EAD 	Old Mutual EAD	500,000.00
2	Poor Sanitation	<ul style="list-style-type: none"> • Provision of adequate toilets for students and workers • Construction of double chambered septic tanks for disposal of liquid wastes • Regular Inspection and maintenance of the septic tank network 	Old Mutual	1,350,000 Part of project cost

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
3	Increase in HIV and AIDS and other sexually transmitted diseases	<ul style="list-style-type: none"> • Carry out sensitization meetings for students and workers from time to time. • Develop an HIV and AIDS workplace policy; • Distribution of condoms and Education, Information and Communication materials on HIV and AIDS to workers 	Old Mutual Lilongwe DHO	750,000
4	Increase in criminal acts	<ul style="list-style-type: none"> • Sensitize the communities and students on how they can live in harmony • Introduce community policing in conjunction with Sanctuary Police station • Sensitizing the students on the ownership of the college 	Old Mutual Sanctuary Police	1,000,000
5	Liquid Waste	<ul style="list-style-type: none"> • Construction of the double chamber septic tank. • The design of the internal sewerage system should consider the estimate discharges from individual sources and the cumulative discharge of the entire project i.e. it should have the capacity to consistently handle the loads even during peak volumes. • All drain pipes passing under building, driveway or parking should be of heavy duty PVC pipe tube encased in concrete surround. All manholes on drive ways and parking areas should have heavy-duty covers set and double sealed airtight; as approved by specialists. 	Old Mutual	8,500,00.00

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
		<ul style="list-style-type: none"> • Sanitary facilities should be kept clean always, through regular washing/cleaning. • Frequent monitoring of the internal drainage system. • Blockages and damages should be fixed expeditiously 		
6	Surface Drainage	<ul style="list-style-type: none"> • Rain water harvesting gutters and storage tanks should be installed to reduce the amount of rainfall reaching the surface. • Semi permeable materials should be used for construction of pavements. • After completion of construction, the proponent should embark on comprehensive landscaping to increase softscape cover on the plot. 	Old Mutual	4,500,000.00
7	Fire	<ul style="list-style-type: none"> • Hire competent and properly authorized electrical contractor to do the wiring and other electrical works. • Install fire alarm system for entire project • Install smoke detectors in kitchens. • Installation of firefighting equipment following County Fire requirements. • Conduct regular firefighting drills within the site. 	Old Mutual	3,000,000.00

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
		<ul style="list-style-type: none"> • Develop and adapt an (fire) emergency response plan for the project during and occupation stage. • Ensure that all firefighting equipment are regularly maintained and serviced. • Provide fire hazard signs such as “No Smoking sign”, Direction to exit in case of any fire incidence and emergency numbers. 		
8	Increase in Energy Demand	<ul style="list-style-type: none"> • Put off all lights immediately when not in use or are not needed. • Use energy conserving electric lamps for general lighting. • Make use of alternative source of energy such as solar power. Solar panels proposed in the project should be fully utilized and timely repaired in case of damage. 	Old Mutual	6,500,000.00
9	Increase in water demand	<ul style="list-style-type: none"> • Install water conserving taps that turn-off automatically when water is not in use. • Encourage water reuse/recycling during occupation phases. • Roof catchments of building blocks should be provided with rainwater harvesting systems (gutters, down pipes and water storage facilities) to enhance 	Old Mutual	2,000,000.00

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
		<p>collection and storage of the resulting run-off. Such water can be used in watering flower gardens, general cleaning etc</p> <ul style="list-style-type: none"> • Provide notices and information signs to sensitize on means and needs to conserve water resource i.e. Keep/Leave the Tap Closed etc. This will awaken the civic consciousness of the workers and residents with regard to water usage and management 		

7.2 Environmental and Social Monitoring Plan

The monitoring plan is vital because it is used as check if the mitigation measures prescribed in the management plan are being implemented. It provides parameters to be monitored, indicators to be used for monitoring, means of verification that mitigation/enhancement measures were implemented, frequency of monitoring and assigns responsibility for monitoring.

To ensure that the environmental and social management plan for the students' hostels is implemented, an environmental and social monitoring plan has been prepared as outlined in Table 7.2. Stakeholders that have been assigned a responsibility in the monitoring plan need to budget for fuel and subsistence allowances for their officers for them to carry out the inspection. This urges the developer to implement the management plans so that the implementation of their project does not contribute to environmental degradation in the project area or impinge on the welfare of employees, students and local communities.

Table 7.2 Proposed Environmental and Social Monitoring Plan

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
IMPACTS FROM PLANNING AND DESIGN PHASE							
POSITIVE IMPACTS							
1	Creation of employment	Employment of local consultants	No. of local consultants employed	Employment records	Once, on commencement of assignment	Old Mutual	N/A
IMPACTS DURING CONSTRUCTION PHASE OF THE PROJECT							
POSITIVE IMPACTS							
1	Creation of employment	<ul style="list-style-type: none"> Employing unskilled labours as much as possible from the project area Giving women equal employment opportunities as men. 	Number of local people employed Number of women employed	Records	quarterly	Client/ Project manager Ministry of Labour	500,000
2	Increase in market for local construction materials	<ul style="list-style-type: none"> Designating a place for the local market close to the site Purchasing materials from as many local suppliers. 	No. of local people supplying materials Number of local transporters ferrying material	interviews	quarterly	Contractor Project manager	500,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
		<ul style="list-style-type: none"> Piling trucks to transport construction materials like sand, quarry and cement to the project site. 					
3	Increase in business activities within the project area	<ul style="list-style-type: none"> Designating an area as a market within the project site 	Number of local people selling goods at the project site	interviews	quarterly	Contractor	1,000,000
NEGATIVE IMPACTS							
1	Air pollution	<ul style="list-style-type: none"> i) Applying water regularly to civil works and earth roads to suppress dust; ii) Controlling the speed of construction vehicles to reduce generation of dust. 	<p>No. of times water is applied</p> <p>No of vehicles over speeding</p>	record	quarterly	Contractor/E DO	500,000
2	Noise	<ul style="list-style-type: none"> iii) Fitting construction vehicles with silencers to reduce the noise iv) Servicing machinery so that they can be in good condition at all times v) Providing ear protection materials for the workers in noisy areas 	<p>No. of vehicles fitted with silencers</p> <p>Machines in good condition</p> <p>No. of workers using PPEs</p>	inspections	quarterly	Contractor	750,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
3	Soil erosion	<ul style="list-style-type: none"> Carrying out construction works out from May – September Creating drainage channels to direct storm water movement Creating stone pitching where soils have been excavated Clearing only those places where buildings will be constructed 	<p>Construction period</p> <p>Availability of drainage channels</p> <p>presence of stone pitching</p>	inspections	Once on commencement	Contractor/EDO	500,000
4	Soil Contamination	<ul style="list-style-type: none"> Construction vehicles should be in good condition to avoid fuel leaks Servicing areas for vehicles should have impermeable surfaces 	<p>No. of vehicles serviced</p> <p>Availability of impermeable surface</p>	Records	quarterly	Contractor Project Manager EDO	1,000,000
5	Increase in accident/incidences	<ul style="list-style-type: none"> Introducing humps on the road to help reduce the speed of the vehicles Erecting warning signs showing that there is heavy machinery and construction vehicles 	<p>No. of humps on the local road</p> <p>No. of warning signs erected</p>	inspections	Once on commencement	Contractor Project Manager Ministry of Labour	1,000,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
		<ul style="list-style-type: none"> using that road for people to be alert • Following health and safety regulations • Providing workers with protective clothing • Training workers in the proper use and handling of heavy equipment and machinery • Maintaining a first aid kit at the project site 	<p>No. of people using PPEs</p> <p>No. of people trained</p> <p>Presence of a first aid kit</p>		quarterly		
6	Increase in HIV/AIDS and other diseases	<ul style="list-style-type: none"> • Sensitizing local people and workers at the site on the dangers of unacceptable unions • Distribute condoms to both men and women • Encouraging girls to go to school to avoid early marriages • Providing women with loans for small scale businesses so that they can be self sufficient 	<p>No. of sensitization meetings</p> <p>No of school drop outs</p> <p>No. of women carrying out businesses</p> <p>HIV policy in place</p>	Records	quarterly	Contractor Local leaders District AIDS Cordinator	1,000,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
		<ul style="list-style-type: none"> Develop an HIV and AIDS workplace policy; 					
7	Increase in criminal Acts.	<ul style="list-style-type: none"> Employ people from the surrounding areas to reduce number of migrant workers Sensitize the community on the ownership of the project Introduce community policing in conjunction with Mitundu Police station Request for a police unit within the project area 	<p>No of criminal incidences</p> <p>No. of local people employed</p> <p>Community policing in place</p> <p>Police unit in place</p>	<p>Police records</p> <p>Records</p>	<p>Quarterly</p> <p>Once on commencement</p>	Developer	1,000,000
8	Poor waste management	<ul style="list-style-type: none"> Provision of dust bins or rubbish pits for the wastes produced Segregation of wastes by providing different bins for each type of waste Identification of a dumping site within the project area for various types of wastes 	<p>Dust bins for each type of waste in place</p> <p>Dumping site identified</p> <p>No. of times rubbish is removed</p>	Inspections	<p>Quarterly</p> <p>Once on commencement</p> <p>quarterly</p>	Contractor EDO DEHO	1,000,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
		<ul style="list-style-type: none"> Disposing of wastes at the designated places regularly 					
9	Poor sanitation	<ul style="list-style-type: none"> Provision of pit latrines for workers on the construction site Provision of potable water within the site Sensitization of workers on the importance of good hygiene practices. 	Pit latrines in place Potable water in place No. of sensitization meetings	Inspections records	Once during commencement quarterly	Contractor Project Manager DEHO	1,250,000
10	Degradation of land and river banks	<ul style="list-style-type: none"> Buying sand and quarry from registered local artisans Carrying out sensitization of local artisans on good mining practices Designating places for sand and quarry mining Assisting communities with afforestation programs for river banks Introducing alternative income generating activities in the area. 	No. of local registered local artisans supplying materials No. of meetings No. of official mining sites No. of afforestation programs	Records	quarterly	Min. of education Mines Local communities EDO	1,000,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
			Presence of other IGAs				
11	Risks of child labour on the construction site	<ul style="list-style-type: none"> Recruitment of workers through district labour office Erect sign board “ NO CHILD LABOUR” on site 	<ul style="list-style-type: none"> Records of recruitment Presence of sign of “No Child Labour” 	<ul style="list-style-type: none"> Signposts Records 	Monthly	<ul style="list-style-type: none"> Ministry of Labour 	500,000.00
12	Use of lead-based paint products.	<ul style="list-style-type: none"> The Contractor shall ensure that paints with toxic ingredients or solvents or lead-based paints will not be used 	<ul style="list-style-type: none"> Evidence of using non lead-based paint 	<ul style="list-style-type: none"> Purchase records/receipts 	Quarterly	<ul style="list-style-type: none"> Old Mutual EAD 	550,000.00
13	Risks of inappropriate contacts between workers and students	<ul style="list-style-type: none"> Periodic sensitization of workers and students on zero tolerance against the malpractices 	<ul style="list-style-type: none"> Number of meetings 	<ul style="list-style-type: none"> Minutes 	Monthly	<ul style="list-style-type: none"> Dean of Students 	300,000.00
IMPACTS FROM DECOMMISSIONING PHASE							
POSITIVE IMPACTS							
1	Reduced noise levels	<ul style="list-style-type: none"> Removing all working and damaged construction machinery and equipment 	All equipment removed	Inspections	Once upon decommissioning	Contractor Project Manager EDO	1,250,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
NEGATIVE IMPACTS							
1	Loss of employment	<ul style="list-style-type: none"> Informing workers of project duration when employing them Educating the labour force on the need to save part of their wages Paying severance benefits to all laid off workers according to the provisions of the labour laws. 	Severance benefits	Records	Once on decommissioning	Contractor Project manager Min. of Labour	50,000
2	Poor waste management	<ul style="list-style-type: none"> Disposing of construction wastes at the dumping sites that will be identified during construction phase. Scrap metals will have to be sold or disposed at a dumping site that will be designated specifically for such wastes. Trees and grass should be planted in bare areas of the project site as a way of restoring the area. 	<p>Site clear of construction wastes and scrap metal</p> <p>Well landscaped premises</p>	Inspections	Once	Contractor Project manager EDO Min. of Education	500,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
3	Loss of business opportunities	<ul style="list-style-type: none"> • Informing local traders of the project duration in time • Paying for all materials that were obtained on loan in time • Incorporate TEVET training in the project • Outsourcing some services for non core activities for the college 	Materials paid for	Records	Once	Contractor Project Manager	850,000
IMPACTS FROM OPERATION PHASE							
POSITIVE IMPACTS							
1	increase in the number of teachers in the country	<ul style="list-style-type: none"> • Sourcing funds for running costs • Providing equal enrolment opportunities for men and women teachers from across the country 	No. of students trained No. of women enrolled	Records	Annually	Ministry of Education	500,000
2	Creation of employment	<ul style="list-style-type: none"> • Employing more people from the communities surrounding the project area and other areas within the country for 	No. of people local people employed	Records	Annually	Developer/Ministry of Labour	750,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
		<ul style="list-style-type: none"> both unskilled and skilled jobs giving equal employment opportunities for both men and women 	No. of women employed				
3	Improved access to social services by the local community	<ul style="list-style-type: none"> Providing extra social services that can be accessed by the communities. 	Presence of social services	Inspection	Once on	Min. of Education Local communities	500,000
4	Increase in economic activities	<ul style="list-style-type: none"> Sourcing funds for operation and maintenance cost Outsourcing non-core functions Traders from the project area to be given the opportunity to supply food stuffs for student meals. 	No. of traders supplying goods	Records	Quarterly	Min. of Education	N/A
5	Increase in revenue by government through taxes	<ul style="list-style-type: none"> Remitting taxes to MRA from wages and service contracts in time 	Remittances to MRA	Records	Annually	Min. of Education	N/A
NEGATIVE IMPACTS							

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
1	Poor waste management	<ul style="list-style-type: none"> • Provision of dust bins or rubbish pits for the wastes produced • Segregation of wastes by providing different bins for each type of waste • Maintaining the dumping site that will be identified during construction • Collecting and disposing of wastes at the designated places regularly • Used chemicals should be disposed in consultation with EAD 	<p>No. of dust bins</p> <p>Presence of dumping site</p> <p>Frequency of waste disposal</p> <p>Presence of hazardous waste disposal site</p>	<p>Inspections</p> <p>Records</p> <p>inspections</p>	<p>Quarterly</p> <p>Once during operation</p> <p>quarterly</p>	Principal of Bunda Campus EAD	1,500,000
2	Poor Sanitation	<ul style="list-style-type: none"> • Provision of adequate toilets for students and members of staff • Construction of double chambered septic tanks for disposal of liquid wastes • Regular Inspection and maintenance of the septic tank network 	<p>No of toilets</p> <p>Presence of septic tank in good condition</p>	<p>Inspections</p>	<p>Once during operation</p> <p>Quarterly</p>	Bunda Campus Management DEHO	1,000,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
3	Increase in HIV and AIDS and other sexually transmitted diseases	<ul style="list-style-type: none"> Carry out sensitization meetings for students, teachers support staff and local communities from time to time. Develop an HIV and AIDS workplace policy; Distribution of condoms and information materials on HIV and AIDS to workers 	<p>No of meetings</p> <p>Policy in place</p> <p>No. of condoms distributed</p>	Records	Quarterly	Local Communities Principal of Bunda Campus DEHO District AIDS Cordinator	750,000
4	Increase in criminal acts	<ul style="list-style-type: none"> Sensitize the communities and students on how they can live in harmony Sensitizing the community members on the ownership of the college Introduce community policing in conjunction with Mitundu Police station Request for a police unit within the project area. 	<p>No. of criminal incidences</p> <p>Community policing in place</p> <p>Police unit in place</p>	Police records inspections	<p>Quarterly</p> <p>Once during operation</p>	Min of Education Mitundu Police	1,000,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
5	Surface Drainage	<ul style="list-style-type: none"> • Rain water harvesting gutters and storage tanks should be installed to reduce the amount of rainfall reaching the surface. • Semi permeable materials should be used for construction of pavements. • After completion of construction, the proponent should embark on comprehensive landscaping to increase softscape cover on the plot. 	Presence of rain harvesting gutters and storage tanks	Inspection	Bi-annual	EAD	750,000.00
6	Fire	<ul style="list-style-type: none"> • Hire competent and properly authorized electrical contractor to do the wiring and other electrical works. • Install fire alarm system for entire project 	Records of authorized electrician Presence of fire alarm	Inspection	Monthly	Ministry of Labour MERA	2,500,000.00

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
		<ul style="list-style-type: none"> • Install smoke detectors in kitchens. • Installation of firefighting equipment following County Fire requirements. • Conduct regular firefighting drills within the site. • Develop and adapt an (fire) emergency response plan for the project during and occupation stage. • Ensure that all firefighting equipment are regularly maintained and serviced. • Provide fire hazard signs such as “No Smoking sign”, Direction to exit in case of any fire incidence and emergency numbers. 	<p>Presence of fire exit signs</p> <p>Presence of firefighting equipment and records of servicing</p> <p>Presence of fire hazard signs</p>				

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
7	Increase in Energy Demand	<ul style="list-style-type: none"> Put off all lights immediately when not in use or are not needed. Use energy conserving electric lamps for general lighting. Make use of alternative source of energy such as solar power. Solar panels proposed in the project should be fully utilized and timely repaired in case of damage. 	<p>Presence of energy conserving electric lamps</p> <p>Availability and condition of solar panels</p>	Inspection	Quarterly	Energy Department	950,000.00
8	Increase in water demand	<ul style="list-style-type: none"> Install water conserving taps that turn-off automatically when water is not in use. Encourage water reuse/recycling during occupation phases. Roof catchments of building blocks should be provided with 	<p>Presence of water conserving taps</p> <p>Presence of gutters on roofs</p> <p>Presence of notices on water serving means</p>	Inspection	Bi-annual	CRWB	1,000,000.00

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
		<p>rainwater harvesting systems (gutters, down pipes and water storage facilities) to enhance collection and storage of the resulting run-off. Such water can be used in watering flower gardens, general cleaning etc</p> <ul style="list-style-type: none"> • Provide notices and information signs to sensitize on means and needs to conserve water resource i.e. Keep/Leave the Tap Closed etc. This will awaken the civic consciousness of the workers and residents with regard to water usage and management 					

CHAPTER 8 CONCLUSION AND RECOMMENDATIONS

8.1 CONCLUSION

From the environmental assessment conducted for the project, it is clear that the project potentially has some significant negative impacts which relate to the surrounding environment. The impacts relate to issues pertaining to risk of pollution of the environment in case of improper solid and liquid waste disposal; traffic congestion and general nuisance during construction. Sanitation is also a challenge that has to be appropriately considered with adequate safety measures in case of bursting of sewage pipes which may pollute the immediate environment.

It should be noted, however, that despite the above potential impacts, it is possible with adequate design and implementation measures advanced in this report to mitigate the environmental effects and reduce them to acceptable levels. It is recommended that strict monitoring measures will be instituted both from an engineering and environmental point considering the sensitivity of the site. This will ensure that the project adheres to acceptable practices and standards.

The project will assist to create modern and adequate hostel facilities at LUANAR, Bunda campus, which will assist to increase students' enrolment and enhance their academic performance.

8.2 SUMMARY OF POSITIVE AND NEGATIVE IMPACTS

8.2.1 Summary of key positive impacts

A summary of the key positive impacts identified in the EIA study are indicated below:

- a) Provision of modern and adequate and affordable student hostels facilities at LUANAR, Bunda campus;
- b) Increased enrolment of medical University Students;
- c) Reduced demand for rented out-of-campus accommodation
- d) Increase in performance of students academically as most students will leave close to the campus and easily access college facilities
- e) Creation of Employment;
- f) Increase in market for local construction materials;
- g) Increase in business activities within the project area;
- h) Improve security in the area;
- i) Increase in economic activities;
- j) Increase in revenue by government through taxes; and
- k) Improved aesthetic value.
- l)

8.2.2 Summary of key negative impacts

The following is a summary of the main negative impacts and recommended measures to minimize or eliminated the impacts:

- a) Loss of vegetation and animal habitats due to site clearing;
- b) Dust generation;
- c) Soil erosion and sedimentation;
- d) Generation of waste;
- e) Increased Noise Levels;
- f) Pollution of the environment from engine oils and pollution;

- g) Creation of borrow pits from quarrying of construction materials
- h) Visual Intrusion;
- i) Disruption of existing services;
- j) Occupational safety and health risks;
- k) Risk of Increased incidences of Sexually Transmitted Infections (STIs) and HIV and AIDS.

The proposed project design has integrated mitigation measures with a view to ensuring compliance with all the applicable laws and procedures. The structures will be built to the required planning/architectural/structural standards of the National Construction Industrial Council (NCIC). During project implementation and occupation, sustainable environmental management will be ensured; avoiding inadequate use of natural resources, conserving nature sensitively and guarantees a respectful and fair treatment of all people working on the project, general public at the vicinity and inhabitants of the project.

In relation to the proposed mitigation measures that will be incorporated during construction and operational/occupation phases; the development's input to the society; the project is considered beneficial and important. It is our considerable opinion that the proposed development is a timely venture that will subscribe to the government housing policy and investment call. It is thus our recommendation that the project be allowed to go ahead with the implementation provided the outlined mitigation measures are adhered to. Major concerns should nevertheless be focused towards minimizing the occurrence of impacts that would degrade the general environment. This will however be overcome through close adherence and implementation of the recommended Environmental and Social Management and Monitoring Plans (ESMPs).

8.3 OVERALL RECOMMENDATION

It is the consultant's view that the project be allowed to proceed on condition that the measures proposed in this ESIA Report and in particular in the ESMP are fully implemented. Recommendations for the prevention and mitigation of adverse impacts are as follows:

- a) All solid waste materials and debris resulting from construction activities must be disposed off at Waste management dumping site in Area 38;
- b) Construction activities must be undertaken only during the day i.e. between 7:30 am – 6:00 pm to minimize disturbance to the general public within the proximity of the site/project;
- c) Traffic along the access/connecting roads should be controlled during construction and especially when heavy trucks are turning in and out of the site to ensure that no accidents are caused by the site's activities;
- d) During construction all loose soils must be compacted to prevent any erosion by wind or water. Other appropriate soil erosion control measures can be adapted. Any stockpiles of earth should be enclosed, covered or sprinkled with water during dry or windy conditions to minimize generation of dust particles into the air;
- e) Once earthworks have been done, restoration of the worked areas should be carried out immediately by backfilling, landscaping/ levelling and planting of low grass (in open areas), flowers and suitable tree species;
- f) Ensure proper water usage during construction and occupational phases. Contractor can import water using bowsers and tankers with the approval of relevant water authority. Provide water saving valves and install rainwater harvesting systems (gutters, down pipes and storage facilities);

- g) Drains will be properly designed, installed and regularly maintained to prevent storm water (run-off) from accumulating within the site and spreading to the neighbourhood. These must effectively drain the storm from the premise in to the existing public drainage system along the road;
- h) Proper and regular maintenance of construction machinery and equipment will reduce emission of hazardous fumes and noise resulting from friction of rubbing metal bodies. Maintenance should be conducted in a designated area and in a manner not to interfere with the environment;
- i) Heavy construction activities should be limited (or avoided) during the rainy season to minimize the chances of soil degradation (soil erosion);
- j) Maintenance activities must be carried out in service bay to reduce chances of oils or grease or other maintenance materials, from coming into contact with environment (water or soil). Waste water from such areas must be refrained from coming into contact with soil mass or water bodies as it contains oil/grease spills;
- k) Used and new oils must be handled and stored appropriately to avoid oil leaks and spills on the site;
- l) Sewerage system must be properly designed within the site /house and effectively connected to the existing sewer line. Design specifications must be followed during installation. Standard cleanliness of sanitary and waste disposal facilities at construction site must be maintained;
- m) Workers must be provided with complete protective and safety gear. They must have working boots, complete overalls, helmets, gloves, earmuffs, nose-masks, goggles etc.
- n) Fully equipped first aid kit must be provided within the site. Workers should get food that is hygienically prepared; the source of such food must be legalized or closely controlled;
- o) The contractor must provide adequate security during the construction period and especially during the night when there are no construction activities;
- p) A complete firefighting system must be provided after completion of the project. The equipment is clearly provided in the design plan, and in the report. This must be installed or provided at strategic points; and
- q) Diligence on the part of the contractor and proper supervision by the Supervising Foreman during construction and the property manager during operation.

REFERENCES

1. Government of Malawi (1997), **Guidelines of Environmental Impact Assessment in Malawi**, Ministry of Natural Resources, Energy and Mining;
2. Government of Malawi (1997), **Occupational Safety, Health and Welfare Act**, Ministry of Labour, Youth, Sports and Manpower Development;
3. Government of Malawi (1998) **National Decentralization Policy**, Ministry of Local Government and Rural Development;
4. Government of Malawi (1998), **Local Government Act**, Ministry of Local Government, Lilongwe;
5. Government of Malawi (2000), **National Land Resources Management Policy and Strategy**, Ministry of Agriculture, Irrigation and Water Development;
6. Government of Malawi (2002), **Malawi National Land Policy**, Ministry of Lands, Housing and Urban Development;
7. Government of Malawi (2003), **Malawi National HIV/AIDS Policy**, Ministry of Health;
8. Government of Malawi (2004), **National Environment Policy**, Ministry of Natural Resources, Energy and Mining;
9. Government of Malawi (2005), **National Water Policy**, Ministry of Agriculture, Irrigation and Water Development;
10. Government of Malawi (2007), **Forestry Act**, Ministry of Natural Resources, Energy and Mining;
11. Government of Malawi (2013), **Gender Equality Act**, Ministry of Gender, Children, Disability and Social Welfare;
12. Government of Malawi (2013), **Water Resources Act**, Ministry of Agriculture, Irrigation and Water Development;
13. Government of Malawi (2016), **Customary Lands Act**, Ministry of Lands, Housing and Urban Development;
14. Government of Malawi (2016), **Land Act**, Ministry of Lands, Housing and Urban Development;
15. Government of Malawi (2016), **National Forestry Policy**, Ministry of Natural Resources, Energy and Mining;
16. Government of Malawi (2016), **Physical Planning Act**, Ministry of Lands, Housing and Urban Development;
17. Government of Malawi (2016), **The Constitution of the Republic of Malawi**, Office of President and Cabinet;
18. Government of Malawi (2017), **Forestry (Amendment) Act**, Ministry of Natural Resources, Energy and Mining;
19. Government of Malawi (2017), **Land Survey Act**, Ministry of Lands, Housing and Urban Development;
20. Government of Malawi (2017), **Lands Acquisition (Amendment) Act**, Ministry of Lands, Housing and Urban Development;
21. Government of Malawi (2017), **Local Government (Amendment) Act**, Ministry of Local Government, Lilongwe;
22. Government of Malawi (2017), **Registered Land (Amendment) Act**, Ministry of Lands, Housing and Urban Development;
23. **National Statistical Office, 2008**. Population and Household Survey.

ANNEXES

ANNEX 1 Terms of reference for the ESIS for construction of Hostels at College of Medicine, Lilongwe campus

1. Provide a full description of the scope of the project with respect to the:
 - (a) Name of the proponent;
 - (b) The postal and physical address;
 - (c) The spatial location of the site for the project,
 - (d) The estimated cost of the project, the size of land for the project site,
 - (e) The number of people to work on the area including water reticulation,
 - (f) Waste disposal and access roads.

2. Examine the existing physical and socio-economic conditions of the proposed area by identifying and analyzing:
 - (a) Geology and soil conditions of the area;
 - (b) Site topography and drainage systems (water courses);
 - (c) The scope of vegetative resources of the site;
 - (d) The scope of fauna within the area;
 - (e) Existing human land uses (e.g. cultivation by local people) and developments within and surrounding area
 - (f) Suitability of the site for the proposed project.

3. Provide a site-specific map of the area (Scale 1:50,000) showing the proposed project site and (1:10,000) showing existing establishments in the proposed area and surrounding areas. A site plan for the project should also be provided.

4. Describe the major activities to be undertaken in the construction and operation of the infrastructure and facilities for the proposed project. Identify the main construction and operation activities of the project.

- 4 State any alternatives considered for the project.

5. Identify the potential short and long-term environmental impacts associated with the proposed project, focusing on both the positive and negative effects as well as effects to the biophysical, social, economic and cultural components of the environment. The potential impacts must include those related to:
 - (a) Project planning;
 - (b) Project construction;
 - (c) Project operation; and
 - (d) Project decommissioning.

6. Prescribe appropriate measures /strategies to eliminate, reduce, reverse or mitigate the identified negative impacts/effects identified in 5 including the measures to enhance the positive effects.

7. Propose an environmental management and monitoring plan for the project. The EMP should be in tabular form, which should specify the predicted impacts, mitigation measures/enhancement measures, schedule of these measures, costs to undertake these measures, and responsible persons and institutions. The Environmental Monitoring Plan should outline all the main indicators to be used for monitoring the impacts and also the frequency of monitoring.

8. Undertake public consultation to ensure that all interested and affected stakeholders are involved in the EIA process and incorporate their views into the EIA report.
9. Outline government objectives and the policy/legal framework on the environmental impact assessment - as a justification for preparation of environmental impact assessment for a project. Provide a proper citation within the study report of all the reference materials including all relevant Malawi Government Policies and laws in the case of the implementation of the proposed project (e.g. Environmental Management Act, Mines and Minerals Act, National Land Policy and Water Resources Act)

ANNEX 2 Stakeholders consulted and issues raised

Name	Position	Organization	Comment	Action taken
LUANA, Bunda Campus				
Prof. G. Kanyama Phiri	Vice Chancellor	LUANAR	The Project is a very important one as it will assist to provide the much-needed additional bed spaces for the students	The ESIA report has outlined the benefits of the project
Chimwemwe Nyirongo	Estate Managers	LUANAR, Bunda campus	The Project will assist to facelift Bunda Campus as the proposed hostels will have modern structures	The report has included details of the structures and how the Contractor should adhere to details of the architect designs
Dr. Andy Safalao	Senior Lecturer	LUANAR, Bunda Campus	The project will assist to improve students' performance in their academic work as the students will not be traveling longer distances to access the University facilities	The ESIA report has outlined the benefits of the project
Mr. Malembo	Director of Finance and Administration	LUANAR Campus	The project will enhance students' safety and safety of their assets as they will all be accommodated on the campus	The ESIA report has outlined the benefits of the project
Client, Old Mutual Investment Group				
Mphatso Kasalika	Head of Alternative Investment	Old Mutual	Old Mutual will continue to work with all the relevant authorities to ensure that the project is implemented as planned	Preparation of the ESIA report itself is an indication of how committed the Client is to follow all the prescribed laws and regulations when implementing this project
Linda Kumsinda		Old Mutual	Old Mutual is doing everything possible to ensure that the project is implemented in an environmentally and	Preparation of the ESIA report itself is an indication of how committed the Client is to follow all the

			socially acceptable manner	prescribed laws and regulations when implementing this project
Brenda Mwale	Investment Manager	Old Mutual	Old Mutual will continue to work with all the relevant authorities to ensure that the project is implemented as planned. Once the plans and designs are ready Old Mutual will work hand in hand with the City Council to have the plans and designs approved	Preparation of the ESIA report itself is an indication of how committed the Client is to follow all the prescribed laws and regulations when implementing this project
Architect				
Justin Mushan	Architect	MOD	The designs of the hostels and the associated infrastructure are developed together with the developer. This will ensure that the developer's desires are incorporated into the designs.	The report has recommended that the Contractor should adhere to details of the architect designs
Patrick Calise	Architect	MOD	The designs of the hostels and the associated infrastructure are developed together with the developer. This will ensure that the developer's desires are incorporated into the designs.	the Contractor should adhere to details of the architect designs
Other stakeholders relevant to the project				
T. Mbale – Luka	Director	Environmental Affairs Department	The project is a good initiative. It will assist to make available modern and adequate hostels facilities at Bunda Campus of LUANAR. However,	The ESIA report has recommended that implementation of the project should follow all the environmental laws and regulations

			<p>the developer should ensure that the necessary laws and policies pertaining to environment and natural resources management are adhered to when implementing the project.</p> <p>EAD will be monitoring implementation of the project activities time and again during construction phase to ensure that the project activities comply with environmental laws of the land.</p> <p>Construction activities will not be allowed to commence until the ESIA report is approved</p>	
Mr. Charles Kachingwe	Water Quality and Environmental Manager	Lilongwe Water Board	LWB will be able to supply sufficient water and water of good quality to meet the new water requirements of the college. However, the developer will be expected to use river water and not piped water for all the construction activities.	The report has included details of how Bunda will enhance water availability for the project
H. Nyangulu	Commissioner of Labour	Ministry of Labour, Vocation Training and Manpower Development	The Contractor should as much as possible employ Malawians in his workforce. The Contractor will further be required to introduce and enforce a site specific	The report has stipulated all the recommendations which will assist to take care of all the Occupation Health and Safety Concerns which may arise as a result of the project

			Occupation Health and Safety policy to ensure that no occupational accidents happen at work place	
Mr. Timothy Mwale	Land and Property Valuation officer	Ministry of Lands, Housing and Urban Development	The development will take place within Bunda Campus and the land already belong to Bunda campus hence issues of compensation and resettlement will not occur	The report has not included issues of compensation and resettlement.
Mr A.D. Kwanjana	Dep. Director for Cleansing Services	Lilongwe City Council	The project will generate both solid and liquid waste hence the project will be required to put in place good measures to manage these wastes	The report has made recommendations as to how both solid and liquid wastes should be managed
Dr. Dafer Khembo.	Monitoring and Evaluation Specialist	NCHE	Availability of adequate and modern Hostels will assist to increase enrolment in these institutions of higher learning and assist to improve academic performance of students as all the students will be accommodated within the campus where access to university facilities will be easy. The project is very much required	The report has included different benefits that the project will generate

ANNEX 3 Designations and qualifications of the experts

The following personnel list was responsible for the conducting of EIA study for the project:

4.1 Lyson Kampira: (MSc. Environmental Science, Bachelor of Education Science (Hons)) Mr. Kampira is an experienced Environmental and Social Impact Assessment expert and will be the Team Leader for the Assignment. He is a seasoned Environmental and Social Impact Assessment expert with More than 10 years of practical experience in ESIA studies and environmental management in General. He has successfully conducted a number of ESIA. In all, he has successfully conducted and led more than 20 ESIA studies and has prepared more than 20 ESIA reports and Environmental and Social Management Plans for different developmental projects ranging from irrigation, road infrastructure, hydropower generation, mining, industrial development, infrastructure developments and water and sanitation which have been approved by the Environmental Affairs Department.

4.2 Jonas Mwatseteza: PhD, MSc, Bed (Hons) and Bed (Sc): An Environment and Analytical Chemist. He has conducted a number of EA studies and prepared a number of EIA reports for different development projects. Has more than 6 years of practical experience in conducting EIA studies and preparation of EIA reports. He has successfully done **more than 10 similar assignments**. The expert was involved in conducting stakeholder consultations, environment review and assessment, report writing.

4.3 Martna Chimzimu: (Bachelor of Arts in Social Science) - Majoring in Sociology with minors Political Science & Administrative Studies

Ms. Chimzimu is a seasoned Social Development Expert with wide experience in Environment and Natural Resources Management, Climate Change, Gender and HIV/AIDS management. She has more than 5 years' experience in conducting socio-economic surveys and preparation of social impact assessment and mitigation plans. She has vast experience in public consultation.

4.4 Stanley Phiri (B.Sc. in Irrigation Engineering)

Mr. Phiri is a Water Resources Expert. Mr. Phiri has wide professional experience in the water sector; irrigation, water supply, disaster risk management, environment and climate change management and related water disciplines of water, sanitation and hygiene. This includes water resources policy reforms for complex water demands for urban and rural water supply, Sustainable Environmental Management of Water Schemes, Designing of Water Infrastructures and Rural Development, Surface and Groundwater Hydrology, Catchment Analysis and Management, Hydrological Modelling and Water Management, Rural Water Supply and Construction Management.