



REGIONAL TRANSPORT RESEARCH AND EDUCATION CENTRE KUMASI  
KWAME NKUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

# **Africa Centers of Excellence for Development Impact (ACE Impact) Project**

## **Environmental and Social Management Plan**

**For**

## **Construction of Three-storey Postgraduate Building**

**August 2022**

## Executive Summary

### A.1 Preamble

The Kwame Nkrumah University of Science and Technology (KNUST) has over half a century, maintained a reputation for quality training and has been at the forefront of preparing manpower to support the technological and engineering advancement of Ghana and the world. The University takes great pride in providing a safe and secure learning environment to enable students grow intellectually, emotionally and socially, while offering a wide array of exciting and challenging academic programmes.

The Regional Transport Research and Education Centre Kumasi (TRECK), a World Bank Africa Centre of Excellence (ACE), is the expansion of the Road and Transport Engineering Programme (RTEP) which was established at KNUST in 2004 with support from the Ministry of Roads and Highways, Ghana and the World Bank. TRECK as an inter-disciplinary Research Centre to hone skills from various Departments at the University, including Civil Engineering, Planning, Supply Chain and Information Systems, Mathematics, Computer Engineering, Electrical/Electronic Engineering, Geomatic Engineering, and the Centre for Disability and Rehab.

The vision of TRECK is to be the leading hub for advancing applied research knowledge, providing high quality education, training, leadership, developing and adapting innovative technologies, and its transfer through sustained partnerships for transport, mobility and integrated logistics. In line with this vision, TRECK has a mission to support the improvement in the transport system by:

- providing the environment for the training of high calibre transport professionals and mentoring academics with world class expertise;
- conducting inter-disciplinary research with academic and relevant national and regional industries to support strategic directions and development;
- collaborating with other researchers for knowledge sharing and advancement;
- being a key training centre for transport and road safety resource;
- being a stakeholder in the coordination support for the integration and growth of all modes of transport and,
- establishing a data hub to support research and industry.

Through the ACE Impact Project, which has a five-year duration beginning in 2019 and ending in 2024, TRECK has received a grant of USD 5.5m through the Government of Ghana to undertake applied research with industry, train high-calibre manpower at the postgraduate (MSc/PhD) level, run demand-driven short courses and undertake technology transfer for the transport sector in the region. The Centre intends to utilise part of the funds to construct a postgraduate building to facilitate teaching and learning in highway and transportation engineering, transport logistics, entrepreneurship and other thematic areas of the Centre. The building will comprise of classrooms, an auditorium and suitable spaces for self-study and research by students and other relevant facilities to enhance teaching and learning.

This Environmental and Social Management Plan (ESMP) assesses the potential impacts of the construction of the building on the biophysical and social environment and presents measures to address adverse impacts of the proposed undertaking. It outlines the legal, regulatory and policy framework within which the proposed project is to be implemented. It also presents the existing project environment and the expected environmental and social impacts of the pre-construction, construction and operational phases of the project. Key stakeholders in the implementation of the building project have been identified and their respective roles and responsibilities outlined. A three-tier mechanism for addressing grievances arising from the proposed project is also presented in this report.

## **A.2 Potential environmental and social risks**

Environmental and social risks anticipated to occur during pre-construction, construction and operation of the proposed facility are of low to medium risk, of short term and generally reversible.

### *A.2.1 Pre-construction phase*

Risks during the pre-construction phase include:

- Overlooking environmental and social issues during technical design of the project resulting in inadequate environmental studies
- Overlooking the participation of the public in project design
- Siting the project without appropriate consultation and authorization from the University resulting in conflicts or siting the project in an area conflicting with the adjoining land use or in an area prone to soil erosion or degradation.
- Damage to vegetation and loss of fertile topsoil
- Erosion of bare land surfaces
- Impacts on air quality via dust and emissions
- Noise from equipment for site clearing and site mobilization activities

### *A.2.2 Construction phase*

Anticipated environmental and social impacts during the construction phase are:

- Loss of vegetation
- Erosion and soil degradation
- Impacts on air and water quality
- Generation of noise and vibrations
- Solid and liquid waste generation
- Impacts on water quality
- Risk of use of child labour
- Sexual Exploitation and Abuse and Sexual Harassment
- Labour influx and associated risks
- Issues with hygiene and occupational health and safety of workers
- Risks posed by large deep excavations

- Risks related to pedestrian safety
- Generation of traffic
- Conflicts between construction workers and university community, students and local populations
- Impacts on physical cultural resources
- Natural risks such as flooding and earthquakes

Constructional activities may also cause damage to some underground networks or give rise to a temporary suspension of certain services such water and electricity.

### *A.2.3 Operational phase*

The operational phase of the project will present potential risks such as:

- Inadequate design of the building presenting difficulties or discomfort in its use
- Lack of a system for the collection and transfer of solid waste
- Lack of an effective, regulatory and adapted sanitation system
- Lack of regular maintenance procedure
- Insufficient enforcement of security measures
- Lack of appropriate measures for people with disabilities
- Risk of fire outbreak
- Noise generation
- Sexual Exploitation and Abuse and Sexual Harassment

### A.3 Mitigation measures for anticipated risks

Mitigation measures to address the identified adverse impacts for the pre-construction, construction and operational phases of the proposed building are summarised in the Table below.

Environmental and social risks	Level of risk	Main measures
<b>Pre-construction phase</b>		
Improper siting of the building and project design	Low	Proper consultation with the University authorities. Consultations with relevant stakeholders
Neglect of environmental and social issues during the tendering process	Low to moderate	Preparation of appropriate Terms of Reference for proper environmental management. All mitigation measures to be included in the contractor bidding documents for implementation during the construction phase.
Effects of climate change	Low	Appropriate choice of materials and overall energy efficient design of building Building to be in consonance with local climatic, environmental, and meteorological conditions The location and design of the building to take into account the risk of flooding.
Inadequate provision for water and sanitation	Low	The design of the building to take into account the gender dimension in the provision of lavatories, washbasins and urinals.
Disability unfriendliness	Low to moderate	Facility to be designed in strict compliance with national standards for the protection and promotion of persons with disabilities
Loss of vegetation	Low	Land to be cleared of its vegetative cover only when needed. Fertile topsoil to be removed and retained for subsequent rehabilitation of the site.
Air pollution	Low	Machinery for site clearing and demolition works to be maintained in good working condition to minimize exhaust emissions. The site and access route to be watered during dry and windy weather conditions to control dust.
Noise generation	Low to moderate	To control noise, equipment as well as trucks to be kept in good working condition. During operation, the engine covers of generators, air compressors and other mechanical equipment would be closed and the equipment will be placed as far as possible from the residential areas and classrooms.

		<p>Very noisy site activities to be carried out at the weekends.</p> <p>Delivery of materials to the site during site mobilization would be carried out after 4pm on weekdays when teaching activities in the adjoining building are likely to have been completed.</p>
Waste generation		<p>Demolition waste emanating from site preparation activities to be managed appropriately.</p> <p>As much as possible, salvageable materials to be separated from the waste and reused at the site.</p>
Health and safety		Hoarding of site to shield it from view and also prevent unauthorized access.
<b>Construction phase</b>		
Risks related to large deep excavations	Moderate	<p>Selection of specialized companies</p> <p>Conduct of prior technical studies.</p> <p>Preparation of detailed technical specifications for contractors</p>
Soil pollution or accidental soil erosion	Low	<p>Conducting preliminary geotechnical studies</p> <p>Implementing anti-erosion measures</p> <p>Minimizing oils spills and appropriate disposal of used oils</p>
Land degradation from sourcing coarse and fine aggregates from unapproved or unregistered sites	Moderate	Materials to be sourced from approved and registered quarries and burrow pits only
<p>Potential groundwater pollution and surface water contamination from:</p> <p>Sediments transported from the site</p> <p>Accidental spills of hydrocarbons and lubricating oils or improper disposal of used oil</p> <p>Improper disposal of liquid wastes generated at the site</p> <p>Open defaecation by construction workers</p>	Low to moderate	<p>Use of small structures allowing the flow of rainwater</p> <p>Quality control of drinking water</p> <p>Implementation of appropriate erosion and sediment control measures, such as hay bales and / or silt barriers to prevent the movement of sediments from the site and the generation of excessive turbidity in the yards, water and nearby rivers.</p> <p>Use of impermeable barriers on the ground when servicing equipment or carry out operations on impermeable surfaces.</p> <p>Cleaning up accidental oil spills</p> <p>Proper treatment and disposal of wastewater</p> <p>Implementing wastewater management through sanitary sewage disposal or creation of sealed and fenced pit latrine</p>

Waste generation:	Moderate	Correct management of debris, according to the standards established in the contractor's worksite ESMP
Construction and demolition waste and domestic waste	Low to moderate	<p>Adequate storage of products and waste</p> <p>Disposal of construction waste to authorized public landfills</p> <p>Ensuring hygiene at construction site</p> <p>Prohibition of waste in the open air</p> <p>Roadways and sites for waste collection and disposal will be identified for the main types of waste typically generated by construction activities.</p> <p>Mineral construction waste to be segregated from general waste, organic, liquid and chemical waste through on-site sorting and placed in appropriate containers.</p> <p>Reuse and recycling of suitable and viable materials when appropriate</p> <p>Collection and appropriate disposal of construction waste by licensed collectors</p>
Generation of hazardous toxic waste	Low	<p>Temporary on-site storage of hazardous or toxic substances in secure containers</p> <p>Hazardous waste transported by specially authorized carriers and disposed of at an authorized site</p> <p>No use of paints containing toxic ingredients or solvents or lead-based paints</p>
Air pollution from dust and exhaust emissions from heavy machinery, vehicles and air conditioners	Low to moderate	<p>Regular maintenance of construction machinery and vehicles</p> <p>Install air conditioners that do not utilize R22 fluid or hydro-chloro-fluoro-carbons (HCFCs)</p> <p>Watering of construction site and unpaved vehicle access routes to minimize dust</p>
Loss of vegetation and reduction or destruction of green spaces.	Low	<p>Establishment of a green zone</p> <p>Tree planting and re-grassing to compensate for the possible destruction of green spaces</p>
Increased noise and vibration	Low to moderate	<p>Establishment of regular control measures of the intensity of noise pollution</p> <p>Respect of working hours on construction site</p> <p>Engine covers of generators, air compressors and other mechanical equipment to be closed during operation and the equipment placed as far as possible from classrooms and hostels.</p>

		Workers to use ear protection when operating or working close to noisy equipment
Health and safety of workers: Accidents at construction site Workers falling from scaffolding, injuries from falling objects, trips, etc. Spread of communicable diseases, HIV/AIDS, and COVID-19	Moderate	Establishment of safety rules at the construction site Staff management and training First aid provision Ensuring hygiene at site Helmets donned by workers Warning signs for areas posing risks Hoarding of site to prevent unauthorized access  Provisions against spread of COVID-19, HIV/AIDS and other STDs  Information campaigns on COVID-19 and STDs among the workers and local community  Implementation of HIV/AIDS education program  Vaccinating workers against common and locally prevalent diseases including COVID-19  Project workers to avoid sexual relations with members in adjoining communities, students and other members of the university community and abide by a Code of Conduct barring such acts  Contracting of an HIV service provider to be available on-site
Direct or indirect hazards to public traffic and pedestrians through construction activities	Low to moderate	Properly secure construction site and regulate traffic related to the construction.  Provision of signage, warning signs, gates and diversions to protect public from dangers  Provision of traffic management system and staff training  Adjustment of working hours to local traffic patterns  Active management of traffic by trained and visible staff on the site  Adherence to speed limits
Use of child labour by contractors and school dropout	Low	Strict compliance with national regulations on child labour by works contractors  Ensuring that children and minors are not employed directly or indirectly on the project  Discouraging the practice of hawking by children on the construction site and worker's campsite



Neglecting disabled people in building plans	Low to moderate	Installation of accessibility mechanisms for persons with disabilities in public buildings according to building designs (access ramps, toilet fixtures, etc.)
Neglecting historic heritage	Low	<p>Putting in place arrangements to ensure that artefacts or other "finds" encountered during excavation or construction are noted, that officials are contacted and that work is delayed or altered to accommodate these discoveries.</p> <p>Compliance with national regulations for the protection of historical and cultural property.</p>
<p>Religious, cultural, social and ethnic conflicts</p> <p>Increase in teenage pregnancy and HIV infections in local population</p> <p>Illicit behaviour and crime among construction workers (including prostitution, theft and substance abuse)</p>	Low to moderate	<p>Provision of cultural sensitization training for workers regarding engagement with the local community</p> <p>Construction workers to abide by a Code of Conduct providing information regarding behaviour</p> <p>Sanctions for non-compliance with Code of Conduct</p> <p>Use local workforce</p> <p>Paying adequate salaries to workers to reduce incentive for theft</p> <p>Paying salaries into workers' bank accounts rather than in cash</p> <p>Sourcing of local workforce</p> <p>Creation of supervised leisure areas in workers' camp</p> <p>Cooperation with local law enforcement</p> <p>Introduction of sanctions such as dismissal for workers involved in criminal activities</p> <p>Provision of substance abuse prevention and management programs</p>
<p>Increased pressure on accommodation facilities and rents in local community and</p> <p>Increased burden on public service provision</p> <p>Adverse impacts on community dynamics</p>	Low to moderate	<p>Use local workforce</p> <p>Workers' camp to include wastewater disposal and septic systems</p> <p>Identification of authorized water supply source and prohibition of use from other community sources</p> <p>Provide worker Code of Conduct on SEA/SH prevention.</p> <p>Provision of services in the workers' camp to reduce the need for workers to use local community facilities such as internet and sports</p>

		Provision of entertainment and events for workers within the camp to reduce the tendency for workers to mix with the local community
Influx of job seekers	Low to moderate	Contractor to hire workers appropriately through recruitment offices rather than at the construction site to discourage spontaneous influx of job seekers.
Sexual Exploitation and Abuse and Sexual Harrassment	Low	<p>Training and sensitizing of workers of contractor and subcontractor's staff, as well as other project staff on risks pertaining to sexual exploitation and abuse and sexual harassment, and reporting</p> <p>Mandatory and regular training for workers on required lawful conduct in host community and legal consequences for failure to comply with laws</p> <p>Construction workers to sign and abide by an appropriate Code of Conduct that bars GBV</p> <p>Instituting sanctions for non-compliance with Code of Conduct, to include dismissal</p> <p>Commitment / policy to cooperate with law enforcement agencies investigating perpetrators of gender-based violence</p> <p>Use of local workforce as much as possible</p> <p>Provision of opportunities for workers to regularly return to their families</p> <p>Creating avenues for reporting of GBV perpetrated by project staff, including set up of grievance reporting and management system</p>
<b>Operational phase</b>		
Security: Risks related to theft	Low to Moderate	<p>Provision of adequate number of security men at the facility</p> <p>Prevent access to building by unauthorized individuals</p>
Building safety: Risk of fires and explosions	Low	<p>Respecting NADMO's regulations for building safety and prevention of fire and explosion risks.</p> <p>Installation of smoke detectors, fire extinguishers and alarm devices.</p> <p>Maintenance of fire extinguishers</p> <p>Training and fire drills for users of the building</p>
Health and safety: Risk of accidents and injuries in the laboratory	Low to moderate	<p>Adherence to standard operational procedures for use of laboratory equipment</p> <p>Training of students and laboratory technicians on laboratory safety</p>

Generation of waste	Moderate	<p>Provision of arrangements for storage, collection and disposal of waste at approved disposal facility</p> <p>Implement waste segregation measures</p> <p>Manage non-hazardous waste from dry laboratories</p>
Poor sanitation and hygiene	Low to moderate	<p>Employ cleaners and implement rigorous cleaning programme</p> <p>Ensure constant supply of water to the building</p>
Noise: Nuisance conditions affecting activities in adjoining facilities	Low	<p>Limit types of activities taking place in the building to those generating low levels of noise</p> <p>Rent out auditorium for social and religious events at weekends only</p>
Lack of maintenance leading to deterioration of building and equipment	Low to Moderate	<p>Implement planned maintenance programme</p> <p>Promptly repair any damage</p> <p>Plan for replacement of equipment after its life span</p>
Sexual Exploitation and Abuse and Sexual Harrassment	Low	<p>Operationalise the University's Sexual Harassment Policy</p> <p>Appoint and train a network of counsellors who will offer confidential sign posting service for staff, students and visitors who may be experiencing any form of discrimination, harassment, bullying and hate crime.</p> <p>Ensure reasonable steps are taken to prevent sexual harassment by circulating relevant information to all stakeholders including students, staff, co-operate partners and visitors.</p> <p>Ensure that all staff and students understand the policy and procedures for dealing with sexual harassment</p> <p>Establish a multidisciplinary committee that will specifically address any complaint on harassment.</p> <p>Provide clear processes of enquiry, procedures for dealing with complaints and disciplinary actions against staff, students and visitors</p> <p>Offer support mechanisms for survivors of discrimination, harassment and gender-based violence.</p>

#### A.4 Labour Requirements

It is estimated that a labour force of about 60 people consisting of Engineers, carpenters, electricians, painters, labourers, security men, etc. would be required for execution of the building project. At various stages of the construction only a section of these workers would be expected to be on site, depending on the type of activity being undertaken. The core of

labour for the construction would mainly consist of the contractor's own registered labour force. Additional labour required would be sourced from the surrounding communities.

#### **A.5 Monitoring of environmental and social impacts**

Monitoring of project is important to ensure proper implementation of the project in accordance with proposed environmental and social safeguards, national policies and World Bank safeguard policies. Monitoring will be carried out by the contractor, safeguards expert and the EPA according to the schedule specified in the monitoring plan to ensure compliance with environmental standards. Any deviations from the expected mitigation measures would serve as an early warning signal for remedial actions to be taken.

#### **A.6 Grievance redress mechanism**

Grievances may arise from Project Affected Persons (PAPs) during the construction of the proposed building. These PAPs may include persons in neighbouring communities, institutions, students and staff of the University, and users of adjoining buildings, or any other individual or interest groups. Grievances may be in the form of complaints about injuries or damage to property, general concerns regarding the project activities, any incidents that may have occurred, real impacts or perceived impacts of the project. The objective of the Grievance redress mechanism is to address and resolve all grievances promptly and with fairness so that there will be a peaceful relationship between TRECK and the PAPs. A three-tier grievance redress mechanism, setup before site mobilization, will be used to receive and respond to queries, complaints and any clarifications regarding the proposed project. The first tier would be the resolution of the complaint by the project site team, followed by the TRECK management and Office of the Director of Works and Physical Development of KNUST, and then the office of the Oforikrom Municipal Assembly, should the preceding arrangements fail. As much as possible attempts will be made to reach amicable resolutions through dialogue. Every effort will be made to avoid the courts of law in the resolution of conflicts. However, if any aggrieved person is not satisfied with the resolution of the matter he/she may seek redress in the courts of law at his/her own cost.

#### **A.7 Training and capacity building**

The Contractor shall provide training of staff involved in construction works at the site to ensure that they are all fully conversant with the requirements of this ESMP. The training should include the Site Engineer, foreman, construction workers, drivers, security men and any other personnel who may be required to carry out some roles or functions in relation to the proposed project and should be specific to their assigned tasks. It is recommended also that the TRECK train relevant staff for proper monitoring of the implementation of the project in line with the requirements of the ESMP.

## **A.8 Budget for implementation of environmental and social safeguards**

Mitigation measures to reduce the impacts of the project during the construction phase of the proposed project is estimated at GHS224,892.00 (US\$17,296.00). A monitoring plan, to ensure compliance to environment and social safeguard measures is also herein presented and its implementation is expected to cost GHS50,050.00 (US\$3,850.00). An amount of GHS42,250.00 (US\$3,250.00) is allocated for training of the proponent's staff on environmental and social safeguards. Total estimated budget for environmental and social safeguards for the proposed undertaking is thus GHS317,192.00 (US\$24,296.00).

# TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY</b> .....	<b>I</b>
<b>LIST OF FIGURES</b> .....	<b>XV</b>
<b>LIST OF TABLES</b> .....	<b>XV</b>
<b>1 INTRODUCTION</b> .....	<b>1</b>
1.1 BACKGROUND .....	1
1.2 AIM AND OBJECTIVE OF THE PROJECT.....	2
1.3 RATIONALE FOR THE BUILDING PROJECT .....	2
1.4 METHODOLOGY FOR THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN.....	3
1.5 KEY STAKEHOLDERS .....	3
1.6 OUTLINE OF THE REPORT .....	5
<b>2 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK</b> .....	<b>6</b>
2.1 POLICY FRAMEWORK.....	6
2.1.1 <i>National Policies</i> .....	6
2.1.2 <i>International conventions</i> .....	9
2.2 INSTITUTIONAL FRAMEWORK.....	9
2.2.1 <i>Ministry of Environment, Science, Technology and Innovation</i> .....	9
2.2.2 <i>Environment Protection Agency</i> .....	10
2.2.3 <i>Ministry of Education</i> .....	10
2.2.4 <i>The Ghana Tertiary Education Commission</i> .....	11
2.2.5 <i>National Commission on Culture (NCC)</i> .....	12
2.2.6 <i>Civil society and the media</i> .....	12
2.3 LEGAL FRAMEWORK.....	12
2.3.1 <i>Environmental Protection Agency (EPA) Act 490</i> .....	13
2.3.2 <i>The 1999 Environmental Assessment Regulations</i> .....	13
2.3.3 <i>Ghana National Fire Service Act, 1997 (Act 537) and Fire Precaution (Premises Regulations, 2003 LI 1724)</i> 14	
2.3.4 <i>Constitution of the Republic of Ghana</i> .....	14
2.3.5 <i>Water Resources Commission Act 1996, Act 522</i> .....	14
2.3.6 <i>Lands Commission Act 2008, Act 767</i> .....	14
2.3.7 <i>Land Use and Spatial Planning Act 2016 (Act 925)</i> .....	15
2.3.8 <i>The Labour Act 2003, Act 651</i> .....	15
2.3.9 <i>Workmen’s Compensation Law 1987, PNDCL 187</i> .....	15
2.3.10 <i>National Building Regulations 1996, (LI 1630)</i> .....	16
2.3.11 <i>The Right to Information Act, 2019 (Act 989)</i> .....	16
2.4 PROCEDURES FOR ENVIRONMENTAL MANAGEMENT .....	16
2.5 WORLD BANK SAFEGUARDS POLICY.....	17
2.5.1 <i>OP 4.01 Environmental Assessment</i> .....	17
2.5.2 <i>OP 4.11 Cultural Physical Resources</i> .....	18
2.5.3 <i>Comparing national procedures and World Bank policies</i> .....	18
2.5.4 <i>Other relevant policies</i> .....	18
2.5.5 <i>National arrangements for persons with reduced mobility</i> .....	19
2.5.6 <i>Constitutional appeal bodies</i> .....	19
<b>3 DESCRIPTION OF THE PROJECT</b> .....	<b>20</b>
3.1 PROJECT LOCATION.....	20
3.2 ADJACENT LAND USES .....	22
3.3 DESCRIPTION OF THE FACILITY .....	23
3.4 SCOPE OF WORKS .....	24

<b>4</b>	<b>ENVIRONMENTAL AND SOCIAL BASELINE .....</b>	<b>26</b>
4.1	EXISTING ENVIRONMENTAL AND SOCIAL CONDITIONS.....	26
4.1.1	<i>Climate</i> .....	26
4.1.2	<i>Geology and Soils</i> .....	26
4.1.3	<i>Relief and drainage</i> .....	26
4.1.4	<i>Flora and Fauna</i> .....	27
4.1.5	<i>Water supply</i> .....	27
4.1.6	<i>Source of electricity</i> .....	27
4.1.7	<i>Socio-economic environment</i> .....	27
4.2	ELIGIBILITY OF THE PROJECT.....	28
4.3	CATEGORY OF THE PROPOSED PROJECT .....	28
<b>5</b>	<b>ENVIRONMENTAL AND SOCIAL RISKS .....</b>	<b>30</b>
5.1	POSITIVE IMPACTS OF THE PROPOSED PROJECT .....	30
5.2	NEGATIVE IMPACTS OF THE PROPOSED PROJECT .....	30
5.2.1	<i>Risks or negative impacts during the pre-construction phase</i> .....	31
5.2.2	<i>Risks or negative impacts during the construction phase</i> .....	31
5.2.3	<i>Risks or negative impacts during the maintenance phase</i> .....	39
5.3	MEASURES TO MITIGATE ADVERSE IMPACTS OF THE PROJECT.....	41
5.3.1	<i>Mitigation measures to be implemented during the pre-construction phase</i> .....	42
5.3.2	<i>Mitigation measures to be implemented during the construction phase</i> .....	45
5.3.3	<i>Mitigation measures to be implemented during the operational phase</i> .....	53
<b>6</b>	<b>ENVIRONMENTAL AND SOCIAL RESPONSIBILITIES OF THE CONTACTOR .....</b>	<b>56</b>
6.1	ENVIRONMENTAL AND SOCIAL CLAUSES .....	56
6.1.1	<i>Environmental management measures</i> .....	56
6.1.2	<i>Safety management</i> .....	58
6.1.3	<i>Relations with the neighbourhood</i> .....	58
6.2	IMPLEMENTATION OF “CHANCE FIND PROCEDURE” .....	59
6.3	PROHIBITED ACTIONS .....	60
6.4	CONTRACTOR PERFORMANCE MONITORING.....	60
6.4.1	<i>Contractor’s Environmental and Social Management Plan</i> .....	60
6.5	REPORTING ON ENVIRONMENTAL AND SOCIAL SAFEGUARDS.....	61
<b>7</b>	<b>MONITORING, SUPERVISION AND CONTROL.....</b>	<b>62</b>
7.1	MONITORING PLAN .....	62
<b>8</b>	<b>ROLES AND RESPONSIBILITIES OF KEY STAKEHOLDERS .....</b>	<b>70</b>
8.1	BENEFICIARIES OF THE PROJECT .....	70
8.2	PROJECT AFFECTED PERSONS .....	70
8.3	ROLES AND RESPONSIBILITIES.....	70
<b>9</b>	<b>GRIEVANCE PROCEDURE FOR HANDLING COMPLAINTS AND SETTLING POTENTIAL CONFLICTS .....</b>	<b>73</b>
9.1	GRIEVANCE REPORTING .....	74
9.2	GRIEVANCE MANAGEMENT .....	76
9.3	PLAN FOR FURTHER STAKEHOLDER ENGAGEMENT, CONSULTATIONS AND GRIEVANCE MANAGEMENT .....	77
<b>10</b>	<b>TRAINING AND CAPACITY BUILDING INITIATIVES .....</b>	<b>80</b>
10.1	TRAINING OF CONTRACTOR’S PERSONNEL.....	80
10.2	TRAINING OF PROPONENT’S STAFF .....	81
<b>11</b>	<b>COST OF IMPLEMENTATION OF ENVIRONMENTAL AND SOCIAL SAFEGUARDS.....</b>	<b>82</b>
<b>12</b>	<b>CONCLUSION.....</b>	<b>85</b>

REFERENCES.....	86
ANNEX A ARCHITECTURAL DRAWINGS.....	87
ANNEX B SIMPLIFIED SCREENING FOR ENVIRONMENTAL IMPACTS .....	92
ANNEX C SAMPLE CODE OF CONDUCT FOR CONTRACTOR’S PERSONNEL.....	93
ANNEX D GENERAL OUTLINE OF A CONTRACTOR’S-ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (C-ESMP)	97
ANNEX E FORMAT FOR REPORTING ON ENVIRONMENTAL AND SOCIAL MANAGEMENT .....	100

## LIST OF FIGURES

Figure 3.1 Proposed site for construction of TRECK building showing adjoining land use .....	21
Figure 3.2 Topographic map of proposed site.....	22
Figure 9.1 Flowchart outlining the procedures for staff and students to report cases of harassment or bullying in KNUST .....	75

## LIST OF TABLES

Table 3.1 Room function and capacity .....	24
Table 3.2 List of construction plant and equipment.....	25
Table 4.1 General eligibility for funding under the ACE Impact Project .....	28
Table 5.1 Mitigation measures for construction phase .....	45
Table 5.2 Mitigation measures for operational phase .....	53
Table 7.1 Monitoring Plan .....	63
Table 8.1 Roles and responsibilities of key stakeholders.....	71
Table 11.1 Cost of implementation of environmental and social risks during the construction phase	82
Table 11.2 Cost of monitoring implementation of environmental and social safeguards.....	83



# 1 Introduction

## 1.1 Background

The Kwame Nkrumah University of Science and Technology (KNUST) has over half a century, maintained a reputation for quality training and has been at the forefront of preparing manpower to support the technological and engineering advancement of Ghana and the world. The University takes great pride in providing a safe and secure learning environment to enable students grow intellectually, emotionally and socially, while offering a wide array of exciting and challenging academic programmes.

The Regional Transport Research and Education Centre Kumasi (TRECK), a World Bank Africa Centre of Excellence (ACE), is the expansion of the Road and Transport Engineering Programme (RTEP) which was established at KNUST in 2004 with support from the Ministry of Roads and Highways, Ghana and the World Bank. RTEP was established as part of the capacity building component of the Highway Sector Investment Project (HSIP) to train professional engineering staff from the Ministry of Roads and Highways (MRH) on a local basis. The University of Birmingham (United Kingdom) initially provided technical assistance in the form of lectures and staff mentoring in the establishment of the MSc Road and Transportation Engineering programme. Furthermore, in 2009, the MRH's Transport Sector Project provided support for staff capacity building, equipment and laboratory infrastructure, and short courses for sector engineers in collaboration with the Indian Institute of Technology Madras (IITM), Chennai, India. In 2018, the KNUST established TRECK as an interdisciplinary Research Centre to hone skills from various departments at the university, including Civil Engineering, Planning, Supply Chain and Information Systems, Mathematics, Computer Engineering, Electrical/Electronic Engineering, Geomatic Engineering, and the Centre for Disability and Rehab.

Through the ACE Impact Project, which is for five years beginning in 2019 and ending in 2024, TRECK can access a grant of USD 5.5m through the Government of Ghana to undertake applied research with industry, train high-calibre manpower at the postgraduate (MSc/PhD) level, run demand-driven short courses and undertake technology transfer for the transport sector in the region. The Centre intends to utilise part of the funds to construct a postgraduate building to facilitate teaching and learning in highway and transportation engineering, transport logistics, entrepreneurship and other thematic areas of the Centre.

## **1.2 Aim and objective of the project**

The vision of TRECK is to be the leading hub for advancing applied research knowledge, providing high quality education, training, leadership, developing and adapting innovative technologies, and its transfer through sustained partnerships for transport, mobility and integrated logistics.

In line with this vision, TRECK has a mission to support the improvement in the transport system by:

- providing the environment for the training of high calibre transport professionals and mentoring academics with world class expertise;
- conducting inter-disciplinary research with academic and relevant national and regional industries to support strategic directions and development;
- collaborating with other researchers for knowledge sharing and advancement;
- being a key training centre for transport and road safety resource;
- being a stakeholder in the coordination support for the integration and growth of all modes of transport and,
- establishing a data hub to support research and industry.

## **1.3 Rationale for the building project**

One key disbursement linked indicator under the ACE Impact project is an improvement in the teaching and learning environment. With funding for the programmes offered by the Centre, postgraduate student intake, both international and regional has increased considerably across all programmes within the thematic areas of TRECK, being Transportation Engineering, Transport systems, logistics and leadership and currently there are about 150 students enrolled in various postgraduate programmes of the Centre. The College of Engineering has very limited number of classrooms to accommodate current students enrolled in its postgraduate programmes and therefore, a key deliverable for TRECK under the ACE Impact project is the construction of a postgraduate building to provide suitable spaces for self-study, research, computer simulations and other relevant facilities to enhance teaching and learning.

The direct beneficiaries of the project are mainly students enrolled into programmes supported by TRECK as well as faculty of the Departments running the programmes. The project will also benefit other postgraduate students and Departments of the College of Engineering as they will also have access to the facility. Overall, the project will enhance the image and

postgraduate output of the College of Engineering and the University as a whole by providing a conducive physical environment for teaching and learning.

#### **1.4 Methodology for the Environmental and Social Management Plan**

The methodology adopted for developing this ESMP involved visits to the proposed site to examine the nature of the land, biophysical environment and structures in use in and around the project site. Measurements were also made regarding distances to these physical structures, adjoining communities and water bodies which were likely to be influenced by the project. Ariel photographs of the site were taken and the layout studied. The eligibility of the project for funding by the World Bank, under the ACE Impact Project was determined using the eligibility criteria presented in Table 4.1. The project, classified as a Category B project, was screened for environmental impacts using a simplified screening form (Annex B), the outcome indicating the need for an ESMP.

To ensure smooth implementation of the project, stakeholder engagements were held with key persons and interest groups for their input into project design as well as to collate any concerns they may have regarding the project. These concerns related to the various phases of the project being pre-construction, construction and operational phases.

Reference was also made to relevant literature and other documents such as the Environmental and Social Management Framework (ESMF) of the ACE project and regulatory and policy documents regarding development projects to ensure that the ESMP would be developed according to the requirements of the framework and national environmental and social regulations.

#### **1.5 Key stakeholders**

Key stakeholders in the project include the Kwame Nkrumah University of Science and Technology (KNUST), the College of Engineering and the Department of Civil Engineering, all of KNUST as well as national, regional and international Partners of TRECK, students enrolled on the academic programmes of TRECK. Other stakeholders are World Bank, Association of African Universities (AAU), the Ghana Tertiary Education Commission (GTEC), the Environmental Protection Agency (EPA), the Ministry of Roads and Highways, the Ministry of Transport and sector professionals, the Ministry of Education, Government of Ghana. The roles of these stakeholders are as outlined:

- KNUST: to provide institutional support and an enabling environment for project implementation. This includes provision of a site for construction of the Centre building, administrative and technical support for the construction.
- College of Engineering: The College of Engineering would provide administrative and academic support for the programme.
- Department of Civil engineering and allied faculties and departments: Academic support through faculty for teaching of programmes,
- AAU: to provide implementation support
- GTEC: regulation of the tertiary landscape, accreditation of programmes of the Centre, facilitating implementation of the project, transfer of financial resources to the Centre and monitoring of the Centre's deliverables
- EPA: Ensure the environment is not adversely affected by the activities of the Centre, ensure adherence of the Centre to regulations governing the environment
- World Bank: Provision of funding, monitoring of results and technical support for project implementation
- Ministry of Roads and Highways and the Ministry of Transport: The Ministries and allied agencies such as the Ghana Highway Authority, the Department of Urban Roads and the Department of Feeder Roads would provide some direction in research and be involved in targeted capacity building initiatives including short courses and participation in Masters and PhD programmes of the Centre.
- International academic partners: TRECK collaborates with International academic partners to improve relevance of programmes and undertake joint activities for enhanced education and research. TRECK maintains strategic networks and partners at national, regional and international universities, research institutes, ministries departments and agencies, and stakeholders under the Africa Centres of Excellence (ACE) for Development Impact Project. Regional academic and sectoral partners are from Nigeria, Sierra Leone, Liberia, and Senegal. It also has international partner universities in Germany, Switzerland, and the USA.

## **1.6 Outline of the report**

This report presents the Environmental and Social Management Plan for construction the three-storey postgraduate facility. It gives the background to the project and outlines the policy, legal and institutional framework within which the building project will be executed, with reference to national and World Bank policies. It also presents a description of the proposed project, the existing project environment and the expected environmental and social impacts of the pre-constructional, constructional and operational phases of the project. Mitigation measures to reduce the impacts of the project on the environment and associated budget are presented as well as a monitoring plan to ensure compliance to environment and social safeguard measures is also given. Key stakeholders in the implementation of the building project have been identified and their respective roles and responsibilities outlined. A mechanism for addressing grievances arising from the projected is also presented. Recommendations for training and capacity building of Contractor's staff and Centre's staff have been given.

## **2 Policy, Legal and Institutional framework**

In Ghana, sustainable development and enhancement of natural and human resources are a priority axis of the Government's policy on the environment. Infrastructure development is therefore expected to be guided and regulated in such a manner as to maintain the integrity of the environment. The Project will therefore strictly adhere to and follow the applicable policy, legal and regulatory frameworks for proper environmental management, as set in Ghana. These are herein outlined.

### **2.1 Policy framework**

The key environmental policies and legal framework and procedures considered as relevant to the project are as detailed.

#### **2.1.1 National Policies**

##### ***2.1.1.1 Ghana's National Environmental Policy***

Ghana's National Environmental Policy, formulated in the National Environmental Action Plan (NEAP) of 1993, aims at ensuring sound management of resources and the environment and avoiding any exploitation of these resources in a manner that might cause irreparable damage to the environment. The policy endorses the preventive approach to environmental management and emphasizes the need to promote socio-economic development within the context of prescribed acceptable environmental standards and safeguards. The policy statement seeks to, among others, institute and implement the concept of sustainable development by requiring prior environmental impact assessments of new investments and developments that would be deemed to affect the quality of the environment.

The policy is directed at:

- Maintaining ecosystems and ecological processes essential for the functioning of the biosphere;
- Ensuring sound management of natural resources and the environment;
- Adequately protecting human-beings, animals and plants and their biological communities and habitats against harmful impacts and destructive practices, and preserving biological diversity;
- Guiding development in accordance with quality requirements to prevent, reduce and as far as possible, eliminate pollution and nuisances;

- Integrating environmental considerations in sectoral, structural and socio-economic planning at national, regional and district levels; and
- Seeking common solution to environmental problems in West Africa and the world at large.

#### ***2.1.1.2 The National Environmental Sanitation Policy***

The National Environmental Sanitation Policy (1999) aims at developing and maintaining a clean, safe and pleasant physical environment in all human settlements, to promote the social, economic and physical well-being of all sections of the population. The principal components of environmental sanitation identified in the policy include, among others, the collection and sanitary disposal of wastes, inspection and enforcement of sanitary regulations and monitoring the observance of environmental standards.

#### ***2.1.1.3 The 2004 Cultural Policy of Ghana***

The Cultural Policy of Ghana (2004) provides that special attention be given to the preservation of traditional sacred groves, monuments, artistic treasures held in chiefs' palaces, mausoleums, private homes and all objects of high artistic value. It requires the State to enact and review legislation to protect all cultural assets, to protect the rights of indigenous owners of cultural heritage, and to vest in itself ownership, protection and preservation rights of rare and monumental heritage objects. The Constitution itself enjoins the State to preserve and protect places of historical interest and artifacts.

#### ***2.1.1.4 National Land Policy (1999)***

The Land Policy of Ghana aims at the judicious use of the nation's land and all its natural resources by all sections of the Ghanaian society in support of various socio-economic activities undertaken in accordance with sustainable resource management principles and in maintaining viable ecosystems. The specific objectives of this policy include:

- Ensure that shared water bodies are utilised to the mutual benefit of all stakeholder countries.
- Ensure that every socio-economic activity is consistent with sound land use through sustainable land use planning in the long-term national interest.
- Protect the rights of landowners and their descendants from becoming landless or tenants on their own lands.

- Ensure the payment, within reasonable time, of fair and adequate compensation for land acquired by government from stool, skin or traditional council, clan, family and individuals.
- Instil order and discipline into the land market to curb the incidence of land encroachment, unapproved development schemes, multiple or illegal land sales, land speculation and other forms of land racketeering.

The key aspects of the policy relevant to the project include:

- The use of any land in Ghana for sustainable development,
- The protection of water bodies and the environment and,
- Any other socioeconomic activity that will be determined through national land use planning guidelines based on sustainable principles in the long-term national interest.

All land and water resources development activities must conform to the environmental laws in the country and where an Environmental Impact Assessment report is required this must be provided. Environmental protection within the 'polluter pays' principle will be enforced.

#### ***2.1.1.5 Gender Policy (2016)***

The goal of Ghana's Gender Policy (2016), "Mainstreaming Gender Equality and Women's Empowerment into Ghana's Development Effort," is to mainstream gender equality concerns into the national development processes by improving the social, legal, civic, political, economic and socio-cultural conditions of the people of Ghana, particularly women, girls, children, the vulnerable and people with special needs; persons with disability and the marginalized.

The policy is anchored on five (5) main policy commitments and strategies the namely;

- i. Women's Empowerment and Livelihoods;
- ii. Gender-Based Violence;
- iii. Women's leadership and Accountable Governance;
- iv. Economic Opportunities for Women; and
- v. Gender Roles and Relations

In addition to outlining the strategies and commitments to achieve the goal of the policy, the Gender Policy also identifies existing challenges and problems militating against gender mainstreaming in Ghana, institutional roles and responsibilities and a framework for resource



mobilization, monitoring and evaluation. The Policy is relevant as it requires institutions to ensure gender equality mainstreaming in all undertakings.

### **2.1.2 International conventions**

Besides the national policies stated above, Ghana is linked to the international community through bilateral and multilateral cooperation agreements and has ratified almost all international conventions related to environmental issues. These conventions include:

- The Vienna Convention on the Protection of the Ozone Layer (2001)
- The United Nations Framework Convention on Climate Change (1994)
- The Convention on Biological Diversity (Biodiversity Treaty) (1993)
- The Convention on Combating Desertification (1996)
- The Environmental Modification Treaty (1997)
- The World Heritage Convention (1975)

Ghana therefore strives through implementation of development strategies, to observe international standards in terms of indicators of socio-economic development. The Ghana Environmental Conventions Coordinating Authority (GECCA) was established to consolidate oversight and coordination of all international environmental conventions to which Ghana is party.

## **2.2 Institutional Framework**

Institutions relevant to the project include the Ministry of Environment, Science, Technology and Innovation (MESTI), the Environment Protection Agency (EPA), the National Commission on Culture (NCC) and the Ministry of Education (MoE).

### **2.2.1 Ministry of Environment, Science, Technology and Innovation**

The Ministry of Environment, Science, Technology and Innovation (MESTI) has, among other missions, the mandate to ensure the establishment of the regulatory framework and setting of standards to govern the activities of science and technology and the management of the environment for sustainable development and also ensure effective environmental management and governance.

### **2.2.2 Environment Protection Agency**

The Environment Protection Agency (EPA) was established to regulate Environmental Impact Assessment (EIA) procedures in the planning and execution of development projects, including compliance in respect of existing projects. The Agency's overall approach includes compliance promotion to facilitate good environmental practice and to seek co-operation and collaboration from those whose activities could potentially injure the environment.

The basic objectives of the EIA system are to:

- Integrate environmental management and economic decisions at the earliest stages of planning an undertaking or investment;
- Provide avenues for the involvement of the public, sub-project promoters, private and government agencies in the assessment and review of proposed undertakings, among others; and
- Ensure compliance with any required environmental impact assessment procedures in the planning and execution of development projects, including compliance in respect of existing projects.

Public consultation is inherent in the EA process from screening to permit issuance. This provides the opportunity to incorporate the concerns of those who will be affected by the project in the project design. These concerns are considered at the project screening stage.

EPA has a Grievance Redress Mechanism (GRM), which is a system that assists the Agency's clients and the general public to resolve environmental related complaints and grievances in a timely, effective and efficient manner. The goal of the GRM is to make the Agency more accessible and ensure that complaints and grievances from the public are promptly analyzed and resolved in a timely and satisfactory manner.

### **2.2.3 Ministry of Education**

The Ministry of Education (MoE), established under the Civil Service Law (1993) and the PNDC Law 327, is mandated to provide relevant education to all Ghanaians as a vehicle for human growth and national development.

The goal of the MoE is to formulate and implement policies that would ensure quality and accessible education to all Ghanaians to meet the needs of the labour market and accelerate the acquisition of requisite skills to achieve human development, good health, poverty reduction, national integration and international recognition and to create an honest, creative

and responsible citizenship. Its vision is to prepare and equip all Ghanaians with relevant education and skills to promote socio-economic development and national orientation. Its mission is to provide relevant education with emphasis on science, information, communication and technology to equip individuals for self-actualization and peaceful co-existence as well as skills for the workplace for national development.

#### **2.2.4 The Ghana Tertiary Education Commission**

The Ghana Tertiary Education Commission (GTEC), which will facilitate implementation of the ACE Impact project in Ghana, is the key coordination agency. The Tertiary Education sector is expected to produce cadres of highly qualified individuals to support economic and social development in Ghana. Ghana currently has twenty five state Universities and eighty five private tertiary institutions, six of which are Chartered Universities and these are regulated by GTEC.

In the performance of its general functions, the Commission shall:

- Ensure that tertiary education institutions apply the highest quality standards and relevance of teaching, learning and research programmes and outcomes;
- Promote equitable and inclusive access to all tertiary education programmes and services;
- Promote transparent governance and best practices, including reporting and checks and balances to ensure full accountability;
- Promote a culture of independent, life-long learning and of scientific and technological inquiry among staff, students and the wider society;
- Promote affirmative action for persons with disabilities and other marginalised and disadvantaged groups; and
- Promote non-discrimination policies and practices.

Besides these, the Commission plays co-ordinating roles which include:

- Acting as an agency for channelling external assistance and funding to public tertiary education institutions;
- Collating, analysing and publishing information on tertiary education in the country;
- Co-ordinating the planning of the tertiary education system in line with manpower needs and national development goals;
- Creating a platform for regular interaction between industry and academia; and

- Providing a hub for mutually beneficial interaction and the articulation of national interest within the tertiary education system.

### **2.2.5 National Commission on Culture (NCC)**

The National Commission on Culture (NCC) is in charge of implementing the cultural policy on physical cultural resources, which requires the preservation of monuments, all forts and castles, designated shrines, mosques, church buildings, old city walls and gates, cultural sites, palaces, public and private buildings of historical significance and monumental sculptures. These are required to be protected from neglect, desecration and/or destruction. Under the policy, the NCC, in collaboration with the EPA, is required to identify heritage sites of Ghana and collect, collate and store indigenous beliefs and practices associated with them.

### **2.2.6 Civil society and the media**

Civil society and the media play a strong role in environmental awareness, and in influencing to the extent possible, the decision-making process related to environmental issues. Ghana has non-governmental organizations (NGOs) actively participating in the environmental arena, on issues ranging from public awareness and environmental education to waste collection and community self-help programmes. NGOs have been increasingly involved in project implementation, in public debate, in hearings/consultations on Environmental Assessment, and also in monitoring compliance with environmental laws. The media have contributed to increased awareness and to changes in behaviour.

## **2.3 Legal framework**

According to the 1992 Constitution of the fourth Republic of Ghana, citizens of Ghana are required to protect and safeguard the environment. This is a constitutional requirement which applies to all construction stakeholders, large and small and must be applied in all sectors, both private and public. Regulations within which the building project will be executed include the Environmental Protection Agency (EPA) Act 490, the Environmental Assessment Regulations of 1999, the 1995 Environmental Assessment Procedures and the 2003 Labour Act.

### **2.3.1 Environmental Protection Agency (EPA) Act 490**

The Environmental Protection Agency (EPA) Act 1994, Act 490 gives mandate to the Agency to ensure compliance of all investments and undertakings with laid down environmental assessment procedures in the planning and execution of development projects.

### **2.3.2 The 1999 Environmental Assessment Regulations**

The purpose of the assessment regulation is to ensure that environmental considerations and alternatives are addressed as early as possible and at par with economic and social factors in policy, plan or programme development. The environmental assessment (EA) Regulations enjoin the proponents of projects to register an undertaking with the Agency and obtain an environmental permit prior to commencement of the project. The 1999 Environmental Assessment Regulations or Legislative Instrument (LI) 1652, include the procedures for compliance with EA requirements. They consist of thirty Regulations and five Schedules detailing the procedures to be followed in the EA process.

The 1995 Environmental Impact Assessment Procedures aim to provide guidance on complying with the EA requirements of the EPA Act. Schedule 1 of LI 1652 provides the list of undertakings that require registration with EPA and issuance of an environment permit. Schedule 2 lists undertakings for which an Environmental Impact Statement (EIS) is mandatory. An EIS is also required for any proposed undertaking or development to be located in any of the areas broadly defined as environmentally sensitive. EIA procedures describe in detail the stepwise EA process, including registration of any activity with the EPA, screening, which allows the EPA to determine whether a proposed activity should be subjected to further assessment, and if so, the level of assessment that will be required, issuance of environmental permit, type of environmental assessment report required, i.e. whether a Preliminary Environmental Report (PER), Scoping Report or Environmental Impact Statement (EIS) and, finally the issuance of an Environmental Permitting Decision (EPD).

Under LI 1652, potential impacts on physical cultural resources are to be taken into account at several stages in the EA process in screening proposed undertakings, scoping, preparing, consulting on and reviewing reports.

### **2.3.3 Ghana National Fire Service Act, 1997 (Act 537) and Fire Precaution (Premises Regulations, 2003 LI 1724)**

The provision of the Ghana National Fire Service Act, 1997 (Act 537) and Fire Precaution (Premises Regulations, 2003 LI 1724) require proponents of undertakings to obtain/secure fire certificates from Ghana National Fire Service (GNFS) for proposed and existing undertakings. Issuance of fire certificates by GNFS requires prior installations of fire detection and fighting equipment.

### **2.3.4 Constitution of the Republic of Ghana**

Article 20 of the 1992 Constitution of the Republic of Ghana provides for the protection from deprivation of property unless such acquisition is made in the interest of defense, public safety, public order, public morality, town and country planning, or the development or utilization of property to promote the public benefit.

### **2.3.5 Water Resources Commission Act 1996, Act 522**

The Water Resources Commission Act 1996 (Act 522) establishes and mandates the Water Resources Commission as the sole agent responsible for the regulation and management and the utilisation of water resources and for the co-ordination of any policy in relation to them. Section 13 prohibits the use of water (divert, dam, store, abstract or use water resources or construct or maintain any works for the use of water resources) without authority. The Act states under Section 24 that any person who pollutes or fouls a water resource beyond the level that the EPA may pre-scribe, commits an offence and is liable on conviction to a fine or a term of imprisonment or both.

### **2.3.6 Lands Commission Act 2008, Act 767**

This Act provides for the management of public lands and other lands and for related matters. The Commission manages public lands and any other lands vested in the President by the Constitution or by any other enactment or the lands vested in the Commission. The Act advises the Government, local authorities and traditional authorities on the policy framework for the development of particular areas to ensure that the development of individual pieces of land is coordinated with the relevant development plan for the area concerned.

The Minister may, with the approval of the President, give general directions in writing to the Commission on matters of policy in respect of the management of public lands.

### **2.3.7 Land Use and Spatial Planning Act 2016 (Act 925)**

The Land Use and Spatial Planning Act 2016 (Act 925) consolidates the laws on land use and spatial planning. It provides sustainable development of land and human settlements through a decentralized planning system and ensures judicious use of land to improve the quality of life, promote health and safety in respect of human settlements. This gives a clearer direction to ensure compliance and enforcement of development regulations by the Ghanaian society. It seeks to also contribute to a more sustainable and well-functioning land administration system that is fair, efficient, cost effective and decentralized and will enhance land tenure security in the country. The Act is relevant since the Physical Planning Department of the Assembly within which the construction activity fall will issue the building permit and monitor compliance with the permit conditions.

### **2.3.8 The Labour Act 2003, Act 651**

Section 118(1) of the Labour Act 2003 (Act 651) stipulates that it is the duty of an employer to ensure that every worker employed works under satisfactory, safe and healthy conditions. Act 651 contains a number of specific provisions relating to an employer's duty to its workers. These include providing and maintaining "*at the workplace, plant and system of work that are safe and without risk to health*" and taking "*steps to prevent contamination of the workplaces by, and protect the workers from, toxic gases, noxious substances, vapours, dust, fumes, mists and other substances or materials likely to cause risk to safety or health*". A worker is required to report situations that he believes may pose "an imminent and serious danger to his or her life, safety or health". This Act is relevant since the project will employ workers for the construction activities.

### **2.3.9 Workmen's Compensation Law 1987, PNDCL 187**

It is to provide for the payment of compensation to workmen for personal injuries caused by accidents arising out and in the course of their employment. The tenets of the law place a large share of the burden of supporting workers injured at the workplace on the shoulders of the employers. This Act is relevant since the project will employ labour for implementation of project activities and mandates contractors to pay compensation to workers for work related accidents when they occur.

### **2.3.10 National Building Regulations 1996, (LI 1630)**

National Building Regulations 1996, (LI 1630) is a legislative instrument mandated by the Local Government Act. The core principle of the National Building Regulations like most National Codes is the provision of guidelines for safety, health and governance is a legislative instrument mandated by the Local Government Act. The core principle of the National Building Regulations like most National Codes is the provision of guidelines for safety, health and governance. This is relevant since the facility needs to meet structural integrity requirements for the safety of the users.

### **2.3.11 The Right to Information Act, 2019 (Act 989)**

The Right to Information Act, 2019 (Act 989), mandates state institutions to provide information as required by Article 21(1) (f) of the 1992 Constitution of Ghana which provides that “all persons shall have the right to information subject to such qualifications and laws as are necessary for a democratic society”. The University will ensure the ESMP is publicly disclosed to the public.

## **2.4 Procedures for environmental management**

The Environmental Impact Assessment (EIA) Procedures (1999) are recognized and applied in Ghana to development projects as well as other undertakings as an environmental permitting pre-requisite and a major environmental management tool. The existing procedures are a requirement to screen and evaluate all developments, undertakings, projects and programs, which have the potential to give rise to significant environmental impacts. They describe undertakings requiring registration and issuance of environmental permit.

A main objective of the EIA process is to provide enough relevant information to enable the Environmental Protection Agency (EPA) to set an appropriate level of assessment of any proposed undertaking, investment or program for the assessment for the necessary review and to facilitate the decision-making process for EIA approval. The information may be gathered through an environmental impact assessment study and published in an Environmental Impact Statement (EIS), Preliminary Environmental Report (PER), or by completing an Environmental Assessment Preliminary Registration, Form EA1 or EA2, depending on the complexity, nature, and location of the proposed undertaking.



## 2.5 World Bank safeguards policy

The World Bank Environmental and Social Safeguards Guidelines and Operational Policies enable the integration of environmental and social considerations into the development, planning and execution of development projects. These policies are designed to:

- Protect the environment and society from the potential negative effects of projects, plans, programs and policies;
- Reduce and manage the risks associated with implementation of project activities; and
- Assist in better decision-making to ensure sustainability of activities.

The Environmental and Social Safeguard Policies provide guidance to the World Bank on the process, scope and extent of environmental and social assessment required for project evaluation. Every project is subject to a preliminary environmental and social review based on the type, location, degree of sensitivity, scale, nature and extent of its potential environmental and social impacts, which is classed in one of the following categories:

- Category A: Project that is likely to have very negative, nerve, diverse or unprecedented impacts on the environment.
- Category B: Project whose adverse effects on the population or areas of environmental importance (land, forests, and other natural habitats, etc.) are moderate.
- Category C: Project whose likelihood of negative environmental impacts is considered minimal or zero.

The proposed building project is classified as Category B because its adverse effects on the population or areas of environmental importance are limited, site-specific, and likely reversible, and mitigation measures can be more easily designed/implemented.

Among all the World Bank environmental and social safeguard policies, two Operational Policies (OPs) and Bank Procedures (BPs) are triggered under the ACE Impact Project. These are OP 4.01 Environmental Assessment and OP 4.11 Cultural Physical Resources.

### 2.5.1 OP 4.01 Environmental Assessment

OP 4.01 Environmental Assessment covers impacts on the environment (air, water and land), human health and safety, physical cultural resources, and global transboundary and environmental issues. OP 4.01 is triggered because the Project is likely to have environmental risks and impacts on its area of influence. This policy requires that environmental and social consequences be identified early in the project cycle and considered in the selection, location,

planning, and design of the project to minimize, prevent, reduce, or compensate for adverse impacts and thereby maximize positive impacts and include processes for mitigation and management of environmental and social impacts during the project cycle.

### **2.5.2 OP 4.11 Cultural Physical Resources**

OP 4.11 Cultural Physical Resources provides cultural heritage guidelines to avoid or mitigate adverse impacts of development projects. This policy applies to any project involving major excavation, demolition, earthworks, flooding or other environmental modifications, projects located on or near a site recognized as cultural property as well as projects designed to support the management or conservation of physical cultural property. The construction companies will follow key procedures of the Cultural Heritage in Environmental Assessment; Environmental Assessment Sourcebook (1994), prepared by the World Bank.

The following World Bank Group's guidelines will be applied:

- Environmental, Health and Safety Guidelines
- The 2010 Access to Information Policy for wide dissemination of all information concerning the nature and objectives of a project
- Guidelines on Labor Influx

### **2.5.3 Comparing national procedures and World Bank policies**

In general, there is great convergence of views and similarity between Ghana's environmental and social management system and that of the World Bank. All laws, regulations and instruments governing investments and activities in the natural resources sector are generally consistent with the Bank procedures. There are only minor gaps and differences in terms of explicit arrangements such as for disclosure of documents in form and language. If policy discrepancy exists in some domains, World Bank policies will override national policies and regulations.

### **2.5.4 Other relevant policies**

According to the Children's Act (1998) (Part V on Employment of children), the minimum age for admission of a child to employment is fifteen years (eighteen years for hazardous works). The program on the elimination of child labor was instituted in Ghana in 2000. Since then, several steps have been taken to withdraw or prevent children from engaging in child labor. In line with these efforts, a legal framework and a National Plan of Action (NPA) has been

developed to guide the prevention or fight against child labor. The selected contractor for the building project will strictly adhere to this legislation.

### **2.5.5 National arrangements for persons with reduced mobility**

Ghana is among the few countries in Africa that have taken affirmative action in favor of marginalized groups at a higher level with a focus on persons with disabilities. These efforts have resulted in laws and policies promoting equality, inclusion and participation of persons with disabilities in society. More specifically, the national legislation recognizes the formal rights of persons with disabilities or those with limited mobility to access public buildings and buildings open to the public. The National Disability Policy of 1996, leading to the passage of the National Disability Law, Act 715 of 2006, aims to promote equal opportunities, enhance, empower and seek the protection of the rights of persons with disabilities irrespective of gender, age, or type of disability. Among other things, this concerns the accessibility of disabled people to public building and facilities. The College of Engineering Postgraduate building will therefore strictly adhere to this legislation.

### **2.5.6 Constitutional appeal bodies**

The Constitution provided for the office of an Ombudsman, who, appointed by the President, may investigate any action taken or omitted to be taken by or on behalf of the administration. However, the Commission on Human Rights and Administrative Justice (CHRAJ), which subsequently absorbed the position of the Ombudsman, was established in 1993 under the 1992 Constitution of Ghana by Act 456. CHRAJ is the national institution for the protection and promotion of fundamental rights and freedoms and administrative justice in Ghana. By combining the work of the Anti-Corruption Agency, the Ombudsman and the human rights commission under one umbrella, the Commission exists to enhance the scale of good governance, democracy, integrity, peace and social development by promoting, protecting and enforcing fundamental human rights and freedoms and administrative justice for all persons in Ghana.

In cases of major disputes, persons affected by the activities of the ACE Impact Project will be assisted, if necessary, to submit their claims to the Ombudsman.

### 3 Description of the Project

#### 3.1 Project location

The site for the proposed TRECK Building is located at Research Hills, in the South-East section of the main KNUST campus, latitude  $6^{\circ}39'58.9''\text{N}$  and longitude  $1^{\circ}33'57.1''\text{W}$ .

The boundary of the parcel is bounded by seven (7) survey beacons, five (5) of which are inscribed as KNUST.TRECK.10/2021/1-5 and the remaining two inscribed based on an existing survey as KNUST.CEPB.10/2021/2,3. The boundary commences at control pillar marked UST TP1, which bearing and all further bearings hereinafter mentioned is referred to meridian  $1^{\circ}$  West Longitude, runs on a bearing of  $175^{\circ} 03'$  for a distance of 3195.2 feet (973.9 meters) to a pillar marked KNUST.CEPB.10/2021/2 which marks the northern-eastern edge of the acquisition and forms part of the survey and runs on a bearing of  $173^{\circ}38'$  for a distance of 206.3 feet (62.9 meters) to a pillar marked KNUST.TREK.10/2021/1 and thence on a bearing of  $203^{\circ}11'$  for a distance of 23.8 feet (7.2 meters) to a pillar marked KNUST.TREK.10/2021/2 and thence on a bearing of  $234^{\circ}59'$  for a distance of 24.2 feet (7.4 meters) to a pillar marked KNUST.TREK.10/2021/3 and thence on a bearing of  $263^{\circ}28'$  for a distance of 289.3 feet (88.2 meters) to a pillar marked KNUST.TREK.10/2021/4 and thence on a bearing of  $351^{\circ}09'$  for a distance of 142 feet (43.3 meters) to a pillar marked KNUST.TREK.10/2021/5 and thence on a bearing of  $354^{\circ}39'$  for a distance of 98 feet (29.9 meters) to a pillar marked KNUST.CEPB.10/2021/3 and thence on a bearing of  $083^{\circ}46'$  for a distance of 321.2 feet (97.9 meters) to a pillar marked KNUST.CEPB.10/2021/2 the point of commencement and thence also from pillar marked KNUST.CEPB.10/2021/3 on a bearing of  $290^{\circ}15'$  for a distance of 23089.9 feet (7037.8 meters) to close on control pillar marked SGA.CORS 2020 3.

The site covers an approximate area of 1.78 acres (0.72 hectares) with the perimeter of the parcel being approximately 338.42 m. A portion of the site has a number of temporary structures located on it for storage of building materials by the contractor executing construction projects on the adjoining sites (the RWESCK building and the College of Engineering (KEEP) postgraduate building). The rest of the site has minimum vegetation comprising some grasses and shrubs and does not boast of any animals which are endangered. The land slopes from the north-east to south-west with an approximate height difference of 9.6 meters. The highest area is at the south-eastern side of the parcel slopping uniformly towards northwest and northeast sides. The highest elevation on the site approximately 302.4 meters above datum and a minimum elevation of approximately 292.8 meters above datum. The site

location, showing adjoining land use, and topography of the land are shown in Figures 3.1 and 3.2 respectively.

A Low KW Electricity power line closer to the site about 304.5 meters away from the boundary line. The main adjoining road for access to the site runs from the north-eastern side to southern side parcel. The main KNUST Shuttle Rank to Gyenyase road is about 120 meters from the site.

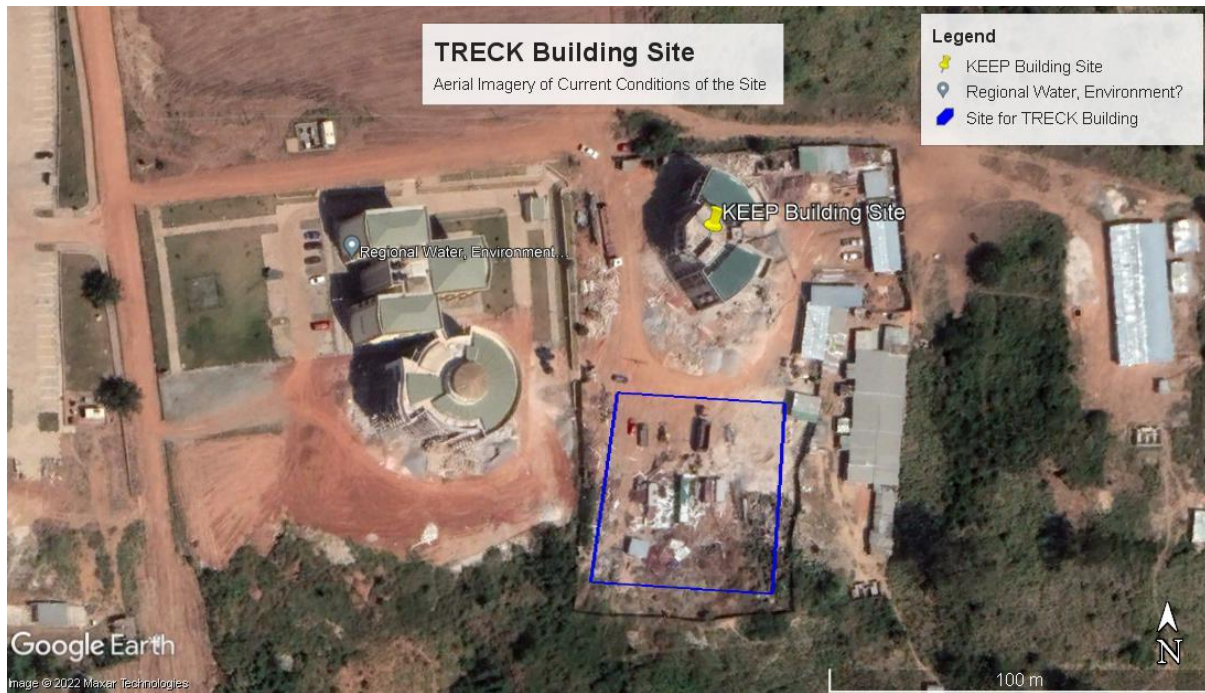


Figure 3.1 Proposed site for construction of TRECK building showing adjoining land use

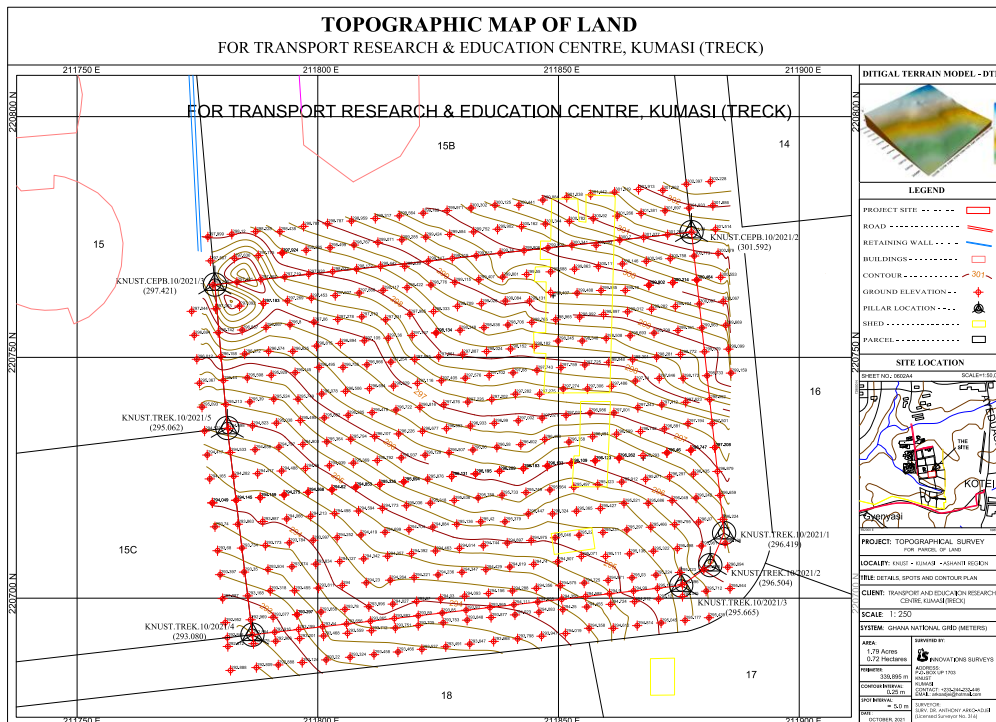


Figure 3.2 Topographic map of proposed site

### 3.2 Adjacent land uses

The site is bounded on the north by the College of Engineering Postgraduate Building, East by undeveloped land allocated to the Faculty of Built Environment, North-West by the Regional Water and Environmental Sanitation Centre Kumasi (RWESCK), South-West by the undeveloped land and South by undeveloped land.

Besides the RWESCK and College of Engineering postgraduate buildings, other buildings existing within the area of influence of the proposed undertaking are the Faculty of Social Science building, KNUST Graduate School of Business building, the new Faculty of Art building, the Centre for Disability Studies and the Central Laboratory. The New Faculty of Social Science building located at about 120 m from the project site, the College of Art and Built Environment and the KNUST School of Business (Graduate School) are situated at a distance of about 200 m while the School of Graduate Studies, the School of Business, the Central Laboratory, and the Centre for Disability Studies are about 450 m from the project site. These facilities are for teaching and learning and accessed daily by students and staff for

academic purposes. The College of Engineering postgraduate building, however, is still under construction and therefore only has construction workers and security at the site. The nearest residential facilities to the proposed site are the Flint Hostel and the Classic Homstel which are located about 320 m from the proposed site in an adjoining community, Kotei.

Part of the immediate environment, besides the land on which the Regional Water and Environmental Sanitation Centre (RWESCK) and the College of Engineering Postgraduate Building are situated, is cultivated by itinerant farmers growing especially vegetables and plantain. The rest of the land is covered by vegetation. It is likely that in the near future, buildings will be put up in the area as the University expands. There is an informal canteen located opposite the KNUST School of Business (Graduate School), which is about 200m from the proposed site. This canteen is mainly patronized by students and staff in the surrounding academic facilities.

### **3.3 Description of the facility**

The proposed building is a 3-storey reinforced concrete structure covering a floor space of about 500m<sup>2</sup> and set on a land area of about 8 135m<sup>2</sup> on the campus of the Kwame Nkrumah University of Science and Technology. The proposed building will serve as a teaching and learning facility for postgraduate (Masters and PhD) students undertaking programmes within the thematic areas of Transportation and Highway Engineering, Transport systems, Transport leadership and Transport Logistics. It will also serve as a location for the delivery of short courses to sector professionals, a resource centre for road safety research, education and promotion and consultancy.

The postgraduate facility would house six classrooms of various seating capacities, two dry laboratories, research workstations, auditorium and a boardroom. Capacities of the various rooms and floor space are given in the Table 3.1. The lecture halls, PhD research commons and research workstations will be fitted with office furniture and other basic office equipment such as projectors and wall mounted marker boards. The ICT laboratory will be equipped with computers for transport simulations, engineering design and drafting. Gender specific toilets, including disability friendly toilets, would be provided on each floor of the building. An elevator will ease access to upper floors of the building. External works will include landscaping and drainage works. Architectural drawings are provided in Annex A.

Table 3.1 Room function and capacity

No.	Room Function	Number	Area (m <sup>2</sup> )	Capacity (No.)	Floor*
1	Multipurpose Auditorium	1	118	161	GF
2	I.C.T Lab	1	90	60	GF
3	Cafeteria	1	20	18	GF
4	Server Room	2	10	2	GF, FF
5	Lecture Hall (01)	1	62	75	FF
	Lecture Hall (02)	1	44	54	FF
6	Research Workstation	1	86	55	FF
		1	62	40	SF
7	PhD Research Commons	1	52	40	SF
8	Offices	6	148	37	FF, SF
9	Board Room	1	41	25	SF
10	Male Washroom	3	16	3	GF, FF & SF
	Female Washroom	3	16	4	GF, FF & SF

\* GF – Ground floor

FF – First floor

SF – Second floor

### 3.4 Scope of works

The project components include mainly civil works and some electrical and mechanical services to make the building functional. The proposed civil works include construction of the 3-storey building, drainage and sewage infrastructure and landscaping. Excavations will be created for foundations, the depth of which will be dependent on the ground conditions determined through geotechnical investigations. Construction materials to be used at the site would mainly comprise cement, chippings, sand, water and steel reinforcing bars and binding wires for concrete works. Other construction materials include quarry dust, sandcrete blocks, lateritic material for fill, timber for formwork and joinery, roofing sheets, galvanised and PVC pipes, bends and sockets, nails and paint.

Services to be provided to the building will include plumbing and electrical works, ICT infrastructure, air-conditioning and facilities for the physically challenged, including an elevator. Electrical works will comprise installation of electrical cables, light fixtures,



electricity access ports, etc. Mechanical works will involve installation of air conditioning ducts, elevator, plumbing and vents, service lines for internet, etc. equipment expected to be used at the site is given in Table 3.2.

It is estimated that a labour force of about 60 people consisting of Engineers, carpenters, electricians, painters, labourers, security men, etc. would be required for execution of the building project. At various stages of the construction only a section of these workers would be expected to be on site, depending on the type of activity being undertaken. The core of the labour for the construction would mainly consist of the contractor's own registered labour force. Additional labour required would be sourced from surrounding communities.

**Table 3.2 List of construction plant and equipment**

<b>S/N</b>	<b>PLANT/EQUIPMENT</b>
1	Tower Crane
2	Concrete Mixer
3	Pickup Truck
4	Backhoe
5	Plate Compactor
6	Tipper Truck
7	Dumpy Level
8	Compressor
9	Poker Vibrator
10	Water Pump
11	Electronic Theodolite
12	Wheel Barrows
13	Shovels
14	Pickaxes
15	Generator
16	Loadbed
17	Telescopic handler
18	Scaffold

## **4 ENVIRONMENTAL AND SOCIAL BASELINE**

### **4.1 Existing environmental and social conditions**

#### **4.1.1 Climate**

The climate of Kumasi is tropical and falls within the wet sub-equatorial type. Kumasi experiences high rainfall compared to most areas and regions in the country. The metropolis experiences two distinct rainfall peaks of 214.3mm and 165.2mm which occur in June and September respectively. The dry season brings with it the harmattan and often begins in the second half of November or early December. The average humidity is about 84.16 % at sunrise and 60 % at sunset. Humidity is high, due to the location of Kumasi within the Forest Zone of Ghana. The temperature is moderate with average minimum and maximum temperatures in Kumasi of about 21.5°C and 30.7°C respectively.

#### **4.1.2 Geology and Soils**

The Kumasi Metropolitan area is dominated by the Middle Precambrian rock. The major soil type of the metropolis is the Forest Ochrosol, which is a very rich in nutrients and enables the practices of urban agriculture in the periphery areas of the Metropolis. The soil supports the growth of several foodstuffs such as vegetables, plantain, cassava. The detailed soil associations are the Kumasi-Offin Compound Association, Bomso-Offin Compound Association, Nhyanao-Tinkong Association, Bomso-Suko Simple Association, Bekwai-Oda Compound Association and Bekwai-Akumadan-Oda Compound Association.

#### **4.1.3 Relief and drainage**

The Kumasi Metropolis lies within the plateau of the South –West physical region which ranges from 250-300 meters above sea level and has undulating topography. The Metropolis is traversed by a major river (Owabi) and streams like Subin, Wiwi, Sisai, Aboabo and Nsuben. These water bodies, especially Owabi, serve as the main source of drinking water to residents not only within the Metropolis but the region as a whole. The KNUST campus is drained by a number of small streams and rivers, primary among them being the Wiwi River. Other smaller water bodies in the project area are a stream located about 300 m from the project site and the Bibini stream which is beyond 500 m from the site. Fairly high runoff rates occur due to the moderately slow to slowly permeable nature of silty clay loam, which is the basic soil within the basin.

#### **4.1.4 Flora and Fauna**

The Metropolis lies in the transitional forest zone specifically within the moist semi- deciduous South-East Ecological Zone. Predominant species of trees found are Ceiba, Triplochlon, Celtis and other exotic species. A sizable proportion of the proposed site however is used for storage of construction materials by contactors execution projects on the adjoining land and therefore clear of vegetation. The remaining portion has minimal vegetative cover and does not boast of any trees, dense vegetation or animals which are endangered or of economic value. Mainly small shrubs and grasses can be found on the site.

#### **4.1.5 Water supply**

The Kumasi Metropolis is served by treated water from the Owabi and Barekese reservoirs. This service is rendered by the Ghana Water Company Limited (GWCL). Groundwater is also used by some private persons and Institutions. The KNUST campus receives water from the GWCL supply system into an overhead tank and is further distributed by gravity to the various buildings on campus. The project site is located in an area which has water distribution lines within a few meters as the buildings close to the site are connected to the municipal water supply system. Water will therefore be tapped to the facility from this source. Groundwater can also be used to supplement supply from GWCL when the service fails, as is the practice in other facilities on campus.

#### **4.1.6 Source of electricity**

The KNUST campus is connected to the national grid, which is supplied with power by the Electricity Company of Ghana. The building will thus be connected to this supply source. During periods of power failure, the building will receive power from the standby generator installed for the RWESCK building.

#### **4.1.7 Socio-economic environment**

The proposed project is located within the campus of the University. Hence, teaching and learning mainly takes place within the project area of influence. Economic activities within the project site are food vending and some small-scale farming activities, which are undertaken by itinerant farmers cultivating vegetables.

The surrounding communities in close proximity to the project site, Gynase, Kotei and Ayeduase, are populated by indigens as well as non-residential students and staff of KNUST.

Each of these communities comprise the old town which has mainly compound houses and the new site which is much more developed.

## 4.2 Eligibility of the project

Eligibility of the project for funding under the ACE Impact Project is determined according to the general eligibility criteria outline in Table 4.1. None of the World Bank operational policies outlined in the Table will be triggered by the proposed project. Hence the proposed project meets the general eligibility criteria under the ACE Impact Project.

Table 4.1 General eligibility for funding under the ACE Impact Project

Does the activity ...	Yes	No
Have an impact on areas for which the World Bank operational policies have not been triggered? In particular:		
Impact on Natural habitats, protected zones ( <i>Under OP 4.04 Natural Habitats</i> )		x
Use of pesticides to control pests ( <i>under OP 4.09, Pest Management</i> )?		x
Disrespect for human dignity, human rights, economic systems and cultures of indigenous peoples ( <i>under OP 4.10: Indigenous Peoples</i> )?		x
Involuntary taking of land ( <i>Under OP 4.12: Involuntary resettlement</i> )		x
Impact on forest health and quality ( <i>under OP 4.36: Forests</i> )?		x
Serious consequences resulting in malfunctioning or stopping a dam ( <i>under OP 4.37 Safety of dams</i> )?		x
Effects on waters of two or more states ( <i>under OP 7.50 International waterways</i> )?		x
Sub-projects located in disputed areas ( <i>under OP 7.60, Disputed areas</i> )?		x

## 4.3 Category of the proposed project

According to World Bank regulations, the proposed project is classified as a Category B project because the adverse effects of the project on the population or on areas of environmental importance, such as lands and natural habitats, are limited, site-specific and reversible. Measures can therefore easily be designed and implemented to mitigation or avoid occurrence of these adverse effects.

The requirements of the World Bank are that an Environmental and Social Management Plan is required if any of the outcomes from construction activities indicated in the simplified

screening process given in Annex B will occur. It is anticipated that the proposed project will involve some large and deep excavations for foundations, cause some soil erosion, generate non-hazardous waste that will be stored on the project site, and have the potential to create water pollution, noise and vibrations.

## **5 Environmental and Social Risks**

The project is anticipated to present both positive and negative environmental and social impacts. Environmental and social impacts will occur during pre-construction, construction, and operational phases of the project. Adverse impacts include effects on the existing landscape (particularly vegetation), soil erosion, noise generation from site activities and movement of heavy vehicles to and from the site, air quality impacts resulting from dust and other gaseous emissions, impacts on water quality, solid and liquid waste generation, labour, health and safety. These adverse impacts are expected to be of low or moderate significance will be short-term and reversible.

### **5.1 Positive Impacts of the proposed project**

Beneficiaries of the project would be postgraduate students enrolled on TRECK related programmes, the Departments of Civil Engineering and Planning, the College of Engineering and the KNUST School of Business, partners of the Centre as well as the Ministry of Roads and Highways and the Ministry of Transport. Construction of the TRECK building will provide the much-needed space for postgraduate teaching and learning. Hitherto, students of TRECK have had to have their lectures in classrooms at the Roads and Transport Project (RTEP) Hostel and in some modified classrooms located at the College of Engineering laboratory posing some inconvenience to students and lecturers. Laboratory spaces will also be available as well as working spaces for students, the latter of which has been a long-standing problem for postgraduate students of the College of Engineering. Overall, the project will improve the quality of delivery and efficiency of postgraduate programmes run by the College of Engineering and partner Departments and Colleges and facilitate generation of highly qualified human resources especially for the roads and transportation sector as well as academia.

The construction of the building will also present a source of livelihood for construction workers, thereby improving their quality of life.

### **5.2 Negative impacts of the proposed project**

The project is envisaged to have some reversible short-term impacts on the environment. These impacts have low to moderate severity and relate to effects on the existing landscape, labour, health and safety, noise, air and water quality and conflicts between the university community,

adjoining local community or other persons within the vicinity of the proposed project site and the contractor.

### **5.2.1 Risks or negative impacts during the pre-construction phase**

Risks during the pre-construction phase include overlooking environmental and social issues during technical design of the project resulting in inadequate environmental studies and consideration of environmental effects that can be avoided through proper project design. Overlooking the participation of the public in project design can also constitute risks as environmental and social issues may not be fully addressed by the project design.

There is also the risk on siting the project in area conflicting with the adjoining land use outside the boundaries of the University or inappropriate siting of the project in areas prone to soil erosion or degradation. In addition, there is a risk of siting the project without appropriate consultation and authorization from the University, resulting in conflicts.

Other impacts related to site mobilization during this phase include loss of some vegetation and noise generation due to clearing of the land to make way for setting up of a site office and storage areas as well as setting out of the structure. Clearing the land of all vegetation can provoke erosion of bare land surfaces and also generate dust. As part of the proposed site served as a storage area for materials for construction works on the adjoining sites, there may be the need for demolition or relocation of these temporary storage structures situated on the land. Demolition works would generate noise, dust and demolition waste. Besides these, vehicles accessing the site and machinery used for site clearing and demolition works would emit exhaust fumes which may impact air quality.

### **5.2.2 Risks or negative impacts during the construction phase**

Environmental and social impacts that will occur during the construction phase of the project are expected to be low to moderate. These risks relate to, loss of vegetation, erosion and soil degradation, air and water quality, generation of noise and solid and liquid waste, occupational health and safety of workers, health and safety of students and locals living close to the construction site, conflicts between construction workers and students and local populations and adjoining land users, physical cultural resources as well as natural risks such as flooding and earthquakes. Constructional activities may also cause damage to some underground networks or give rise to a temporary suspension of certain services such water and electricity.

The project could generate an influx of labour into the project area as jobseekers from other areas move into the local community in order to gain employment on the project. The influx of labour and any associated additional population could adversely impact on the social and cultural systems, economic and health services and infrastructure as well as environmental resources of the local community.

Social risks that may be presented by this influx of labour include:

- Increased risk of illicit behaviour such as theft and crime including substance abuse in the project area and adjoining communities
- Risk of social conflict
- Increased burden on and competition for public service provision
- Increased risk of communicable diseases and COVID-19 and burden on local health services
- Gender-based violence including sexual exploitation and abuse and sexual harassment
- Child labour and school dropout
- Local inflation of prices
- Increased pressure on accommodations and rents
- Increase in traffic and related accidents
- Teenage pregnancy and incidence of sexually transmitted diseases such as HIV/AIDS due to fraternizing of workers with women and girls in the local communities

Labour influx could also pose environmental risks regarding:

- Inadequate waste disposal and illegal waste disposal sites
- Wastewater discharges
- Increased demand on freshwater resources
- Camp related land use, access roads, noise and lights
- Increased deforestation, ecosystem degradation, and species loss
- Increased use of and demand for natural resources

#### **5.2.2.1 Vegetation**

Impacts on vegetation through reduction of green spaces in the project area will occur. This will however be minimal and reversible since the project is situated on land that does not have much vegetation, including of trees or any plants of economic value.



#### **5.2.2.2 Soils**

There is a risks of localized soil degradation and pollution. Soils could become compacted as a result of heavy machinery or trucks constantly plying the surface. This can create near impermeable soils with highly reduced infiltration rates of water into the soil as well as risk of increased runoff from the site and further erosion of bare surfaces. Disposal of concrete waste and mortar as well as artificialization of the soil could also contribute to making the soil impermeable. There is also a risk of subsidence and landslides due to possible excavation work. Soils can become polluted by oil spills or intentional disposal of waste oils from trucks and construction equipment. The project presents a risk of degradation of land from due to sand and gravel winning from unapproved and non-registered borrow pits and quarries for construction works. Illegal sand-mining or creating new quarries through illegal extractions can create pits which can pose hazardous conditions for users of the site, breed mosquitoes which can lead to malaria as well as be an aesthetic nuisance. Besides they create a reduction in green spaces and loss of productive layer of the soil.

#### **5.2.2.3 Air quality**

There is the risk of air pollution from dust generated by excavation work, improper storage of construction materials and cuttings, and the movement of construction machinery over bare land surfaces. Dust will also be generated on access roads to the site by trucks delivering construction materials such as coarse and fine aggregates, reinforcement, cement, etc. for construction works.

Greenhouse gases (GHG) would increase in the environment due to release of such gases from the exhausts of construction vehicles and other mechanical equipment on site. Particulate matter, carbon monoxide (CO), volatile organic compounds (VOCs), nitrogen oxides (NO<sub>x</sub>) and sulphur oxides (SO<sub>2</sub>) would be released via fuel combustion. Besides increase in GHGs these exhaust fumes can cause olfactory nuisances, health risks and pollution. The presence of polluting paints, with resin and potentially toxic or dangerous solvents on site, can affect asthmatics. There could also be emissions of ozone depleting substances if air conditioners installed at the site office contain R22 fluid or hydro-chloro-fluoro-carbons (HCFCs).

#### ***5.2.2.4 Noise and vibrations***

Noise pollution, vibrations and nuisance conditions can arise from operation of light and heavy duty construction machinery and noisy equipment or vibrating equipment such as concrete mixers, jackhammer, air compressors, excavators, vibrators, compactors, electric drills, etc. on site. Noise will also result from construction activities such as hammering and workers shouting to or at each other. Besides these, noise will emanate from trucks hauling construction materials to, and discharging materials at the site.

#### ***5.2.2.5 Water and sanitation, waste generation***

Solid and liquid wastes will be generated from construction activities. The stream closest to the site may be at risk of pollution with effluents from washout of concrete mixers and other equipment on site. It may also be polluted by surface runoff from the site by workers disposing of sanitary waste in the form of flying toilets or open defaecation as well as urination at unapproved locations on the site and surrounding areas. Pit latrines constructed for constructed workers may also spill over and be washed by rain into surrounding water bodies. Human waste entering the water body will increase its nutrient content and the concentration of faecal coliforms in the water. Pollution of the stream can also cause damage to aquatic life in the water body. Inadequate sanitation systems can also generate unpleasant odours at the site, flies and spread of diseases to construction site workers and any other people exposed to the polluted water. Other liquids that can pollute surface and groundwater in the area include hydraulic oils, motor, gearbox and lubricating oils and insulating and heat carrying fluids. Oils may leak from vehicles and machinery or may be discharged via spills during repair and servicing of vehicles and equipment onsite. They may also be found in the environment from improper disposal of used oil.

Solid waste expected to be generated at the site include construction wastes comprising reinforcement and wood cuttings, left over concrete, cement bags, plastic wraps from materials delivered, etc. Domestic wastes comprising plastic bags, sachet water bags, plastic bottles, left-over food, fruit peels, paper etc. will also be generated at the site. There is a risk of improper disposal of these at the site leading to poor aesthetic and foul odours from putrifying organic waste. Construction waste and debris littered around the site can also create hazardous conditions. Due to increased generation of waste in the area, the existing systems for waste collection may be inadequate or overwhelmed and may lead to workers engaging in improper waste disposal practices.

There is a risk of inadequate water at the project site for proper hygiene and drinking purposes. This may result in the use of water of poor quality which may endanger the health of construction workers.

#### ***5.2.2.6 Risks related to large deep excavations***

Depth of excavations for foundations would be dependent on the soil conditions identified at the site through geotechnical investigation. Deep excavations would present hazardous conditions as workers and other people accessing the construction site could fall into them and sustain various degrees of injuries.

#### ***5.2.2.7 Natural risks***

The proposed development could be affected by risks associated with the effects of climate change. Heavy rains could trigger localized flooding of the site or general flooding on the campus. Since the site is close to a stream there is also a risk of the stream bursting its banks and flooding the site temporarily or flooding of access routes to the site could occur. Natural disasters such as earthquakes may also pose a risk.

#### ***5.2.2.8 Hygiene, health and safety of workers, residents and users***

There is the risk of accidents occurring at the site during construction. These include trips and falls, falling objects from a height which may hit and cause injury to persons, bruises and cuts from equipment, injuries from nails, etc. There is also a risk of injury from falls from scaffolding, misuse of equipment and electrocution. Accidents can also be caused by construction machinery and possible non-compliance with safety instructions. Workers not complying with standard operating procedures and those working without appropriate PPE could sustain injuries from equipment use.

There could be the spread of communicable diseases among construction workers, security personnel, and other site staff, as well as spread of COVID-19 due to non-adherence to COVID-19 protocols. The disease could also be spread by these workers in the local community or they may be infected by the local population as they access services in the adjoining communities. The safety of university users could also be compromised due to poor organization of work sites and work areas such as poor gear location, improper storage of construction materials and equipment, etc. as well as absence of signaling of certain areas that pose safety risks.

#### ***5.2.2.9 Risk of illicit behaviour and crime***

There is the risk of illicit behaviour among construction workers and an increase in theft and crime on the campus and local communities emanating from construction workers and any other accomplices. Illicit behaviour or crimes propagated by these workers may also include physical assaults on students, University staff and the local community, substance abuse, prostitution and human trafficking.

Although it is prudent to recruit a local workforce to avoid social tension, skilled and unskilled workers may be brought in by the contractor temporarily from outside the community. This would potentially increase risks of sexual harassment, prostitution and underage sex on vulnerable sections of the local population, especially women and minors living in the adjoining communities. Given that the construction workers will reside close to or within the adjoining communities, especially Kotei, Gyinyase and Ayeduase, or accessing social services, there is the risk of increase in teenage pregnancy and spread of HIV in these local communities.

#### ***5.2.2.10 Gender based violence risks***

Construction workers at the project site are expected to be predominantly male and young. An influx of male labour has the tendency to pose risks of increase in exploitative sexual relationships and even human trafficking in communities where projects occur. Women and girls in the local community may therefore find themselves being forced into sex work. Besides this, young male workers on the project, being away from home and separated from their families, would be outside their normal sphere of social control and may start engaging in inappropriate and criminal behaviour, such as sexual harassment of women and girls in the local community as well as exploitative and illicit sexual relations with minors.

Employment opportunities offered by the project could also create shifts in power dynamics between community members and within households in the communities surrounding the project site. These shifts can generate the potential for perpetration of harmful acts such as infliction of physical, mental, sexual harm or suffering, threats of such acts, and coercion and other deprivations of liberty, against the will of people, based on socially ascribed gender differences. Gender based violence (GBV) disproportionately affects women and girls, and male jealousy, being a key driver of GBV can be triggered by labour influx into the community due to the project. Women and girls in the community may therefore be subjected to various forms of violence such as sexual, physical, and psychological abuse by their male partners when workers on the project are believed to be interacting with these women and girls in the

community. This abusive behaviour can occur not only between project staff and those living in and around the project site, but also within the homes of those affected by the project.

At the project site, potential perpetrators of GBV include construction workers and other personnel of the contractor, consultants supervising the civil works or undertaking technical assistance activities or studies relating to the civil works as well as security personnel hired to guard the site.

### *Sexual exploitation and abuse, and sexual harassment*

There is a risk of persons in positions of power or trust on the project abusing or attempting to abuse positions of vulnerability, differential power, or trust, for sexual purposes. This abuse could involve the use of goods, works, non-consulting or consulting services to extract sexual gain from others. Project workers may sexually exploit women and girls in the adjoining communities through promise of employment or other favours and may profit monetarily, socially or politically from such acts. Women or girls attempting to traverse the worksite or selling goods may also be exploited for sexual favours by site workers.

Besides sexual exploitation there is a risk of occurrence of sexual abuse where actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions could be perpetrated. Staff of the contractor or subcontractors, the supervising engineer, or other project staff may use force or unequal power on a community member or colleague to perpetrate or threaten to perpetrate unwanted sexual acts.

Employees of the contractor, subcontractor or other project staff could be at risk of sexual harassment, which could occur in the form of unwelcome sexual advances, requests for sexual favours, verbal or physical conduct or gestures of a sexual nature, or any other behaviour of a sexual nature that might reasonably be expected or be perceived to cause offense or humiliation to another, when such conduct interferes with work, is made a condition of employment or creates an intimidating, hostile or offensive work environment. Acts of a sexual nature that are offensive and humiliating to coworkers include unwanted sexual physical contact, sexual advances or requests for sexual favours, unsolicited or unwanted sexually explicit text messages or exposure to offensive pictures that is sexually explicit, etc.

Risk factors that can contribute to sexual exploitation and abuse and sexual harassment on the project include:

- Using a non-local workforce on the project

- Lack of sanctions by the contractor or subcontractor for inappropriate behaviour of employees
- Increase in income of workers thereby distorting power balance between workers and other community members
- Increase in income of persons, due to employment, which enables transactional sex and exploitative relationships
- Lack of information on how to report project-induced grievances

#### ***5.2.2.11 Traffic and pedestrian safety***

There is also a risk of accidents on materials haulage routes. Given the narrow nature of roads on KNUST campus and heavy pedestrian traffic on these roads as well as buses conveying students and private vehicles constantly plying the roads, there is the risk of accidents involving trucks and pedestrians and other road users, smaller private vehicles and buses. Slow moving heavy-duty trucks may cause traffic and also encourage overtaking by impatient drivers at dangerous sections of roads leading to accidents.

Delivery of supplies for construction workers and the transportation of workers to and from the project site can also lead to an increase in traffic, rise in accidents, as well as additional burden on the transportation infrastructure.

#### ***5.2.2.12 Risks of social conflicts between the workers and local populations***

The construction works may have impacts on university community by way of restriction of vehicle and pedestrian traffic in the vicinity of construction site, noise and dust-related inconvenience, space congestion caused by building materials, construction and construction waste, as well as negative impacts due to the transformation of the landscape. There could be some conflicts between the contractor's staff and students or staff of the university over their work ethics and inappropriate behaviour of some workers.

The influx of additional population, comprising the construction workers and their families, poses a risk of competition for social and health services as well as goods and services in the local communities. There could also be conflicts resulting from religious, cultural and ethnic differences.

#### ***5.2.2.13 Increased burden on and competition for public service provision***

The construction workers and their families who may move with them to the local community, as well as service providers for the project, can create an additional demand for the provision of public services, such as water, electricity, medical services, transport, education and social services in the local community. Some of these workers and their families may remain in the local community even after the project has ended.

#### ***5.2.2.14 Local inflation of prices***

A significant increase in the demand for specific goods and services in the local community due to the influx of labour could lead to inflation in local prices of these goods and services in the adjoining local communities.

#### ***5.2.2.15 Increased pressure on accommodations and rents***

There could be an increase in demand for accommodation in the adjoining local communities due to the influx of labour. This resulting pressure on accommodation could drive up rents as landlords capitalise on the new market to maximize profits. Local residents could stand the risk of difficulties in obtaining accommodation which was hitherto easy to come by.

#### ***5.2.2.16 Risk of child labour and school dropout***

There is a risk of the contractor employing underage children to carry out various activities such as carrying concrete or other building materials at the site to save on labour cost. Increase in opportunities for sale of goods and services to sell to the construction workers by the local community can also lead to child labour, whereby children are used to produce and deliver these goods and services. This can cause drop out of the affected children from school.

#### ***5.2.2.17 Physical cultural resources***

There is the risk of excavations unearthing some archaeological and historical remains, tombs or other buried items of cultural significance.

### **5.2.3 Risks or negative impacts during the maintenance phase**

Potential negative impacts during the operational phase of the project relate to sanitation and waste management, noise, security, fire and accidents, adequacy of systems for persons with

disability and adequacy of the building in meeting the needs of users, including persons with disability.

#### ***5.2.3.1 Inadequate design of the building***

There is a risk of discomfort in accessing the building or using the facility due to absence of critical facilities and inadequate gender specific sanitary infrastructure. This will occur if the building is not well designed due to inadequate consultation at the pre-construction phase.

#### ***5.2.3.2 Lack of a system for the collection and transfer of solid waste***

Domestic solid waste will be generated during the operational phase of the project. This waste will contain organic materials which will putrefy, causing foul odours, if not removed from the premises in a timely fashion for disposal. Littering and aesthetic nuisance as well as unhygienic conditions will arise if measures are not put in place to manage the waste properly.

#### ***5.2.3.3 Lack of an effective, regulatory and adapted sanitation system***

Without an effective and regulated sanitation system, users of the facility will dispose of wastes in a haphazard and unhygienic manner. Washrooms will also be used inappropriately. These may result in nuisance conditions, difficulties in disposing of waste and unhygienic conditions of toilets and the general environment.

#### ***5.2.3.4 Lack of regular maintenance procedure***

There is a risk of inadequate maintenance of the building during its use. Lack of maintenance will lead to deterioration of the facility during use and ensuing hazardous conditions should the facility be left to deteriorate over a very long period of time. The facility will therefore no longer serve its purpose as a conducive environment for teaching and learning.

#### ***5.2.3.5 Insufficient enforcement of security measures***

Theft of small laboratory and IT equipment, and other small equipment to facilitate teaching, such as LCD projectors and computers projectors, learning resources such as library books as well as portable furniture may occur.



#### ***5.2.3.6 Lack of appropriate measures for people with disabilities***

Persons with disability will struggle to with accessing the building and associated facilities, using toilets and other sanitary infrastructure and benefitting fully from the programmes they are enrolled in. These may lead to drop out from the programme.

#### ***5.2.3.7 Risk of fire***

There is a risk of fire outbreak in the building due to faulty electrical installations and other faulty equipment. This can result in injuries to persons in the building at the time of the fire outbreak as well as loss of property and the resources of the Centre.

#### ***5.2.3.8 Noise***

Noise will emanate from the activities being undertaken in the building. This includes lectures, discussions, seminars and other programmes as well as social interactions. Noise will especially emanate from the auditorium if the space is rented out for social events or religious activities. Vehicles accessing the building will also contribute to noise in the area.

#### ***5.2.3.9 Sexual harassment***

Students, academic and non-academic staff and other persons related to the project may experience an offensive and hostile working or learning environment as result of sexual harassment in the form of unwelcome and unwanted sexual advances, requests for sexual favours and other verbal or physical contact of a sexual nature. The right to learn or work can be seriously impaired when both students and employees alike are subjected to sexual and gender based violence within their learning and working environment. Harassment is a serious offence under the criminal Offences Act No. 29 and the 1960 Labour Act of Ghana.

### **5.3 Measures to mitigate adverse impacts of the project**

Measures to be implemented to reduce the potential impacts of the project during the pre-construction phase, construction phase and operational phases of the project are herein summarized. Normative measures to be complied with by TRECK and the contractor executing the works will be in accordance with national regulations and World Bank operating procedures, OP 4.01 and OP.4.11.

In compliance with national regulations, the contractor will be required to regularly monitor compliance with safety and health standards. The contractor will have to carry out

measurements, analyses and assessments of environmental conditions periodically and also undertake collective or individual protection measures to protect the health and safety of workers.

### **5.3.1 Mitigation measures to be implemented during the pre-construction phase**

Key mitigation measures to be implemented at the pre-construction phase to minimize risks relating to the project include holding public and stakeholder consultations during design of the building, site selection and preparation and validation of studies. Responsibility for implementing mitigation measures at the preconstruction stage, except those related to site preparation for construction works, lies with the proponent, which is TRECK/ The Directorate for Works and Physical Development, KNUST.

#### **5.3.1.1 Siting of the building**

There will be proper consultation with the University authorities, specifically the Vice Chancellor, Land use committee and the Directorate for Works and Physical Development to be allocated a site for the building. There will also be consultations with the users of adjoining facilities in the project area to solicit their views on project design and collate any concerns they may have regarding the proposed project.

#### **5.3.1.2 Neglecting environmental and social issues**

The risk of neglecting environmental and social issues during the tendering process will be addressed through the preparation of appropriate Terms of Reference for proper environmental management, which will be validated by the EPA and approved by the World Bank. All mitigation measures will be included in the contractor bidding documents and the contractor will be required to implement such during the construction phase.

#### **5.3.1.3 Effect of climate change**

The effects of climate change will be taken into account in the choice of materials, the overall design of buildings and the technological options for construction which should be energy efficient. The building will be in consonance with local climatic, environmental, and meteorological conditions and will incorporate proper ventilation and provision of sunshine, air movement, and maximum usage of daylight.

The location and design of the building will also take into account the risk of flooding. It will be ensured that the building is designed and sited such that this risk is eliminated. Measures to control erosion will also be implemented. These will include not clearing the entire land surface of vegetation until required. Clearing of only portions of the land required for setting out of the building and setting up the site office will be carried out. As and when required additional portions of the land will be cleared.

#### **5.3.1.4 Water and sanitation**

The design of the building will take into account the gender dimension in the provision of lavatories, washbasins and urinals the design of the building. A sufficient number of separate washrooms for men and women will be provided.

#### **5.3.1.5 Disability friendliness**

To cater for the needs of persons with disability the facility will be properly designed in strict compliance with national standards for the protection and promotion of persons with disabilities, by removing barriers for their inclusion and improving their accessibility to physical infrastructure. Important measures to be planned for to ensure comfort of the disabled are as follows:

- There will be the provision of access ramps of low slope and with resting places.
- All pathways on the site would be of limited slope and include sufficient turning radius
- Light weight and easy to turn doors will be used
- All entrances will be made sufficiently wide to accommodate wheelchairs
- There will be a provision for disabled parking space close to the main entrance of the building
- Furniture, counters, equipment, power sockets, and plugs will be placed at suitable heights reachable by persons who use wheelchairs
- A disability friendly toilet, wide enough to accommodate a wheelchair and with suitable handrails that are easy to grasp, will be provided

#### **5.3.1.6 Loss of vegetation**

The land would be cleared of its vegetative cover only when needed. A stepwise approach would therefore be adopted, and vegetative cover maintained on sections of the land until that portion of land needs to be utilized. This measure will also help minimise the risk of erosion.

The fertile topsoil will be removed and retained in low mounds of no more than 1 to 2m high for subsequent rehabilitation of the site. Soils will not be stripped when wet as this can lead to soil compaction and loss of structure.

#### ***5.3.1.7 Air quality***

Mitigation measures to minimize impacts on air quality would include the use of machines in good working condition for site clearing and demolition works to minimize exhaust emissions. To control dust, the site and access route will be watered during dry and windy weather conditions.

#### ***5.3.1.8 Noise***

To control noise, equipment to be used as well as trucks should be in good working condition. During operation, the engine covers of generators, air compressors and other mechanical equipment would be closed and the equipment placed as far away as possible from the residential areas and classrooms. Very noisy site activities would be carried out at the weekends. Delivery of materials to the site during site mobilization would be carried out after 4pm on weekdays when teaching activities in the adjoining building are likely to have been completed.

#### ***5.3.1.9 Waste generation***

Any demolition waste emanating from site preparation activities will be managed appropriately. As much as possible, salvageable materials will be separated from the waste and reused at the site. The remaining waste disposed of at an approved landfill site.

#### ***5.3.1.10 Health and safety***

Plans will be made for hoarding the site to shield it from view and also prevent unauthorized access. This will aid in reducing risk of any accidents and injuries that may be sustained by the local community accessing the site as well as theft of construction material or any unauthorized modifications to the project that may render it unsafe or vandalism. Hoarding will also help contain some sediments that may be transported from the site during rainfall and help contain other wastes within the confines of the project site.

### 5.3.2 Mitigation measures to be implemented during the construction phase

The environmental and social risks during the constructional phase and the corresponding mitigation measures are summarized in Table 5.1. This will serve as an indicative list of environmental and social clauses to be included in the contracts of the contracting companies and their respective Worksites-ESMP. There will be the implementation of quality control measures as well as regular supervision of the building site to ensure works are carried out appropriately. Chance find procedures are also outlined should the contractor unearth any objects of archeological, cultural or historic significance during excavation works.

#### 5.3.2.1 Mitigation measures

For anticipated environmental and social impacts, mitigation measures to be implemented, responsibility for implementation and associated costs are summarized below.

Table 5.1 Mitigation measures for construction phase

Types of risk	Assessment	Level of risk	Main measures	Responsibility	Estimated Cost GHS (US\$)
Construction	Risks related to large deep excavations; opening of trenches for laying extension and densification pipes.	Moderate	Selection of specialized companies to undertake works  Conduct of prior technical studies.  Preparation of detailed technical specifications for contractors	Proponent	20,000 (\$1,538)
Soils	Pollution risks or accidental soil erosion (at the site and neighborhood level)  Land degradation from sourcing coarse and fine aggregates from unapproved or unregistered sites	Low  Moderate	Conducting preliminary geotechnical studies  Implementing anti-erosion measures  Minimizing oils spills and disposing of used oils appropriately  Materials to be sourced from approved and registered quarries and burrow pits only	Contractor	10,000 (\$800)
Waters	Potential groundwater pollution and surface water contamination from:	Low to moderate	Use of small structures allowing the flow of rainwater  Quality control of drinking water	Contractor	36,407 (\$2,800)

	<p>Sediments transported from the site</p> <p>Accidental spills of hydrocarbons and lubricating oils or improper disposal of used oil</p> <p>Improper disposal of liquid wastes generated at the site</p> <p>Open defaecation by construction workers</p>		<p>Implementation of appropriate erosion and sediment control measures, such as hay bales and / or silt barriers to prevent the movement of sediments from the site and the generation of excessive turbidity in the yards, water and nearby rivers.</p> <p>Use of impermeable barriers on the ground when servicing equipment or carry out operations on impermeable surfaces.</p> <p>Cleaning up accidental oil spills</p> <p>Proper treatment and disposal of wastewater</p> <p>Implementing wastewater management through sanitary sewage disposal or creation of sealed and fenced pit latrine</p>		
Debris	Construction debris	Moderate	Correct management of debris, according to the standards established in the contractor's worksite ESMP	Contractor	4,000 (\$308)
Waste	Construction site waste: construction and demolition waste and domestic waste	Low to moderate	<p>Adequate storage of products and waste (waterproof storage)</p> <p>Disposal of waste to authorized public landfills.</p> <p>Ensure hygiene at construction site</p> <p>Prohibition of waste in the open air</p> <p>Roadways and sites for waste collection and disposal will be identified for the main types of waste typically generated by construction activities.</p> <p>Mineral construction waste will be segregated from general waste, organic, liquid and chemical waste through on-site sorting and placed in appropriate containers.</p> <p>Construction waste will be collected and disposed of appropriately by licensed collectors</p>	Contractor	9,102 (\$700)

			<p>Waste disposal records will be maintained as evidence for the appropriate management planned.</p> <p>Where appropriate, the contractor will reuse and recycle suitable and viable materials (with the exception of asbestos)</p>		
Hazardous toxic waste	Management of hazardous toxic waste	Low	<p>Temporary on-site storage of any hazardous or toxic substances will be conducted in secure containers that provide compositional data, properties and handling information for those substances.</p> <p>Containers of hazardous substances must be placed in a leak-proof container to prevent spillage and leakage</p> <p>The waste will be transported by specially authorized carriers and is disposed of at a site authorized for this purpose.</p> <p>Paints containing toxic ingredients or solvents or lead-based paints will not be used</p>	Contractor	5,201 (\$400)
Greenhouse gas emissions and other ozone depleting substances	Exhaust gas  Air conditioners	Low to moderate	<p>Regular maintenance of construction machinery and vehicles</p> <p>Install air conditioners that do not utilize R22 fluid or hydro-chloro-fluoro-carbons (HCFCs).</p>	Contractor	26,005. (\$2000)
Vegetation	Some works involve the cutting or removal of vegetation (grass, shrubs) and the reduction or destruction of green spaces.	Low	<p>Establishment of a green zone</p> <p>Search for alternative solutions (to avoid removing a lot of vegetation)</p> <p>Tree planting to compensate for the possible destruction of green spaces and the shortfall in terms of CO<sub>2</sub> sequestration capacities</p> <p>Regrassing after construction</p>	Contractor	10,402 (\$800)
Air quality	Negative potential impact of heavy machinery on construction sites and movement of vehicles	Moderate	Air pollution control system (compliance with standards for exhaust emissions from construction equipment (work phase).	Contractor	1,950 (\$150)

			Regular servicing of machinery and vehicles Systematic removal of unused embankments		
Atmospheric pollution	The site could contribute to increase in air pollution and dust generation.  Increased pollution from improper storage of materials and displacement and use of materials	Low to moderate	Adoption of strict safety standards in areas close to construction sites.  Use of techniques to mitigate this risk at the construction site  Watering of construction site and unpaved vehicle access routes to minimize dust	Contractor	13,003  (\$1000)
Noise pollution	Increased noise and vibration (rolling stock, jackhammers, air compressors, electric drills, etc.)	Low to moderate	Establishment of regular control measures of the intensity of noise pollution  Sound measurements according to NT 48.04 (ISO.1996 / 1) in case of complaints or perception of exceedance by controllers  Respect of working hours on construction sites  Noise from construction activities will be restricted to the schedule agreed in the permit  During operation, the engine covers of generators, air compressors and other mechanical equipment shall be closed and the equipment will be placed as far as possible from the residential areas and classrooms.  Regular servicing of equipment  Workers to use ear protection when operating or working close to noisy equipment	Contractor	10,402  (\$800)
Health and safety of workers, residents and users	Accidents on construction sites  Workers falling from scaffolding	Moderate	Establishment of safety rules in construction sites and application of instructions and rules of hygiene  Staff management and training  First aid provision  Helmets donned by workers  Warning signs for places at risk	Contractor	13,003  (\$1000)



	Spread of communicable diseases, HIV/AIDS and COVID-19		<p>Hoarding of site to prevent unauthorized access</p> <p>Education about the transmission of diseases</p> <p>Vaccinating workers against common and locally prevalent diseases including COVID-19</p> <p>Provisions against spread of COVID-19 such as use of nose masks, good hand hygiene and isolation of sick staff</p> <p>Project workers to avoid sexual relations with members in adjoining communities, students and other members of the university community and abide by a Code of Conduct barring such acts</p> <p>Information campaigns on STDs among the workers and local community</p> <p>Contracting of an HIV service provider to be available on-site</p> <p>Implementation of HIV/AIDS education program</p> <p>Provision of condoms to workers</p>		
Traffic and pedestrian safety	Direct or indirect hazards to public traffic and pedestrians through construction activities	Low to moderate	<p>In accordance with national regulations, the contractor must ensure that the construction site is properly secured and that traffic related to the construction is regulated. This includes, but is not limited to, signage, warning signs, gates and diversions: the site will be clearly visible and the public warned of all potential dangers</p> <p>Traffic management system and staff training, particularly for site access and dense traffic near the site. Provide safe crossings and passages for pedestrians when construction traffic interferes.</p> <p>Adjustment of working hours to local traffic patterns</p>	Contractor	6,501 (\$500)

			<p>Active management of traffic by trained and visible staff on the site, if necessary for a safe passage and convenient for the public.</p> <p>Adhere to speed limits</p> <p>Training of drivers of materials haulage trucks</p>		
Child labour and school dropout	Use of child labour by contractors	Low	<p>Strict compliance with national regulations on child labour by works contractors</p> <p>Ensuring that children and minors are not employed directly or indirectly on the project</p> <p>Discouraging the practice of hawking by children on the construction site</p>	Contractor	
Conflicts between contractor and local populations	<p>Religious, cultural, social and ethical conflicts</p> <p>Increase in teenage pregnancy and HIV infections in local population</p> <p>Illicit behaviour and crime among construction workers (including prostitution, theft and substance abuse)</p>	Low to moderate	<p>Provision of cultural sensitization training for workers regarding engagement with the local community</p> <p>Construction workers to abide by a Code of Conduct providing information regarding behaviour</p> <p>Sanctions for non-compliance with Code of Conduct</p> <p>Use local workforce as much as possible</p> <p>Paying adequate salaries to workers to reduce incentive for theft</p> <p>Paying salaries into workers' bank accounts rather than in cash</p> <p>Sourcing of local workforce</p> <p>Creation of supervised leisure areas in workers' camp</p> <p>Cooperation with local law enforcement</p> <p>Introduction of sanctions such as dismissal for workers involved in criminal activities</p>	Contractor	13,003 (\$1000)

			Provision of substance abuse prevention and management programs		
Competition for local resources	<p>Increased pressure on accommodation facilities and rents in local community</p> <p>Increased burden on public service provision</p> <p>Adverse impacts on community dynamics</p>	Low to moderate	<p>Use minimum number of contractor's permanent staff and supplement with local workforce as much as possible</p> <p>Establishment of workers' camp facilities with sufficient capacity for contractor's permanent staff, including sub-contractors and associated support staff</p> <p>Workers' camp to include wastewater disposal and septic systems</p> <p>Identification of authorized water supply source and prohibition of use from other community sources</p> <p>Use separate service providers for community and workers' camp/construction site</p> <p>Provide worker Code of Conduct on water and electricity consumption.</p> <p>Provision of services in the workers' camp to reduce the need for workers to use local community facilities such as internet and sports</p> <p>Provision of entertainment and events for workers within the camp to reduce the tendency for workers to mix with the local community</p>	Contractor	26,005 (\$2000)
Influx of additional population	Influx of job seekers	Low to moderate	Contractor to hire workers appropriately through recruitment offices rather than at the construction site to discourage spontaneous influx of job seekers.	Contractor	
Disabled people	Neglecting disabled people in building plans	Low to moderate	Install accessibility mechanisms for persons with disabilities in public buildings according to	Contractor	13,003 (\$1000)

			building designs (access ramps, toilet fixtures, etc.)		
Archaeological, cultural and historical heritage	Neglecting historic heritage	Low	<p>Ensure that arrangements are in place to ensure that artefacts or other “finds” encountered during excavation or construction are noted, that officials are contacted and that work is delayed or altered to accommodate these discoveries.</p> <p>Compliance with national regulations for the protection of historical and cultural property.</p>	Proponent	
Gender based violence, including sexual exploitation and abuse, and sexual harassment	<p>Community members and other persons experiencing sexual exploitation and abuse perpetrated by project staff</p> <p>Coworkers being sexually harassed</p>	Low	<p>Training and sensitizing of workers of contractor and subcontractor’s staff, as well as other project staff on risks pertaining to sexual exploitation and abuse and sexual harassment, and reporting</p> <p>Mandatory and regular training for workers on required lawful conduct in host community and legal consequences for failure to comply with laws</p> <p>Construction workers to sign and abide by an appropriate Code of Conduct that bars GBV</p> <p>Sanctions for non-compliance with Code of Conduct, to include dismissal</p> <p>Commitment / policy to cooperate with law enforcement agencies investigating perpetrators of gender-based violence</p> <p>Use of local workforce as much as possible</p> <p>Provision of opportunities for workers to regularly return to their families</p> <p>Create avenues for reporting of GBV perpetrated by project staff, including set up of grievance reporting and management system</p>	<p>Contractor</p> <p>Proponent</p>	6,501 (\$500)

### 5.3.2.2 *Chance find procedure for objects of archaeological, cultural and historical heritage*

Should the contractor make any discoveries of any items of archaeological, cultural or historical significance during excavation works, the contractor will be expected to act in such a manner as to safeguard the historical relics for the benefit of culture and economic activities such as tourism. The contractor will therefore be required to do the following:

- Alert the competent authority (in this case the Directorate for Works and Physical Development of KNUST who will in turn inform the EPA and National Commission on Culture) of the discovery, be it objects of ancient art, archeological vestiges, tombs, etc.
- Inform workers of the goods concerned and the procedure to be followed.
- Stop work immediately in the case of finding archeological remains such as caves, furnaces, cemetery, pending the decision of the competent authority.
- In the case of objects such as figurines or statuettes, circumscribe the area and alert the competent authority.
- Not resume work until authorized by the competent authority.

### 5.3.3 **Mitigation measures to be implemented during the operational phase**

After project completion and occupancy of the building, the impacts identified will be mitigated as outlined in Table 5.2.

**Table 5.2 Mitigation measures for operational phase**

	<b>Assessment</b>	<b>Level of risk</b>	<b>Main measures</b>	<b>Responsibility</b>
Security	Risks related to theft of Centre property and educational resources	Low to Moderate	Install adequate number of security men at the facility  Ensure doors are securely locked up at the end of the day's work  Prevent access to building by unauthorized individuals	Proponent
Building safety	Risk of fires and explosions	Low	Respecting NADMO's regulations (building safety and prevention of fire and explosion risks).  Installation of smoke detectors, fire extinguishers and alarm devices.  Maintenance of fire extinguishers  Training and fire drills for users of the building	Proponent

Health and safety	Risk of accidents and injuries in the laboratory	Low to moderate	<p>Adhere to standard operational procedures for use of laboratory equipment</p> <p>Use personal protective equipment</p> <p>Training of students and laboratory technicians on laboratory safety</p> <p>Implementation of signage, labelling and clear instructions in the laboratory</p>	Proponent
Waste	<p>Generation of domestic waste</p> <p>Generation of non-hazardous laboratory waste</p>	Moderate	<p>Provision of arrangements for storage, collection and disposal of waste at approved disposal facility</p> <p>Implement waste segregation measures</p> <p>Manage non-hazardous waste from dry laboratories</p>	Proponent
Sanitation and hygiene	Poor sanitary condition of washrooms	Low to moderate	<p>Employ cleaners</p> <p>Implement rigorous cleaning programme</p> <p>Provide handwash soap and sanitizers</p> <p>Promptly repair faulty sanitary ware</p> <p>Clean laboratories frequently</p> <p>Ensure constant supply of water to the building</p>	Proponent
Noise	Nuisance conditions affecting activities in adjoining facilities	Low	<p>Limit types of activities taking place in the building to those generating low levels of noise</p> <p>Rent out auditorium for social and religious events at weekends only</p>	Proponent
Maintenance	Lack of maintenance leading to deterioration of building and equipment	Low to Moderate	<p>Implement planned maintenance programme</p> <p>Promptly repair any damage</p> <p>Ensure elevator is in good working condition in order not to impede access to all floors of the building by persons with disability</p> <p>Routinely maintain laboratory equipment</p> <p>Maintain teaching and learning equipment</p>	Proponent

			Plan for replacement of equipment after its life span	
Sexual harassment	Hostile and offensive learning and working environment for staff and students due to unwanted sexual advances, requests or physical contact from coworkers, students or persons in authority	Low	<p>Operationalise the University's Anti-Sexual Harassment Policy</p> <p>Appoint and train a network of counsellors who will offer confidential sign posting service for staff, students and visitors who may be experiencing any form of discrimination, harassment, bullying and hate crime.</p> <p>Ensure reasonable steps are taken to prevent sexual harassment by circulating relevant information to all stakeholders including students, staff, co-operate partners and visitors.</p> <p>Ensure that all staff and students understand the policy and procedures for dealing with sexual harassment</p> <p>Establish a multidisciplinary committee that will specifically address any complaint on harassment.</p> <p>Provide clear processes of enquiry, procedures for dealing with complaints and disciplinary actions against staff, students and visitors.</p> <p>Offer support mechanisms for survivors of discrimination, harassment and gender-based violence.</p>	Proponent

## **6 Environmental and social responsibilities of the contractor**

The section outlines the Contractor's responsibility with regards to the protection of physical and social environment, prohibited actions, safety management, relationship between the contractor's staff and members of the adjoining community as well as those within which the project is located, punitive actions for non-compliance by workers and chance find procedures. It also provides some guidelines on the Contractor's performance monitoring and reporting.

### **6.1 Environmental and social clauses**

The Contractor's responsibility is defined in environmental and social clauses, which would be incorporated in the contract document. It is the responsibility of the contractor to be acquainted with all national and local legislation relating to activities to be undertaken during the construction phase of the project. The contractor is also expected to take all reasonable steps to protect the environment both on the proposed project site and in any activities undertaken off the site in relation to the project, in order to avoid damage to the environment, nuisance to persons, damage to public property or others as a result of pollution, noise or other causes arising as a consequence of the Contractor's methods of operation.

#### **6.1.1 Environmental management measures**

Measures to manage the environmental are outlined in the clauses below. These precautions are to be taken by the contractor during works to avoid the occurrence of nuisances and adverse environmental impacts. The contractor is expected to comply with all the outlined environmental and social clauses.

##### **6.1.1.1 Waste management**

###### ***Clause 1***

The contractor shall minimize the production of waste and eliminate any waste generated.

###### ***Clause 2***

The contractor shall set up controlled assembly sites, identify and classify potentially hazardous waste and apply specific procedures for storage, transportation and disposal of all hazardous wastes.



### **Clause 3**

The contractor shall entrust the disposal of wastes to the approved professional structures and shall store and dispose of construction waste in a manner consistent with national regulations.

#### **6.1.1.2 Equipment maintenance**

### **Clause 4**

The contractor shall delimit garage, repair and maintenance areas (washing, emptying) of materials and equipment away from any source of water. Maintenance shall be carried out on the demarcated areas and draining oils properly managed.

#### **6.1.1.3 Fight against erosion and filling of water courses**

### **Clause 5**

The contractor shall avoid creating trenches and deep furrows along developed access roads.

### **Clause 6**

The contractor shall avoid disposing of loose materials on sloping ground and shall erect protections around borrow pits and deposits of fine soft materials.

#### **6.1.1.4 Materials in reserves and loans**

### **Clause 7**

The contractor shall identify and delineate areas for stockpiled materials and borrow pits, ensuring that it is at a safe distance (at least 50 m) from steep slopes or erosion-prone soils and drainage areas, and shall limit the opening of borrow pits to the strict minimum necessary.

#### **6.1.1.5 Fight against dust and other nuisances**

### **Clause 8**

The contractor shall minimize dust emission to avoid or minimize negative consequences influencing air quality and shall regularly water areas prone to dust emission during the day.

### **Clause 9**

The contractor shall limit speed to 24 kmh<sup>-1</sup> within 500 m of the site.

### ***Clause 10***

The contractor shall respect the hours of rest for work in residential areas in the city, or on the campus during teaching hours.

### **6.1.2 Safety management**

Safe layout on the site is to be undertaken by the contracting company, according to national health and safety standards for the benefit of the workers, and adequate signage of the site provided to avoid accidents.

### ***Clause 11***

The contractor shall properly and permanently sign site access roads and regulate traffic in the area.

### ***Clause 12***

The contractor shall properly and permanently provide signage for hazardous areas of the site and make staff aware of the importance of using personal protective equipment such as nose covers, gloves, helmets, etc.

### ***Clause 13***

The contractor shall interrupt all work during heavy rains or in case of emergency.

### **6.1.3 Relations with the neighbourhood**

#### ***Clause 14***

All employees of the contractor (including sub-contractors), with a footprint on the ground in the project area, shall sign a Code of Conduct guiding behaviour and relationships with the adjoining communities and shall abide by such. A sample Code of Conduct is provided in Annex C. Appropriate sanctions, proportional to the extent of the violation, shall be applied for breach of the Code of Conduct. Potential sanctions to be applied include:

- Informal warning
- Formal warning
- Additional training
- Loss of up to one week's salary
- Suspension of employment (either administrative leave or leave without pay), for a minimum period of one month and up to a maximum of six months

- Termination of employment; and/or,
- Referral to the police or other authorities as warranted.

Prior to imposition of sanctions, a worker who raises a credible challenge to an alleged violation with the Code of Conduct should be placed by the employer on administrative leave pending a full and fair review of the allegation.

#### ***Clause 15***

The contractor shall inform local authorities and the University about the detailed schedule of work and the risks associated with the site and shall avoid disruption to the supply of basic services such as water, electricity and telephone due to work, or otherwise inform stakeholders at least 48 hours in advance should disruptions be unavoidable. The contractor shall also not work at night. In case this cannot be avoided the local/University authorities should be informed at least 48 hours in advance.

#### ***Clause 16***

The contractor shall systematically recruit local workers of equal competence.

#### ***Clause 17***

The contractor shall contribute to the maintenance of tracks used by vehicles serving the site.

### **6.2 Implementation of “Chance Find Procedure”.**

The application of “chance find procedures” makes it possible to safeguard historical vestiges for the benefit of culture and economic activities such as tourism. It consists of alerting the competent authority in case of discovery of any vestiges such as objects of ancient art, archaeological vestiges, etc. during excavation, borrow of materials from pits or other works relating to the construction. The contractor is shall therefore be required to comply with the following clause.

#### ***Clause 18***

The contractor shall inform his/her workers of the items concerned and the procedure to be followed should any vestiges be discovered. Work shall immediately be brought to a halt in the case of a find of archaeological remains such a cave, furnace, cemetery, or burial pending the decision of the competent authority. In the case of objects such as figurines and statuettes the

area shall be circumscribed, and the competent authority alerted. The contractor shall not resume work unless authorized by the competent authority.

### **6.3 Prohibited actions**

Actions prohibited on the project site or in its immediate vicinity include:

- Cutting of trees outside the construction zone
- Use of unauthorized raw materials
- Intentional destruction of a discovered physical cultural resource
- Continuation of work after discovery of archaeological remains (cave, cave, cemetery, burial ground)
- Use of firearms (except authorized guards)
- Consumption of alcohol on the job site and during working hours.

### **6.4 Contractor performance monitoring**

#### **6.4.1 Contractor's Environmental and Social Management Plan**

In order to ensure that all environmental and social measures are implemented to adequately minimise adverse impacts on the environment during the construction phase, the contractor will be required to submit a Contractor Environmental and Social Management Plan (C-ESMP) guiding the operations on the site. This plan would also serve as an operational manual covering works on the site and as a basis for monitoring the performance of the contractor by the client, with respect to implementation of environmental and social safeguards. The Contractor's C-ESMP will be reviewed and approved by the Client to ensure that it addresses all potential environmental and social impacts and appropriate measures to counteract these impacts have been given. A general outline of the C-ESMP given in Annex D.

The Contractor's C-ESMP to be prepared should include:

- An overview of the environmental and social issues and impacts related to construction works.
- The relevant policies, legal and institutional framework and the Ghanaian and World Bank standards to which the Contractor will comply how compliance would be monitored by specifying:
  - The National and World Bank standards against which the monitoring will be set

- The parameters and limits that will be monitored
- The frequency at which monitoring will be undertaken
- A clear definition of specific mitigation measures that are intended to be implemented in order to minimize environmental and social impacts.
- The internal organisational, management and reporting mechanisms put in place

## **6.5 Reporting on environmental and social safeguards**

Appropriate reporting is key in the implementation and monitoring of the proposed undertaking. The Contractor would therefore be required to prepare monthly progress reports addressing among others, safety statistics, including details of any hazardous incidents and activities related to environmental and social safeguards.

The contractor would be required to report on the following:

- Environmental and social management actions or measures taken to safeguard the environment
- Any environmental and social problems encountered such as incidents and delays and cost implications as a consequence of these incidents
- Compliance or lack of compliance with requirements of the contract
- Any changes made in assumptions, conditions, measures, designs and actual works in relation to environmental and social safeguards
- Observations, concerns raised and/or decisions taken with regard to environmental and social safeguards during site meetings.

A sample reporting format for environmental and social management is given in Annex E as well as a sample format for reporting incidents. An incident report form should be prepared within 24 hours of any incident occurring on site and submitted to the Director of Works and Physical Development of the University and the Management of TRECK. A full report should be subsequently prepared and submitted. A sample incident report format is also included in Annex E.

## **7 Monitoring, supervision and control**

To ensure safety and durability of the building during use, as well as adherence to laid down procedures for construction and protection of the environment, adequate monitoring and supervision and quality control measures will be instituted at the proposed site. The measures will include the following:

- A clerk of works will be assigned to the site by the Director of Works and Physical Development, KNUST. The clerk of works will be stationed at the site and has the responsibility of reporting daily to the Director on progress of work at the site and any issues that need to be addressed. The clerk of works is also to ensure quality of construction and ensure that the contractor is working strictly according to specifications and is to draw the Directors attention should the contractor go contrary to technical specifications as well as environmental controls.
- Technical site meetings will be held every two weeks between the Directorate for Works and Physical Development of KNUST and the consultants to the project and the contractor.
- Site visits and periodic inspections would be carried out by all consultants to the project as well as safeguards expert to the project.
- Monthly site meetings to inspect the site progress and discuss issues.
- Samples of construction materials to be inspected and certified by the Development office before use.

### **7.1 Monitoring plan**

Monitoring of the project is important to ensure proper implementation of the project in accordance with proposed environmental and social safeguards, national policies and world bank safeguard policies. A plan which details how impacts from pre-construction, construction and operational phase of the project will be monitored is presented in Table 6.1. The monitoring plan is intended to check overall compliance of the proposed project to environmental and social safeguards and serve as an early warning signal for remedial actions to be taken.

Monitoring of compliance to environmental and social safeguards will be carried out by the contractor, the projects safeguard officer, the project implementation unit as well as the EPA at its discretion.

**Table 7.1 Monitoring Plan**

Potential environmental and social risks	Parameters to be measured	Monitoring methods and procedures used (e.g. sampling)	Timing/Frequency of measurement	Definition of thresholds	Sampling/monitoring location	Responsibility	Cost, GHS (US\$)
<b>Pre-construction phase</b>							
Loss of vegetation	Vegetation clearing techniques  Amount of vegetative cover on site	Visual inspection  Comparison with pre-construction photographs	Within one month of site possession	Areas of land not being utilised cleared of vegetation	Construction site	Proponent	
Soil erosion  And loss of fertile topsoil	Extent of erosion of land surface  Adequacy of anti-erosion measures  Soil storage location and procedures	Visual inspection	Weekly	Visible signs of erosion.  Eroded water paths/ gulleys visible on site  Topsoil improperly stored	Construction site	Environmental Safeguards officer/ PIU	
Air pollution by dust	Dust level	Visual inspection	During demolition works and site clearing	Visibly dusty environment	Construction site  Site access roads	Environmental Safeguards officer/ PIU	
Noise	Noise levels  Number and frequency of complaints in project area	Insitu measurement of noise levels	During demolition works and site clearing	Noise level not to exceed 90 dB(A) for 8 hrs at the site and 65 dB(A) off site	Within 500 m radius of project site	Environmental safeguards officer/ PIU	1,950  (\$150)

Construction phase							
Noise and vibrations	Noise levels  Number and frequency of complaints in project area	Insitu measurement of noise levels at peak times of construction	Monthly	Noise level not to exceed 90 dB(A) for 8 hrs and 65 dB(A) off site	Within 500 m radius of project site	Environmental safeguards officer/ PIU	15,600  (\$1,200)
Air quality deterioration by dust and exhaust fumes	Particulate matter (PM),  SO <sub>2</sub> , NO <sub>x</sub> , CO, VOCs	Visual observations  Insitu air quality measurements	Monthly	Environmental pollutants permissible limits  NO <sub>x</sub> : Annual average ≤ 40µg/m <sup>3</sup> ; Max 24hr average ≤ 150µg/m <sup>3</sup> ; Max 30min average ≤ 500µg/m <sup>3</sup>  SO <sub>2</sub> ; Annual average ≤ 40µg/m <sup>3</sup> ; Max 24hr average ≤ 150µg/m <sup>3</sup> ; Max 30min average ≤ 500µg/m <sup>3</sup>  PM : Annual average ≤ 50µg/m <sup>3</sup> ; Max 24hr average ≤ 125µg/m <sup>3</sup> ; Max 30min average ≤ 280µg/m <sup>3</sup>	Construction site	Environmental safeguards officer/ PIU	19,500  (\$1,500)
Sediment transport and water pollution	Indication of sediment transported from site	Visual inspection	Monthly	Sediments transported from site to surrounding areas	Construction site and environs	Environmental safeguards officer/ PIU	



Pollution from improper management of solid waste from construction site	Quantity of construction and domestic waste improperly stored on site  Adequacy of waste bins	Compliance with waste management procedures  Visible observations through site inspections	Weekly	Construction waste and domestic solid wastes found at unapproved locations on site  Bad odours from putrifying waste onsite	Construction site and immediate environment	Contractor  Environmental safeguards officer/ PIU	
Open defaecation by workers	Visible faecal waste at construction site and environs  Faecal odours on site  Adequacy of toilet facilities	Visual observations  Aesthetic quality of site	Weekly	Visible faecal matter  Faecal odours on site and immediate environment	Construction site and immediate environment	Environmental safeguards officer/ PIU	
Soil and groundwater contamination from wastewater and oil spills and leaks from machinery	Soil and water quality parameters  Compliance with oil storage procedures  Adequacy of arrangements for wastewater management	Visual observations  Insitu/ laboratory soil and groundwater quality analysis	Once every two months	Soil and water quality permissible limits	Construction site	Environmental safeguards officer/ PIU	10,400  (\$800)
Soil erosion	Extent of erosion of bare surfaces	Visual inspection	Weekly	Visible signs of erosion.	Construction site	Environmental Safeguards officer/ PIU	

	Adequacy of anti-erosion measures	Eroded water paths visible		Eroded water paths/gulleys visible on site			
Dangers posed by excavation	Unsafe excavations Warning signs for unsafe areas	Visual inspection	Daily until excavations are filled in Weekly until excavations are filled in	Restricted access to excavated areas	During foundation works	Contractor Environmental Safeguards officer/ PIU	
Disagreements on location of project and approval of site	Number of complaints on location of building	Consultations Reports	Monthly	One complaint	University community/ construction site	Proponent Environmental safeguards officer/ PIU	
Health and safety of workers on site: Risk of occupational accidents, injuries, diseases	Number of workers appropriately using PPEs and adherence to other occupational health and safety protocols Number of reported cases of accidents Adequacy of protocols for COVID-19	Visual observations/ routine inspection Accident reports	Weekly	Non-compliance on use of PPEs Non-adherence to COVID-19 protocols	Construction site	Environmental Safeguards officer/ PIU	
Traffic and pedestrian safety	Compliance with speed limits Number of incidents	Complaints from other road users Incident reports	Weekly	Speed limit of 40km/hr on roads and 24km/hr within 500m of the project site	Roads on campus Site access routes	Contractor Environmental Safeguards officer/ PIU	

Public safety at site	<p>Number of unauthorised persons traversing site</p> <p>Number of unsafe incidents involving unauthorised persons at the site</p> <p>Adequacy and integrity of hoarding of site</p> <p>Warning signs restricting site access</p>	<p>Visual inspection</p> <p>Site security reports</p>	Weekly	<p>Unauthorized persons on site</p> <p>Inadequate warning signs</p>	Construction site	<p>Contractor</p> <p>Environmental Safeguards officer/ PIU</p>	
Child labour	Under-aged persons engaged in construction activities	Observations and interviews	Weekly	A construction worker under the age of eighteen.	Construction site	Environmental Safeguards officer/ PIU	
Sexual exploitation, abuse and harassment	Complaints of sexual exploitation and abuse and sexual harassment	Number of complaints received	Weekly	One complaint	Construction site	<p>Contractor</p> <p>Environmental Safeguards officer</p>	
Illicit behaviour of construction workers	Complaints on workers involved in crime and other illicit activities	Number of complaints received	Weekly	One complaint	Construction site	<p>Contractor</p> <p>Environmental safeguards officer</p>	

Labour influx	Unwarranted increase in labour force	Observations	Monthly	High number of workers on site	Construction site	Environmental safeguards officer	
<b>Operational phase</b>							
Solid waste generation	Adequacy and number of bins in good condition	Visual inspection	Monthly	Damaged bins	Project site	Environmental Safeguards officer	
Ineffective sanitation system	Adequacy and hygiene of washroom facilities  Integrity of wastewater management system	Visual inspection	Monthly	Toilet facilities in unhygienic condition  Broken fixtures in washrooms	Project site	Environmental Safeguards officer	
Building safety	Availability of fire extinguishers and smoke detectors  Number of fire safety drills	Visual inspection  Testing of fire systems	Every six months	Expired fire extinguishers  Non functional smoke detectors	Project site	Fire Department of KNUST  Environmental Safeguards officer	2,600  (\$200)
Health and safety	Adequacy of standard operating procedures and signage  Trained laboratory technicians	Visual inspection  Interviews	Every three months	Untrained laboratory technicians  No procedures or signage in laboratory	Project site	Environmental Safeguards officer  Heads of Department	
Security	Security personnel onsite	Visual observations  Head count	Daily	No security personnel	Project site	Environmental Safeguards officer	

Maintenance	Condition of facility	Visual inspection	Yearly	Facility in poor condition	Project site	Environmental Safeguards officer	
Sexual harassment	Complaints of sexual harassment from staff and students	Number of complaints received	Weekly	One complaint	Project site	Environmental Safeguards officer	

## **8 Roles and responsibilities of key stakeholders**

Stakeholders in the proposed project will include direct beneficiaries of the project as well as those whose interests may be positively or negatively affected by the project and are concerned about the consequences of the project. These will therefore include the university community, students and staff related to TRECK and its activities, such as the School of Business studies, KNUST, the Department of planning and other partners of the Centre, regulators such as EPA and GTEC, the World Bank, AAU, and all interest groups and affected parties.

### **8.1 Beneficiaries of the project**

The beneficiaries of the project include students enrolled on TRECK related programmes and allied Departments, the College of Engineering, the Department of Civil Engineering, partners of the Centre, the Ministry of Roads and Highways and the Ministry of Transport.

### **8.2 Project affected persons**

Project Affected Persons (PAPs) will mainly be the users of the RWESCK building located on the land immediately adjoining the project site. Other PAPs may include persons in neighbouring communities, institutions, students and staff of the University, and users of other buildings within the project's area of influence, or any other individual or interest groups. Since the project is located within the confines of the University campus, PAPs of the University community will be consulted and informed about the proposed project and their views and concerns collated for inclusion in the design of the project to minimize contentious issues arising during project implementation.

### **8.3 Roles and responsibilities**

Various stakeholders expected to play a direct role in the implementation of the proposed project are the World Bank, Project Implementation Unit, EPA, AAU, KNUST (TRECK, safeguards expert and the Directorate for Works and Physical Development) and the contractor executing the works. The phases of the project when these stakeholders will play key roles are during site and sub-project identification, screening of the sub-project, communication and stakeholder engagement, grievance management, monitoring and control and reporting, project evaluation and auditing. Roles and responsibilities of the various stakeholders of relevance at the different phase of construction of the proposed building, herein referred to as the sub-project, are as outlined in Table 8.1.

Table 8.1 Roles and responsibilities of key stakeholders

Phase of Project	Role to be Played	Objective	Stakeholder Responsible
Site identification and sub-project identification	Identification of the sub-project	Describe the nature of the activities of the sub-project and its main characteristics	Promoter of the sub-project (TRECK and Directorate for Works and Physical Development of KNUST)
Screening of the submitted sub-project and preparation of the type of backup instrument required	Preparation of the simplified screening form (SSF) Categorization of the subproject	Identify the nature and extent of the environmental and social impact of the sub-project	Safeguards Expert, in collaboration with EPA (with information to the World Bank).
	Preparation of Registration Form EA1	For sub-projects whose negative environmental and social impact is considered minimal: preparation of a simple Environmental and Social Impact Statement (ESIS).  ESIS mitigation measures will be directly integrated into the tenders and specifications of the contractors	Safeguards Expert, in collaboration with EPA (with information to the World Bank)  Documentation sent to EPA for review and clearance.
	Analysis and validation of the results of the screening	Verification of all the information.  Review of proposed mitigation measures  Categorization of subproject and required safeguard tools  Decisions regarding the type of public consultation to be applied	Safeguards Expert with external resource persons  Package sent to EPA for clearance
	Combined preparation of EIA and ESMP	A combined EIA / ESMP will be prepared for subprojects with potential negative impacts considered as moderate  Validation of the EIA/ESMP and issuance of the environmental permit.  ESMP mitigation measures will be directly incorporated into tenders and contractor technical specifications.	External firm / resource person (ToR validated by EPA, if needed).  EPA  PIU: coordinator and safeguards expert, with procurement officer

Communication and stakeholder engagement	Disclosure of information Public consultations	EIA/ESMPs and records of consultations will be made available to the public through the most appropriate means.	MoE with PIU
Grievances	Grievance management and redress mechanisms	A grievance management and redress mechanism will be defined and put in place at the site level for management of grievances of those directly or indirectly affected by Project activities. This system would be set up before construction work and related activities, such as clearing and mobilization begin at the project site.	AAU will set up a regional E-system (with the participation of each university / center at national level): the center will solve grievances in first instance, including issues related to environmental and social safeguards.
Monitoring & control and reporting	Environmental and social monitoring  Reporting	Monitoring of the proper implementation of sub-projects in accordance with proposed environmental and social measures, national laws and World Bank's Safeguards Policies (against a set of indicators)  Maintenance and maintenance measures  Preparation of an annual supervision report for safeguards at the regional level.	PIU Safeguards Expert (with external TA).  Contractor: implementation of the EIA/ESMP environmental and social safeguard measures  EPA external control (compliance to national regulations).  The safeguard consultant at AAU will develop this report based upon information from the participating universities.
Evaluations	Mid-term and final evaluation of the Project	Assess the implementation of safeguards	Participation of the PIU Safeguard expert in the preparation of the evaluations (conducted by external consultants)
Independent audit	Before mid-term review of the Project	Environmental/ social audit of all the sub-projects	To be commissioned by PIU



## **9 Grievance procedure for handling complaints and settling potential conflicts**

Grievances may arise from Project Affected Persons (PAPs) during the construction of the proposed building. These PAPs may include persons in neighbouring communities, institutions, students and staff of the University, and users of adjoining buildings, or any other individual or interest groups. A grievance redress mechanism will therefore be setup to receive and respond to queries, complaints and any clarifications regarding the proposed project. Grievances may be in the form of complaints about injuries or damage to property, general concerns regarding the project activities, any incidents that may have occurred, real impacts or perceived impacts of the project.

The objective of the Grievance redress mechanism is to address and resolve all grievances promptly and with fairness so that there will be a peaceful relationship between TRECK and the PAPs. The legal framework for grievance redress has basis in the Constitution of Ghana (Article 20) and the State lands Act of 1962. Grievances will be managed according to the mechanism outlined in the subsequent sections. The grievance mechanism would include:

- A reporting system that includes recording and filing of verbal and written grievances
- Staff of the contractor designated to record and report grievances
- A scheduled forum to discuss and propose solutions to grievances
- A time frame within which to address all grievances

For cases specifically relating to alleged sexual exploitation and abuse and sexual harassment involving staff, students and visitors, the University's Sexual Harassment Policy would be applied for grievance reporting and redress. The Policy clearly sets out systematic strategies and procedures regarding sexual harassment. These include:

- Institutionalization of an Anti-sexual Harassment Unit as a sub-unit under the University's Counselling Centre.
- Setup of an Anti-sexual Harassment Committee which will work in consonance with the university disciplinary committee.
- Informal and formal procedures for addressing harassment which spells out clearly the compliant procedures, investigation processes, hearing, sanctions and disciplinary measures, appeals from decision and appeal procedures.

The Anti-sexual Harassment Committee will be responsible for the education and training on sexual harassment as well as documentation, reporting and investigation of cases. Specifically, the Committee will facilitate the following:

- **Education and Training:** The Committee will plan and manage the University's sexual harassment education and training programmes. These programmes would include wide dissemination of the policy to the University community; providing educational materials to promote compliance with the policy and familiarity with local reporting procedures; and training of other University personnel who may be responsible for responding to informal reports of sexual harassment.
- **Documentation:** The Committee would maintain records of reports of sexual harassment and actions taken in response to reports, including records of investigations, voluntary resolutions, and disciplinary action, as appropriate.
- **Reporting:** The Committee would prepare and submit annual reports to the Vice-Chancellor and/or the University Council on its work.
- **Investigation:** The Committee shall deal with specific complaints of sexual harassment as an investigative body

The reporting and investigation procedure would ensure that victims of sexual harassment and sexual misconduct or anyone who participates in the investigation does not face retaliation or stigmatisation.

## 9.1 Grievance reporting

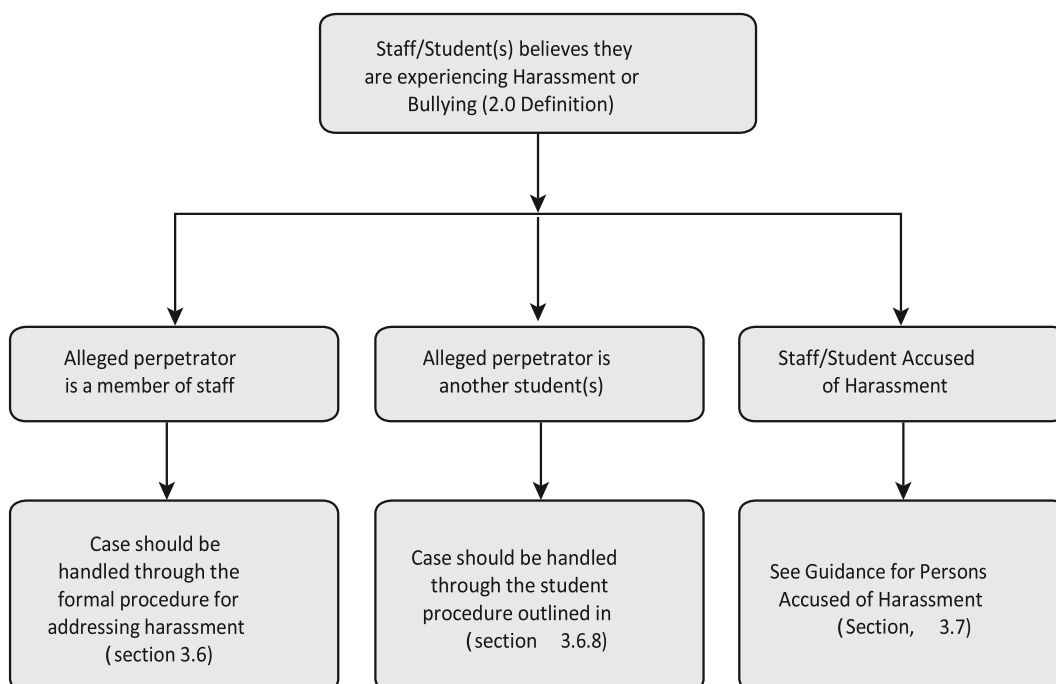
There will be a dedicated point for receipt of complaints at the project site. This point will be the Site Manager's office. PAPs may use any of the following channels for registering their complaints: verbal reporting, letters, email, the social media platform, by phone or by using a special form designed for that purpose (e-grievance form on the TRECK website).

Regarding complaints on gender-based violence, particularly sexual exploitation and sexual abuse, and sexual harassment, complainants stand the risk of stigmatization, rejection and reprisal. This creates and reinforces a culture of silence and therefore survivors may be unwilling to report incidents directly. To facilitate safe access to the grievance mechanism, therefore, multiple channels through which complaints can be registered in a safe and confidential manner would be enabled. These channels would include the e-grievance system

on the TRECK website and existing channels and procedure (Figure 9.1) for reporting grievances as outlined in the Sexual Harassment Policy of the University (KNUST Policy 0027, available on University and TRECK website). Either formal or informal, the Policy advises that a written record of any incident of sexual harassment should be made as early as possible after such an incident has occurred. The written record should be signed, dated and kept for future reference. The university would ensure that reports of sexual harassment or misconduct are handled with great delicacy to ensure the identity of victim and all the participants involved in the investigation are protected.

To ensure confidentiality the e-grievance system will also store no identifiable information on the complainant. Besides, the system would collect and record information on only the following regarding allegations of sexual exploitation and abuse, and sexual harassment:

- The nature of the complaint (what the complainant says in her/his own words without direct questioning);
- If, to the best of the survivor’s knowledge, the perpetrator was associated with the project;
- If possible, the age and sex of the survivor; and
- If possible, information on whether the survivor was referred to services for support.



**Figure 9.1** Flowchart outlining the procedures for staff and students to report cases of harassment or bullying in KNUST

## 9.2 Grievance management

Any complaint received during the construction phase regarding works and related activities and conduct of workers will be managed via a three-tier system, the first tier being its resolution by the project site team. Should the project site team fail to resolve the problem, the TRECK management office and the Office of the Director of Works and Physical Development will be the second tier for resolution of the problem. The third tier would be the office of the Oforikrom Municipal Assembly. It will be ensured that every complaint received is managed efficiently and satisfactorily to the benefit of aggrieved parties. As much as possible attempts will be made to reach amicable resolutions through dialogue.

In addressing grievances, the following guidelines will be adopted:

- All grievances received shall be acknowledged
- The grievances shall be recorded in a log book dedicated to complaints
- All grievances received will be investigated
- The complaint shall be referred to the appropriate grievance redress team for action
- The grievance redress team shall investigate the complaint after which they shall communicate the feedback to the aggrieved person(s)
- All grievances shall be resolved and the outcome communicated to the aggrieved person within 14 days
- The grievance shall be closed if the grievance is resolved
- Any grievance not resolved will be referred to the next tier for action
- All efforts would be made to resolve all grievances without the intervention of the courts of law. However, if this fails, and the complainant so wishes, he/she may seek redress in the courts of law at his/her own cost.

When a student or member of staff is being subjected to sexual harassment the Sexual Harassment Policy of the University recommends that, if possible and appropriate, those involved should attempt to resolve the situation informally in the first instance. It is, however, up to the Complainant to decide how they wish to proceed. In the formal hearing of an investigation, the following may be considered as evidence:

- A written detailed account of the complainant and the respondent's witness statements (if any);
- Statements of persons with whom the complainant might have discussed the incident, or from whom advice may have been sought;

- Any other documentary, audio, video, e-mails, text messages, etc. with expert technical advice being sought concerning such submissions;
- In some cases, the determination of a sexual harassment case may be based solely on the credibility of the complainant's allegation, if it is sufficiently detailed and internally consistent
- Medical and police evidence, including DNA or forensic if appropriate.

### **9.3 Plan for further stakeholder engagement, consultations and grievance management**

Stakeholder consultation and engagement is a continuous process and does not end even after the construction of the building. Engagement with stakeholders such as students and other interest groups by TRECK will therefore continue and be based on the following key principles of good practice:

- Timeliness to consider key issues and provide input to decisions agreed upon;
- Dissemination of information in readily understandable formats and using culturally appropriate techniques, in advance of engagement events/meetings, to ensure that stakeholders are informed;
- Gender-inclusivity for meetings/events, where it is feasible to do so, setting a target of 50% participation by both men and women respectively at each event;
- Engagements to be free from manipulation and coercion; and
- Documentation to keep track of who has been consulted and the key issues raised with feedback to stakeholders at key stages in the update process.

While construction is ongoing, stakeholders such as the Ghana National Fire Service (GNFS) and the Environmental Protection Agency (EPA) may periodically visit the building site for continuous engagement and also to ensure that the mode of construction remains in compliance with environmental and fire regulations. During the operational phase of the project, the Ghana National Fire Service will periodically conduct fire drills and ensure that fire extinguishers are functional and in place.

Existing plans and programmes for student engagement will also be strengthened. This will involve continually engaging with students on a regular basis to discuss academic progress and other pertinent issues, as is the current practice. Engaging with students will be in the form of open forums organized on a periodic basis with the entire group of students registered in

TRECK programmes and focus group meetings with the class representatives for each programme. The student body will also be kept informed and engaged through emails. The TRECK Student Representative will serve as a strong link between management and the student body. The academic coordinator of TRECK programmes will also meet students on a regular basis so that students can relay any challenges or concerns they have in relation to their studies and the academic environment. Academic performance of students and other pertinent student issues will be discussed periodically at TRECK management meetings.

The management team will meet on a monthly basis and have the postgraduate building as well as student academics and welfare as a permanent agenda item to ensure that any grievances or petitions are discussed promptly, and the necessary action taken. The TRECK Project Manager will receive all such petitions and concerns and present them at these management meetings for discussion and decision-making, and thereafter, communicate the outcome to the affected student or stakeholder. It will be ensured that the process is very transparent, and each petition is treated on merit and without any favouritism.

Other stakeholders such as the AAU, GTEC, the World Bank, industrial partners, and other interest groups will be continually engaged through the provision of key information regarding project milestones and other achievements and activities via meetings, reports, newsletters and emails. This ESMP will also be disclosed on the TRECK website for the consumption of key stakeholders and the general public.

To prohibit discrimination and harassment of any type or form amongst students and staff and to address any such occurrences, the University will institute the following measures:

- Setup a network of appointed and trained counsellors who will offer confidential sign posting service for staff, students and visitors who may be experiencing any form of discrimination, harassment, bullying and hate crimes.
- Circulate relevant information to all stakeholders including students, staff, co-operate partners and visitors to prevent sexual harassment
- Establish a multidisciplinary committee that will specifically address any complaint on harassment.
- Provide clear processes of enquiry, procedures for dealing with complaints and disciplinary actions against staff, students and visitors.
- Offer support mechanisms for survivors of discrimination

The grievance mechanism will continue to follow the underlying principles of accessibility, transparency, efficiency, fairness and documentation by way of written records of grievances.

TRECK management will therefore be committed to the following:

- Ensuring that the Grievance Mechanism is accessible to those who may wish to submit a grievance.
- Clarifying at the outset who is expected to use the Grievance Mechanism, and assuring the petitioners that the process will be fair and their identity kept confidential if need be.
- Publicly communicating and committing to a timeframe within which all recorded grievances will generate a response and ensure that all response times are met. This will help to allay frustration by informing people when they can expect to be contacted and/or receive a response to their grievances.
- Ensuring that an appeal procedure for complainants will be duly considered during a project meeting which has been fully constituted with a quorum.
- Maintaining written records of all grievances received as this is critical for effective grievance management.

## 10 Training and capacity building initiatives

### 10.1 Training of contractor's personnel

The Contractor shall provide training of staff involved in construction works at the site to ensure that they are all fully conversant with the requirements of this ESMP. The training should include the contractor, sub-contractors, site Engineer, foreman, construction workers, drivers, security men and any other personnel who may be required to carry out some roles or functions in relation to the proposed project and should be specific to their assigned tasks.

General topics for training include:

- General health and safety: site working procedures, driver and pedestrian safety, site security, COVID-19 protocols, etc.
- Emergency procedures
- First aid
- Social and cultural aspects such as awareness raising on social issues, appropriate behaviour of personnel, chance find procedures, etc.
- Sexual exploitation and abuse, sexual harassment and the policy of the University regarding such acts. Suppliers of construction materials, supervision consultants and other consultants who may have a presence in the project adjoining communities should be included in trainings on sexual exploitation and abuse, and sexual harassment. Training modules on SEA and SH can be embedded into the regular Occupational Health and Safety (OHS) meetings held with workers, official training and/or implemented on their own. The training should cover, but not limited to the following:
  - Definitions of sexual exploitation and abuse, and sexual harassment;
  - How the project can induce or exacerbate sexual exploitation and abuse or sexual harassment or both;
  - Roles and responsibilities of actors involved in the project (as indicated in the Codes of Conduct);
  - Reporting mechanisms for staff and communities, accountability structures for investigation and disciplinary processes, and safe and ethical referral procedures for survivors of SEA and SH;
  - Services available for survivors of SEA/SH; and
  - Follow-up activities to reinforce training content.



## **10.2 Training of proponent's staff**

The proponent shall train relevant staff for proper monitoring of the implementation of the project in line with the requirements of the ESMP. Recommended capacity building programmes include health and safety, monitoring of implementation of ESMP as well as data collection and reporting on implementation of environmental and social safeguards. There will also be the need for training on of centre staff and focal persons on sexual exploitation and abuse and sexual harassment as well as training on operating the grievance management system and handling gender-based violence using a survivor-centered approach, which should include empathetic and non-judgmental listening.

## 11 Cost of implementation of environmental and social safeguards

It is estimated that implementing measures to safeguard the environment during the constructional phase of the proposed project would require a budget of about GHC 224,892.00 (US\$ 17,296.00). The Contractor would be required to provide, as part of the bill of quantities, the cost of implementing mitigation measures to address the environmental and social risks summarised in Table 11.1, with reference to Table 5.1 for mitigation measures.

Monitoring activities, to include any necessary data collection exercises, laboratory analysis and reporting, are estimated as GHS 45,500.00 (US\$ 3,500.00) and GHS2,600.00 (US\$200) during the construction phase and the operational phase respectively. Costs of mitigation measures for pre-construction will be absorbed in the project design cost. Monitoring of compliance with environmental and social safeguards during site mobilisation is estimated to cost GHS 1,950.00 (US\$ 150.00) and cost of training the proponent's staff, GHS 42,250.00 (US\$ 3,250.00). The breakdown of these costs is given in Table 11.2.

Total estimated budget for environmental and social safeguards, including training, is GHS317,192.00 (US\$24,396).

Table 11.1 Cost of implementation of environmental and social risks during the construction phase

Type of risk	Risk	Responsibility
Construction	Large deep excavations	Contractor
Vegetation	Reduction or destruction of green spaces.	Contractor
Soil	Pollution risks or accidental soil erosion	Contractor
Waters	Potential groundwater surface water contamination	Contractor
Debris	Management of construction debris	Contractor
Waste	Construction and demolition waste and domestic waste	Contractor
Hazardous toxic waste	Management of hazardous toxic waste	Contractor
Greenhouse gas emissions/ other ozone depleting substances	Exhaust gas emissions Air conditioners	Contractor
Air quality	Degradation of air quality by heavy machinery on construction sites and vehicles	Contractor

Atmospheric pollution	Increase in air pollution from dust generation and improper storage of materials	Contractor
Noise pollution	Increased noise and vibration	Contractor
Health and safety of workers, residents and users	Accidents and spread of non-communicable diseases such as Covid-19 and HIV/AIDS	Contractor
Traffic and pedestrian safety	Direct or indirect hazards to public from traffic	Contractor
Conflicts between contractor and local populations	Religious, cultural and ethnic conflicts	Contractor
Competition for local resources	Increased pressure on accommodation and public services	Contractor
Disabled people	Neglecting disabled people in building plans	Contractor
Gender based violence, including sexual exploitation and abuse, and sexual harassment	Community members and other persons experiencing sexual exploitation and abuse perpetrated by project staff and coworkers being sexually harassed	Contractor

Table 11.2 Cost of monitoring implementation of environmental and social safeguards

Type of risk	Monitoring parameter	Responsibility	Cost	
			GHS	US\$
<b>Monitoring (Pre-Construction)</b>				
Noise	Number and frequency of high noise level complaints in project area	Environmental safeguards officer/ PIU	1,950	150
<b>SUB-TOTAL</b>			<b>1,950</b>	<b>150</b>
<b>Construction phase</b>				
Noise and vibrations	Number and frequency of high noise level complaints in project area	Environmental safeguards officer/ PIU	15,600	1,200
Air quality deterioration by dust and exhaust fumes	Particulate matter (PM)	Environmental safeguards officer/ PIU	19,500	1,500
Soil and groundwater contamination from wastewater and oil spills and leaks from machinery	Adequacy of arrangements for wastewater management and compliance with oil storage procedures	Environmental safeguards officer/ PIU	10,400	800
<b>SUB-TOTAL</b>			<b>45,500</b>	<b>3,500</b>

<b>Operational Phase</b>				
Building safety	Availability of fire extinguishers and smoke detectors and fire drills	Fire Department of KNUST/ Environmental Safeguards officer	2,600	200
<b>SUB-TOTAL</b>			<b>2,600</b>	<b>200</b>
<b>GRAND TOTAL</b>			<b>50,050</b>	<b>3,850</b>

## 12 Conclusion

The Regional Transport Research and Education Centre (TRECK) has the vision to be the leading hub for advancing applied research knowledge, providing high quality education, training, leadership, developing and adapting innovative technologies, and its transfer through sustained partnerships for transport, mobility and integrated logistics. In line with this vision, TRECK aims to strengthen the quality of postgraduate education and research through increased enrolment in postgraduate programmes and applied research in the thematic areas of Highway and Transportation Engineering, Transportation Logistics and Leadership.

The construction of the TRECK building is expected to impact positively on postgraduate education at the College of Engineering, the KNUST School of Business and the College of Architecture and Built Environment, which hosts the Department of Planning, by providing a conducive environment for teaching and learning and contribute immensely to achieving the vision of TRECK.

The project would however pose the risk of adverse effects on the physical and social environment during the pre-construction, construction and operational phases. These impacts however are anticipated to be of low to moderate severity and include impacts on soils, surface water and groundwater and air quality, loss of vegetation, as well as noise and vibrations. There is also a risk of accidents during the constructional phase, some conflicts with the local community, the risk of spread of diseases such as HIV/AIDs and COVID-19, risk of use of child labour. Other social risks include gender-based violence, specifically sexual exploitation and abuse and sexual harassment, which could disproportionately affect women and girls in the project area, both during construction and operational phases of the project.

While the different phases of implementation of the project have anticipated negative impacts on the biophysical and social environment, proper implementation of mitigation actions will markedly reduce the adverse impacts of the project.

The environmental and social safeguards measures presented in this report are expected to guide the implementation of the project and ensure proper compliance to National and World Bank requirements.

## References

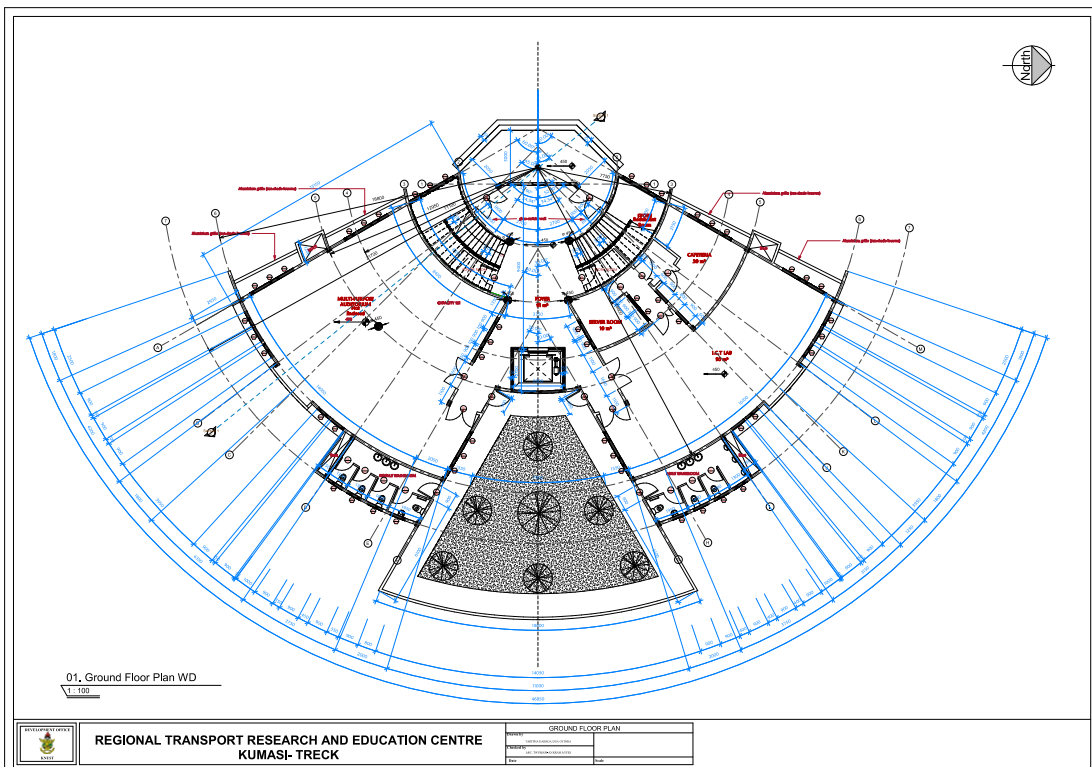
1. AAU (2018). Environmental and social management framework (Revised Edition).
2. HSE (2006). Health and safety in construction (Third Edition). Crown, UK.
3. Workmen's Compensation Act, 1987 (P.N.D.C.L. 187).
4. <https://acts.ghanajustice.com/actsofparliament/workmens-compensation-act-1987-p-n-d-c-l-187/>
5. [https://www.bcp.gov.gh/acc/registry/docs/GHANA%20NATIONAL%20FIRE%20SERVICE%20ACT,%201997%20\(ACT%20537\).pdf](https://www.bcp.gov.gh/acc/registry/docs/GHANA%20NATIONAL%20FIRE%20SERVICE%20ACT,%201997%20(ACT%20537).pdf)
6. Fire Precaution (Premises) Regulations 2003 L.I. 1724.
7. [http://lawsghana.com/post\\_1992\\_legislation/regulation\\_acts\\_table\\_of\\_content/Administrative%20Laws/FIRE%20PRECAUTION%20\(PREMISES\)%20REGULATIONS,%202003%20\(L.I%201724\)/44](http://lawsghana.com/post_1992_legislation/regulation_acts_table_of_content/Administrative%20Laws/FIRE%20PRECAUTION%20(PREMISES)%20REGULATIONS,%202003%20(L.I%201724)/44)
8. Ghana Statistical Service (2014). 2010 Population and Housing Census: District analytical report, Kumasi Metropolitan.
9. [https://www2.statsghana.gov.gh/docfiles/2010\\_District\\_Report/Ashanti/KMA.pdf](https://www2.statsghana.gov.gh/docfiles/2010_District_Report/Ashanti/KMA.pdf)
10. Land Administration Project II (LAP 2) Environmental Management Plan
11. Controlling noise on construction sites.  
<https://www.lhsfna.org/LHSFNA/assets/File/bpguide%202014.pdf>.
12. QAPU-KNUST (2018) Kwame Nkrumah University of Science and Technology Sexual Harassment Policy, Quality Assurance and Planning Unit
13. <https://www.knust.edu.gh/sites/default/files/2020-09/SEXUAL%20HARASSMENT%20POLICY%202020.pdf> . ISBN: 978-9988-2-8487-9
14. Ramboll Environ (2017). New Bugesera International Airport: ESIA Phase Stakeholder Engagement Plan
15. <https://esa.afdb.org/sites/default/files/Technical%20Appendix%207.1%20-%20Stakeholder%20Engagement%20Plan.pdf>
16. Environmental and Social Safeguards Advisory Team (2016). Operations Policy and Country Services, Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx.  
<https://thedocs.worldbank.org/en/doc/497851495202591233-0290022017/original/ManagingRiskofAdverseimpactfromprojectlaborinflux.pdf>

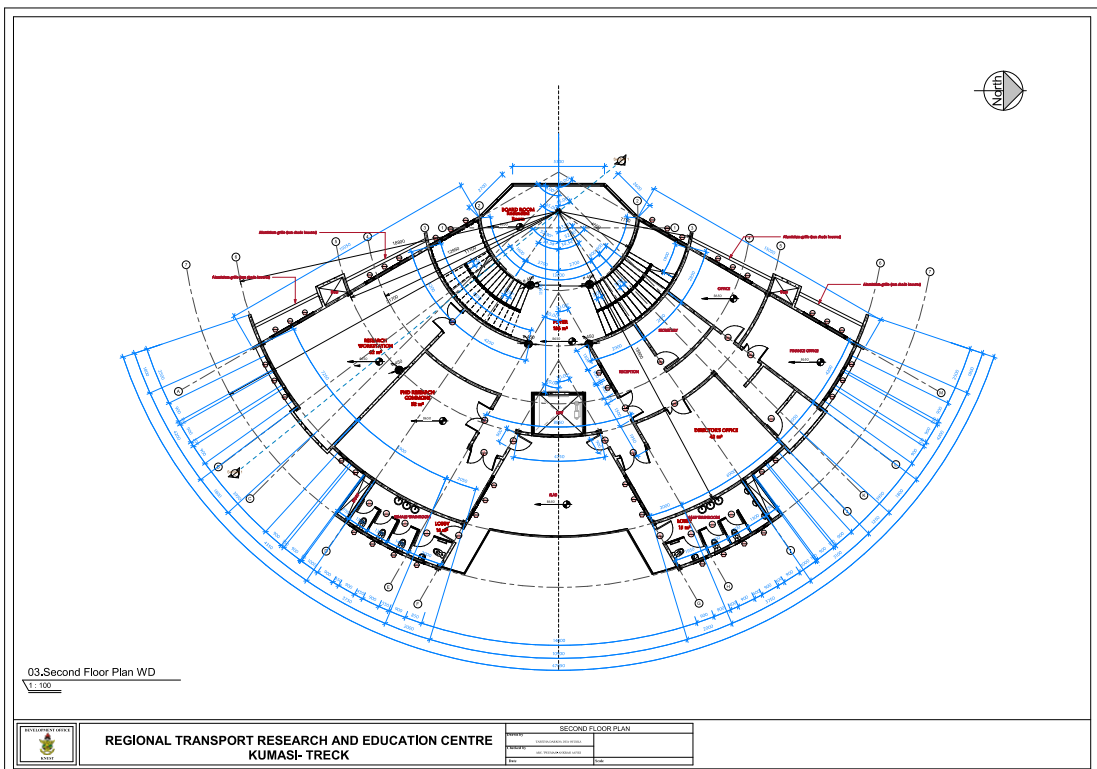
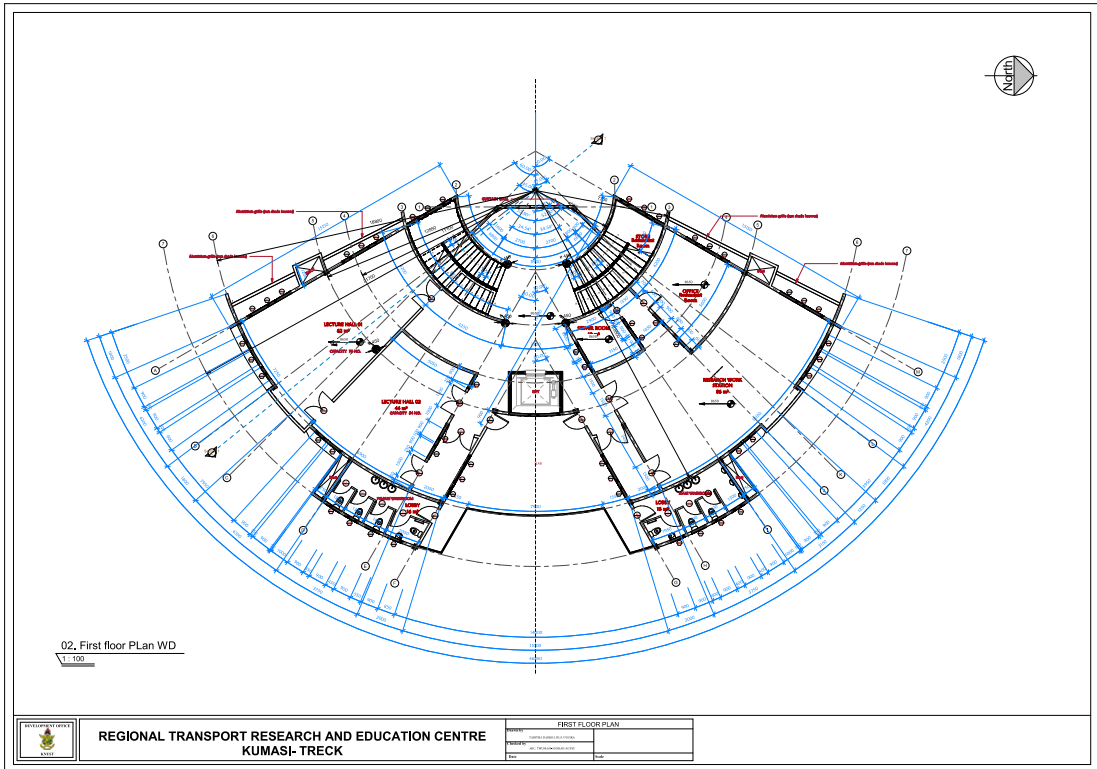
## Annex A Architectural Drawings

### REGIONAL TRANSPORT RESEARCH & EDUCATION CENTRE KUMASI (TRECK)

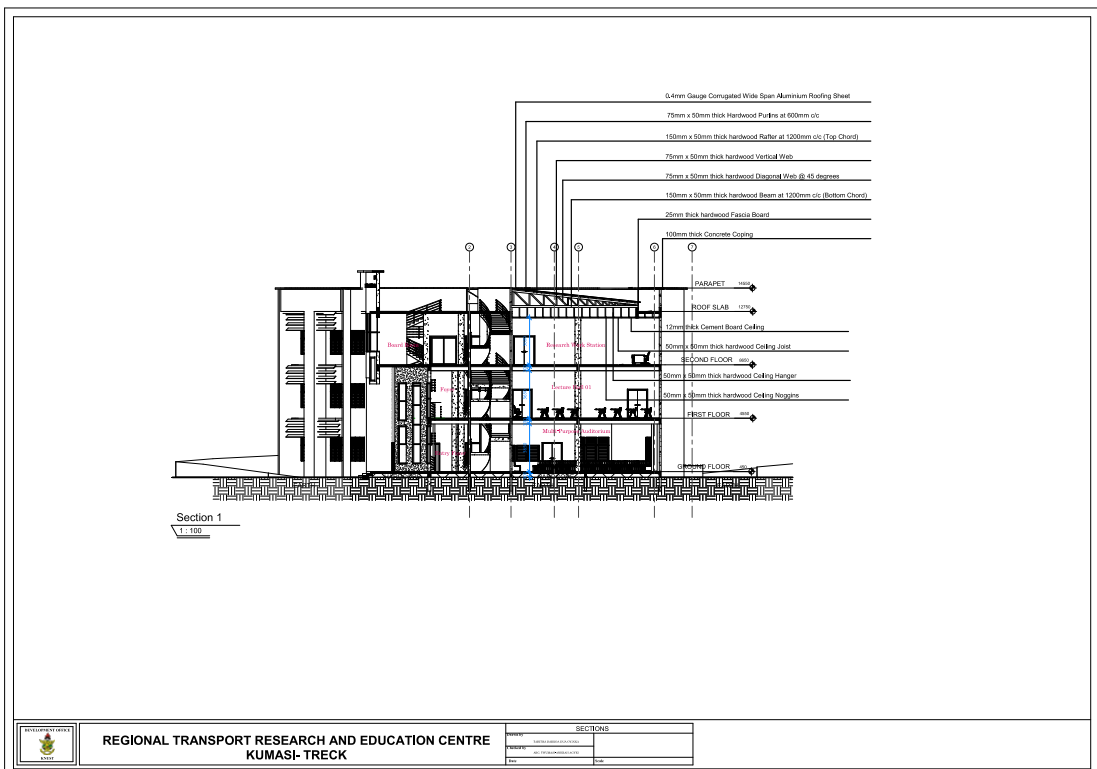
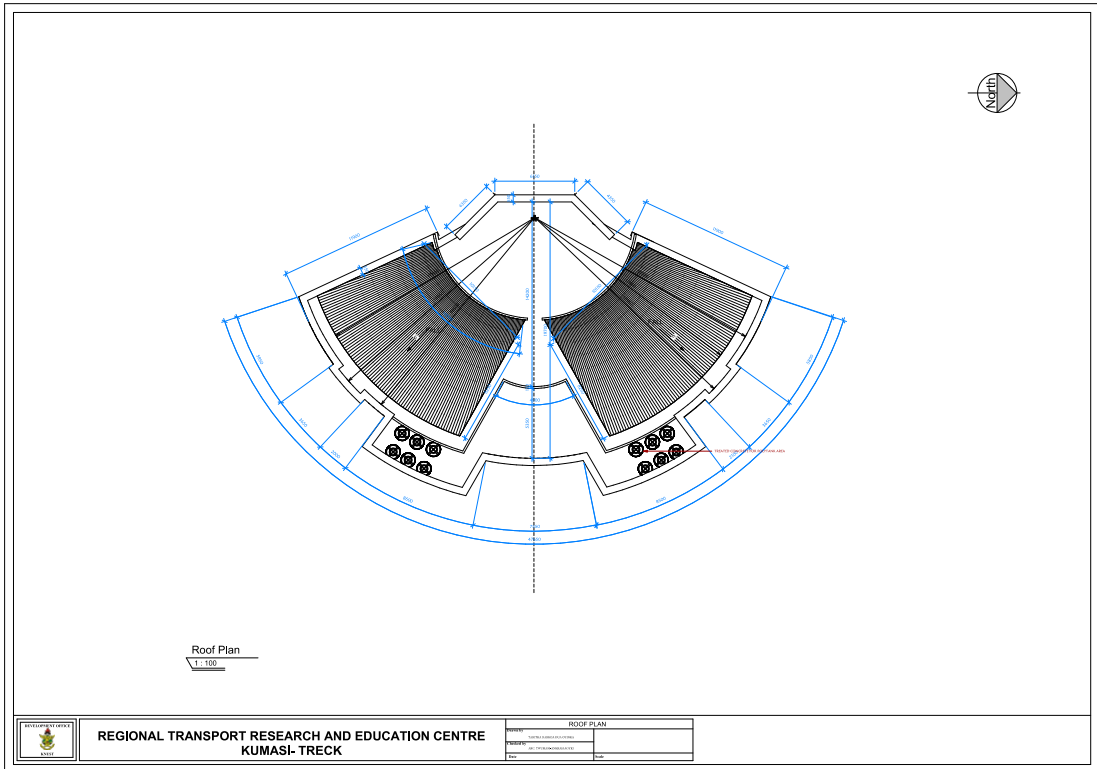


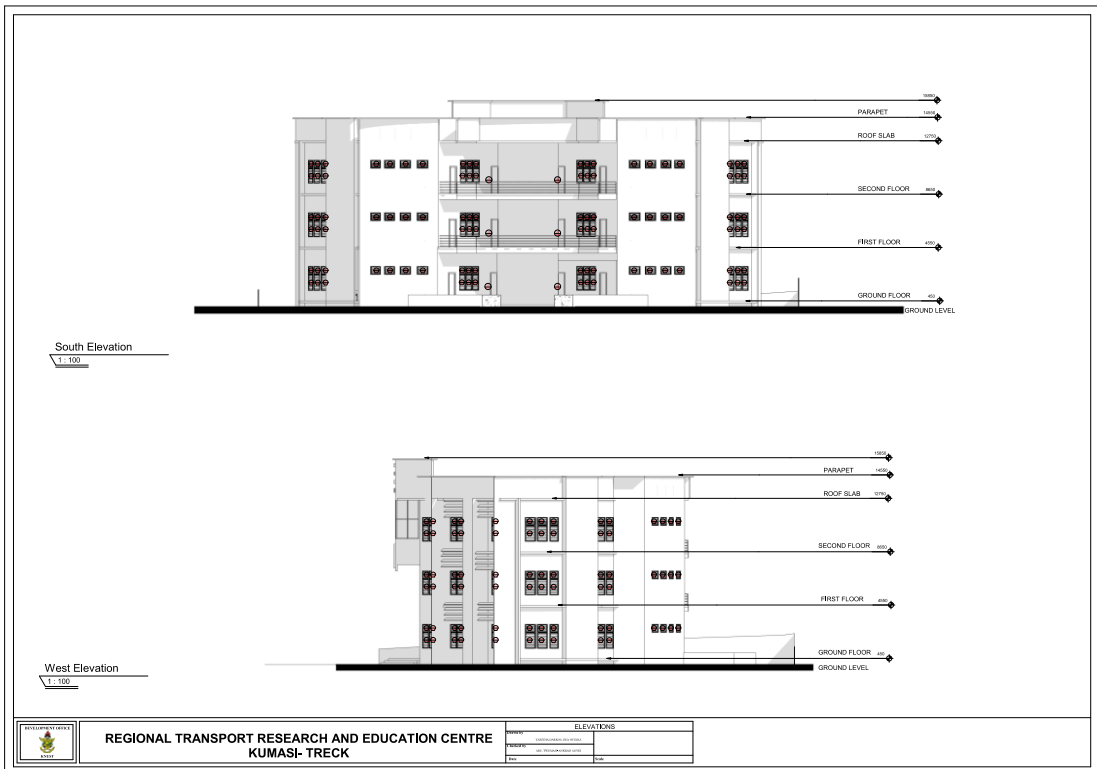
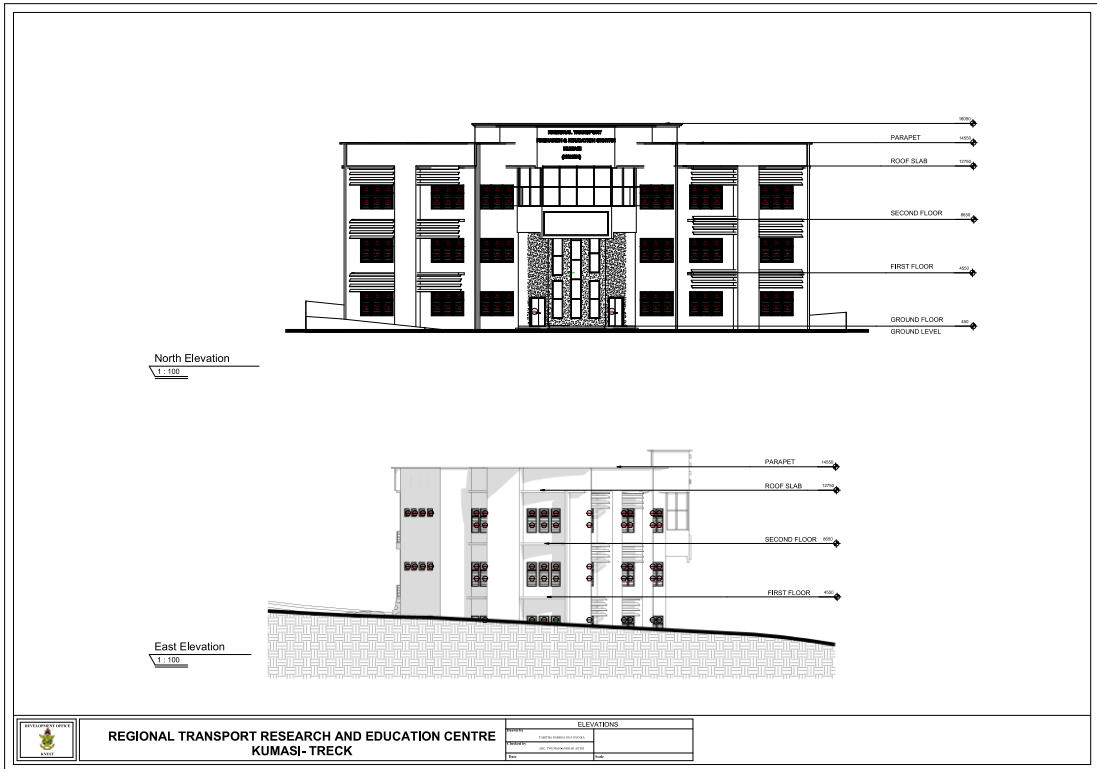
DEVELOPMENT OFFICE  
KNUST - KUMASI

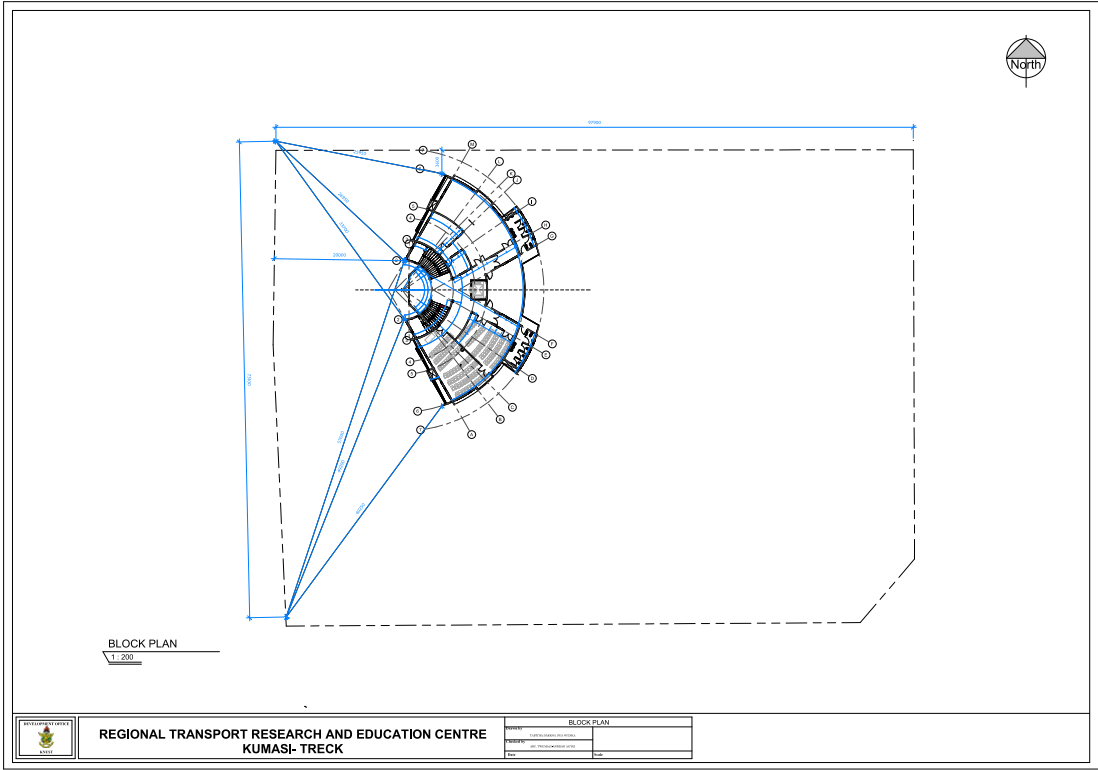












## Annex B Simplified screening for environmental impacts

	Will the activity ...	Yes	No
1	Include removal and/or cutting of a considerable number of trees?		x
2	Potentially affect the ecology of a protected area (e.g. interference on mammalian or bird migration routes)?		x
3	Potentially affect geological or soil instability (e.g., erosion, landslides and subsidence)?	x	
4	Be located in an area threatened by silting?		x
5	Is located in an area where there is no household waste management system?		x
6	Generate non-hazardous waste that will be stored on the project site?	x	
7	Involve the use of an already over-exploited groundwater?		x
8	Contribute to reducing the amount of water available to other local users?		x
9	Is located in an area where there is no sanitation network?		x
10	Occur in old establishments that may contain asbestos cement?		x
11	Include large deep excavations?	x	
12	Have important potential accidental soil erosion, groundwater pollution and contamination?	x	
13	Greatly increase air pollution and dust generation?		x
14	Greatly increase noise pollution and vibrations?	x	

## ANNEX C Sample Code of Conduct for Contractor's Personnel

*Delete this Box prior to issuance of the bidding documents.*

**Note to the Employer:**

*The following minimum requirements shall not be modified. The Employer may add additional requirements to address identified issues, informed by relevant environmental and social assessment. The types of issues identified could include risks associated with: labour influx, spread of communicable diseases, Sexual Exploitation and Sexual Abuse (SEA), Sexual Harassment (SH) in the workplace, etc.*

**Note to the Bidder:**

The minimum content of the Code of Conduct form as set out by the Employer shall not be substantially modified. However, the Bidder may add requirements as appropriate including to take into account contract-specific issues/risks.

The Bidder shall initial and submit the Code of Conduct form as part of its bid.

We are the Contractor, [enter name of Contractor]. We have signed a contract with [enter name of Employer] for [enter description of the Works]. These Works will be carried out at [enter the Site and other locations where the Works will be carried out]. Our contract requires us to implement measures to address environmental and social risks related to the Works, including the risks of sexual exploitation and abuse and sexual harassment.

This Code of Conduct is part of our measures to deal with environmental and social risks related to the Works. It applies to all our staff, laborers and other employees at the Works Site or other places where the Works are being carried out. It also applies to the personnel of each subcontractor and any other personnel assisting us in the execution of the Works. All such persons are referred to as "Contractor's Personnel" and are subject to this Code of Conduct.

This Code of Conduct identifies the behaviour that we require from all Contractor's Personnel.

Our workplace is an environment where unsafe, offensive, abusive or violent behaviour will not be tolerated and where all persons should feel comfortable raising issues or concerns without fear of retaliation.

### **REQUIRED CONDUCT**

Contractor's Personnel shall:

1. carry out his/her duties competently and diligently;

2. comply with this Code of Conduct and all applicable laws, regulations and other requirements, including requirements to protect the health, safety and well-being of other Contractor's Personnel and any other person;
3. maintain a safe working environment including by:
  - ensuring that workplaces, machinery, equipment and processes under each person's control are safe and without risk to health;
  - wearing required personal protective equipment;
  - using appropriate measures relating to chemical, physical and biological substances and agents; and
  - following applicable emergency operating procedures.
4. report work situations that he/she believes are not safe or healthy and remove himself/herself from a work situation which he/she reasonably believes presents an imminent and serious danger to his/her life or health;
5. treat other people with respect, and not discriminate against specific groups such as women, people with disabilities, migrant workers or children;
6. not engage in any form of sexual harassment including unwelcome sexual advances, requests for sexual favors, and other unwanted verbal or physical conduct of a sexual nature with other Contractor's or Employer's Personnel;
7. not engage in sexual exploitation, which means any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another. In Bank- financed projects/operations, sexual exploitation occurs when access to or benefit from Bank- financed Goods, Works, Consulting or Non-consulting services is used to extract sexual gain;
8. not engage in sexual abuse, which means the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions, including (but not limited to)
  - Rape, which means physically forced or otherwise coerced penetration, even if slight, of the vagina, anus or mouth with a penis or other body part. It also includes penetration of the vagina or anus with an object. Rape includes marital rape and anal rape/sodomy. The attempt to do so is known as attempted rape. Rape of a person by two or more perpetrators is known as gang rape;
  - Other forms of sexual assault, which means any form of non-consensual sexual contact that does not result in or include penetration. Examples include

attempted rape, as well as unwanted kissing, fondling, or touching of genitalia and buttocks not engage in any form of sexual activity with individuals under the age of 18, except in case of pre-existing marriage;

9. complete relevant training courses that will be provided related to the environmental and social aspects of the Contract, including on health and safety matters, and Sexual Exploitation, and Sexual Abuse (SEA), and on Sexual Harassment (SH);
10. report any actual or suspected violations of this Code of Conduct or any rumors thereof, regardless of whether evidence exists to substantiate the violation; and
11. not retaliate against any person who reports actual or suspected violations of this Code of Conduct, whether to us or the Employer, or who makes use of the [Project Grievance [Redress] Mechanism].

## **RAISING CONCERNS**

If any person observes behavior that he/she believes may represent a violation of this Code of Conduct, or that otherwise concerns him/her, he/she should raise the issue promptly. This can be done in either of the following ways:

1. Contact [enter name of the Contractor's Social Expert with relevant experience in handling SEA or SH, or if such person is not required under the Contract, another individual designated by the Contractor to handle these matters] in writing at this address [ ] or by telephone at [ ] or in person at [ ]; or
2. Call [ ] to reach the Contractor's hotline (if any) and leave a message.

The person's identity will be kept confidential, unless reporting of allegations is mandated by the country law. Anonymous complaints or allegations may also be submitted and will be given all due and appropriate consideration. We take seriously all reports of possible misconduct and will investigate and take appropriate action. We will provide confidential referrals to service providers who may help support the person who experienced the alleged incident, as appropriate.

There will be no retaliation against any person who raises a concern in good faith about any behaviour prohibited by this Code of Conduct. Such retaliation would be a violation of this Code of Conduct.

## **CONSEQUENCES OF VIOLATING THE CODE OF CONDUCT**

Any violation of this Code of Conduct by Contractor's Personnel may result in serious consequences, up to and including termination and possible referral to legal authorities.

### **FOR CONTRACTOR'S PERSONNEL:**

I have received a copy of this Code of Conduct written in a language that I comprehend.

I understand that if I have any questions about this Code of Conduct, I can contact [enter name of Contractor's contact person with relevant experience in handling gender-based violence] requesting an explanation.

Name of Contractor's Personnel: [insert name] Signature:

Date: (day month year):

Counter signature of authorized representative of the Contractor: Signature:

Date: (day month year):



## **ANNEX D General Outline of a Contractor's-Environmental and Social Management Plan (C-ESMP)**

### **1. ENVIRONMENTAL POLICY OF THE CONTRACTOR: GENERAL STATEMENT**

#### **2. OBJECTIVES**

- 2.1 Preparation of the ESMP
- 2.2 Responsibilities of the contractor
- 2.3 Responsibilities of sub-contractors
- 2.4 Documentation related to monitoring and control
- 2.5 Security and hygiene plan (SHP)
- 2.6 Implementing and updating the C-ESMP

#### **3. ENVIRONMENTAL MANAGEMENT SYSTEM**

- 3.1 Responsibilities of the contractor
- 3.2 Sub-contractors
- 3.3 Planning the Environment, Health, Hygiene and Security documentation
- 3.4 Request for approval of site
- 3.5 Management of non-compliances
- 3.5 Human resources
- 3.6 Controls
- 3.7 Reporting
- 3.8 Notification of accidents
- 3.9 Internal regulations
- 3.10 Training on Environmental Health, Hygiene and Security
- 3.11 Standards

#### **4. PROTECTION OF THE ENVIRONMENT**

- 4.1 Protection of surrounding areas
- 4.2 Selection of excavation and site access areas
- 4.3 Effluents
- 4.4 Water management
- 4.5 Rivers and streams
- 4.6 Emissions and dust
- 4.7 Noises and vibrations

- 4.8 Waste management
- 4.9 Clearing of vegetation
- 4.10 Erosion and sedimentation
- 4.11 Cleaning up after works
- 4.12 Documentation concerning the site (after the works)

## 5. SECURITY AND HYGIENE

- 5.1 Safety and hygiene plan
- 5.2 Daily and weekly meetings
- 5.3 Equipment and operating standards
- 5.4 Working licenses
- 5.5 Equipment and individual protection
- 5.6 Hazardous material
- 5.7 Emergency planning
- 5.8 Ability to work
- 5.9 First help
- 5.10 Health center and medical staff
- 5.11 First aid kits
- 5.12 Emergency medical evacuation
- 5.13 Health care access
- 5.14 Medical monitoring
- 5.15 Sanitary repatriation
- 5.16 Hygiene
- 5.17 Sexually transmitted diseases and infections
- 5.18 Substance abuse

## 6. LOCAL WORKFORCE AND RELATIONS WITH THE COMMUNITIES

- 6.1 Local recruitment
- 6.2 Transportation and housing
- 6.3 Meals
- 6.4 Damage to people and property
- 6.5 Occupation or acquisition of land
- 6.6 Traffic and rolling stock management
- 6.7 Gender based violence (sexual exploitation and abuse and sexual harassment)

## 7. ADDITIONAL AND SPECIFIC MEASURES

7.1 Security in risk areas

7.2 Relations with neighbouring communities

7.3 Grievances management

7.4 Gender issues

7.5 Procedure in case of incidental discovery (chance finds) of archaeological artifacts

7.6 Internal audits

## ANNEXES

ANNEX 1: Mitigation measures: Pre-construction phase

ANNEX 2: Mitigation measures: Pre-construction phase

ANNEX 3: Responsibilities to monitor and control implementation of mitigation measures

## ANNEX E Format for reporting on environmental and social management

### ENVIRONMENTAL AND SOCIAL MANAGEMENT REPORT

<b>Contract:</b>	<b>Period of reporting:</b>
<p><b>Environmental and Social management actions/measures:</b></p> <p>Summarise environmental and social management actions/measures taken during the period of reporting, including planning and management activities (e.g. risk and impact assessments), environmental and social management training, specific design and work measures taken, etc.</p>	
<p><b>Environmental and social management incidents:</b></p> <p>Report on any problems encountered in relation to environmental and social management, including its consequences (delays, costs) and corrective measures taken. Include relevant incident reports.</p>	
<p><b>Environmental and social management compliance:</b></p> <p>Report on compliance with contract environmental and social management conditions, including any cases of non-compliance.</p>	
<p><b>Changes:</b></p> <p>Report on any changes of assumptions, conditions, measures, designs and actual works in relation to environmental and social management.</p>	
<p><b>Concerns and observations:</b></p> <p>Report on any observations, concerns raised and/or decisions taken with regard to <b>environmental and social</b> management during site meetings and visits.</p>	

**Contractor Representative**

**Engineer Representative**

**Client Representative**

**Signature:**

**Signature:**

**Signature:**

**Name:**

**Name:**

**Name:**

**Title:**

**Title:**

**Title:**

## INCIDENT NOTIFICATION FORM

To be submitted within 24 hrs to Head of Project Implementation Unit and Supervising Engineer.

Reference No.	Date of Incident	Time of Incident
Location of incident		
Name of person(s) involved		
Employing Company		
Type of incident		
Description of incident	Where, when, what, how, who, operation in progress at the time (only factual)	
Immediate action:	Immediate remedial action and actions taken to prevent reoccurrence or escalation	

Signature

Name

Title

Date

## **SAMPLE FORMAT FOR INCIDENT NOTIFICATION AND REPORTING**

### **Detailed Incident Report**

The Incident Report should containing the following information where applicable:

#### 1. Incident Summary

#### 2. Specific Details

- Date
- Time
- Place
- Weather/Visibility
- Road conditions

#### 3. Persons Involved

- Name(s)
- Age(s)
- Experience
- Date joined Company
- Last Medical Check
- Current Medical Treatment
- Evidence of Drugs/Alcohol
- Last Safety Meeting attended
- Infringements/Incidents record

#### 4. Equipment Involved

#### 5. Description of Incident

#### 6. Findings of Investigation Team Interim/Final

- Investigation Team Members
- Persons Interviewed
- Recommendations & Remedial Actions
- Investigation Methodology

#### 7. Attachments

- Photographs
- Witness Statements and Initial Report