Environmental and Social Management Plan for Multi-purpose Building

Africa CDC Regional Investment Financing Program (P167916)

The Ethiopian Ministry of Health and the Ethiopian Public Health Institute

A Multi-purpose Building (Central Warehouse, PT Panel Production, Bio-bank and Equipment Maintance Centers)

Consulting Firm: Basal Consulting

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

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Executive Summary

In the last decade, Ethiopia has achieved numerous public health successes to improve health care system for the provision of quality services; there are several gaps and challenges which are not addressed as well. Most of the laboratories in the health care system including the National Reference Laboratories function in facilities with sub-optimum infrastructures, poor safety working environment, shortage of equipment and equipment maintenance centers, sustainable supplies and storage interruption, bio-bank centers to stores leftover specimens and huge gaps in the implementation of Laboratory Quality Management System. The Ethiopian Public Health Institute (EPHI) is one such institution, and a close look at its practices can help other central institutions promote public health through integration with national laboratory systems. One part of EPHI's mission is to lead the national public laboratory system. In addition the tiered system includes 13 regional reference laboratories, 300 hospital laboratories, and about 3,700 health centre laboratories but their facilities are, generally, inadequate for the scope of services proposed by the project and quality varies significantly among them. To tackle these problems, the government of Ethiopia plans to construct the proposed multipurpose building with the objective to elevate the capacity and status of the institute by establishment of a Proficiency Testing System and panel production for standard quality assurance, Bio-bank Centre for reference materials of all sorts, central warehouse to serve as logistics supply hub and laboratory equipment maintenance center to provide maintenance and calibration services for laboratory medical equipment and sustainable laboratory services without interruption of the services.

Environmental and Social Management Plan (ESMP) is describes the measures and controls developed in line with the mitigation hierarchy for the management of the impacts identified during the impact assessment process, determines the implementation schedule, roles and responsibilities, reporting and monitoring requirements. Each of the management plans defines in detail the environmental and social mitigation measures and management controls to be implemented in order to ensure compliance with the Project Standards presented under ESIA Report on relevant environmental and social issues.

The proposed multi-purpose project (which contains central warehouse, bio-bank, profiency testing panel production and laboratory equipment maintenance centres) will be situated within the campus premises of the Ethiopian Public Health Institute (EPHI) which is found in Gullele Sub City, Woreda 09, on Swaziland Street. Being an urban core, the Swaziland Street is dominated by houses and buildings occupied by commercial and business entities. This ESMP is a document that lives open to regular review and update due to changes in environmental and social conditions

as the project progresses. EPHI and all contractors / sub-contractors (who will hire to construct the complex) are responsible for the implementation of the ESMP and the general principles presented within the scope of the ESMP, as well as for the implementation of more detailed plans and procedures. Aware of this the Ethiopian government has set environmental policies, laws and regulations, and administrative frameworks requiring environmental assessment prior to the launching of any investment and development activity in the country. Two of the World Bank Safeguards Policies, namely OP/BP 4.01 and OP 4.11 are also applicable to this project and have been triggered. The fact that the proposed multi-purpose building project activities would largely entail construction of new buildings within EPHI premises, which is already owned by the proponent, it will not seek involuntary acquisition of land and hence will not trigger OP/BP 4.12 on Involuntary Resettlement. Ethiopia has ratified several international/multilateral environmental conventions and many of the principles and provisions in those conventions have been well addressed in the national environmental policies and regulations. Because Ethiopia ratified different conventions, it has international obligations on proper management of hazardous wastes and minimization of dioxins emission. This has implications for the medical waste management and proper operation of incinerators. Air emission from incineration of decontaminated wastes and effluents from the proposed multi-purpose building should fulfill the requirements of the relevant World Bank Group Environment Health and Safety Guidelines including the General Guidelines, industry specific guidelines for Healthcare Facilities and Waste Management. The project will also be in compliance with Good International Industry Practices (GIIP) such as WHO guidelines for healthcare facilities and laboratory biosafety.

The scope of this ESMP, therefore, covered; description of the proposed project, Provisions of the relevant environmental laws, identification of impacts (Positive and negative), appropriate mitigation measures, provision of an environmental management and monitoring plan outline, stakeholder consultation, GRM mechanisms and conclusion and recommendation.

The major positive impacts associated with the implementation of the proposed project includes: creation of permanent and technical job opportunity, local suppliers of construction materials will benefit by providing goods and services. The project will positively impact the health sector of Ethiopia and the African region through easing access to services for public health emergency diseases and other communicable diseases. It will help to enhance access to advanced diagnostic services for vulnerable groups; improve capacity to provide referral diagnostic services; and strengthen laboratory-based disease surveillance to provide early warning of public health emergency.

The significant potential adverse impacts of the proposed project, which were identified through this ESIA's methodology includes: generation of solid wastes, air pollution: dusts and particulates, generation of hazardous and non-Hazardous wastes, traffic related problems during construction, noise generation, increased insecurity and OHS Risks.

The above mentioned impacts will be effectively managed and where possible eliminated through the following mitigation measures: Sprinkling water on soil before excavation and periodically when operations are under way to prevent raising of dusts; Enclosing the structures under construction with dust proof nets; Controlling the speed and operation of construction vehicles; Placing signs around the site to notify people about the noisy conditions; Regular inspection and audit of waste segregation, storage and collection would be implemented to verify the accidental release, proper labeling and collection practices, Infectious solid waste generated in the PTPC, Bio-bank Centre would leave the laboratories only after decontamination using autoclave, Improve incinerators and infrastructure for waste treatment and disposal, Conduct continued sensitization and awareness creation to EPHI staff in general and the project staff on prevention of gender based violence, containment and good laboratory practices would be implemented in the proposed project facilities at EPHI as to reduce impacts, implementation of engineering and administrative control measures to avoid or minimize the release of hazardous substances into the work environment keeping the level of exposure below internationally established or recognized limits, All staff will have training in fire control through regular firefighting drills.

To ensure its sustainability, the project should proceed and adhere with the prescribed mitigation measures. Constant monitoring of the said aspects (impacts and mitigation) through close follow-up and implementation of the recommended Environmental Management and Monitoring Plans will also ensure project success. In relation to the proposed mitigation and environmental management and planning measures that will be incorporated during construction and operation phases; and the developments' input to the proponent and the general society, the proposed project is considered beneficial and important. Major concerns should nevertheless be focused towards minimizing the occurrence of impacts that will have negative impacts.

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Abbreviations and Definitions

AAEPA	Addis Ababa Environmental Protection Authority
AAWSSA	Addis Ababa Water Supply and Sewerage Authority
ACDCP	Africa CDC Regional Investment Financing Project
AMR	Anti-microbial Resistance
BMBL	Biosafety in Microbiological and Biomedical Laboratories
BSL	Biosafety Level
CDC	Centre for Diseases Prevention and Control
C-ESMP	Contractor's Environmental and Social Management Plan
CHP	Chemical Hygiene Plan
EFDA	Ethiopian Food and Drug Authority
EHS	Environment, health and safety
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
EPHI	Ethiopian Public Health Institute
E & S	Environmental and Social
ESA	Environmental and Social Audit
ESD	Engineering Service Directorate
ESCP	Environmental and Social Commitment Plan
ESIA	Environmental and Social Impact Assessment
ESIRT	Environment and Social Incidence Response Toolkit
ESHS	Environmental, Social, Health and Safety
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESS	Environmental and Social Standards
FDRE	Federal Democratic Republic of Ethiopia
GBV	Gender-Based Violence
GMU	Grant Management Unit
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
HCF	Health Care Facility
HCW	Health Care Waste

HCWM	Health Care Waste Management
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
ICSC	International Chemical Safety Cards
ICWMP	Infection Control and Waste Management Plan
MOH	Minister of Health
MSDS	Materials Safety Data Sheets
NRL	National Reference Laboratory
PIT	Project Implementation Unit
PPE	Personal Protection Equipment
PP	Panel Production
PT	Proficiency Testing
RCA	Root Cause Analysis
SEP	Stakeholder Engagement Plan
SEA	Sexual Exploitation and Abuse
SH	Sexual Harassment
VAC	Violence Against Children
WB	World Bank
WHO	World Health Organization

1. Introduction

1.1. Background of the project

In the last decade, Ethiopia has achieved numerous public health successes to improve health care system for the provision of quality services; there are several gaps and challenges which are not addressed as well. Most of the laboratories in the health care system including the National Reference Laboratories function in facilities with sub-optimum infrastructures, poor safety working environment, shortage of equipment and equipment maintenance centers, sustainable supplies and storage interruption, bio-bank centers and huge gaps in the implementation of Laboratory Quality Management System. The overall desire of the Government of Ethiopia is to have the highest possible level of health and quality of life for all its citizens, attained through providing and regulating a comprehensive package of promotive, preventive, curative and rehabilitative health services of the highest possible quality in an equitable manner. The EPHI is one such institution, and a close look at its practices can help other central institutions promote public health through integration with national laboratory systems. One part of EPHI's mission is to lead the national public laboratory system. In addition the tiered system includes 13 regional reference laboratories, 300 hospital laboratories, and about 3,700 health centre laboratories but their facilities are, generally, inadequate for the scope of services proposed by the project and quality varies significantly among them. To tackle these problems, the government of Ethiopia plans to construct the proposed multipurpose building with the objective to elevate the capacity and status of the institute by establishment of a Proficiency Testing System and panel production for standard quality assurance, Bio-bank Centre for reference materials of all sorts, central warehouse to serve as logistics supply hub and laboratory equipment maintenance centre to provide maintenance and calibration services for laboratory medical equipment and sustainable laboratory services without interruption of the services.

The overall aim of the proposed project is to strengthen the Ethiopian heath care system. The project is designed to support the government's healthcare program for the successful implementation of a basic package of minimum health services for beneficiaries through development of well-established healthcare system and strengthening of the Ethiopia Public Health Institute to meet its national and regional mandate. The construction of the proposed building will strengthen the capacity of EPHI for storing leftover specimens; producing PT samples for different laboratory sample tests provide and maintenance sustainable supply and storage of reagents,

chemicals and consumables and providing maintenance and calibration services for medical equipment's. This advances public health researches, provision of quality referral diagnostic services and timely detection of causative agents of epidemic disease outbreaks thus facilitating quick and effective response to public health threats. Ultimately, the strengthening of EPHI will allow the government to improve the national laboratory system, national and regional Antimicrobial (AMR) surveillance system and networking, sub-national, national and regional Data Management Centre (DMC) for public health, promote "data sharing and use for action", build resilient public health and emergency management systems, infrastructure, project management and human resource development. The national data management centre for health (NDMC) will support ACDC functions on data sharing, building expertise for real time surveillance and reporting, integrated data analysis, evidence translation and in establishing databases and will serve as a regional and continental hub. EPHI will require substantial data processing and electronic communication capacity to fulfill its core function and to contribute to the Africa CDC strategy in establishing a continental data sharing platform.

The project will have a significant positive impact on that enable the EPHI as a public health center of excellence to achieve its goals of detecting, and responding timely to disease outbreaks by (i) surveillance systems strengthening, including at critical Points of Entry (POEs), through developing, adapting, and disseminating guidelines, manuals, and formats; (ii) training the surveillance workforce to the lowest levels; (iii) preventing disease spread through expanding four international travellers' vaccination centres, 22 screening points, and 2 airport isolation sites; (v) strengthening response to public health emergencies through equipping and networking of PHEOCs in Ethiopia; (iv) creating a continent-wide platform for sharing experiences on surveillance and public health emergency response coordination.

This project will also has a substantial investment in human capital (all relevant staff are adequately capacitated with work-related know-how and expertise) to ensure effective emergency surveillance and response activities, to fully utilize the laboratories, for running bio-bank and panel production centres, for building competent workforce for data management and AMR, to ensure smooth and efficient operation of the whole system and to facilitate research collaborations with national, Africa CDC and international partners.

In spite of the above positive impact, the proposed mixed use complex construction development project will have negatively impact on the environment and societies in several ways during

construction, operation and decommissioning phases of their project life cycles. Therefore, Environmental and social Impact Assessment report assessed both the significant positive and negative impact that the proposed mixed use complex development project is likely to have on both the physical and socio-economic environment and the mitigation measures to be taken in order for sound decision making.

1.2. Purpose and Scope

The purpose of ESMP is to provide a general framework for the Environmental and Social Management System (ESMS) planned to be implemented within the scope of the project, and to provide the necessary management tools to ensure compliance with the Project standards in achieving the environmental and social objectives set within the scope of ESIA (ESIA for Multi-purpose building, which has been prepared and approved by Ethiopian Environmental Protection Authority). Besides the legal and institutional requirements for the successful implementation of the relevant management plans, ESMP also determines the roles and responsibilities of each concerned bodies (Engineering Service directorate /ESD/, EPHI, the consultant and the contractor/ sub-contractors). The main objectives of ESMP are as follows:

- To provide an overview of the environment, health and safety (EHS), socio-economic and cultural heritage policies, standards and legal legislation that the Project is obliged to comply with,
- To provide guidance on how to manage EHS risks in the construction phase of the Project in compliance with EHS policies, standards and legal regulations and to ensure that Project commitments are fulfilled,
- To determine the roles and responsibilities of ESD/EPHI and contractors to ensure compliance with EHS requirements during the construction phase of the project,
- To ensure that construction activities are properly checked to ensure that the Project is in compliance with EHS policies, standards and legal regulations;
- Ensure reporting systems are developed and streamlined to deliver EHS compliance performance;
- Enabling ongoing development and EHS compliance coverage.

ESMP sets out the approach planned by the Project, thus ESD/EPHI and its consultants and contractors, to prevent/reduce the identified environmental and social impacts. Environmental and social management plans within the ESMP, covering the construction and commissioning phases,

have been prepared to be updated in line with the changing conditions as the Project progresses and the outputs regarding the stakeholder engagement process. In the operational phase of the Project, if the conditions determined in the ESIA process differ, the risks and impacts arising from the Project will be re-evaluated. At this stage, a new ESMP may be prepared to manage the activities, adapted to the new conditions.

1.3. Description of the Project

1.3.1. Importance of the project

The construction of the proposed building will strengthen the capacity of EPHI for storing leftover specimens with full information collected from health facilities (bio-bank); producing PT samples for different laboratory sample tests (PCPT); provide and maintain sustainable supply and storage of reagents, chemicals and consumables (central warehouse) and providing maintenance and calibration services for medical equipment's (laboratory equipment center). This will strengthen the capacity of EPHI for advanced public health researches, provision of quality referral diagnostic services and timely detection of causative agents of epidemic disease outbreaks thus facilitating quick and effective response to public health threats. Ultimately, the strengthening of EPHI will allow the government to improve the national laboratory system, national and regional Antimicrobial (AMR) surveillance system and networking, sub-national, national and regional Data Management Centre (DMC) for public health, promote "data sharing and use for action", build resilient public health and emergency management systems, infrastructure, project management and human resource development.

Ethiopia's public health system is continually tested by both recurrent and unexpected disease outbreaks and faces the continual challenge of managing the health consequences of natural and manmade disasters, crises, and conflict. While in principle all Ethiopian public health facilities provide Public Health Emergency Management (PHEM) services, the range and quality of such services differs significantly by facility type, region, rural/urban location, and managing authority. Moreover, Ethiopia's proximity to multiple fragile states and its status as a major land and air transportation hub greatly exacerbates its own vulnerability to epidemic disease simultaneously with exposing the African continent to the potential undetected rapid spread of such disease. This project will enable the EPHI as a public health center of excellence to achieve its goals of detecting, and responding timely to disease outbreaks by (i) surveillance systems strengthening, including at critical Points of Entry (POEs), through developing, adapting, and disseminating

guidelines, manuals, and formats; (ii) training the surveillance workforce to the lowest levels; (iii) preventing disease spread through expanding four international travellers' vaccination centres, 22 screening points, and 2 airport isolation sites; (v) strengthening response to public health emergencies through equipping and networking of PHEOCs in Ethiopia; (iv) creating a continent-wide platform for sharing experiences on surveillance and public health emergency response coordination.The World Bank Group financed ACDCP is designed as multiphase programmatic approach and it will be implemented in Africa CDC, Ethiopia and Zambia. The Project Development Objective is to strengthen the Africa CDC's regional disease detection and response systems and link them together into an effective network of networks. It will support Africa CDC, Ethiopia and the Southern Africa regional collaborating center in Zambia to establish infectious disease control systems for the benefit of African Union member states and its citizens. In Ethiopia activities to be financed by the project under Component 2.2, include, inter alia: (i) the design, construction, equipping and furnishing and maintenance of a Biosafety Level 3 (BSL-3) national reference laboratory; (ii) Establishment of a Proficiency Testing System and panel production for standard quality assurance, bio bank centre for reference materials of all sorts, central warehouse to serve as logistics supply hub for Africa CDC and the East Africa RCC countries (Multi-purpose Building); (iii) Construction, equipping and furnishing of 15 laboratories along Ethiopia's borders; (iv) Equipping and furnishing 8 BSL-2 district laboratories already constructed by the Global Fund; and (v) a set (4) of programs designed to improve laboratory capacity building and operational effectiveness.

This ESMP (and its ESIA) apply to the construction of multi-purpose building facilities of the EPHI, and that the Environmental and Social safeguards instrument for the remaining investments under Component 2.2 (Construction, equipping and furnishing of 15 reference BSL-2 laboratories along Ethiopia's borders; Equipping and furnishing 8 BSL-2 district laboratories already constructed by the Global Fund) are contemplated in a separate ESMF[1] , under which the MOH screens sub projects and submits them to the Environmental Protection Authority for approval, with clearance by its Regional entity.

This project will also has a substantial investment in human capital (all relevant staff are adequately capacitated with work-related know-how and expertise) to ensure effective emergency

[1] (FDRE Environmental and Social Management Framework (ESMF) for Africa CDC Regional Investment Financing Program (Revised ESMF Report), 2019)

surveillance and response activities, to fully utilize the laboratories, for running bio-bank and panel production centers, for building competent workforce for data management and AMR, to ensure smooth and efficient operation of the whole system and to facilitate research collaborations with national, Africa CDC and international partners.

Therefore, the Ethiopian government planned to construct the proposed multi-purpose building in the premise of the EPHI using financial support from the World Bank to implement "Africa CDC Regional Investment Financing Program (ACCDP)". The main purpose of the proposed project is to construct the multi-purpose building (which contains Proficiency Testing System and panel production, Bio-bank, Laboratory equipment maintenance centers and central warehouse) to establish a Proficiency Testing System and panel production for standard quality assurance, bio-bank Centre for reference materials of all sorts, central warehouse to serve as logistics supply hub for Africa CDC and the East Africa countries.

1.3.2. Location of Project Site

The proposed multi-purpose building project will be located in Addis Ababa, Capital City of Ethiopia. It is specifically located within the campus premises of the EPHI which is found in Gullele Sub City, Woreda 08, on Swaziland Street. Addis Ababa is constituted of ten sub cities and Gulele sub-city is situated in the Northern part of the Capital City. It is bordered by Oromiya Special Zone to the North, Kolfe Keranyo sub city to the west, Addis ketema and Arada sub cities to the south, and Yeka sub city to the east respectively.

The proposed project will be situated within the campus premises of the EPHI which is found in Gullele Sub City, Woreda 09, on Swaziland Street. Being an urban core, the Swaziland Street is dominated by houses and buildings occupied by commercial and business entities. The EPHI campus is surrounded by mixed residential and business areas such as Ethiopian commercial Bank branch (about 1.5 km far away from EPHI incinerator facility), Ethiopian pharmaceutical supply Agency (about 1 km far away from EPHI incinerator facility), shops (about 1 km far away from EPHI incinerator facility), pharmacies (about 1 km far away from EPHI incinerator facility), and health care facilities (about 2 km far away from EPHI incinerator facility), are common on this woreda, EPHI is being the oldest Centre have close proximity to Paulos Hospital Millennium Medical College (but the Medical College school is far about 1 km away from EPHI incinerator facility). Although infectious, it was estimated to be about 1 kg (2 kg per week). Although there Sensitive receivers such as residential, educational institution; healthcare facilities; shops sensitive

to pollution are identified, there are no sensitive receivers within and in the vicinity of EPHI. As per the discussion conducted with woreda city administration, forest and environmental protection office, community leader, and community representatives.

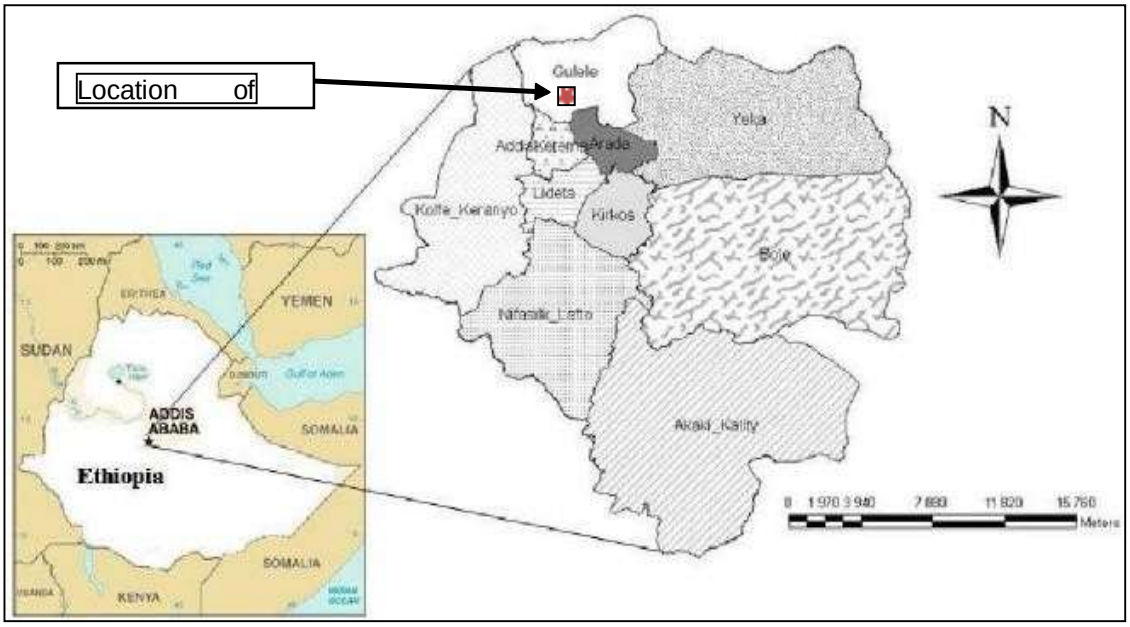


Figure 1: Location of Project Site

The EPHI Campus is approximately 80,000 m^2 in area (Figure 2). The site selected is relatively flat and is found inside the premises of EPHI. There is a relatively large unutilized space available for development, some of which is covered with grass and indigenous trees towards the Centre of the campus and tall eucalyptus trees along the southern perimeter. A small portion of the site designated for the development of the proposed multi-purpose building is currently occupied by G+0 office buildings of EPHI which will be demolished and cleared.

Figure 2: Google Earth Map of EPHI campus and its surroundings

1.3.3. Description of the proposed Multi-purpose Building

The proposed multi-purpose building would be designedto lie on 3,480m^2 area. In conformity with the city master plan, the proposed building will be a 9 story building (2B +G+9) that fulfils the minimum requirements for height of buildings in the designated area. The 2B + G+9 multi-purpose building will have a total gross floor area of 22,780m^2, consisting of Proficiency Testing System and panel production for standard quality assurance, Bio-bank Centre for reference materials of all sorts, central warehouse to serve as logistics supply hub and Office spaces, including related support spaces. The project will have different activities that are executed in sequence and some in parallel like deep excavation and earth works, masonry work , concrete work (mixing, pouring and casting), roofing work, aluminum & metal works, finishing, painting, glazing, sanitary installation and electrical installation works.

The multi purpose building will consist of Proficiency Testing Panel Production Centre (PTPC), Biobank Centre, Central Warehouse, a laboratory medical equipment maintenance Centre and office spaces. Design of these facilities have based in part on the types of work that will occur in

each facility and the inherent risks associated with that work. The design of the facilities has followed the principles of biosafety and biosecurity. Biosafety is ensured by introducing various design criteria of laboratory control and containment, through laboratory design and access restrictions, use of containment equipment, and safe methods of managing infectious materials in a laboratory setting. On the other hand, in order to ensure biosecurity, the project envisaged development of strict procedures for securing" or limiting access to the facilities, research materials and information during operational phases.

Proficiency Testing Panel Production Centre (PTPC): The PTPC will produce PT samples for Microbiology, Hematology, Parasitology, HIV Viral Load, HIV Early Infant Diagnosis (EID), serological tests, biochemistry, blood transfusion, immunological tests, mycology, and other samples. The PTPC will characterize samples, store, and transport and distribute to BSL 2 laboratories as well as preparing report and providing feedback to participant laboratories. The agents used in the PTPC have moderate individual risk and low community risk. It is usually a pathogen that can cause human or animal disease but is unlikely to be a serious hazard to laboratory workers, the community, livestock or the environment. The exposures may cause serious infection, but effective treatment and preventative measures are available and their risk of spread of infection is limited. Processes that include the generation of aerosols should be conducted in primary containment such as biological safety cabinets. The PTPC generally designed like BSL 2 laboratory that recommended by CDCs BMBL recommended design criteria for BSL-2 laboratories. The PTPC benches and other furniture will be installed based on the design layout. The floors, walls and working services would be designed to withstand accidental spills of the chemicals used in the laboratory. Floors would be cove up walls and cabinets to ensure spills cannot penetrate underneath floors/cabinets.

PTPC facility design criteria/requirements generally included in the proposed project consists of:

- Lockable self-closing doors with windows for viewing the occupants.
- Sinks for hand washing would be available
- The Centre is designed so that it can be easily cleaned. Walls would be painted with washable, hard non-porous paints.
- Bench tops would be impervious to water, resistant to heat and any chemicals that may be used in the laboratory.

- A method for decontaminating all laboratory waste would be available within the facility
- An eye wash station shall be readily available or centrally located in the corridors.
- Single-pass inward directional airflow is recommended.
- A method for decontaminating all laboratory waste would be available within the facility
- An eye wash station shall be readily available or centrally located in the corridors.
- Furniture would be able to support anticipated loads and uses. Bench tops would be impervious to water, resistant to heat and any chemicals that may be used in the laboratory. In addition, chairs used in the bio-bank work would be covered with nonporous easily cleanable material.

Bio-bank Centre: EPHI critically needs to establish a bio-bank that meet international standard. The planned bio-bank stores leftover specimens with full information collected from health facilities. The bio-bank infrastructure and storage system depend on the type of material being stored, the required storage conditions, the anticipated period of storage, and the intended use of the materials, and the storage system is fundamental to maintaining high sample quality. The data and databases related to bio-specimen annotation, quality, storage location, and use, are important attributes of bio-bank infrastructure. Bio-specimen storage infrastructure will have two types of storage systems are used for bio-specimen storage: ultra-low-temperature (or low-temperature) storage systems and ambient- temperature storage systems. Ultra-low temperature" can be defined as temperatures below −80 °C (e.g. LN2), and "low temperature" as temperatures between 0 °C and −80 °C details are described in the ESIA. Facility design criteria/requirements for bio-bank generally included in the proposed multi-purpose building project consists of:

- Lockable self-closing doors with windows for viewing the occupants.
- Sinks for hand washing would be available
- The bio-bank is designed so that it can be easily cleaned. Walls would be painted with washable, hard non-porous paints.
- Bench tops would be impervious to water, resistant to heat and any chemicals that may be used in the laboratory.
- Single-pass inward directional airflow is recommended.
- Sinks for hand washing would be available

- ☛ Finishes and surfaces that can be easily cleaned and will not harbour potential contamination if spills were to occur like carpet and cloth.
- ☛ Spaces between benches, freezer/refrigerators, and equipment would be accessible for cleaning.

Central Warehouse: The warehouse is an auxiliary facility and its main utility is to provide and maintain sustainable supply and storage of reagents, chemicals and consumables bound to activities of the BSL 2 and BSL 3 laboratories. The furniture will be installed based on the design layout. The floors, walls and working services would be designed to withstand accidental spills of the chemicals stored. Emergency shower, an eye wash station, fire alarm, and other security devices would be readily available and centrally located in the corridors. Spaces between shelve, tables benches, freezer/refrigerators, and equipment would be accessible for cleaning. All building materials would be chemical resistance, especially towards the stored chemicals. In particular, the flooring will be damp-and chemical-proof. Moreover, in order to avoid contact with hazardous substances all surfaces would be easy to clean. At the same time skid-proof flooring will prevent occupational accidents due to falls. Storage facilities would also preferably be constructed of non-combustible materials so as to avoid dissemination of hazardous chemicals, should a fire threaten the storage facility.

The central warehouse is allowed only to authorize personnel. Therefore, constructive arrangements would be made in order to control access. Furthermore, access to the facility and its alleyways will be large enough and designed according to the activities carried out (use of handling equipment, for instance). In case of emergency, the rescue teams would also be able to access the storage facility quickly. Thus, stairs and steps close to the entrance of the facility would be avoided. There would be emergency exits on the facility size and configuration. Escape doors would be designed in such a way that they open to the outside and that they would be opened easily from the inside without the use of any key. An eye wash station, first aid kits fire alarm, and other security devices would be readily available and centrally located in the corridors

Laboratory medical equipment maintenance Centre: equipment maintenance Centre is also an auxiliary facility and its main utility is to provide maintenance and calibration services for BSL 3 laboratory medical equipment and NRL for the sustainable laboratory services without interruption of the services. The floors, walls and working services would be designed

to withstand accidental spills of the chemicals stored and well ventilation. Spaces between shelve, tables benches, maintenance and calibration equipment, and equipment would be accessible for maintenance and cleaning. Enough space for storage of spare parts and tools. An eye wash station, first aid kits fire alarm, and other security devices would be readily available and centrally located in the corridors.

An access to the facility and its alleyways will be large enough and designed according to the activities carried out (use of handling equipment, for instance). In case of emergency, the rescue teams would also be able to access the storage facility quickly. Thus, stairs and steps close to the entrance of the facility would be avoided. There would be emergency exits on the facility size and configuration. Escape doors would be designed in such a way that they open to the outside and that they would be opened easily from the inside without the use of any key.

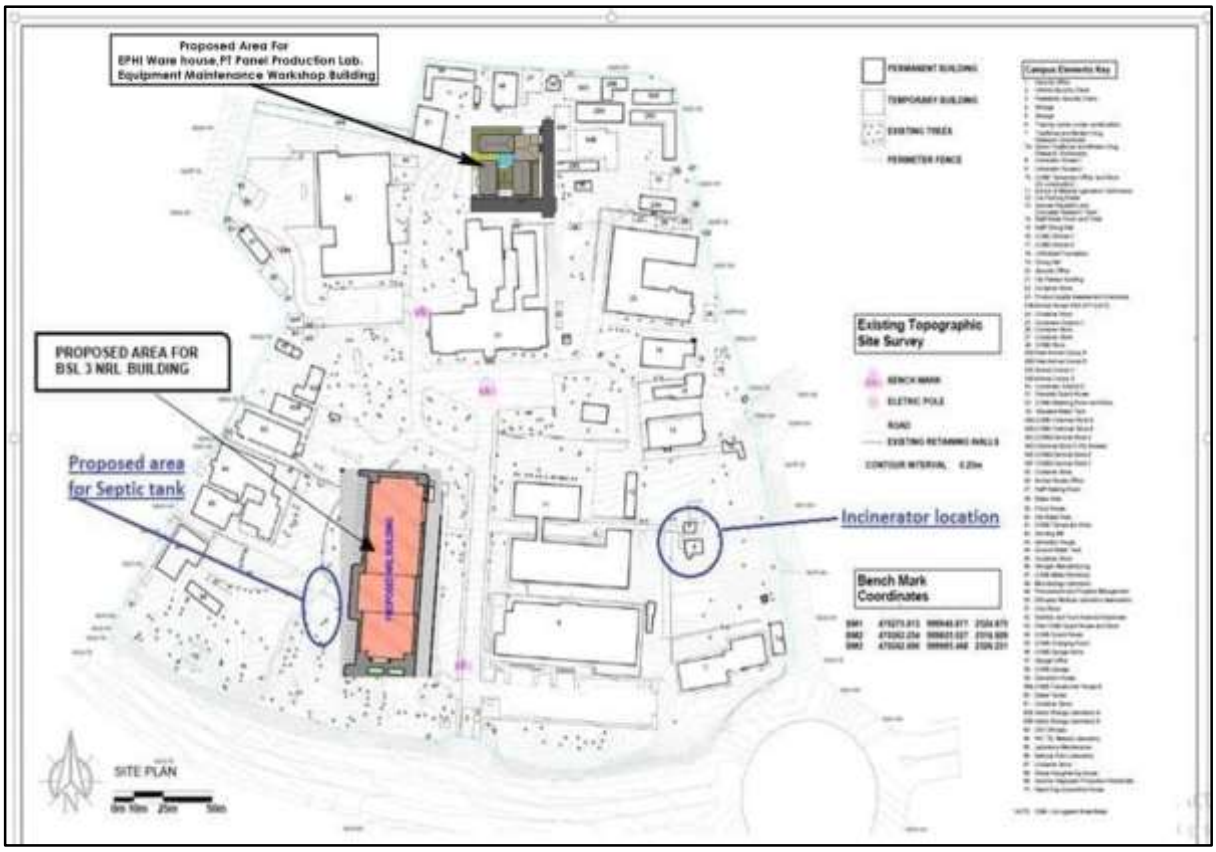


Figure 3: Site map showing the location of the Multi-purpose building at EPHI

2. National and international Environmental and Social Legislation

2.1. National Regulatory Framework

This section describes the legal and regulatory requirements for environmental impact assessment and management in Ethiopia. Under this section the relevance of these requirements to ACDC regional financing investments is assessed with due consideration of the requirements and guidelines (see detail legal & regulatory requirement assessment in ESIA report).

Constitution

The constitution of the Federal Democratic Republic of Ethiopia (FDRE) provides the overriding principles for all legislative frameworks in the country.

Article 43: The Right to Development identifies citizens' right to improve living standards and sustainable development and participates in national development and to be consulted with respect to policies and projects affecting their community.

Article 44: Environmental Rights stipulate that all citizens have the right to a clean and healthy environment; and those who have been displaced or whose livelihoods have been adversely affected as a result of state programs have a right to commensurate monetary or alternative means of compensation, including relocation with adequate state assistance.

Article 92: Environmental objectives are identified as government would endeavor to ensure that all Ethiopians live in a clean and healthy environment.

The National Conservation Strategy (1995) takes a holistic view of natural and cultural resources and seeks to present a coherent framework of plans, policies, and investments related to environmental sustainability.

Environmental Policy of Ethiopia

Environmental Proclamations Regulation and Guidelines Relevant to this project

- Proclamation 513/2007, Solid Waste Management
- Proclamation 299/2002, Environmental Impact Assessment
- Proclamation 300/2002, Environmental Pollution Control
- Proclamation 295/2002, Establishment of Environmental Protection Organs
- Proclamation 159/2008, Prevention of Industrial Pollution Regulation:

- Guideline for Environmental Management Plan (draft), May 2004:
- Waste Handling and Disposal Guideline, 1997:
- Proclamation on Expropriation of Landholdings for Public Purposes and Payment of Compensation: Proclamation 455/2005:
- Regulation for the payment of Compensation for property Situated on Landholdings
- Expropriated for public purposes: Regulation No. 135/2007:
- Proclamation 456/2005 Rural Land Administration and Land Use:
- Proclamation 200/2000, Public Health Proclamation;
- Proclamation 189/2010, Ethiopian Food, Medicine and Health Care Administration
- Health and Safety Guidelines for Public Health Laboratories in Ethiopia, 2010:
- National Hygiene and Sanitation Strategic Action Plan 2015/16-2019/20:
- Medicinal Waste Management and Disposal Directive, 2011
- Proclamation 197/2000, Ethiopian Water Resources Management Proclamation
- Labour Proclamation 377/2003:
- Ethiopian Water Resources Management Proclamation, No. 197/2000:
- Proclamation 200/2000, Public Health Proclamation;

Environmental and Social Impact Assessment Guidelines and Directives

- Environmental Impact Assessment Guideline, May 2000
- Environmental and Social Management Plan Preparation Guideline, Nov. 2004
- Directive Issued to Determine Projects Subject to Environmental Impact Assessment, Directive No.1/ 2008:
- ESIA Procedural Guideline (draft), November 2003:

2.2. International Environmental and Social Standards

Project standards have been established within the framework of the policies and procedures developed by the international financial institutions regarding the evaluation and management of the environmental and social impacts of the projects they finance.

World Bank Safeguard Policies and Guidelines

This project has been benchmarked against World Bank Group (WBG) standards. These standards, practices or guidelines are discussed below.

2.2.1. World Bank Operating Policies

The World Bank requires environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. During project preparation, the World Bank examines the implications of the proposed project for a series of policies below: The applicable World Bank safeguard policies as it applies to the proposed multi-purpose building project are summarized in Table 1.

Two of the World Bank Safeguards Policies, namely OP/BP 4.01 and OP 4.11 are also applicable to this project and have been triggered. The project will not trigger the rest of the World Bank Safeguard Policies. The fact that the proposed multi-purpose building project activities would largely entail construction of new buildings within EPHI premises, which is already owned by the proponent (Annex IV), it will not seek involuntary acquisition of land and hence will not trigger OP/BP 4.12 on Involuntary Resettlement. Ethiopia has ratified several international/multilateral environmental conventions and many of the principles and provisions in those conventions have been well addressed in the national environmental policies and regulations.

Table 1: World Bank – Applicable Operational Policies, Bank Procedures

Safeguard Policies	Triggered?	Explanation (Optional)
Environmental Assessment OP/BP 4.01	Yes	The project will finance the construction of a multi-purpose building. The proposed project is Category B. It triggered OP 4.01. Thus, the present ESMP has been prepared in response to OP/BP 4.01.
Physical and Cultural Resources (OP 4.11)	Yes	The proposed multi-purpose building is going to be built within the premises of the EPHI, where there are no known physical and cultural heritage sites. However, since excavation will be conducted before constructing the proposed building, it will be inappropriate to neglect the possibility of chance finds. Thus, the proposed project will trigger by this project.
Involuntary Resettlement OP /BP 4.12	No	The proposed multi-purpose building is going to be built within the existing vacant land spaces found within EPHI campus owned by itself. The project will not require acquisition of additional land and will not affect private properties. Thus OP /BP 4.12 will not be triggered by this project.

Natural Habitats OP/BP 4.04	No	The proposed multi-purpose building is going to be built in the EPHI campus found in predominantly urban core settlement. The project area is devoid of any natural habitat, park or wildlife sanctuaries. Implementation of the project will not affect any natural habitat and hence OP /BP 4.04 will not be triggered by this project.
Forests OP/BP 4.36	No	The proposed multi-purpose building is going to be built in the EPHI campus found in predominantly urban core settlement. The project area is devoid of any natural forest and park. Implementation of the project will not affect any natural forest and hence OP/BP 4.36 will not be triggered by this project.
Pest Management OP /BP 4.09	No	The proposed multi-purpose building will apply chemicals at Laboratory scale for carrying out chemical and biological experiment and analysis during operation. These laboratory chemicals are essentially not pesticides. The proposed project may also handle experimental vectors in small quantity not amounting pest. Thus, OP/BP 4.09 won't bet triggered.
Indigenous Peoples OP/BP 4.10	No	The project will not trigger OP/BP 4.10.
Safety of Dams OP/BP4.37	No	The project will not trigger OP/BP 4.10.
Projects on International Waterways OP/BP 7.50	No	The project will not trigger OP/BP 4.10.
Projects in Disputed Areas OP/BP 7.60	No	The project will not trigger OP/BP 4.10.

2.2.2. Relevant EHS guidelines (World Bank Group) for the project

The Environment Health and Safety general and sector guidelines provide information on a variety of issues which need to be adopted to mitigate adverse environmental and safety issues that may likely arise during the implementation of the project. The most relevant of these guidelines to the project include the following:

- EHS Guideline for Health Care Facilities
- EHS General Guideline

2.2.2.1. EHS Guidlines for Health Care Facilities

- The EHS guideline for Health Care Facilities provide specific guidance on a range of issues involving HCF design considerations, environmental aspects consisting of waste management (solid, air emissions and wastewater), occupational health and safety, as

well as community health as applicable to health care facilities. The guideline provides important mitigation recommendations in the aforementioned areas which are applicable to these project activities and hence the document was consulted and applied in the ESMF as appropriate.

2.2.2.2. EHS General Guideline

- The EHS general guideline section 1 to 4 provides guidance on prevention and control of environmental, occupational health and safety, community health and safety, as well as on construction and decommissioning impacts that may occur during new project development, at the end of the project life-cycle, or due to expansion or modification of existing project facilities. As the project is construction of 2B+G+9 multi-purpose building which will involve manual labor work activities, section 2.0 and 4.0 of the EHS general guidance provides some appropriate strategies and recommendations useful to minimize occupational health and safety hazards and demolition waste management. It describes the sources of hazards and recommended strategies for the prevention of risks associated with over-exertion, slips and falls, work in heights, struck by objects, and working in confined spaces and excavations in construction and decommissioning sites. These recommendations of the EHS guidance are highly applicable for the project and would need to be considered during course of project implementation.

Under its "General EHS Guidelines, the World Bank has several guidelines, many of which are applicable to various components of the proposed project namely:

- Air emissions from onsite waste combustion units ("incinerators")
- Hazardous waste management
- Noise
- Occupational health and safety (against biological and radiological hazards).
- Community health and safety including traffic safety such as during project construction or disease prevention (where incinerators emission waft into and affect not only local communities but also patients visiting or admitted in hospital including their attendants and the hospital staff).
- Construction and decommissioning.

2.2.2.3. Relevant World Health Organization (WHO) and Center for Disease Control (CDC) Guidelines

This Project involves construction/civil works which will involve a large work force, together with suppliers and supporting functions and services. The work force may comprise workers from national, regional, and local labor markets. They may need to live in on-site accommodation, lodge within communities close to work sites or return to their homes after work. Given the complexity and the concentrated number of workers, the potential for the spread of infectious disease (COVID-19) in projects involving construction is extremely serious, as are the implications of such a spread. Projects may experience large numbers of the work force becoming ill, which will strain the project's health facilities, have implications for local emergency and health services and may jeopardize the progress of the construction work and the schedule of the project.

Given the unprecedented nature of the COVID-19 pandemic, it is unlikely that the existing construction/civil works contracts will cover all the things that a prudent contractor will need to do. This project triggered COVID-19 spread. Thus, some of the WHO and CDC guideline documents will be referred and applied in this project includes:

- ESF/safeguards interim note: COVID-19 considerations in construction/civil works projects, April, 2020
- Technical guidance Coronavirus disease (COVID-19): Risk communication and community engagement.
- Interim Guidance: COVID-19: Occupational health and safety for health workers, February, 2021
- WHO Interim Guidance for Technical Specifications of Personal Protective Equipment for COVID-19, November 2020.

3. Environmental and Social Impacts and Mitigation Measures

In this chapter, identification, prediction and analyses of potential positive and negative impacts of construction and operation of the proposed multipurpose building at EPHI is presented. Impact analysis involves determination of magnitude, extent, duration and significance of potential impacts. A detailed assessment of impacts is presented in ESIA document. Potential impacts and mitigation measures related to the construction and operation activities are discussed below.

3.1. Construction-phase impacts

3.1.1. Positive impacts

Income generation: Development of this project will give residents temporary job opportunity. Currently, there are a lot of unemployed person in the city that will be recruited as daily labourers since the construction of the multi-purpose buildings need large number of temporary workers. Temporary workers can use food and drinking service around the area. Hence, the surrounding community particularly women who want to works on food and drinking service provision can be a good job opportunity. Besides, although it is a short term positive impact, local suppliers of construction materials will benefit by providing goods and services.

Enhancement measure: The contractor will be advised through contractual means to maximize the application and use of locally produced construction material. Earth materials for example, aggregate (stones and sand) shall be obtained from quarry operations. Conscious or unwitting purchase of these materials from unlicensed sellers indirectly promotes environmental degradation at illegal quarry sites and has to be avoided. Therefore, there shall be contractual obligation for contractors to procure construction materials from quarries legitimately licensed by the government.

Employment opportunity: Construction of the multipurpose building will create job opportunities for both men and women. It is estimated that the project will create about 100 unskilled and semi-skilled temporary jobs during construction phases and about 50 skilled permanent jobs during operation. There is already much anticipation among the project area communities and local leaders that the local population will be employed on the proposed project, for whatever task will be found to lie within their capabilities. Several of the local

population will be considered for unskilled positions such as casual laborers, drivers and masons. These skills are readily available within the project implementing area.

This would be a positive impact lasting through the construction and operation phases. Owing to the moderate size of the proposed multi-purpose project G+9 building (a type of building widely constructed in Addis Ababa city), it is anticipated that it will not become a mega attraction causing labor influx into the city. Women should work in different activities such as loading and unloading of construction materials, sites clearance , removal of demolition and excavated materials, human resource management, warehouse of construction materials management, etc in the construction and operation phases of the project. All workers should take on site job training.

Enhancement measure: The contractor will be advised to recruit daily labourers from the neighbourhood resident to increase the economic benefit and involvement of the surrounding community. This also helps to minimize the grievance of the community. It is recommended that both the contractor and EPHI should give priority for women in the employment of skilled and casual laborers. By giving priority to women, the project will contribute to reduce the dependency of women on men and encourages them to learn new skills. Also to prevent conflicts and bad attitudes towards the contractors and their workers, it is strategic that the contractors give priority for employment to the local people. There should be affirmative action taken to employ disadvantaged groups of people in the project implementing area especially the youth and women.

3.1.2. Negative Impacts during Construction Phase

3.1.2.1. Project Impact on the staff and Services through disrucption of EPHI Premise

Construction activities of the proposed multi-purpose building in the premises of the EPHI, if not properly managed will create risks to patients seeking laboratory service staff may also adversely impact the day to day operation of the EPHI.

To minimize these types of health impacts, WBG EHS Guideline recommend measures to protect workers, patients and community from general site hazards associated with site under construction as follow:

- Restricting access to the site, through a combination of institutional and administrative controls, with a focus on high risk structures or areas depending on site-specific situations, including fencing, signage, and communication of risks to the workers, and patients as well as local community.
- Removing hazardous conditions from construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials.

3.1.2.2. Impact and Mitigation Measures on Geology/Soils

During construction of the multi-purpose building excavation of soil and movement of heavy vehicles and equipment is expected to aggravate soil erosion. Soil may also be contaminated due to fuel and lubricant that will be released from garages, construction machineries and construction wastes. These impacts will be moderate, temporary and localized.

To minimize these types of impacts the following mitigation measures are proposed to be implemented.

- Light construction machinery would be used and excavation would be strictly carried out within the space provided in the layout;
- Fuel and lubricants would be carefully removed from soil and disposed in an environmentally safer way (at Reppie solid waste disposal site in Addis Ababa) Erosion would be minimized by rescheduling for the construction to carried out during the dry season and by contouring, steep channel and slopes, mulching to stabilize exposed areas and by re-vegetating areas around the site.

3.1.2.3. Impacts and Mitigation measures on Ecological Resources and Biodiversity

The EPHI multi-purpose building will be constructed at existing EPHI compound and consequently will have almost no impact on a habitat or buffer areas. A small portion of vegetation and trees may need to be cleared to construct the new laboratory building as well as access road to the construction sites.

To minimize these types of impacts

- Limit extent of trees and vegetation removal

- Tree planting to compensate losses during construction.

3.1.2.4. Impact on Landscape

Piles of construction wastes and packaging materials may affect the scenery of the hospital and also restrict peoples' movement within the premises of the hospital. During construction activities heavy construction machinery will be working at the site producing dust (e.g. due to excavation works) and thus representing a visual impact.

To minimize impact

- The construction wastes and packaging materials would be regularly collected, transported and properly disposed on a site designated for this purpose.
- Establishing waste management priorities at the outset of activities based on an understanding of potential Environmental, Health, and Safety (EHS) risks and impacts and considering waste generation and its consequences
- Avoiding or minimizing the generation of waste materials, as far as practicable and where waste generation cannot be avoided , recover and reuse wastes

3.1.2.5. Impacts and Mitigation Measures on Air Quality

Construction activities may generate emission of fugitive dust caused by a combination of on-site excavation and movement of earth materials, contact of construction machinery with bare soil, and exposure of bare soil and soil piles to wind. A secondary source of emissions may include exhaust from diesel engines of earth moving equipment, as well as from open burning of solid waste on-site. Air pollution from vehicle emissions will be short term, moderate, and localized.

According to the WBG EHS guideline, techniques to consider for the reduction and control of air emissions during construction includes but not limited to:

- Dust suppression techniques would be implemented, such as applying water or non-toxic chemicals to minimize dust from vehicle movements. To minimize air pollution from earthmoving machineries water would be sprayed on access roads and construction sites and loose soil would be compacted and construction machinery would be regularly maintained.
- Selectively removing potential hazardous air pollutants, such as asbestos, from existing infrastructure prior to demolition
- Construction work should be undertaken by an experienced and duly registered

contractor with a verifiable sense of environmental awareness and responsibility.

- Workers will be provided with PPE and the use of PPE shall be enforced.
- Trucks shall be covered during haulage of construction materials and should be diverted away from busy areas of the institute;

3.1.2.6. Impact and Mitigation Mesures of due to Noise, Vibration and Dust

During construction, noise and vibration may be caused by the operation of pile drivers, earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and people. This will create occupational health risks to the patients, construction workers and communities. These are risks associated with non-compliance to national labor laws. Dust, vehicular emission, noise and vibration could hamper the health of local residents, EPHI community, patients and construction workers. Besides, vibrations due to movement of construction machineries could affect EPHI equipment and surrounding buildings. In addition, dust from construction could affect the quality of EPHI premise social service and laboratory diagnosis services. Thus, existing EPHI equipment would be relocated to the rooms where vibration due to construction machineries is minimal. Some of the WBG EHS guideline recommended noise reduction and control strategies include:

- Planning activities in consultation with local communities so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance. Construction activities during night time would be avoided.
- Using noise control devices, such as temporary noise barriers and exhaust muffling devices for combustion engines. Noise due to construction machineries would be minimized by introducing silencer to the construction machineries
- Avoiding or minimizing movement through community residence
- Workers would wear ear mufflers and other safety equipment's /PPE/. Similarly, the contractor would also be advised to follow the contractor guideline indicated in the ESIA report of the project and the consultant during construction would supervise such guideline are strictly followed by the contractor.

3.1.2.7. Traffic accident due to moving machinery

Material haulage trucks as well as pedestrians around the construction sites may create traffic congestion and may increase of traffic accident. Vehicle traffic and use of lifting equipment in the movement of machinery and materials on a construction site may pose temporary hazards,

such as physical contact, spills, dust, emissions, and noise. Heavy equipment operators have limited fields of view close to their equipment and may not see pedestrians close to the vehicle. The WBG EHS guideline (i.e. sub section- moving machineries) clearly sets techniques for the prevention and control of these impacts, these include:

- Planning and segregating the location of vehicle traffic, machine operation, and walking areas, and controlling vehicle traffic through the use of one-way traffic routes, establishment of speed limits, and on-site trained flag people wearing high-visibility vests or outer clothing covering to direct traffic
- Ensuring the visibility of personnel through their use of high visibility vests when working in or walking through heavy equipment operating areas.Ensuring moving equipment is outfitted with audible back-up alarms
- Using inspected and well-maintained lifting devices that are appropriate for the load, such as cranes, and securing loads when lifting them to higher job-site elevations.
- Provide onsite training to truck driver, machine operators, vehicle trafiic controller, and others on traffic and its accidents
- Develop traffic plan that clearly indicate time of transport, type of vehicle, routes and frequency

3.1.2.8. Sourcing of construction materials

The implementation of the proposed project involves vast material requirements. Among others, there will be need for aggregate, stone, cement, HCB, Steel, aluminum and cladding and associated equipment among others. The sourcing of materials may have mixed impacts. The positive impacts may include incomes from sales of gravel and aggregate by commercial borrow pit and gravel operators as well as business community dealing in construction materials such as cement. The potential negative effects include increase in ecological footprint from the disfiguring of the landscape beyond the project sites and exhaust emissions from the material hauling tracks. Give that the material source points such as borrow pits are scarce in the immediate environs of Addis Ababa City, longer distances to available sources will enhance the impact significance.

Mitigation measures

- Where possible the construction contractor will be advised through contractual means to maximize the application and use of locally produced construction material supplies. This

will increase the quantity of materials to be procured from the various local suppliers and hence it will enhance the income generation capacity of local suppliers. On the other hand earth materials needed for construction, for example, aggregate (stones and sand) are obtained from quarry operations. However, Conscious or unwitting purchase of these materials from unlicensed operations indirectly promotes environmental degradation at illegal quarry sites and can cause medium- to long term negative impacts. Therefore, there will be contractual obligation for contractors to procure construction materials from quarries legitimately licensed by Government.

- ☛ Where the Contractor opens up new material sources other than procuring materials from commercial operators, restoration of the sites immediately after the construction phase shall be undertaken in accordance with restoration plan
- ☛ Where materials are sourced from commercial operators, the Contractor will ensure to establish the operators' compliance with statutory requirements with evidence of Certificate of ESIA approval, and Certificates of compliance.

After application of the above mitigation measures, the impact severity will reduce from moderate to minor and the impact significance to negligible.

3.1.2.9. Impacts and Mitigation measures on Physical Hazards

Human health effects during site preparation and construction for the multi-purpose building is no different to other construction project. However, effects would be much localized and would affect only site workers or visitors to the site. Construction activities have the potential to cause common hazards including, for example:

- ➢ Physical hazards (slips-trips-falls, walking-working surfaces, powered hand-tool operation, pinch-points, hoisting, motor-vehicle operation, excavations, ladders, noise, heat stress, cold stress, sunburn, dust, and particulates).
- ➢ Electrical hazards (temporary electrical drops, excavations in areas with underground utilities, heavy equipment lifting with nearby overhead utilities);
- ➢ Fire and explosion hazards (portable gasoline containers for generators and other gasoline- powered equipment, fuel transfers for onsite heavy equipment operation);
- ➢ Biological hazards (e.g., snake bites, and insect stings);

EPHI will adopt Occupational Safety and Health Administration (OSHA) regulations to reduce these hazards. Appropriate personal protection measures would be a routine part of the construction activities (such as gloves, hard hats, steel toed boots, eye shields, and ear plugs or covers). Common hazards and mitigation strategies are discussed below.

Adherence to the application of salient practices from the WBG EHS Guidelines for Occupational Health and Safety will be the mitigation strategy. For example:

- All construction workers will be oriented on safe work practices and guidelines and ensure that they adhere to them. Workers will also receive tool box talks/ briefings. New workers will be provided with inductions on health and safety features and procedures.
- Training will be conducted on how to prevent and manage incidences. This will involve proper handling of electricity, water etc. and on various modes of escape, conduct and responsibility during such incidences.
- Use signage to warn staff and/ or visitors that are not involved in the construction activities of dangerous places.
- Strict instructions shall be given for drivers of heavy equipment.
- The contractor shall provide adequate OHS protective gear
- A regular supervision shall be in place to ensure that safety conditions are met

3.1.2.10. Impacts and Mitigation Measures on Incidence of Communicable & Vector-Borne Diseases

Increased incidence of communicable and vector-borne diseases attributable to construction activities represents a potentially serious health threat to project personnel and residents of local communities. Construction waste and rubble, if not disposed in designated places, is likely to lead to clogging of drainage systems and, in some places may also create stagnant pools of water where mosquitoes, flies and other insects might breed and lead to the transmission of vector-borne diseases as well as affect the general aesthetics of the surroundings. The WBG EHS material provided an integrated control strategy for mosquito and other arthropod-borne diseases that might involve:

- Prevention of larval and adult propagation through sanitary improvements and elimination of breeding habitats close to human settlements.
- Elimination of unusable impounded water \

- Implementation of integrated vector control programs
- Promoting use of repellents, clothing, netting, and other barriers to prevent insect bites
- Use of chemoprophylaxis drugs by non-immune workers and collaborating with public health officials to help eradicate disease reservoirs
- Monitoring and treatment of circulating and migrating populations to prevent disease reservoir spread
- Collaboration and exchange of in-kind services with other control programs in the project area to maximize beneficial effects

Furthermore, Mosquito breeding sites such as stagnant pools created due to construction wastes will have to be drained regularly to minimize malaria intensification. The construction wastes would also be regularly collected and transported to the disposal site designated for this purpose and that way aesthetics effect of the surroundings will also improve.

3.1.2.11. Impacts and Mitigation Meseares on Propagation of infectious diseases

Impacts associate with interaction of workers (contractors) with the community may lead to the propagation of infectious diseases. Health hazards typically associated with large development projects are those relating to poor sanitation and living conditions, sexual transmission, air born and droplet born transmission and vector-borne infections. Communicable diseases such as HIV/AIDS, and COVID-19 would be common during construction phase due to labour mobility and overcrowding. Contagious diseases may spread due to human contact among the construction working force and community.

WBG EHS recommended interventions for preventing illness among workers in local communities includes:

- Establishing surveillance system and active case search or conduct screening
- Preventing illness by undertaking health awareness and education initiatives, for example, by implementing an information strategy to reinforce person-to-person counselling addressing systemic factors that can influence individual behaviour as well as promoting individual protection, and protecting others from infection, by encouraging condom use

- ☛ Give on site orientation to daily workers about disease prevention and control, and need of seeking medical treatment if they acquired contagious diseases
- ☛ All workers should apply standard and transmission based precautions. For example, the workers should wear face mask and use hand sanitizer
- ☛ Apply prevention measures for Covid-19 throughout the construction phases and follow the following guidelines:
    - WHO and CDC guideline documents recommended guidance for works under COVID-19 and measures against COVID-19
    - The ESF/Safeguards Interım Note: COVID-19 Consıderatıons ın Constructıon/Cıvıl Works Projects will be practiced
    - Technical guidance Coronavirus disease (COVID-19): Risk communication and community engagement.
    - Interim Guidance: COVID-19: Occupational health and safety for health workers, February, 2021
    - WHO Interim Guidance for Technical Specifications of Personal Protective Equipment for COVID-19, November 2020.
- ☛ Give treatment to workers

3.1.2.12. Training health workers in disease treatment Impacts and Mitigation Measures on the existing facilities

Water pipes, telephone and electric cables may be interrupted due to construction. The contractor would relocate water pipes, telephone and electric cables from the construction site. Contingency plan would be prepared to provide water and power to the community during interruption of power and water supply to the community to minimize impact.

3.1.2.13. Impact and Mitigation Measures of improper construction and demolition waste management

The incremental increase in waste materials produced during this phase of work is very minimal. Typical wastes expected to be generated during construction of the multi-purpose building are construction debris, primarily comprised of wood, metal, asphalt, paper and plastic. Additionally, the project could generate excess uncontaminated soil from excavation activities.

Demolishing of the existing building and construction activities will result in generation of waste comprising of brick and concrete rubble, metal, timber, glass cullet, paper/cement bags, empty paint and solvent containers, among others. Some of the waste materials such as paints, cement, adhesives and cleaning solvents contain hazardous substances, while others including metal cuttings and plastic containers are not biodegradable and can have long-term and cumulative effects on the environment. Food debris, contaminated water from washing, cleaning equipment, construction tools and vehicles are also wastes.

The following mitigation measure will be implemented:

- The contractor shall segregate and separate wastes properly to encourage recycling.
- Hazardous wastes should not be mixed with other wastes generated and shall be managed properly (incineration or land-filling etc).
- Waste collection will be done at least once in 24 hours and when kept temporarily on site, it should be covered.
- Contractor and EPHI will work together to facilitate proper waste handling and disposal. All wastes must be taken to the approved dumpsites.

Additionally, the WBG EHS Guidelines for Construction and Decommissioning will be practiced.

3.1.2.14. Impacts and Mitigation measures on construction Incidences

Routine accidents are those that commonly occur on construction sites (for example, slips, trips and falls). Because they are routine, they are not considered abnormal events, nor do they take into consideration accidents with more substantial consequences, such as those resulting from catastrophic events. The proposed multi-purpose building has the potential to be affected by earth movements due to earthquakes. The earthquake could cause damage to the proposed nine-story building during construction and could injure construction workers by physical mass-movement. However, no hazardous materials or pathogens would be present during construction, and therefore no exposures to these materials would result to workers or the public from a seismic event. There is no report on earthquakes, so the probability is very low.

This project will have an Emergency Preparedness and Response Plan to mitigate any construction incidence with the following basic elements:

- Administration (policy, purpose, distribution, definitions, etc.)
- Organization of emergency areas (command centers, medical stations, etc)
- Roles and responsibilities
- Communication systems
- Emergency response procedures
- Emergency resources
- Training and updating
- Checklists (role and action list and equipment checklist)

Additional information for key components of the emergency plan is described below.

Communication Systems

Worker notification and Communication:

Alarm bells, visual alarms, or other forms of communication will be used to reliably alert workers to an emergency. Related measures include:

- Testing warning systems at least annually (fire alarms monthly), and more frequently if required by local regulations, equipment, or other consideration
- Installing a back-up system for communications on-site with off-site resources, such as fire departments, if normal communication methods may be inoperable during an emergency.

Community Notification

If local community is at risk from a potential emergency arising at the facility, the contractor will implement communication measures to alert the community, such as:

- Audible alarms, such as fire bells or sirens
- Fan out telephone call lists
- Vehicle mounted speakers
- Communicating details of the nature of the emergency
- Communicating protection options (evacuation, quarantine)
- Providing advice on selecting an appropriate protection option

Fire Services

- The contractor should consider an available firefighting capacity and practices with trained personnel.

Medical Services

- The contractor should provide first aid attendants for the facility as well as medical services.

Contact List

The contractor should develop a list of contact information for all internal and external resources and personnel. The list would include the name, description, location, and contact details (telephone, email).

3.1.2.15. Impacts and Mitigation measures on Gender Based Violence (GBV) and Child Labour

During construction phase there may be Physical violence (such as slapping, kicking, hitting, or the use of weapons); Emotional abuse (such as systematic humiliation, controlling behavior, degrading treatment, insults, and threats); Sexual violence, which includes any form of non-consensual sexual contact. In infrastructure development projects experiences show that there is lack of knowledge, awareness and understanding on gender issues and GBV either by the construction contractors and/or by the employer representative (Supervision Consultants). As a result female construction workers face difficulties in their work places, such as, GVB and sexual harassment. Though substantial risk is not anticipated with the project, in order to prevent GBV//SEA, the contractor is recommended to provide orientation on GBV/Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) and signing of code of conduct (CoC) by subproject workers and take appropriate actions on workers violating the CoC. It is also recommended to extend the monitoring activities and have GRM system in place in case of complaints by workers during construction phases.

Child labour involves the employment of children whose age is below the statutory minimum age of 15 years old. Though the Ethiopian labour law no.1156/2019 prohibits child labour and sexual harassment at work place, there will be a need for the project to ensure observance of the laws by the contractor and subcontractors by including restrictive articles on the works contract. The Contractor must thus follow strict measures against the employment of children; the construction supervisor must monitor to ensure that no child labor is engaged in the

construction work (both at construction site and quarries area), and if the contractor is found employing children below the legally required age, he/she must be penalized and compensate the child.

The following mitigation methods need to be implemented by the contractors/subcontractor to prevent child labour:

- The contractor should clearly state the minimum age for general work in their hiring policy and job announcements
- Hiring procedures and processes must include a robust age verification mechanism, which includes checking ID documents (government-issued ID) and in-person interviews

Additionally, the International Labour Organization Supplier Guidance on Preventing, Identifying and Addressing Child Labour Guidelines will be practiced.**SEA/SH Mitigation Measures**

- Clearly define the SEA/SH requirements and expectations in the bidding documents for contractor
- Evaluate the contractors SEA/SH Accountability and Response Framework in Contractor Environmental and Social Management Plan (C-ESMP)

GBV-related risk mitigation measure in project

- GBV Capacity building and technical support for PIU: Training/orientation session carried out to sensitize PIU on importance of addressing GBV/SEA/SH risks on the project and the mechanisms that will be implemented
- Establish and strengthen an effective GRM that can respond to GBV/SEA/SH cases
- Awareness raising and sensitization on GBV:
  - ☑ Consultations carried out with the project-affected local communities and other stakeholders to inform them properly about the potential SEA/SH risks and project activities to address SEA/SH related issues
  - ☑ Disseminate the relevant information on GBV/SEA/SH and other associated risks i.e., human trafficking and child marriage among the wider communities and stakeholders.
  - ☑ Prepare the relevant communication materials on GBV/SEA/SH, including the risk of human trafficking and child marriage and dissemination of these materials

The C-ESMP is the plan prepared by the contractor outlining how it will implement the works activities in accordance with the ESMP's requirements and in accordance with the contract. The development of an effective C-ESMP is a cornerstone for addressing SEA/SH, and more broadly the ESHS risks, during implementation. Contractually, the contractor must follow the C-ESMP, which is why it is important that the C-ESMP build upon the findings and proposed measures identified in the project ESMP.

The C-ESMP should include:

- **Code of Conduct:** The agreed CoC to address behavior which will be used on the project for the contractor's workers, including sub-contractors and suppliers;
- **Training Plan:** The plan for training workers on SEA/SH;
- **Community Consultation Plan:** The strategy by which in consultation with the MoH/EPHI, the communities adjoining the project will be advised on the project activities, how to make complaints, and what GBV support services are available; and
- **Labor Influx Management:** Should the project involve the influx of labor, how this influx will be managed—particularly to address SEA/SH risks.

To ensure that the SEA/SH risks are managed, it is important that:

- The contractor prepares the C-ESMP in accordance with the requirements of the project ESMP. The C-ESMP should provide a detailed explanation of how the contractor will comply with the project's E & S requirements (embodied in the ESMP) and demonstrate that sufficient funds are budgeted for that purpose.
- The contractor not carry out any works, including mobilization and/or pre-construction activities (e.g., limited clearance for haul roads, site access and work site establishment, geotechnical investigations or investigations to select ancillary features such as quarries and borrow pits), unless the supervising Engineer is satisfied that appropriate measures are in place to address SEA/SH risks and impacts through the C-ESMP.
- Public consultations be held on the C-ESMP, with the active participation of the contractor and the supervising Engineer's E & S specialist. These consultations must be well documented and include separate consultations with women and girls. •
- The C-ESMP be submitted and approved by MoH.

3.2. Operation Phase

3.2.1. Positive Impact during Operation Phase

Improved medical surveillance services: The project will positively impact the health sector of Ethiopia and the African region through easing access to services for public health emergency diseases and other communicable diseases. It will help to enhance access to advanced diagnostic services for vulnerable groups; improve capacity to provide referral diagnostic services; and strengthen laboratory-based disease surveillance to provide early warning of public health emergency.

Enhancement measures: Appropriate staffing with technical/ medical personnel adequately trained in use of newly installed equipment.

Employment opportunities: Operation of the proposed project will create additional permanent technical and non-technical job opportunities for laboratory and other supportive professionals, cleaners, etc. for both men and women.

Enhancement measure: Wherever feasible, local qualified people will be considered for job opportunities.

3.2.2. Negative Impact during Operation Phase

3.2.2.1. Potential impacts associated with Bio-bank, PPTC, Central warehouse and Laboratory equipment maintenance Centers operation

Primary hazards to personnel working in those facilities is related with indigenous or exotic agents which are highly infectious microorganism, and the common routes of exposure to infectious agents are inhalation, inoculation, ingestion and contamination of skin and mucous membranes. Inhalation hazards may arise during work practices that can generate aerosols. These include the following: centrifugation, mixing, pouring and spilling of fluids. Inoculation hazards include needle sticks and lacerations from sharp objects. Ingestion hazards include the following: splashes to the mouth, placing contaminated articles/fingers in mouth, consumption of food in the facilities, and mouth pipetting. Contamination of skin and mucous membranes can occur via splashes or contact with contaminated fomites. Containment and good laboratory practices reduce these risks; more emphasis is placed on primary and secondary barriers to protect personnel in contiguous areas, the community, and the environment from exposure to infectious aerosols.

Workers in the facilities are not only exposed to pathogenic microorganisms, but also to chemical hazards. It is important that they have proper knowledge of the toxic effects of these chemicals, the routes of exposure and the hazards that may be associated with handling and storage. Material safety data sheets or other chemical hazard information are available from chemical manufacturers and/or suppliers. These would be accessible in each laboratory where these chemicals are used, as part of a safety manual. Also the quantities of hazardous chemicals stored in the facility should be managed properly and personnel exposure must be assessed in primary containment equipment, or in devices such as a biological safety cabinet (BSC) or safety centrifuge cups.

Some chemicals adversely affect the health of those who handle them or inhale their vapors. Apart from overt poisons, a number of chemicals are known to have various toxic effects. Moreover, chemical hazards also represent a risk of uncontrolled reaction, including the risk of fire and explosion, if incompatible chemicals are inadvertently mixed.

3.2.2.2. Strategies to mitigate the potential risks associated with Bio-bank, PPTC, Central warehouse and Laboratory equipment maintenance Centers

As no laboratory has complete control over the specimens it receives, laboratory workers may be exposed to organisms in higher risk groups than anticipated. The proposed facilities will not be the exception and these possibilities must be recognized in the development of safety plans and policies. The facility, containment devices, administrative controls, and practices and procedures that constitute bio-bank, PTPC and central warehouse would be designed to maximize safe working conditions for laboratory personnel working with agents of moderate risk to personnel and the environment. The following standards and best practices are adopted from WHO laboratory biosafety manual, WBG EHS guideline, Occupational Safety and Health Administration (OSHA) and CDC Biosafety in Microbiological and Biomedical Laboratories 5th Edition to minimize risks associated to BSL2 laboratories

3.2.2.2.1. Microbiological Practices for the proposed project

- Persons must wash their hands after working with potentially hazardous materials and before leaving the laboratory.
- Eating, drinking, smoking, handling contact lenses, applying cosmetics, and storing food for human consumption must not be permitted in laboratory areas. Food must be stored outside the laboratory area in cabinets or refrigerators designated and used for this purpose.

- Mouth pipetting is prohibited; mechanical pipetting devices must be used.
- Policies for the safe handling of sharps, such as needles, scalpels, pipettes, and broken glassware must be developed and implemented. Whenever practical, laboratory supervisors would adopt improved engineering and work practice controls that reduce risk of sharps injuries. Precautions, including those listed below, must always be taken with sharp items. These include:
  - Careful management of needles and other sharps are of primary importance. Needles must not be bent, sheared, broken, recapped, removed from disposable syringes, or otherwise manipulated by hand before disposal.
  - Used disposable needles and syringes must be carefully placed in conveniently located puncture-resistant containers used for sharps disposal.
  - Non-disposable sharps must be placed in a hard-walled container for transport to a processing area for decontamination, preferably by autoclaving.
  - Broken glassware must not be handled directly. Instead, it must be removed using a brush and dustpan, tongs, or forceps. Plastic ware would be substituted for glassware whenever possible.
- Perform all procedures to minimize the creation of splashes and/or aerosols.
- Decontaminate work surfaces after completion of work and after any spill or splash of potentially infectious material with appropriate disinfectant.
- Decontaminate all cultures, stocks, and other potentially infectious materials before disposal using an effective method. Depending on where the decontamination will be performed, the following methods would be used prior to transport:
  - Materials to be decontaminated outside of the immediate laboratory must be placed in a durable, leak proof container and secured for transport.
  - Materials to be removed from the facility for decontamination must be packed in accordance with applicable local, state, and federal regulations.
  - A sign incorporating the universal biohazard symbol must be posted at the entrance to the laboratory when infectious agents are present. Posted information must include: the laboratory's bio-safety level, supervisor's name (or other responsible personnel), telephone number, and required procedures for entering and exiting the laboratory. Agent information would be posted in accordance with the institutional policy.

- The laboratory supervisor must ensure that laboratory personnel receive appropriate training regarding their duties, the necessary precautions to prevent exposures, and exposure evaluation procedures.
- Personnel must receive annual updates or additional training when procedural or policy changes occur. Personal health status may impact an individual's susceptibility to infection, ability to receive immunizations or prophylactic interventions. Therefore, all laboratory personnel and particularly women of childbearing age would be provided with information regarding immune competence and conditions that may predispose them to infection. Individuals having these conditions would be encouraged to self-identify to the institution's healthcare provider for appropriate counseling and guidance.
- The laboratory supervisor must enforce the institutional policies that control access to the laboratory.

3.2.2.2.2. Special Practices for the proposed project

- All persons entering the laboratory must be advised of the potential hazards and meet specific entry/exit requirements.
- Laboratory personnel must be provided medical surveillance, as appropriate, and offered available immunizations for agents handled or potentially present in the laboratory.
- Each institution would consider the need for collection and storage of serum samples from at-risk personnel.
- A laboratory-specific bio-safety manual must be prepared and adopted as policy. The biosafety manual must be available and accessible.
- The laboratory supervisor must ensure that laboratory personnel demonstrate proficiency in standard and special microbiological practices before working with bio bank and PTPC agents.
- Potentially infectious materials must be placed in a durable, leak proof container during collection, handling, processing, storage, or transport within a facility.
- Laboratory equipment would be routinely decontaminated, as well as, after spills, splashes, or other potential contamination.
- Spills involving infectious materials must be contained, decontaminated, and cleaned up by staff properly trained and equipped to work with infectious material.

- Equipment must be decontaminated before repair, maintenance, or removal from the laboratory.
- Incidents that may result in exposure to infectious materials must be immediately evaluated and treated according to procedures described in the laboratory biosafety manual. All such incidents must be reported to the laboratory supervisor. Medical evaluation, surveillance, and treatment would be provided, and appropriate records maintained.
- All procedures involving the manipulation of infectious materials that may generate an aerosol would be conducted within a BSC or other physical containment devices.

3.2.2.2.3. Recommended Safety Equipment (Primary Barriers and Personal Protective Equipment)

- Properly maintained BSCs, other appropriate personal protective equipment, or other physical containment devices must be used whenever:
- Procedures with a potential for creating infectious aerosols or splashes are conducted. These may include pipetting, centrifuging, grinding, blending, shaking, mixing, sonicating, opening containers of infectious materials, inoculating animals intranasal, and harvesting infected tissues from animals or eggs.
- High concentrations or large volumes of infectious agents are used. Such materials may be centrifuged in the open laboratory using sealed rotor heads or centrifuge safety cups.
- Protective laboratory coats, gowns, smocks, or uniforms designated for laboratory use must be worn while working with hazardous materials. Remove protective clothing before leaving for non-laboratory areas, e.g., cafeteria, library, and administrative offices). Dispose of protective clothing appropriately, or deposit it for laundering by the institution. It is recommended that laboratory clothing not be taken home.
- Eye and face protection (goggles, mask, face shield or other splatter guard) is used for anticipated splashes or sprays of infectious or other hazardous materials when the microorganisms must be handled outside the BSC or containment device. Eye and face protection must be disposed of with other contaminated laboratory waste or decontaminated before reuse. Persons who wear contact lenses in laboratories would also wear eye protection.

- Gloves must be worn to protect hands from exposure to hazardous materials. Glove selection would be based on an appropriate risk assessment. Alternatives to latex gloves would be available. Gloves must not be worn outside the laboratory. In addition, Bio-bank and PTPC workers would:
  - Change gloves when contaminated, glove integrity is compromised, or when otherwise necessary.
  - Remove gloves and wash hands when work with hazardous materials has been completed and before leaving the laboratory.
  - Do not wash or reuse disposable gloves. Dispose of used gloves with other contaminated laboratory waste. Hand washing protocols must be rigorously followed.
- Eye, face and respiratory protection would be used in rooms containing infected animals as determined by the risk assessment.

3.2.2.2.4. Recommended Laboratory Facilities (Secondary Barriers) for Bio-bank and PT panel production centers

- Laboratory doors would be self-closing and have locks in accordance with the institutional policies.
- Laboratories must have a sink for hand washing. The sink may be manually, hands-free, or automatically operated. It would be located near the exit door.
- The laboratory would be designed so that it can be easily cleaned and decontaminated. Carpets and rugs in laboratories are not permitted.
- Laboratory furniture must be capable of supporting anticipated loads and uses. Spaces between benches, cabinets, and equipment would be accessible for cleaning.
- Bench tops must be impervious to water and resistant to heat, organic solvents, acids, alkalis, and other chemicals.
- Chairs used in laboratory work must be covered with a non-porous material that can be easily cleaned and decontaminated with appropriate disinfectant.
- Laboratory windows that open to the exterior are not recommended. However, if a laboratory does have windows that open to the exterior, they must be fitted with screens.
- BSCs must be installed so that fluctuations of the room air supply and exhaust do not interfere with proper operations. BSCs would be located away from doors, windows

that can be opened, heavily traveled laboratory areas, and other possible airflow disruptions.

- Vacuum lines would be protected with liquid disinfectant traps.
- An eyewash station must be readily available.
- There are no specific requirements for ventilation systems. However, planning of new facilities would consider mechanical ventilation systems that provide an inward flow of air without recirculation to spaces outside of the laboratory.
- HEPA filtered exhaust air from a Class II BSC can be safely recirculation back into the laboratory environment if the cabinet is tested and certified at least annually and operated according to manufacturer's recommendations. BSCs can also be connected to the laboratory exhaust system by either a thimble (canopy) connection or directly exhausted to the outside through a hard connection. Provisions to assure proper safety cabinet performance and air system operation must be verified.
- A method for decontaminating all laboratory wastes would be available in the facility (e.g., autoclave, chemical disinfection, incineration, or other validated decontamination method).

3.2.2.3. Risk of Escaping Infectious Agents from Bio-bank and PTPC centers

In the Bio-bank and PTPC centers there would be infectious agents in storage, diagnosis process or culture. So that, there would be a possibility to escape infectious agents and possibly cause human health impacts through direct transmission, vector-borne transmission, vehicle-borne transmission, airborne transmission, and water-borne transmission.

Direct transmission: would first require a worker to be exposed to an infectious agent. The likelihood of a worker inhaling or otherwise becoming exposed to an infectious agent would be extremely remote. While it would be very unlikely that a worker would be exposed, if exposed with a sufficient dose, it would be possible for them to be carriers for those agents and through direct transmission expose others. This potential is further reduced through the intervention of effective vaccines or therapeutic measures (CDC 1999).

Vector-borne Transmission: Vector-borne transmission can include mechanical or biological transmission of infectious agents. Mechanical transmission includes carriage by crawling or flying insects through soiling of feet or proboscis or by passage of organisms through its gastrointestinal tract, it does not require multiplication or development of the organism.

Biological transmission includes the propagation (multiplication), cyclic development, or a combination of these. The facility would be designed to severely limit the potential for possible vector-borne transmission through insects and rodents.

Vehicle-borne Transmission: The primary concern for vehicle-borne transmission would be by the workers' clothing or skin and hair, as all other materials leaving the facilities would go through a sterilization by autoclave or chemical disinfection. The guidelines established by the CDC and NIH, which would be followed within the proposed project facility, are designed to reduce this potential method of transmission. This would substantially reduce any potential for a worker to unknowingly transport infectious microbes from the facility.

Water-borne Transmission: Potable water would not be affected by the implementation of the proposed Action. Facility design features, such as backflow preventers would prevent microbes within the facility from migrating back through the water supply piping to the public. Water exiting through the sink drains would be diverted to a retention tank where it would be disinfected before being sent to the sewer system.

Airborne Transmission: All air leaving the bio-bank and PTPC centers during normal conditions would exit through ductwork that is HEPA-filtered prior to emission through stacks on the building roof. HEPA filters are rated as 99.97 percent efficient at a most-penetrating "design point" of 0.3 microns diameter as tested by dioctyl phthalate (DOP) particles (NSC 1996). This means that HEPA filters are designed to remove at least 99.97 percent of all the particulates that hit the filters, even in the most-penetrating sizes of 0.1 to 0.4 microns. The remaining particles (less than 0.03 percent) can penetrate or pass through the filters. The number of viable vegetative microorganisms after HEPA filtration would be negligible. Because, HEPA filters have fiber diameters ranging from 0.65 to 6.5 microns in three diameter groupings. The process of aerosol filtration does not simply rely on the size of the opening between fibers but uses a number of physical properties of air movement around fibers to capture the particles.

Since in infectious agents are escaped from BSL 2 laboratories, it may have risks resulting life-threatening for personnel working in the proposed facilities and community. The agents that may cause human disease, present a hazard to workers, and may present a risk of spreading to the community. Duration of the impact would be *long-term/* throughout the entire life of the affected person or short-term depending of the hazard exposed to. The intensity of

the impact would be *low* when ‘’facility design’’ and HEPA filters proposed in WHO & WBG EHS Guidelines are adopted. In relation to this, workers at laboratories would always wear PPE while working in bio-bank and PTPC. The facilities would also benefit from a long term practices and experience in performing similar procedures in the existing bio-bank and PTPC. through its established system. However, *sensitivity* on the receptors will be *medium*, thereby giving moderate impact *significance*.

Mitigation strategies for risk of escaping of infectious agents from Bio-bank and PPTC centers

The following mitigation strategies would be implemented to prevent infectious agents from escaping bio-bank and PTPC centers

- Personnel working in bio-bank and PTPC would receive specific training in handling pathogenic and potentially lethal agents and would be supervised by competent staff in handling infectious agents and associated procedures.
- Laboratory workers would be trained in equipment operating and handling techniques during operation,
- Equipment would be periodically maintained and calibrated according to manufacture recommendation
- The BSCs’ HEPA filters would be tested annually and replaced as necessary.
- Effective vaccines or therapeutic measures would be available for all risk groups
- Trainings would be provided on sample and waste handling, transportation, and storage
- All material would be sterilized by autoclave or chemical disinfection
- Ensure that the facility would be designed to severely limit the potential for possible vector-borne transmission through insects and rodents.
- Ensure that water exiting through the sink drains would be diverted to a retention tank where it would be disinfected before being sent to the sewer system.
- All agents would be contained within the laboratory and biosecurity system would be in place.

3.2.2.4. Air Pollution

During sample preparation and processing, release of volatile organic materials from laboratory chemicals and wastes, besides incineration of laboratory and other solid wastes may

contribute to air pollution. The impacts could be moderate, long term in nature, and may be localized.

To minimize air pollution appropriate procedure may need to follow for sample preparation and processing, and wastes disposal. According to WBG EHS Guideline Air Emissions and Ambient Air Quality the following mitigation measures may be implemented:

- Process modification
- Selection of fuels or other materials, the processing of which may result in less polluting emissions
- Application of emissions control techniques or technology that technical feasibility and cost effectiveness of the available options for prevention, control, and release of emissions
- Efficient incinerator would be used to minimize release of volatile organic gases from hazardous wastes

3.2.2.5. Impact of Improper Healthcare Waste Management

During the operational phase of the multipurpose building, it is anticipated that solid and liquid wastes are generated on a daily basis. Mainly the wastes to be generated will be domestic waste and infectious/hazardous waste. Since PT panel production and Bio-bank activities involve certain usage of different sorts of chemicals or reagents, it can be predicted that different types of hazardous wastes would be generated. Therefore, improper and inadequate waste decontamination and disposal can cause public health risks due to environmental pollution (i.e. impaired air quality, contamination of water courses) and infections when people rummage through improperly dumped infectious waste.

The National MOH guideline for Healthcare waste management classifies Infectious waste to consist of the following: sharps (needles, scalpels, etc.), laboratory cultures and stocks, blood and blood products, pathological wastes, and wastes generated from patients in isolation because they are known to have infectious diseases. Medical wastes can also include chemicals and other hazardous materials. These constitute a risk, if they are not properly handled, treated or disposed and otherwise are allowed to get mixed with other municipal waste. The types of healthcare waste expected from the facilities will be cultures, blood and blood products, pathological wastes, liquid hazardous/infectious, chemical waste and non-hazardous wastes (Table 2).

Table 2: Waste Expected from the proposed facilities

Type of waste	Waste description
Biohazard solid waste	Items contaminated with blood and body fluids, including cotton, infected blood, patient samples and specimens
Microbiology Waste	Cultures; stocks and microorganisms; dishes and devices used for culture
Pathological waste	Human tissues, organs or fluids; body parts; unused blood products.
Sharps	Needles; syringes; scalpels; blades; glass, etc.
Disposables	Disposables other than sharps, e.g. Gloves, valves, and any other infected plastics
Liquid Waste (hazards &infectious)	Waste generated in the laboratories hazardous and infectious liquid
Chemical Waste	Chemicals used in the production of biological, laboratory reagents; film developer; disinfectants that are expired or no longer needed; solvents; outdated, contaminated and discarded chemicals
Incineration Ash	Ash from the incineration of any biomedical waste

Improper waste collection and accumulation of waste can be cause of infection and may lead to occupational hazard. It is therefore, the collection of waste would be made at least once in 24 hours, and it would be done in such a way to minimize nuisance of smell and dust during collection and all the waste collected must be carried away from the storage site to an approved disposal point. In addition laboratory would have standard operation and decontamination procedure manuals and clearly displayed at appropriate point(s) with the facilities.

Table 3: Type of waste expected to be generated from multi-purpose building and Treatment methods

Waste category	Type of waste	Source Facility	Treatment Method
Waste cultures and stocks of microorganisms or etiologic agent	Cultures and stocks of infectious agents or microorganisms Cultures of specimens from medical and pathological laboratories Disposable containers, materials, and supplies that may have been contaminated during the manipulation of microbial cultures and stocks	PPTC & Biobank centres	Infectious wastes are disinfected / sterilized at the laboratory and incinerated in high temperature, double chambered pyrolytic incinerator

Waste category	Type of waste	Source Facility	Treatment Method
Human pathological waste including human blood and blood products & their containers waste	Pathological waste consists of human tissues; organs; body parts; dialysate; cerebrospinal, synovial, pleural, peritoneal, and pericardial fluids; and their respective containers Human blood and blood product wastes (e.g. blood plasma, platelets, red or white corpuscles, and other derived licensed products such as interferon, etc.) Items saturated or dripping with human blood or blood products Items caked with dried human blood or blood products	PPTC & Biobank centres	Chemical disinfection, Wet thermal treatment/ autoclave and Incineration (Pyrolytic incinerator) Highly infectious waste, such as cultures from lab work, should be sterilized using autoclave. Pathological waste should be treated using Incineration (pyrolytic incinerator).
Used sharps waste	This category includes used hypodermic needles, syringes (with or without the attached needles), Pasteur pipettes, disposable plastic pipettes, scalpel blades, blood vials, test tubes, needles with attached tubing, Broken plastic culture dishes, unbroken glass culture dishes, and other types of broken and unbroken glassware that was in contact with infectious material including microscope slides and covers lips	PPTC & Biobank centre	All used sharps will be placed in specific cardboard boxes called safety boxes and incinerated preferably in an appropriate double-chamber (>850°C) incinerator, in EPHI compound.
Chemical waste	Laboratory reagents; disinfectants (such as formaldehyde, chloroform, phenol, ethyl alcohol, isopropyl alcohol, amyl alcohol, and sodium hypochlorite) that are expired or no longer needed; and contaminated chemicals	PPTC, Biobank centre, Central warehouse & LEMC	Diluting with a distilled water and/ or neutralization using a lime or acid. Return expired drugs to supplier;
Liquid Waste	Biological and chemical liquid waste generated from PTPC, Bio-bank center Sanitory liquid waste	PPTC and Bio-bank center, PPPTC, Biobank centre, Central ware house &	All effluents will be disinfected with bleach and drained to EPHI's liquid waste treatment plan or cesspool for both storage & treatment in the compound of EPHI. Sanitary liquid wastes are drained to a septic tank or cesspool for both storage & treatment in the compound of EPHI

Waste category	Type of waste	Source Facility	Treatment Method
		LEMC	
Non-hazardous wastes	Paper, cardboard and other non-contaminated materials.	PPTC, Biobank, Central Warehouse & LEMC	Non-hazardous wastes would be incinerated after sorting.

Appropriate technologies and methods would be used to treat and dispose risks due to healthcare waste. The proposed laboratories would adhere to the application of the following guidelines to minimize impact emanating from health care waste.

3.2.2.5.1. Waste Treatment Methods/ Technology for proposed facilities

The Ethiopia Healthcare Waste Management National Guideline 2008 categorises HCW in Ethiopia into nine classes. The treatment options are based on the Healthcare Waste Management National Guideline. In Ethiopia, burning in low-cost incinerators, burying or applying chemical disinfectant of HCW is for the present moment is probably the most affordable and acceptable options for smaller health care facilities. However, this option is not environmentally satisfactory, and would only be considered as a short-term solution. The following HCW treatment technologies /facilities are recommended to minimize HCW impacts.

Steam sterilization (autoclaving): Steam sterilization in an autoclave is one of the most common forms of sterilization. It involves the use of saturated steam within a pressure vessel at temperatures high enough to kill infectious agents in the waste. Sterilization is accomplished primarily by steam penetration. Steam sterilization is most effective with low-density material such as plastics. In general, contaminated items or wastes would be sterilized for 30 minutes at 121°C with a pressure of 106 KPa. Do not begin timing until the autoclave has reached the desired temperature and pressure. Before sterilization, the items to be treated would be decontaminated, cleaned, and dried carefully.

Burning and Incineration: Incineration converts combustible materials into non-combustible residue or ash. Gases are ventilated through the incinerator stacks, and the residue or ash is disposed of in a sanitary landfill or a pit prepared for this purpose (i.e. ash pit). If incinerators are properly designed, maintained, and operated, they are effective in killing organisms present in infectious waste. In health care facilities without an incinerator, burning of paper waste in a protected pit can be used as an alternative short term solution. However, when using this method the area needs to be protected so as to prevent access of an authorized persons or animals.

Thermal inactivation: involves the treatment of waste with high temperatures to eliminate the presence of infectious agents. This method is usually used for large volumes of infectious waste. Liquid waste is collected in a vessel and heated by heat exchangers or a steam jacket that surrounds the vessel. The types of pathogens in the waste determine the temperature and duration of treatment. This method requires higher temperatures and longer treatment cycles than steam treatment.

Gas/vapor sterilization: Gas/vapor sterilization uses gaseous or vaporized chemicals as the sterilizing agents—ethylene oxide is the most commonly used agent.

Chemical disinfection/high-level disinfection (HLD): Chemical disinfection is the preferred treatment for liquid infectious wastes, but can also be used for treating solid infectious waste. Disinfectants are often hazardous and toxic, and many are harmful to the skin and mucous membranes. Users would therefore wear protective clothes including gloves and goggles. Small amounts of disinfectants can be discharged into sewers without pre-treatment, provided there is an adequate sewage treatment process; large amounts of disinfectants would never be discharged into sewers. No disinfectants would be discharged into natural water bodies.

3.2.2.5.2. Waste Treatment Methods in Ethiopia by Waste Class

The Ethiopia Healthcare Waste Management National Guideline 2008 categorises HCW in Ethiopia into nine classes. The treatment options are based on the prevailing health systems in Ethiopia as revealed in the Healthcare Waste Management National Guideline. In Ethiopia, burning in low-cost incinerators, burying or chemical disinfectant HCW is for the present moment probably the most affordable and acceptable options for smaller health care facilities. However, this option is not satisfactory environmentally, and would only be considered a short-term solution to HCW treatment guideline for waste treatment and disposal.

Non Hazardous Waste (Class 1): These would be separated from other HCW and Non-risk health care waste would be disposed of similarly to domestic garbage and food waste (burning, municipal waste collection, land fill, etc.).

Clinical Waste (Class 2): These wastes would be burnt and buried in protected pits and the waste containers would never be placed in public areas.

Sharps (Class 3): This waste would first be incinerated before being landfilled. In the alternative, they can be encapsulated and then landfilled.

Anatomical Wastes and placentas (Class 4): Anatomical wastes such as placentas can be buried at depths of over 1 metre inside the HCF.

Hazardous pharmaceutical and cytotoxic waste (Class 5): These would be burnt in temperature around and exceeding $1200^{O}C$. If the HCF can afford to build a Cement Kilns, then they can be treated at the HCF, if not, these would be transported to a central treatment centre. These would never be disposed of in sewers or land filled without appropriate treatment.

Highly Infectious Wastes (Class 6): These wastes would be autoclaved at a temperature of 121°C for at least 20 minutes at source. Or it would be treated in a concentrated solution of Sodium Hypochlorite (NaClO) before being disposed with other wastes.

Radioactive Wastes (Class 7): These wastes can be stored in designated rooms cordoned off from access and allowed to decay to background level. Once at background level, the non-infectious radioactive wastes can then be treated the same way as Class 1 HCW while the infectious radioactive waste would be treated the same way as Class 2 HCW.

Waste with high contents of heavy metals (Class 8): This would be treated as a specialised kind of waste and would be collected and stored in a tin container at room temperature and transported to where it will be treated in an environmentally sound manner.

Effluents (Class 9): All effluents in HCFs would be drained to a septic tank or cesspool for both storage and treatment in the compound of the HCF.

Liquid Waste (infectious & chemical wastes): Collected body fluids, blood and other infectious liquids will be treated using 5% sodium hypochlorite (NaOCl –bleach) and drained into septic tank as well as liquid chemical waste will be diluted/neutralized and disposed to the sewer with water.

Handling, Storage and Collection of health care waste: Packaging and storage of special health-care waste consists of leak-proof primary packaging at the source and leak-proof solid containers of secondary packaging for transportation. A colour code of either yellow or red would be chosen for infectious HCW. The World Health Organization recommended colour-coding, to indicate the level of risk is as follows;

According to the national guideline the following coding of health care waste containers will be used:

- **Black:** All bins or bags containing non-risk HCW.
- **Yellow:** Any kind of container filled with infectious HCW, including safety boxes.
- **Red:** Any kind of container filled with heavy metal or effluent.
- **White:** Any container or bin filled with drug vials, ampoules, or glass bottles for glass recycling or reuse. This system is used only where a municipal glass recycling system is available.

Final disposal: The following guidelines would be applied when disposing healthcare waste.

- The recommended types of final disposal methods are: conventional sewer system for discharge of treated liquids and grounded solids; or landfill disposal of treated solids and incinerator ash.
- The Ministry responsible for environment and MOH would ensure that only treated infectious wastes are buried in landfills.
- Burial sites would be fenced to prevent access by community members or animals. Burial would not be used in areas with high water tables. The bottom of the pit would

be at least 1.5 meters higher than the groundwater level.

- Facilities would secure the services of reputable waste handlers to ensure, to the extent possible, that final disposal of health care waste is performed according to applicable federal and local regulations.

3.2.2.5.3. WBG EHS Guidelines: "Waste management":

These guidelines apply to both non-hazardous and hazardous waste. They advocate for waste management planning where waste would be characterized according to: composition, source, types, and generation rates. This is essential for laboratory facilities comprised in this project since there is a need to segregate the different categories of waste generated at the laboratory level. These guidelines call for implementation of a waste management hierarchy that comprises prevention, recycling/reuse; treatment and disposal. The guidelines require segregation of conventional waste from hazardous waste streams and if generation of hazardous waste cannot be prevented; its management would focus on prevention of harm to health, safety, and environment, according to the following principles:

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

WBG EHS Guidelines for Hazardous Materials Management:

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

3.2.2.5.4. Impact of Hazardous Laboratory Chemicals and Other Agents

Expired or accidentally spilled hazardous laboratory chemicals will adversely affect human health and the environment if they are not properly managed.

The proposed laboratories would adhere to the application of the following guidelines which represent best practices and experiences in Chemical Hazards management.

WBG EHS Guidelines

Hazardous materials have risk of uncontrolled reaction, including the risk of fire and explosion if they are not properly stored and are inadvertently mixed. Chemical hazards can most effectively be prevented through a hierarchical approach that includes:

- Replacement of the hazardous substance with a less hazardous substitute
- Implementation of engineering and administrative control measures to avoid or minimize the release of hazardous substances into the work environment keeping the level of exposure below internationally established or recognized limits
- Keeping the number of employees exposed, or likely to become exposed, to a minimum
- Communicating chemical hazards to workers through labeling and marking according to national and internationally recognized requirements and standards, including the International Chemical Safety Cards (ICSC), Materials Safety Data Sheets (MSDS), or equivalent. Any means of written communication would be in an easily understood language and be readily available to exposed workers and first-aid personnel
- Training workers in the use of the available information (such as MSDSs), safe work practices, and appropriate use of PPE

Expired and or spilled laboratory chemicals would be collected and handled in a leak-proof container for transportation. The following guidelines would be followed when disposing hazardous laboratory chemicals:

- Disposal sites would be fenced to prevent access by community members or animals. The disposal site in areas with high water tables. The bottom of the pit would be at least 1.5 meters higher than the groundwater level.
- Facilities would secure the services of reputable chemical handlers to ensure, to the extent possible, that final disposal of the expired chemicals is performed according to applicable federal and local regulations.

3.2.3. Basic Principles and Practices for Effective Healthcare Waste Management

The safe and sustainable management of healthcare waste is a public health imperative and a responsibility of partners working in the health sector. Improper management of healthcare waste poses a significant risk to patients, health-care workers, the community and the

environment (Chartier, 2014). The key to effective management of HCW is identification and segregation of the waste. It ensures that the correct disposal procedures are taken, personnel safety is maintained, environmental harm is minimized and recycling consumes the least resources. This topic focuses on the best practices as regards proper acceptable waste management practices for the biobank and PT panel production centers based on the standards recommended by the WHO Safe management of wastes from healthcare guideline, WBG EHS Guidelines and Ethiopian Healthcare waste Management guideline and are discussed in this part for implementing in the proposed facilities.

3.2.3.1. Waste Minimization

The best practice is to ensure that all units in each HCF minimize their waste generation (all classes of wastes) to the barest possible minimum. Appropriate plans, strategies and actions would be established to ensure adequate HCW minimization at source and encouraging the use of recyclable materials and products.

3.2.3.2. Waste Segregation

Proper segregation of waste at source generation (at each medical unit/department) is essential, efficient and effective in managing HCW. It helps in reducing the quantity of waste requiring treatment prior to final disposal and ultimately reduces the cost of waste treatment/management. Segregation involves putting different classes of wastes into separate and appropriate temporary storage color-coded containers/bags as recommended by the Health Care Waste Management National Guidelines. In essence, waste segregation and waste color coding work hand in hand. The nine categories of HCW would be segregated and color-coded as outlined below in table 3. Please refer to Annex 11 of the ESIA report for further information on the nine categories of HCWF or instance; sharps must be put into separate containers (preferably sharp boxes) from other hazardous wastes as well as non-hazardous wastes. All waste would be fully inserted into the container with no part sticking out. A homogenous segregation format must be practiced across all HCF in order to avoid mistakes during recording, collection, storage, transportation and onward treatment.

3.2.3.3. Packaging

Infectious waste would be contained from its point of origin to the point at which it is treated and no longer infectious. The packaging would be appropriate for the type of waste involved.

The following guidelines would be included for packaging sharps and other health care wastes:

- Sharps (sharp items or items with sharp corners) would be placed in rigid, puncture-resistant containers made of glass, metal, rigid plastic, or cardboard.
- Liquid infectious wastes would be placed in capped or tightly stopped bottles or flasks; large quantities may be placed in containment tanks.
- Solid or semisolid wastes would be placed in tear-resistant plastic bags judged by their thickness or durability.
- There would be special packaging characteristics for some treatment techniques: incineration requires combustible containers, and steam sterilization requires packaging materials that allow steam penetration and evacuation of air.

3.2.3.4. Colour Coding

Colour coding is done by using colours to differentiate waste classes from one other. It is efficient and helps in the process of waste segregation at source. It is also simple, easy to use and thus can be understood even by illiterate patients particularly at health posts where illiteracy level is high. Colour coding is one of the efficient ways of achieving segregation of waste and for sorting out items such as paper, plastic, glass and metal for recycling. It is important that all HCF in Ethiopia use the same colour coding scheme as this helps to minimize and avoid a waste class from mixing with other waste classes. This is also advocated in the Ethiopia National Healthcare Wastes Management Guidelines document. As expected, there will be a wider range of waste classes generated at secondary and tertiary healthcare facilities when compared to primary healthcare facilities. Thus is expected that the use of a broader colour scheme be applied at the former when compared to the latter. For the sake of uniformity and homogenous colour coding for Health Care Facilities (HCF) must be an expanded version from that used in the Health Posts.

The following guidelines would be included for the color-coding system:

- **Black:** All bins or bags containing non-risk HCW.
- **Yellow:** Any kind of container filled with infectious HCW, including safety boxes.
- **Red:** Any kind of container filled with heavy metal or effluent.
- **White:** Any container or bin filled with drug vials, ampoules, or glass bottles for glass recycling or reuse. This system is used only where a municipal glass recycling system is available.

In resource limited HCFs, red containers can be omitted and heavy metals and other effluents can be handled as any other infectious waste using yellow receptacles. However, heavy metals and other effluents would not be incinerated. Regarding the disposal of pharmaceutical wastes, please refer to the Medicines Waste Management and Disposal Directive 2011. Health workers must properly segregate waste at the point of use and ensure proper segregation bins and safety boxes are available at all injection sites.

3.2.3.5. Labelling

An important aspect of color coding is labelling. All waste bags or containers would be labelled with basic information in the local language of the area where the HCF is located and or in English. Basic label information would include type of waste in the container; name of the ward/facility, date of collection and, warning of hazardous nature. In general, labelling is important in order to identify the source of HCW or date of generation in case of an accident or improper segregation of the waste, ensure that the workers responsible for HCW management handle the different types of wastes safely, Ensure that each staff member feels more responsible for what they put into the bag/receptacle; Ensure that segregation is done properly; Ensure that Medical Departments gather data on the amount of waste produced in each department.

3.2.3.6. Collection of Healthcare Waste of Bio-bank and PT panel production Center

Collection of waste is extremely important particularly to avoid over spilling of waste out of collection containers. Collection must be done promptly and routinely or as often as required. This will reduce the probability of contaminated wastes coming into contact with the public. Collection of waste must be done by approved and trained personnel fully equipped with appropriate PPEs and conveying machinery such as trollies and carts. The proposed facilities staff must be actively involved in collection of waste as would the waste handlers. They would ensure that their containers/bags (Bins/boxes and collection receptacles) are never more than three- quarter full before sealing them at their points of generation. They would also ensure that such collection containers are appropriately labelled.

Table 4: Summary of WHO recommended segregation and collection

Waste categories	Colour of container and markings	Type of container	Collection frequency

Infectious waste	Yellow with biohazard symbol (highly infectious waste would be additionally marked HIGHLY INFECTIOUS.	Leak-proof strong plastic bag placed in a container (bags for highly infectious waste would be capable of being autoclaved).	When three-quarters filled or at least once a day.
Sharps waste	Yellow, marked ***SHARPS*** with biohazard symbol.	Puncture-proof container.	When filled to the line or three-quarters filled.
Pathological waste	Yellow with biohazard symbol.	Leak-proof strong plastic bag placed in a container.	When three-quarters filled or at least once a day.
Pharmaceutical & Chemical waste	Brown, labelled with appropriate hazard symbol.	Plastic bag or rigid container.	On demand.
Radioactive waste	Labelled with radiation symbol.	Lead box.	On demand.
General health-care waste	Black	Plastic bag inside a container or container which is disinfected after use.	When three-quarters filled or at least once a day.

3.2.3.7. Handling

When handling waste, handlers would wear protective clothing at all times including face asks, aprons, boots, and heavy duty gloves, as required.

Sharps:

- When handling sharps, do not recap or bend needles attached to the syringe.
- Immediately place the syringe in a safety box.
- If needle removers are used, needle removal must take place immediately after the injection.

Safety boxes:

- Safety boxes must be fully and properly assembled before use.
- Safety boxes must be sealed and collected when they are ¾ full, and must never be emptied or opened.
- Place sharps containers (i.e., safety boxes) as close to the point of use as possible and practical, ideally within arm's reach.
- Mark or label safety boxes so that people will not unknowingly use them as a garbage container for discarding other items.

- Do not shake safety box to settle their contents and make room for more sharps.
- Do not place safety boxes in high traffic areas (corridors outside patient rooms or procedure rooms) where people could bump into them or be stuck by someone carrying sharps to be disposed of.
- Do not place containers on the floor or anywhere they could be knocked over or easily reached by a child.

Infectious waste bins:

Infectious waste bins would be covered before collection. Bins would be cleaned and disinfected with 0.5% chlorine solution after emptying and before reuse.

3.2.3.8. Waste Storage

Storage is classified into internal and external. Consideration for storage must be based on the classification or type of waste being dealt with and the potential risk of infection to health-care workers and waste disposal staff.

The following rules would be observed for proper storage of HCW in Ethiopia

- Initial packaging and storage would take place where HCW is generated.
- Storage of waste may then be moved to a temporary on-site storage location
- Non-risk HCW would always be stored in a separate location from the infectious/ hazardous HCW in order to avoid cross-contamination.

Internal (Primary) Storage: Internal storage is the temporary placement of waste at the point of generation before transfer to external storage points. A storage location for the HCW would be designated inside the EPHI compound. The waste in the bin-liners or containers would be stored in a separate area, room or building appropriate to the quantity of waste produced bearing in mind the frequency of collection. Segregation of hazardous waste from general waste would be maintained in storage. They would be planned periodic cleaning and disinfection of temporary storage areas and the containers. The storage time for HCW before it is transferred to external storage facilities would ensure that during cold/rain season 48 hours and during hot season 24 hours.

External (Secondary) Storage: External storage refers to the transit point where waste is stored after removal from primary storage to the time it is collected and transported for treatment and final disposal. The frequency of removal of waste stored depends on the volume and nature of waste

generated Storage is classified into internal and external. Consideration for storage must be based on the classification or type of waste being dealt with and the potential risk of infection to health-care workers and waste disposal staff.

3.2.3.9. Transportation

A protocol for transportation of infectious substances is annexed in ESIA report and ESMF. Consideration for transportation must be based on the classification or type of waste being dealt with and the potential risk of infection to health-care workers and waste disposal staff. Transportation is classified into On-site transport and Off-site transport, since the waste generated from facilities is treated at facility, off-site transport is negligible**.** So that On-site transport involves conveying of wastes from the various points of generation to a temporary storage location also within the EPHI compound.

The following would be adhered to when carrying out On Site transportation

- Every effort would be made to avoid unnecessary handling of HCW;
- All waste bags would in-place and intact at the end of transportation;
- Carts, containers, or vehicles used for the transportation of health-care waste would not be used for the transportation of any other material;
- Waste that has the potential to leak must be double bagged;
- Waste bags would be placed in containers (e.g. cardboard boxes or wheeled, rigid, lidded plastic or galvanized bins), before being placed directly into the transportation vehicle
- A trolley, bin, or wheelbarrow may be used for transporting safety boxes and bins.
- The collected waste would not be left even temporarily anywhere other than at the designated storage room.
- Containers would be covered with lids during storage and transport.
- Carts would be used for transporting bags of infectious waste within the facility.

3.2.3.10. Collection and treatment of liquid health-care waste

Segregation, minimization and safe storage of hazardous materials are just as important for liquid wastes as they are for solid wastes. Typically, a system of sewer pipes linked to form a sewerage system will collect wastewater from around facilities and carry it below ground to a central location for treatment or disposal. This treatment plant is located at a facility, and wastewater collected from

service areas by pipe system and passed into septic tanks. The basic principle of effective wastewater management is a strict limit on the discharge of hazardous liquids to sewers.

The wastewater that is generated from the complex building should be segregated to minimize the load of wastewater that needs treatment. Two types of septic tanks will be arranged to separately collect hazardous and non-hazardous wastes. Non-hazardous wastewater that is generated from hand washing facilities, cafeterias, etc will be directly linked to septic tank designated for non-hazardous wastes and discharged to the sewer without pre-treatment. All other hazardous pre-treatment is recommended for wastewater streams from departments, and the pre-treatment could include acid–base neutralization, filtering to remove sediments, or autoclaving samples from highly infectious patients. Collected body fluids, blood and rinsing liquids from procedures might be highly infectious so that it would be treated using 5% sodium hypochlorite (NaOCl – bleach) before disposal. Sodium hypochlorite would never be mixed with detergents or used for disinfecting ammonia-containing liquids, because it might form toxic gases. Lime milk (calcium oxide) can be used to destroy microorganisms in liquid wastes with high organic content requiring disinfection (e.g. stool during a cholera outbreak). Onsite treatment of healthcare sewage will produce a sludge that contains high concentrations of pathogens, and would be treated before disposal. On-site treated wastewater would be transported to designated wastewater treatment with strict follow up.

However, this alternative is not possible currently because there is no municipal main or trunk sewer to which an EPHI sewer system could be connected. The proposed multi-purpose project will develop its own separate septic tank (for domestic and infectious wastewater) at EPHI to dispose its own sewage. Septic tanks would be constructed according to US EPA or international standard and monitored to avoid ground water pollution. For domestic liquid waste (Effluent from septic tank) Management Alternatives: Use of a public sewer line is one of the options considered for treating and disposing liquid waste generated from the proposed project at the municipal main or trunk sewer. This involves the construction of system to connect the municipal sewer line and it is inexpensive. Therefore, the design of the multi-purpose building will also consider the two separate septic tank waste water treatment system. The system will be designed in such a way to reduce the level of pollution load which can primarily be defined in terms of BOD, COD, total organic carbon, oil and grease, total coliform etc. Reference would be made to standards for effluent discharge into public sewers specified in the World Bank Group EHS guideline.

As it is the case for waste collection, treatment and disposal, in Addis Ababa, sewage disposal is the responsibility of the Addis Ababa Water Supply and Sewerage Authority (AAWSSA). It operates with seventeen wastewater treatment plants and the main ones are Kality and Kotebe. The Kality Wastewater Treatment Plant had capacity to treat 7,600 m^3 wastewater treatments per day but recently it has been upgraded with additional investment and technology so that it could treat 100,000 m^3 wastewater per day. The Kotebe treatment plant (with capacity of 85,000 m^3/day) receives only sludge from vacuum trucks that empty septic tanks. Therefore, once the EPHI treat the wastewater onsite then transfer the effluent to kality wastewater treatment plant through public wastewater sewer line.

3.2.3.11. Waste Disposal Methods for the proposed facilities

Disposal of hazardous ash: Fly ash and bottom ash from incineration is generally considered to be hazardous, because of the possibility of heavy metal content and dioxins and furans. It would preferably be disposed in sites designed for hazardous wastes, e.g. designated cells at engineered landfills, encapsulated and placed in specialized mono fill sites, or disposed in the ground in an ash pit. **Sharp waste disposal:** Even after decontamination, sharp waste may still pose physical risks. There may also be risk of reuse. Decontaminated sharp waste can be disposed of in safe sharp pits on the health-care facility premises or encapsulated by mixing waste with immobilizing material like cement before disposal. These procedures are only recommended in cases where the waste is handled manually and the landfill for general waste is not secured.

3.2.4. Occupational Health and Safety

Health and safety hazards in health facilities may affect healthcare providers, cleaning and other supporting staff personnel, and workers involved in waste management handling, treatment and disposal. Typical hazards which would be prevented with proper safety gear and practices include:

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

OSHA guideline for Laboratory Safety Guidance and WHO Laboratory biosafety manual are recommended to be used to minimize health hazards on the employees during operation of the proposed laboratories. OSHA Standards requires that employers "would furnish to each of his employees and a place of employment which are free from recognized hazards that are causing or likely to cause death or serious physical harm to his employees. The following OSHA for Laboratory Safety Guidance standards and WHO Laboratory biosafety manual must be respected to minimize such hazards.

The Occupational Exposure to Hazardous Chemicals in Laboratories standard

The laboratory safety officer must be tailored to reflect the specific chemical hazards present in the laboratory where it is to be used. Laboratory personnel must receive training regarding the Laboratory standard, the Laboratory Safety Chemical Hygiene Plan (CHP), and other laboratory safety practices, including exposure detection, physical and health hazards associated with chemicals, and protective measures.

The Hazard Communication standard: The standard requires evaluating the potential hazards of chemicals, and communicating information concerning those hazards and appropriate protective measures to employees. The standard includes provisions for: developing and maintaining a written hazard communication program for the workplace, including lists of hazardous chemicals present; labeling of containers of chemicals in the workplace, as well as of containers of chemicals being shipped to other workplaces; preparation and distribution of material safety data sheets (MSDSs) to workers and downstream employers; and development and implementation of worker training programs regarding hazards of chemicals and protective measures. This OSHA standard requires manufacturers and importers of hazardous chemicals to provide material safety data sheets to users of the chemicals describing potential hazards and other information. They must also attach hazard warning labels to containers of the chemicals. Employers must make MSDSs available to workers. They must also train their workers in the hazards caused by the chemicals workers are exposed to and the appropriate protective measures that must be used when handling the chemicals.

The Blood borne Pathogens standard requires employers to protect workers from infection with human blood borne pathogens in the workplace. The standard covers all workers with reasonably anticipated" exposure to blood or other potentially infectious materials. It requires that information and training be provided before the worker begins work that may involve occupational Exposure to

blood borne pathogens, annually thereafter, and before a worker is offered hepatitis B vaccination. The Blood borne Pathogens standard also requires advance information and training for all workers in research laboratories who handle human immunodeficiency virus (HIV) or hepatitis B virus (HBV). The standard was issued as a performance standard, which means that the employer must develop a written exposure control plan (ECP) to provide a safe and healthy work environment, but is allowed some flexibility in accomplishing this goal. Among other things, the ECP requires employers to make an exposure determination, establish procedures for evaluating incidents, and determine a schedule for implementing the standard's requirements, including engineering and work practice controls. The standard also requires employers to provide and pay for appropriate PPE for workers with occupational exposures.

The Personal Protective Equipment (PPE) requires that employers provide and pay for PPE and ensure that it is used wherever "hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants are encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact in order to determine whether and what PPE is needed, the employer must "assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of PPE. Based on that assessment, the employer must select appropriate PPE that will protect the affected worker from the hazard, communicate selection decisions to each affected worker and select PPE that properly fits each affected employee. Employers must provide training for workers who are required to use PPE that addresses when and what PPE are necessary, how to wear and care for PPE properly, and the limitations of PPE.

The Eye and Face Protection standard requires employers to ensure that each affected worker uses appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

The Respiratory Protection standard requires that a respirator be provided to each worker when such equipment is necessary to protect the health of such individual. The employer must provide respirators that are appropriate and suitable for the purpose intended. The employer is responsible for establishing and maintaining a respiratory protection program that includes, but is not limited to, the following: selection of respirators for use in the workplace; medical evaluations of workers

required to use respirators; fit testing for tight-fitting respirators; proper use of respirators during routine and emergency situations; procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing and discarding of respirators; procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators; training of workers in respiratory hazards that they may be exposed to during routine and emergency situations; training of workers in the proper donning and doffing of respirators, and any limitations on their use and maintenance; and regular evaluation of the effectiveness of the program.

The Hand Protection standard requires employers to select and ensure that workers use appropriate hand protection when their hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes. Further, employers must base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use, and the hazards and potential hazards identified.

The Control of Hazardous Energy standard (29 CFR 1910.147) establishes basic requirements for locking and/or tagging out equipment while installation, maintenance, testing, repair, or construction operations are in progress. The primary purpose of the standard is to protect workers from the unexpected energization or startup of machines or equipment, or release of stored energy. The procedures apply to the shutdown of all potential energy sources associated with machines or equipment, including pressures, flows of fluids and gases, electrical power, and radiation.

Safety Standards: These standards pertain to general industry, as well as laboratories. When laboratory workers are using large analyzers and other equipment, their potential exposure to electrical hazards associated with this equipment must be assessed by employers and appropriate precautions taken. Similarly, worker exposure to wet floors or spills and clutter can lead to slips/trips/falls and other possible injuries and employers must assure that these hazards are minimized. While large laboratory fires are rare, there is the potential for small bench-top fires, especially in laboratories using flammable solvents. It is the responsibility of employers to implement appropriate protective measures to assure the safety of workers.

3.2.5. Impact of None-routine Emergency Events

The existing service, laboratories, and multi-purpose projects that will be built by this project will need to have emergency response plan to contain accidents that may arise during none routine events. Such accidents may include fire out break or chemical spill. It is important to develop emergency preparedness and response plan (EPRP) for non-routine emergencies such as fire outbreak and chemical spill. These EPRP plan for fire accident and chemical spill should be a part of the whole EPRP (please refer the EPRP template in Annex III). To minimize the non-routine emergency events the following guiding principles of response will have to be followed.

3.2.5.1. Emergency response plan for the containment of fire accident

- No open and unattended fires will be permitted.
- All hazardous materials are to be properly stored so as to avoid mixing of materials which could result in fires and/or explosions.
- Provide employees with firefighting training and ensure that firefighting equipment is provided or placed at appropriate place and ensure that all fire-fighting equipment are regularly maintained and serviced.
- The management of the laboratory would be certain of the presence of fire alarm and fire assembly hole and appropriate fire exit in the laboratory building Signage of fire hazard will be provided. Directions to exit in case of any fire incidence and emergency contact numbers would be provided. The emergency contact numbers would be displayed within the laboratory facility.
- Staffs working in multi-purpose building will be trained on emergency fire fighting

3.2.5.2. Emergency response plan for the containment of chemical spill

- All hazardous substances must be stored on an impervious surface in a designated area, able to contain 110% of the total volume of materials stored at any given time.
- Material safety data sheets (MSDS's) are to be clearly displayed for all hazardous materials.
- The integrity of the impervious surface and bunded area must be inspected regularly and any maintenance work conducted must be recorded in a maintenance report.
- Provide proper warning signage to make people aware of the activities within designated areas.

- Employees would be provided with absorbent spill kits and disposal containers to handle spillages. Train employees and contractors on the correct handling of spillages and precautionary measures that need to be implemented to minimize potential spillages.
- Employees would record and report any spillages to the responsible person.
- An Emergency Preparedness and Response Plan will be developed and implemented would and incident occur.
- Access to storage areas on site must be restricted to authorized employees only.
- Contractors will be held liable for any environmental damages caused by spillages.

3.2.6. Risk due to Laboratory biosafety issues

As no laboratory has complete control over the specimens it receives, laboratory workers may be exposed to organisms in higher risk groups than anticipated. To minimize such health risks, the proposed facilities will be designated. For the proposed facilities, the following standards practices indicated in the WHO Bio-safety Laboratory Manual of 2004 will have to be respected in order to mitigate the bio-safety risk during the laboratories operation.

Code of practice

Each laboratory would adopt a safety or operations manual that identifies known and potential hazards, and specifies practices and procedures to eliminate or minimize such hazards. Specialized laboratory equipment is a supplement to but can never replace appropriate procedures. The most important concepts are listed below.

Access

- The international biohazard warning symbol and sign must be displayed on the doors of the rooms where microorganisms of Risk Group 2 or higher risk groups are handled;
- Only authorized persons would be allowed to enter the laboratory working areas;
- Laboratory doors would be kept closed;
- Children would not be authorized or allowed to enter laboratory working areas;
- Access to animal houses would be specially authorized;
- No animals would be admitted other than those involved in the work of the laboratory.

Personal protection

- Laboratory coveralls, gowns or uniforms must be worn at all times for work in the laboratory.

- Appropriate gloves must be worn for all procedures that may involve direct or accidental contact with blood, body fluids and other potentially infectious materials or infected animals. After use, gloves would be removed aseptically and hands must then be washed;
- Personnel must wash their hands after handling infectious materials and animals, and before they leave the laboratory working areas;
- Safety glasses, face shields (visors) or other protective devices must be worn when it is necessary to protect the eyes and face from splashes, impacting objects and sources of artificial ultraviolet radiation;
- It is prohibited to wear protective laboratory clothing outside the laboratory, e.g. in canteens, coffee rooms, offices, libraries, staff rooms and toilets;
- Open-toed footwear must not be worn in laboratories;
- Eating, drinking, smoking, applying cosmetics and handling contact lenses is prohibited in the laboratory working areas;
- Storing human foods or drinks anywhere in the laboratory working areas is prohibited;
- Protective laboratory clothing that has been used in the laboratory must not be stored in the same lockers or cupboards as street clothing.

Procedures

- Pipetting by mouth must be strictly forbidden;
- Materials must not be placed in the mouth. Labels must not be licked;
- All technical procedures would be performed in a way that minimizes the formation of aerosols and droplets;
- The use of hypodermic needles and syringes would be limited. They must not be used as substitutes for pipetting devices or for any purpose other than parenteral injection or aspiration of fluids from laboratory animals;
- All spills, accidents and overt or potential exposures to infectious materials must be reported to the laboratory supervisor. A written record of such accidents and incidents would be maintained;
- A written procedure for the clean-up of all spills must be developed and followed.
- Contaminated liquids must be decontaminated (chemically or physically) before discharge to the sanitary sewer. An effluent treatment system may be required, depending on the risk assessment for the agent(s) being handled;

- Written documents that are expected to be removed from the laboratory need to be protected from contamination while in the laboratory.

Laboratory working areas

- The laboratory would be kept neat, clean and free of materials that are not pertinent to the work;
- Work surfaces must be decontaminated after any spill of potentially dangerous material and at the end of the working day;
- All contaminated materials, specimens and cultures must be decontaminated before disposal or cleaning for reuse;
- Packing and transportation must follow applicable national and/or international regulations;
- When windows can be opened, they would be fitted with arthropod-proof screens.

Bio-safety management

- It is the responsibility of the laboratory director (the person who has immediate responsibility for the laboratory) to ensure the development and adoption of a bio-safety management plan and a safety or operations manual;
- The laboratory supervisor (reporting to the laboratory director) would ensure that regular training in laboratory safety is provided;
- Personnel would be advised of special hazards, and required to read the safety or operations manual and follow standard practices and procedures. The laboratory supervisor would make sure that all personnel understand these. A copy of the safety or operations manual would be available in the laboratory;
- There would be an arthropod and rodent control programme;

Appropriate medical evaluation, surveillance and treatment would be provided for all personnel in case of need, and adequate medical records would be maintained.

Health and medical surveillance

The medical director of the hospitals through the laboratory director is responsible for ensuring that there is adequate surveillance of the health of laboratory personnel. The objective of such surveillance is to monitor for occupationally acquired diseases. Appropriate activities to achieve these objectives are:

- Provision of active or passive immunization;

- Facilitation of the early detection of laboratory-acquired infections;
- Exclusion of highly susceptible individuals (e.g. pregnant women or immune-compromised individuals) from highly hazardous laboratory work;
- Provision of effective personal protective equipment and procedures;

3.2.7. Guidelines for the surveillance of laboratory workers handling microorganisms at Bio-safety laboratories

- A pre-employment or pre-placement health check is necessary. The person's medical history would be recorded and a targeted occupational health assessment performed;
- Records of illness and absence would be kept by the laboratory management;

For this reason, continuous in-service training in safety measures is essential. An effective safety programme begins with the laboratory managers, who would ensure that safe laboratory practices and procedures are integrated into the basic training of employees. Training in safety measures would be an integral part of new employees' introduction to the laboratory. Employees would be introduced to the code of practice and to local guidelines, including the safety or operations manual. Measures to assure that employees have read and understood the guidelines, such as signature pages, would be adopted. Laboratory supervisors play the key role in training their immediate staff in good laboratory techniques. The bio-safety officer can assist in training and with the development of training aids and documentation.

Staff training would always include information on safe methods for highly hazardous procedures that are commonly encountered by all laboratory personnel and which involve:

- Inhalation risks (i.e. aerosol production) when using loops, streaking agar plates, pipetting, making smears, opening cultures, taking blood/serum samples, centrifuging, etc.
- Ingestion risks when handling specimens, smears and cultures;
- Risks of per-cutaneous exposures when using syringes and needles;
- Bites and scratches when handling animals;
- Handling of blood and other potentially hazardous pathological materials
- Decontamination and disposal of infectious material;

3.2.8. Community Health and Safety

The guidelines recommend implementation of risk management strategies to protect general community from biological, physical, chemical, or other hazards associated with the laboratories operation phase. Key areas to consider are:

- **General site hazards:** where the laboratory activities can affect people due to the contaminated materials and hazardous chemical waste generated from the laboratories.
- **Disease Prevention:** ensuring that risk of disease from laboratory related activities such specimens processing and infectious waste generated from the laboratories.

WBG EHS Guidelines for Community Health and Safety is recommended to be used to minimize health hazards during operation of the proposed laboratories as follow:

- Providing surveillance and active screening and treatment of workers
- Preventing illness among workers in local communities by:
  - Undertaking health awareness and education initiatives, for example, by implementing an information strategy to reinforce person-to-person counseling addressing systemic factors that can influence individual behavior as well as promoting individual protection, and protecting others from infection, by encouraging condom use
  - Training health workers in disease treatment
  - Conducting immunization programs for workers in local communities to improve health and guard against infection
  - Providing health services
- Providing treatment through standard case management in on-site or community health care facilities. Ensuring ready access to medical treatment, confidentiality and appropriate care, particularly with respect to migrant workers
- Promoting collaboration with local authorities to enhance access of workers families and the community to public health services and promote immunization

3.2.9. Impacts during decommissioning

Decommissioning entails closure of the auxiliary facilities and services such as quarry mines, construction materials storage facilities, leftover materials (sand, cement, iron bars etc..). Decommissioning impacts for a project of this nature are likely to be minor, localised and short term.

To minimize impacts of the decommissioning activities it important to prepare environmentally management plan that will guide the contractor on how to safely demolish the laboratory building and facilities to safely dispose demolished wastes. According to this plan the contractor at the time

of demolishing and dismantling the laboratory facilities is expected fenced the site to prevent the site from being accessed by human and animals.

4. Implementation of the Environmental and Social Management Plan

The ESMP will be implemented with an adaptive management approach to respond to changes occurring at different stages of the Project and, as a living document, will be updated to reflect the current status of the Project and site features and management requirements when necessary.

EPHI is obliged to implement the ESMP with adequate and qualified personnel working under an appropriate organizational structure, in line with Project standards, in line with stakeholder participation and information sharing requirements, and to ensure that contractors/subcontractors adopt management controls.

And this section addresses institutional responsibilities for implementation of activities proposed for management of environmental and social risks, environmental monitoring, capacity development and training, and Chance Finds and GRM Procedure.

4.1. Institutional arrangement, roles and responsibilities for ESMP implementation

Institutional responsibility of implementing this ESMP will rest with the Project Coordination Team, under Engineering Service Directorate (ESD) at MoH. A key role of the unit would be among others, to review consultants' reports for compliance with the ESMP. Other roles will be:

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

The ESD at the Federal Ministry of Health (MOH) shall serve as the implementing body with the mandate to:

- Prepare plans for effective project development and management;
- Co-ordinate the project programs and actions plan, and the various sub-project safeguard activities;
- Manages project construction contracts and supervises project sights;
- Ensure that the design of the project incorporate provision for addressing environmental impacts, including facilities for infectious and hazardous healthcare waste management
- Develop environment, health and safety standards for contractors; incorporate such requirements in construction contracts, and monitoring compliance to these requirements.

The Project Coordination Team is led by a team leader, and focal persons who have supervisory roles and are responsible for collecting information about respective components. Supervision of the implementation of this ESMP will be under the Public Health Infrastructure component. MOH should ensure that all its personnel to be involved in the implementation of this ESMP are adequatelyqualified and were appointed based on their qualification and suitability for respective roles.

Oversight to ensure mitigation actions are implemented will rest with the ESD at MOH but health workers at facility level, Project Coordination Unit, In-charge Officials of each facilities and Work supervisor will have similar responsibility. MOH shall require contractors to comply with this ESMP and where a contractor has an Environmental and Social Officer he/she will undertake environmental supervision during construction. It is believed that the project proponent in this case, the ESD, Project Implementation Unit (PIU), the construction supervisor and the Addis Ababa Administration EPA responsible for environment will take the major responsibility in supervising the implementation of the environmental mitigation and monitoring plans.

For mitigation measures related to design change, the engineering consultancy organization assigned to design the proposed development project will be responsible for incorporating the recommended mitigation measures into the design and into the technical specifications of the main project report.

During construction, the contractor will be responsible for implementing environmental and social mitigation measures included in the present ESIA report. The construction supervisor and delegated officers from the ESD and PIU will monitor the proper implementation of mitigating measures at the right time. The Contractor will be fully responsible for ensuring that all the work will be carried out as per the environmental requirements indicated in the design and technical specifications and the present ESIA/ESMP report.

The delegated staffs from the ESD and PIU and the construction supervisor’s environmentalist will be jointly responsible for the overall coordination of the environmental and social management activities. They will advise the contractors, construction supervisors, the project management unit of the ESD/PIU and the relevant authorities regarding the implementation of the environmental mitigating measures and monitoring of impacts.

During the operation period, the environmental issues will be monitored jointly by Ethiopian Environmental Protection Agency (EPA) or its counterpart city office, Sub-city, Woreda (such as Woreda 9), and the EPHI. The Management of the Project (Central warehouse PT panel Production & Biobank centres) may also organize a unit for Environment, Health and Safety to enable implementation and monitoring of the mitigation measures during operational phases. In addition, AAWSSA will also involve in wastewater and solid waste disposal.

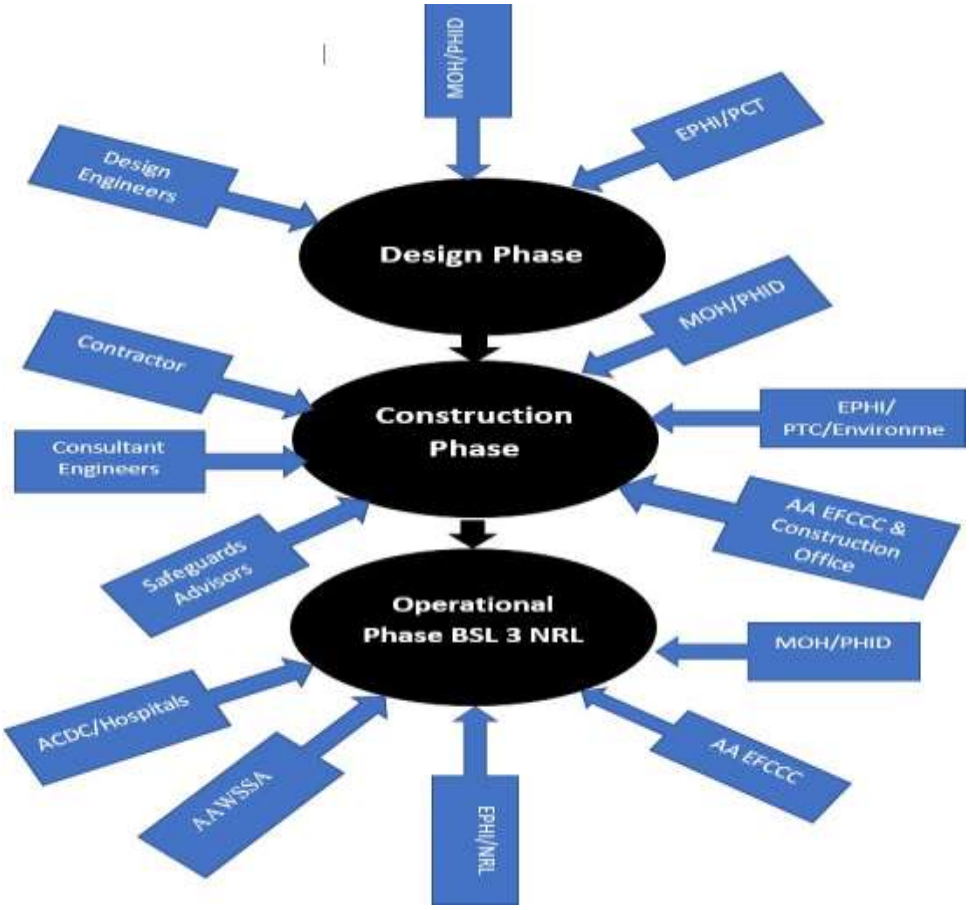


Figure 4: Schematic diagram that shows the stakeholders at design, construction and operational phase

The EHPI will have a biosafety and security unit to address and comply with regulations and recommendations for biosafety and biosecurity, and as well as the health and safety of the staff, researchers, community, and environment. EPHI will be responsible for overall management of the proposed multi-purpose building. To maintain regulatory compliance and to protect personnel, the community and the environment from biohazards, EPHI will be responsible for appointing laboratory director, biosafety and biosecurity officer and other technical and support staff required for the multi-purpose building; ensuring appropriate training is provided to personnel conducting research with biohazards or recombinant or synthetic nucleic acid materials; ensuring that research conforms to the provisions of best international practices such as the NIH Guidelines, BMBL, WHO Biosafety Manual and this ESIA; establishing and maintaining a Biosafety Committee ;establishing and maintaining a health surveillance program for personnel; reporting, when required, any significant problems, violations or significant research-related accidents or illnesses to pertinent Ethiopian Public Health and Environmental issues regulatory organs; and facilitating the preparation of guidelines, policies and plan relevant for smooth functioning of the lab.

The multi-purpose building will employee a full-time based and temporary workers, the number of personnel will be determined based on the work load. The staffs to be deployed includes laboratory director, laboratory scientist, laboratory quality Manager, biosafety and biosecurity officer, HVAC technician, electrical technician, equipment and instrument maintenance technician, security staff, incinerator operator, cleaners, wastewater treatment plant operator. These staff will help to ensure proper implementation of the ESMP and ICWMP; and their roles and responsibilities are described in section 2.10.3 of ESIA report document.

Table 5: Roles and Responsibilities Regarding the Implementation of the ESMP

EPHI/MOH
EPHI/MOH will be responsible for overall management of the proposed Multi-purpose building. To maintain regulatory compliance and to protect personnel, the community and the environment from biohazards, EPHI will be responsible for: ✓ Implementation of ESMP and related management plans and fulfillment of all commitments within the scope of ESCP ✓ Sharing the ESMP and management plans with the Contractor, guiding the Contractor in preparing the implementation plans, approving these plans

- ✓ Updating the ESMP when necessary and sharing additional commitments with the Contractor
- ✓ Employment of competent EHS staff and external experts to work under the project
- ✓ Providing EHS trainings to all Project staff
- ✓ Coordination of the actions and assessments if a change due to engineering/design changes, route/location changes, and applicable legislation changes related to environmental and social issues, authority provision changes, any new environmental/social data is introduced; construction/operation strategy changes or stakeholders influence the project.
- ✓ Appointing laboratory director, biosafety and biosecurity officer and other technical and support staff required for the multi-purpose building
- ✓ Ensuring appropriate training is provided to personnel conducting research with biohazards or recombinant or synthetic nucleic acid materials.
- ✓ Establishing and maintaining a *Biosafety Committee*
- ✓ Establishing and maintaining a health surveillance program for personnel.
- ✓ Reporting, when required, any significant problems, violations or significant research-related accidents or illnesses to pertinent Ethiopian Public Health and Environmental issues regulatory organs.
- ✓ Facilitating the preparation of guidelines, policies and plan relevant for smooth functioning of the facilities
- ✓ Finance the construction/procurement of medical wastewater management facility and incinerator; and oversee the proper functionality of the medical waste management facilities

PMU/PIU

- ✓ Evaluating the implementation of ESMP and related management plans and fulfillment of all commitments within the scope of ESCP
- ✓ Participate in the updating the ESMP when necessary
- ✓ Facilitating the employment of competent EHS staff and external experts to work under the project
- ✓ Facilitating the coordination of the actions and assessments if a change due to engineering/design changes, route/location changes, and applicable legislation changes

related to environmental and social issues, authority provision changes, any new environmental/social data is introduced; construction/operation strategy changes or stakeholders influence the project.

- ✓ Ensuring the appointment of laboratory director, biosafety and biosecurity officer and other technical and support staff required for the multi-purpose building
- ✓ Facilitating the preparation of guidelines, policies and plan relevant for smooth functioning of the facilities
- ✓ Ensure and notify (to the responsible government officials in MOH and the Bank) any incident or accident related to the Project which has a significant adverse effect on the environment, the affected communities, the public or workers including but not limited to; incidents and accidents encountered during construction works, environmental spills, etc
- ✓

Biosafety and Biosecurity Committee

The Biosafety Committee will oversee the review, approval and oversight of biohazards in the facilities. Specifically, the committee will be responsible for assessment of facilities in collaboration with the Biosafety Officer, and developing procedures, practices, and training of staff, or taking other steps necessary to assure compliance with WHO standard, *CDC Guidelines, the BMBL,* and other pertinent standards and regulations.

Besides, Biosafety Committee will supervise the infection control and waste management system of EPHI campus and the committee will be responsible to action for any deviation from the waste management procedure practices or malpractice during waste handling transportation, storage, treatment and disposal.

Environmental and Social Safeguards Specialist

- ✓ Environmental review, monitoring and audits related to ESMP practices, evaluation of results
- ✓ Auditing contractor activities in line with ESMP requirements
- ✓ Ensuring compliance with project standards, making necessary emergency corrections in case of non-compliance
- ✓ Stopping work in any situation that threatens environment and human health and safety
- ✓ Providing follow-up and analysis of environmental and social accidents

- ✓ Ensuring stakeholder participation, implementing the grievance mechanism, ensuring continuous information transfer through open communication
- ✓ Promptly notify the GMU/PIU of any incident or accident related to the Project which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers including but not limited to; incidents and accidents encountered during construction works, environmental spills, etc.
- ✓ Provide sufficient detail regarding the incident or accident, findings of the Root Cause Analysis (RCA), indicating immediate measures or corrective actions taken or that are planned to be taken to address it, compensation paid, and any information provided by any contractor and supervision consultant, as appropriate. Ensure the incident report is in line with the World Bank's Environment and Social Incidence Response Toolkit (ESIRT).
- ✓ Subsequently, as per the Bank's request, prepare a report on the incident or accident and propose any measures to prevent its recurrence.

Construction Contractor

- ✓ Fulfillment of all requirements of the ESMP and management plans
- ✓ Implementation of additional commitments determined by ESD/EPHI
- ✓ Ensuring compliance with project standards, obtaining all relevant permits and licenses
- ✓ Monitoring construction activities (including subcontractor activities) and taking measures within the scope of the ESMP
- ✓ Development of implementation and monitoring plans / procedures in line with the ESMP structure, implementation after the approval of ESD/EPHI
- ✓ Employment of competent EHS staff within the scope of the project
- ✓ Providing the necessary trainings to the contractor and sub-contractor staff on environmental and social issues
- ✓ Providing follow-up and analysis of environmental and social accidents
- ✓ Environmental inspections, monitoring and audits related to ESMP practices, reporting to ESD/EPHI
- ✓ Prompt notification of accident and incidents and keeping an incident register at construction site throughout the Project life.

4.2. Mitigation Measures Implementation Plan

The mitigation measures for anticipated environmental and social risks for the proposed multi-purpose building is outlined in Table 6.

Table 6: Environmental and Social risks mitigation measures and implementation plan

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
Pre-construction phase				
Design fault	Improve and approved design against WBG EHS guideline for facility design, WHO Laboratory safety manual.	Consultants/ MOH/EPHI	Before construction	10,000.00
Construction phase				
Positive impact				
1. Income generation: construction materialsuppliers and contractors	- The project will promote in country procurement where technically or commercially reasonable and feasible. - For earth materials, procure from legitimate sources to avoid encouraging environmental degradation	- Construction contractor - Construction contractor	During Construction Phase	Budget included in project cost
2. Employment Opportunities	- Labor will be recruited exclusively from local community, and professionals will be recruited preferentially from such communities, provided that they have the requisite qualification, competence and desired experience - Contractors will be required to pay a “living wage” to all workers.	- Construction contractor - Construction supervisor	During Construction Phase	Budget included in project cost
Negative impact				
Design fault	During design consider the standard requirements indicated in WBG EHS guideline, OSH laboratory safety guidance and WHO	MOH/EPHI/ Contractor	During	

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	laboratory bio-safety manual 3rd Edition which includes: - Adequate spaces for woks and staff - Accessible to people with disability and others with special needs - Infectious diseases and occupational health hazards prevention and control systems - Emergency management systems - Waste disposal systems		Construction Phase	
Impact on EPHI staff and on patients seeking laboratory service	Access to the construction site would be restricted and Hazardous conditions would be removed from construction sites to minimize impacts.	Construction Contractor	Construction Phase	Budget includedin project cost
Impacts on Landscape	- The construction wastes and packaging materials would be regularly collected, transported and properly disposed on a site designated for this purpose to minimize impacts. - Use dust-suppressing water spray during civil works, where necessary	- Construction Contractor	Construction Phase	Budget includedin project cost
Soil erosion due to clearance of vegetation and movement of heavy construction machineries.	Implement appropriate methods as recommended in the WBG EHS guideline - Reducing or preventing erosion by: contouring and minimizing length and steepness of slopes, mulching to stabilize exposed areas, re-vegetating areas promptly, - Limit extent of vegetation clearing on construction sites, materials mining sites, working areas and service roads - Control movement of vehicles; Light construction machinery would be used and excavation would be strictly carried out within the space provided in the layout - Regular use of water sprays and compacting soil on earth roads and around working areas	EPHI/MOH	Construction Phase	Budget includedin project cost

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	- Re-plant trees and vegetation after construction			
Impact on Geology/Soils	Soil erosion prevention measures would be in place during the construction phase to minimize erosion from storm water; Dust suppression measures would be employed to minimize wind erosion.			Budget includedin project cost
Change in natural drainage flow pattern and surface water runoff Drainage clogging from rubble, cement, paints, lubricants and fuels as well as makeshift toilets	- Use WBG EHS guideline recommendation for the septic systems - Collect and dispose wastes in designated disposal sites as required by the Local Authority - Keep all drains clear of silt and debris regularly and after construction	- Construction Contractor		Budget includedin project cost
Temporary loss of access to services such as water telephones and electricity due to possible damage by contractor	- Identify and divert locations water pipes, telephone and electric cables before construction and relocate laboratory equipment's to a room reasonably away from construction activities	- Construction Contractor & supervisor - EPHI/MOH	During Construction Phase	Budget includedin project cost
Spread of HIV and other contagious diseases due to human contact among the construction work force.	- Sensitizing workers and the surrounding communities on awareness, prevention and management of HIV/AIDS. Distribute condoms and create awareness on the transmission mechanisms of contagious diseases	- Construction Contractor & supervisor - EPHI/MOH	During Construction Phase	Budget includedin project cost
Intensification of Malaria	- Prevention of larval and adult propagation through sanitary improvements and elimination of breeding habitats close to human settlements. - Drain all pools of standing water to minimize or altogether eliminate mosquito breeding sites	- Construction Contractor & supervisor - EPHI/MOH	During Construction Phase	Budget includedin project cost

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
Spread of COVID-19	- Sensitizing workers and the surrounding communities on awareness, prevention and management of COVID-19 - Provide training and onsite covid prevention services to construction crew - Apply ESF/Safeguards Interım Note: COVID-19 Consıderatıons ın Constructıon/Cıvıl Works Projects will be practiced	- Construction Contractor & supervisor - EPHI/MOH	During Construction Phase	Budget includedin project cost
Gender empowerment	- Ensuring equitable distribution of employment opportunities between men and women - Providing toilets and bathrooms for both male and female workers on site	- Construction Contractor & supervisor - EPHI/MOH	During Construction Phase	Budget includedin project cost
Child Labour and Protection	- Provide and implement a child protection strategy - Ensuring no children are employed on site in accordance with national and international labour laws - Ensuring that any child sexual relations offenses among contractors' workers are promptly reported to the police	- Construction Contractor & supervisor - EPHI/MOH	During Construction Phase	Budget includedin project cost
Gender Equity, Sexual Harassment	- Provide and implement a gender-based violence strategy, which will include: • Gender mainstreaming in employment at the worksite with opportunities provided for females to work, in consonance with local laws and customs • Grievances redress mechanisms including non-retaliation. • Provide and implement an employee code of conduct - The works contractor should be required, under its contract, to prepare and enforce a No Sexual Harassment and Non-Discrimination Policy, in accordance with national law where applicable	- Construction Contractor & supervisor - EPHI/MOH	During Construction Phase	Budget includedin project cost

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
Air pollution due to emissions from construction machinery and from dust	Applying Dust suppression techniques as recommended in WBG EHS guideline - Water would be sprayed on access roads and construction sites and loose soil would be compacted and construction machinery would be regularly maintained as recommended by dealers	- Construction Contractor	During Construction Phase	Budget includedin project cost
Noise & vibration disturbances due to movement of heavy plant and equipment	- Planning activities in consultation with local communities - Construction activities during night time would be avoided. - Use of personal protective clothing (PPE) like dust masks on construction crew. - No discretionary use of noisy machinery within 50 m of residential areas and near institutions or use of manual labour in these sections. - Good maintenance and proper operation of construction machinery.	- Construction Contractor	During Construction Phase	Budget includedin project cost
Temporary obstruction of walkways due to road and sidewalk barriers	- Provide alternative routes and passages with adequate and appropriate directional signs	- Construction Contractor	During Construction Phase	Budget includedin project cost

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
Impact of improper construction and demolition waste management	- The wastes will be properly segregated and separated - The contractor and EPHI administration will work together with the Municipal Council to facilitate proper waste handling and disposal from the site. - Hazardous waste will not be mixed with other solid waste generated and would be managed by way of incineration or land-filling. - Waste will be picked off the site every day and when temporarily kept on site it will be covered	- Construction Contractor - Construction supervisor	During Construction Phase	2,000.00
Impacts from physical hazards	- Orientation would be provided to all construction workers on safe work practices and guidelines and ensure that they adhere to them. - Training on incidences handling and prevention would be provided to workers. - Regular drills would constantly follow on various possible incidences. - Use of signage to warn staff and/ or visitors that are not involved in construction activities of dangerous places. - Safety supervision of works would be done regularly to ensure that safety conditions are met	- Construction Contractor - Construction supervisor	During Construction Phase	7,000.00

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	- Evacuation procedures will be developed to handle emergency situations. - Provide appropriate personnel protective equipment (PPE) to all workers.			
Impact from traffic accidents due to moving machinery	- Planning & segregating the location of vehicle traffic, machine operation, & walking areas, and controlling vehicle traffic through the use of one-way traffic routes, - Establishment of speed limits, and on-site trained flag people wearing high-visibility vests or outer clothing covering to direct traffic - Adopt best transport safety practices - Provide on-site training to drivers, machine operators, and traffic controller about traffic accidentEmploye safe traffic control measures - Develop vehicle traffic plan to minimize traffic accidents	- Construction Contractor	During Construction Phase	8,000.00
Impact on Air quality	- Contractors should use dust screens or nets in windows, doorways and ventilators of rooms where demolition or other dusty construction activities are occurring. - Ensure good housekeeping and clean construction operations where, among other necessary actions, dust	- Construction Contractor	During Construction Phase	Budget includedin project cost

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	would be quickly swept off cement floors and collected in covered containers. - EPHI administrator will have the authority to inspect and restrain contractors from generating excessive dust within institute environment - To minimize indoor dust, portable extraction systems are recommended. - Avoid water sprays: this could lead to indoor flooding of surrounding rooms			
Impact on social service causedby disruption of laboratory services	- Construction activities would be carried out during the day time - Plan pre-construction activities early to identify suitable rooms or adjoining buildings into which the sample collection can be carried out with minimal inconvenience	ConstructionContractor Construction supervisor PIU	During Construction Phase	Budget includedin project cost
Impacts of gender based violence and child labour	- Give priority for women in the employment of skilled and casual laborers - Provision and availability of separate sanitation facilities for women, the provision of women friendly safety equipment and materials, - Contract document for workers should incorporate measures	Construction Contractor Construction supervisor PIU	During Construction Phase	Budget includedin project cost

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	to be taken against those workers who commit GBV and sexual harassment. - Establish a standard code of conduct to be produced by the client and signed by all workers including subcontract workers. - As part of prevention, provide orientation on SEA/SH and signing of code of conduct by subproject workers - Take appropriate actions on workers violating the CoC; - Ensure that no child is employed on site in accordance with national labour laws; - Ensure that any child abuse attempts or practices including sexual offenses among contractors' workers are promptly reported to the police - The Contract must follow strict measures against the employment of children - In the contract document must clearly stipulate that it is against the law to employ under age children - If the contractor is found employing children below the legally required age, he/she should be penalized and compensate the child.			

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	- Regular monitoring should be conducted to ensure that no child labour is used in the construction work - Ensure provision and enforcement of all relevant labour laws, regulations, tools and contractual agreements (Employment Act, OSH Act, Workers' compensation, Labour Unions Act etc.) in all workplaces - Empower and facilitate Labour Inspection Function to monitor implementation of relevant policies and legal instruments			
Operation phase *				
Positive impact				
Improved public health emergency preparedness and response services	- Construction of PT Panel production, bio-bank and warehouse facility, would be matched with commensurate staffing with laboratory/ public health personnel adequately trained in use of newly installed equipment	EPHI and MoH	During Operation Phase	12,000.00
Generation of additional permanent employment	- Operation of the PT Panel production, bio-bank and warehouse facility will create additional permanent technical and non-technical job opportunities for different professionals, and supportive personnel.	EPHI and MoH	During Operation Phase	72,000.00 per annum
Negative Impact				

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
Occupational health and safety risks on health care providers & supportive staff due to improper work procedures & healthcare waste management	- Provide personal Protection equipment - Implement engineering control systems like primary and secondary barriers - Organize and implement medical surveillance which includes medical service and immunization programs - Provide health and safety training - Adopting and implementing safety manuals aligned with OSH guideline and WHO laboratory biosafety manual. - Develop and implement safety standards.	EPHI/MOH	During Operation Phase	1,000 per annum
Improper waste management can lead water and soil contamination	- Provide colour coded waste bins for the different types of waste generated - Develop and implement appropriate plan, strategies and action plan for waste minimization and segregation - Use appropriate facilities and methods as stipulated in the WBG EHI guideline to collect, and transport wastes, treat and dispose them using appropriate technologies and disposal facilities such as incineration, autoclave and sanitary landfill - Laboratory staff s and supportive staffs would be trained on waste management and handling during operation - Laboratory would have standard operation and decontamination procedure manuals and clearly displayed at appropriate point (s) with the laboratory - Use WBG EHS guideline recommendations for the septic	EPHI/MOH	During Operation Phase	2,500 per annum

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	systems - Use appropriate waste drainage system leading to septic tank or public sewerage facilities or treatment technologies such as activated sludge and sanitary facilities, if available the town municipality - Use contingency containment facilities to collect accidental health care waste spillage - Training workers on the correct transfer and handling of fuels and chemicals and the response to spills - Provide emergency materials like chemical and biological spill kits and MSDS. - Proper selection of disposal sites - Adhering to recommended waste disposal practices (i.e. WBG EHS guideline)			
Impacts from physical hazards	- All workers to be provided with appropriate PPE against exposure to infectious pathogens, hazardous chemicals and ionizing radiation in accordance with recognized international safety standards and guidelines. - Orientation for all staff would be given on safe work practices and guidelines and ensure that they adhere to it. - Training would be conducted on incident handling and prevent manage. This would involve proper handling of electricity, water etc. and sensitization on various modesof escape, conduct and responsibility during such incidences.	EPHI Management & HSE Officer	During Operation Phase	10,000.00 Per annum.

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	- Regular drills would constantly follow on various possible incidences. This will test the response of the involved stakeholders. Such drills will keep them alert and they will become more responsive to in the case ofincidences. - Use signage to warn staff and/ or visitors that are not involved in laboratory work of dangerous places - Develop evacuation procedures to handle emergency situations.			
Impact from Electrical and Explosive Hazards	• All electrical installations and equipment would be inspected and tested regularly, including earthing/ grounding systems. • Circuit-breakers and earth-fault-interrupters would be installed • All laboratory electrical equipment would be earthed /grounded, Disconnect equipment attached to high-voltage or high-amperage power sources • Never place flammable liquids in a household refrigerator.	EPHI	During Operationphase	Budget included the construction
Impact from Chemical Hazard	• Only small amounts of chemicals necessary for daily use would be stored in the laboratory.		During Operationphase	45,000.00

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	• Replacement of the hazardous substance with a less hazardous substitute • Implementation of engineering and administrative control measures to avoid or minimize the level of exposure below internationally established or recognized limits • Where corrosive, oxidizing, or reactive chemicals are used, handled, or stored, qualified first-aid would alwaysbe ensured. Appropriately equipped first-aid stations would be easily accessible throughout the place of work,and eye-wash stations and/or emergency showers wouldbe provided close to all workstations where the recommended first-aid response is immediate flushing with water • Material Safety Data Sheets (MSDS) or equivalent. Any means of written communication would be in an easily understood language and be readily available to exposed workers and first-aid personnel • Training workers in the use of the available information (such as MSDSs), safe work practices, and appropriateuse of PPE	EPHI		
Impact of escaping of Infectious	• Personnel working in PTPC and bio-bank would be			

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
Agents from PTPC and Bio-bank Centre	trained on sample and waste handling, transportation, and storage • Equipment would be maintained and calibrated periodically • BSCs HEPA filters would be tested annually and replaced as necessary. • Effective vaccines or therapeutic measures would be available for all risk groups • All material would be sterilized by autoclave or chemical disinfection PTPC and Bio-bank would be locked always, and access restricted for non-authorized personnel • All agents would be contained within the laboratory and biosecurity system would be in place.	EPHI	During Operation phase	1,000.00

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
Potential Occupational Healthand safety impacts with operation	• Implement the facility containment devices, and administrativecontrols • Implement special practices for the facilities • Use Personal Protective Equipment during performing activities • Use Secondary Barriers • Check HEPAs periodically	EPHI	During Operation phase	10,000.00
Potential impacts associated with operation of PTPC and Bio-bank	• All procedures involving the manipulation of infectious materials would be conducted within BSCs or other physical containment devices and PTPC and Bio-bank center would havespecial engineering and design features. • Personnel working in PTPC and Bio-bank center would receivespecific training in handling pathogenic and potentially lethal agents and would be supervised by competent staff in handlinginfectious agents and associated procedures	EPHI	During Operation phase	2,500.00
Impact of handling of infectious materials and specimens in the proposed facilities	• Use robust and leak-proof specimen containers • Personnel would be trained on specimen and waste handling, transport and storage. • Use triple package during transportation of infectious materials	- EPHI	During Operation phase	2,000.00

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	• Follow working procedure during handling package during transportation of infectious materials			
Impact of handling and storageof infectious materials and specimens in the proposed PTPC and Bio-bank	• Use robust and leak-proof specimen containers • Containers would be correctly labeled to facilitate identification. • Specimen request or specification forms would not be wrapped around the containers but placed in separate, preferably waterproof envelopes. • Secondary containers, such as boxes, would be used, fitted with racks so that the specimen containers remain upright.	- EPHI	During Operation phase	2,500
Impact associated with the useof equipment	• Training of workers in equipment operating and handling techniques during operation. • Periodic maintenance and calibration of equipment according to manufacture recommendation. • Operation of equipment according to the manufacturer's instructions	- EPHI	During Operation phase	1,000.00
Impact of improper use of equipment in the PTPC and Bio-bank	• Training of workers in equipment operating and handling techniques during operation.		During	

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	• Periodic maintenance and calibration of equipment according to manufacture recommendation. • Operation of equipment according to the manufacturer's instructions.	EPHI	Operation phase	
Impact of contamination of the PTPC and Bio-bank Facilities	• Workers would be trained on evacuation of the contaminated area • Workers would also be trained on decontamination ordisinfection, • Rinsing, and wiping dry of the spillage area with an absorbent cloth by personnel wearing adequate protectiveclothing and • Decontamination or disinfection of the protective clothing if necessary. • Handling and managing of spill and splash	- EPHI	During Operation phase	1,000.00
Potential impact during the operation of central Warehouse	• Replacement of the hazardous substance with a less hazardous substitute • Implementation of engineering and administrative control measures • Appropriately first-aid stations would be easily accessible to all workstations	EPHI	During Operation Phases	5,000.00 per annum

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	• Keeping the number of employees exposed, or likely to become exposed, to a minimum • Communicating chemical hazards to workers through labeling and marking • Material Safety Data Sheets (MSDS), would be in an easily understood language and be readily available • Training workers in the use of MSDSs, safe work practices, and appropriate use of PPE • Store chemicals in a well-ventilated area; however, do not store chemicals in a fume hood. • Maintain an inventory of all chemicals in storage. • Return chemical containers to their proper storage location after use. • Store glass chemical containers so that they are unlikely to be broken. • Store all hazardous chemicals below eye level. • Never store hazardous chemicals in a public area or corridor. • Separate acids from bases. Store these chemicals near floor level.			

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	• Isolate perchloric acid from organic materials. Do not store perchloric acid on a wooden shelf. • Separate highly toxic chemicals and carcinogens from all other chemicals. This storage location should have a warning label and should be locked. • Separate acids from flammables. • Not keep peroxide-forming chemicals longer than twelve months. • Not allow picric acid to dry out. • If flammables need to be chilled, store them in a laboratory-safe refrigerator, not in a standard refrigerator. • Flammables would be stored in a flammable storage cabinet. • Store reactive materials separate from corrosives or flammables. • Store Nitric acid (reactive and corrosive) separately from other acids and flammables. • Storage location would clearly indicate which group/code is stored in that location. Each shelf or cabinet should indicate the colour.			

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	• Groups would always be separated by a vertical divider not horizontal divider. • Each chemical container would be clearly labelled by its storage colour			
Chemical Hazard	• Only small amounts of chemicals necessary for daily use would be stored in the facility. • Replacement of the hazardous substance with a less hazardous substitute • Implementation of engineering and administrative control measures • Appropriately equipped first-aid stations would be easily accessible throughout the laboratory workstations • Communicating chemical hazards to workers through labeling and marking according to national and internationally recognized requirements and standards, • Material Safety Data Sheets would be in an easily understood language and be readily available tolaboratory personnel • Training workers in the use of the MSDSs, safe work practices, and appropriate use of PPE	- EPHI	During operationphase	45,000.00

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
Electrical and Explosive Hazards	• All electrical installations and equipment are inspected and tested regularly. • Circuit-breakers and earth-fault-interrupters would be installed in appropriate laboratory electrical circuits. • All laboratory electrical equipment would be earthed/grounded, preferably through three-prong plugs. • All laboratory electrical equipment and wiring would conform to national electrical safety standards and codes	- EPHI	During Operationphase	Budget included the construction
Ergonomic Hazards	Training of workers in lifting and materials handling techniques during operation, • Planning work site layout to minimize the need formanual transfer of heavy loads • Selecting tools and designing work stations that reduce force requirements and holding times	- EPHI	During Operationphase	1,000
Impact of Air pollution due towaste incineration	• Waste segregation for wastes with polychlorinated wouldbe done and these wastes would never be incinerated, • Materials free of polychlorinated would be purchased, for minimizing the environmental and health impacts. • Workers will be provided with PPE and the use of PPE would be enforced.	Facilities Administration. EPHI	During Operationphase	5,000

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	• Improve incinerators and infrastructure for healthcare waste treatment and disposal • Maintain the incinerators periodically • Purchase new environmentally friendly incinerator see annex 7 for specifications	Supplier ofthe incinerator		
Noise and Vibration	• All generators and laboratory equipment will be insulated or placed in enclosures to minimize disrupting ambientnoise levels.	EPHI	During Operationphase	-
Misuse and/or theft Agents and equipment/supplies	• Strict Biosecurity measures would be implemented tolimit access to facilities, research materials and information. • Continue the use of digital inventory system for both the microorganisms and equipment. • Develop measures to protect against the insider threat (Employees, staff, or contractors), or outsider threat (outsiders who intend to gain access to do harm) and any natural or manmade events that could cause a release. • Establish system for physical security, personnelsecurity, material control & accountability, and information security • All staff will have training in laboratory security and	- EPHI	During OperationPhase	1,500.00

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	biosecurity. • All Bio-bank and PTPC would be\ lock always and non-authorized personnel forbidden toenter the facilities without permission.			
Gender Based Violence Impacts	• Conduct continued sensitization and awareness raising to EPHI staff on prevention of GBV. • Strengthen the Gender and women office of EPHI to address GBV cases when it occurs.	- EPHI womenand youth office	During OperationPhase	2,500
Impact due to Improper solid Waste Management	• Develop and implement a waste management plan for EPHI • Initial packaging and storage would take place where HCW is generated. • Storage of waste will then be moved to a temporary on-site storage location • Non-risk HCW would always be stored in a separate location from the infectious/ hazardous HCW in order to avoid cross-contamination. • Strengthen the internal waste management system (collection, storage and disposal) of the EPHI and equip it with additional facilities to allow for segregated collection	- EPHI	During OperationPhase	870, 000

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	at source. • All sharps used in the lab would be autoclaved prior to incineration. • Sharps would be placed in rigid, puncture-resistant containers made of glass, metal, rigid plastic, orcardboard. • Liquid infectious wastes would be placed in capped or tightly stopped bottles or flasks; large quantities may be placed in containment tanks. • Solid or semisolid wastes would be placed in tear-resistant plastic bags judged by their thickness or durability. • There would be special packaging characteristics for some treatment techniques: incineration requires combustible containers, and steam sterilization requirespackaging materials that allow steam penetration and evacuation of air. • Solid waste generated in the proposed facility would leave the laboratories only after decontamination usingthe laboratory's autoclave. • Non-hazardous wastes that are generated by the proposed facility would be incinerated.			

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	• Liquid Waste discharged from laboratory would be treated chemically prior to being released to the wastetank. • Liquid waste treatment plan would be constructed atEPHI to improve the capacity of the tank. • Provide appropriate waste bins (colour coded) for the different types of waste generated toallow segregation and collection at the point of generation. • Laboratory staff and all other staff involved in waste handling would be trained on the waste handling treatment, and disposal techniques. • Fumigation of the laboratory by disinfectant gases wouldbe conducted according to WHO laboratory manual. • Regular visual inspection of all waste storage collection & storage areas for evidence of accidental releases andto verify that wastes are properly labeled and stored. • Regular audits of waste segregation and collection practices. • Tracking of waste generation trends by type and amountof waste generated, preferably by facility departments. • Keeping manifests or other records that document the			

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	amount of waste generated and its destination.			
Impact associated with collection/ handling and storage of waste	• Develop and implement a waste management plan forEPHI in general and for the proposed project • Initial packaging and storage would take place whereHCW is generated. • Storage of waste will then be moved to a temporary on-site storage location • Non-risk HCW would always be stored in a separate location from the infectious/ hazardous HCW in order to avoid cross-contamination. • Strengthen the internal waste management system (collection, storage and disposal) of the EPHI and equip it with additional facilities to allow for segregated collection at source. • All sharps used would be autoclaved priorto incineration. • Sharps would be placed in rigid, puncture-resistant containers made of glass, metal, rigid plastic, orcardboard. • Liquid infectious wastes would be placed in capped or tightly stopped bottles or flasks; large quantities may be placed in containment tanks.	- EPHI	During OperationPhase	25, 000

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	• Solid or semisolid wastes would be placed in tear-resistant plastic bags judged by their thickness or durability. • Solid waste generated would leave the laboratories only after decontamination usinglaboratory's autoclave. • Non-hazardous wastes generated would be incinerated. • Liquid Waste discharged from laboratory would be treated chemically prior to being released to the wastetank. • Liquid waste treatment plant would be constructed atEPHI to improve the capacity of the tank. • Laboratory staff and all other staff involved in waste handling would be trained on the waste handling treatment, and disposal techniques. • Fumigation of the laboratory by disinfectant gases wouldbe conducted according to WHO laboratory manual. • Regular visual inspection of all waste storage collection and storage areas for evidence of accidental releases andto verify that wastes are properly labelled and stored. • Regular audits of waste segregation and collection practices. • Tracking of waste generation trends by type and amount of			

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	waste generated, preferably by facility departments. • Keeping manifests or other records that document the amount of waste generated and its destination.			
Risk associated with off-site transport of waste	• EPHI would follow applicable national regulations and internationally accepted standards for packaging, labeling, and transport of hazardous materials and wastes • All waste containers designated for off-site shipment would be secured and labeled with the contents and associated hazards, be properly loaded on the transport vehicles before leaving the site, and be accompanied by ashipping paper (i.e., manifest) that describes the load andits associated hazards • EPHI would use tanks and containers specially designed and manufactured to incorporate features appropriate forthe wastes they are intended to carry • EPHI would adequately label all transport tanks and containers to identify the contents, hazards, and actions required in various emergency situations. • The waste would be placed in rigid, leak-proof containers before being loaded. • Containers would be covered with lids duringtransportation.	- EPHI - Addis Ababa municipal waste management authority	During OperationPhase	20, 000

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
	• When transporting plastic bags of infectious waste, care should be taken to prevent tearing the bags. • Vehicles used for transporting infectious waste would be disinfected prior to use for any other purpose. • The vehicles shall carry adequate supplies of plastic bags, protective clothing, cleaning tools, and disinfectants to clean and disinfect in case of any spills. • Records must be kept documenting all transport of medical waste			
Risk associated with solid waste Treatment at EPHI	• Waste segregation for wastes with polychlorinated dibenzo-dioxins and polychlorinated dibenzo-furans PCDD/Fs would be done and these wastes would never beincinerated, • Workers would be provided with PPE usage would be enforced.	- EPHI - Addis Ababa municipal waste management authority	During OperationPhase	10, 000
Emergency Preparedness and Response	• Organization of emergency areas • Communication systems • Emergency response procedures • Training and updating • Checklists (role and action list and equipment checklist) • Business Continuity and Contingency	-		4, 500

Potential environmental & social impacts	Proposed mitigation measures	Responsible for implementing the mitigation measures	Time Horizon	Indicative Budget for implementation (USD)
Archaeological Artefacts and Cultural Chance Finds within the Project Site	• Implementation of Chance Find Procedure (see Section 7.1.1) and training of the construction workers • Report chance finds immediately to Addis Ababa City Administration Museum and Monuments Protection Department	Contractor	Regularly during construction	Included in construction cost
Total cost			1,222,000	

* *The ESMP is included all unit of the building complex (PTPC, Biobank. And warehouse)*

5. Environmental and Social management Monitoring Plan

The overall objective of environmental and social monitoring is to qualitatively and quantitatively measure effectiveness of mitigation measures, and develop appropriate responses to incompliances with Project standards, and emerging environmental and social issues. Monitoring will be carried out to ensure that all Project activities and mitigation measures comply with the national legislation and the World Bank; responsible bodies meet their commitments and requirements of this ESMP in terms of periodical audits and reporting. The main objectives of developing a monitoring program and defining parameters are to;

- Ensure that all mitigation measures are properly implemented ,
- Measure effectiveness of the mitigation measures,
- Provide mechanisms for taking timely action when unexpected environmental and social incidents are encountered, and
- Identify training requirements at all levels of the organizational structure.

5.1. Institutional Arrangement for Monitoring Plan Implementation

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

Monitoring will be undertaken by MOH/ESD directorate, EPHI and representative of Addis Ababa EPA at city administration level or sub city and/or Woreda level (such as Woreda 9). Monitoring by EPA in this case can be considered “third party monitoring” but this is its regulatory mandate according to Pollution Control Proclamation. Another government agency that may undertake “third party monitoring” is the Occupational Health & Safety Department of Addis Ababa Labor and Social Affairs Bureau. It has authority to inspect any facility for compliance with national requirements on safety in workplaces. Monitoring will be done through site inspection, review of grievances logged by stakeholders and ad hoc discussions with potentially affected persons (construction workers, residents near the institute, patients and healthcare staff).

5.2. Frequency for monitoring

Monitoring will be undertaken monthly over a year construction period. Audits will be necessary both during construction and project operation. While construction audits will aim to verify compliance to impact mitigation requirements, post-construction audits are a regulatory requirement within 12 months and not more than 36 months after completion of construction. Since construction duration is estimated to be 3 year, this ESMP has included a budget for 3 year's construction audit and a separate provision so that from year 2 to 5th (4 audits) audits done are a full environmental audit. Both construction and post-construction audits can be conducted internally by ESD/MOH or by a consultant hired by MOH.

5.3. Reporting System

Monthly monitoring reports should be compiled by ESD FMOH's Project Coordination Team and shared with FMoH and EPHI or another interested stakeholder. Construction- and post-construction phase auditing should finish in reports that MOH shall share with EPHI or other interested stakeholders. Note that while MOH is under obligation to disclose construction phase audits, annual post-construction audits must be submitted to Addis Ababa EPA as a guideline requirement as per EIA Proclamation, 299/2002.

5.4. Monitoring Plan

Environmental and social management plan monitoring needs to be carried out during the construction as well as operation and maintenance of the sub-projects to ensure that mitigation measures are implemented, have the intended result, and that remedial measures are undertaken, if mitigation measures are inadequate or the impacts have been underestimated within the environmental and social Assessment (Table 7).

At the Project implementation unit, an environmental and social safeguards specialist will be assigned will be responsible for overseeing safeguards compliance during construction and operation of the multi-purpose building. The specialist will be responsible for monitoring and reporting on the preparation and implementation of ESMP and ESIA throughout the sub-project duration. S/He will supervise and review environmental and social safeguard compliance. S/He will specifically be monitoring of the following aspects:

- The environmental and social assessment processes (screening; ESMP/ESIA preparation);

- The monitoring of the implementation of the mitigation measures;
- Monitoring of environmental and social issues and the supervision of the contractor civil works during the construction process;
- Monitoring of environmental and social issues during operations and maintenance using the environmental indicators indicated in the ESMP;
- Supervision of the implementation of the ESMP
- Submission of monitoring reports to the Project Coordination Unit

Quarterly and annual environmental and social safeguard performance reports should be prepared. The objective of the report should provide clear information about the activities carried out so as to the environmental and social safeguards requirements of the project. This report will be submitted to the project coordination team and to the World Bank country office.

Besides, annual reviews of implementation of the ESMP will be conducted. The annual reviews are intended improve procedures and capacity for safeguards compliance Annual reviews should be undertaken after the annual ESMP report has been prepared and before Bank supervision of the Project, at the closing of each year of the project.

Annual review workshops will be conducted at with the objectives to:

- Assess project performance in complying with ESMP & ESMF procedures, learn lessons, and improve future performance; and
- Assess the occurrence of, and potential for, cumulative impacts due to the proposed project and other development activities in the project area.

The participants of the ESMP review workshop are project implementing agencies whose project have environmental and social concerns and are responsible for the ESMP implementation at all levels. Besides, the World Bank, as necessary, will periodically conduct reviews of the implementation of the ESMP.

Table 7: Environmental and social risks mitigation measures implementation and Monitoring Plan

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
Negative impact						
Impact of construction and demolition waste						
Impacts on Historical and Cultural Sites and Goods	Implementation of Chance Find Procedure and training of the construction workers	Chance Find Procedure implemented and all workers trained	Regularly during construction	Contractor, EPHI		Required
	Report chance finds immediately to Addis Ababa City Administration,, Department of Museums and Monuments .	All chance finds reported to AA City Administration Museum and Monuments department				
Wastes will be properly segregated and separated to encourage recycling	Records of proper waste disposal indicating quantities dumped and location of dumping site. Amount of waste disposedminimized by reuse	Proportion of construction and demolition of waste dumped in designated area (Target 100%) Percent of wastes recycled/reuse (At least	Quarterly	AAEPA ESD/MoH	300.00	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
		20% of demolition and construction wastes)				
Waste will be picked off the site every day and if not it will be covered to minimize nuisance odor and vermin.	Hazardous waste separatedfrom non-hazardous waste on site and each waste stream disposed of according to Ethiopian HCWM requirements in designated sites	Presence of color coded/labeled container for segregation of hazardous and non-hazardous wastes Number of times a waste picked per day	Daily	AAEPA ESD/MoH	3000.00	None
Impacts from physical hazards						
Ensuring safe work practices after orientation has been given	Occupational safety willbe maintained	Proportion of workers who participated in orientation training (at least 95% of the workers should take the orientation)	Biannually	AAEPA	100.00	Required
Training and awareness creation on incidence handling, prevention and potential emergency	Maintains minimum work hazards	Proportion of workers who got training on incidence handling, prevention and potential emergency Documentation of recordsof	Biannually	ESD	200.00	Required

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
		training and Impromptu interviewswith workers on occupation health safety emergency response				
Use of signage to warn staff and/ or visitors that are not involved in construction activities of dangerous places	Minimize occupation health safety risk on construction workers andthe public	Availability of appropriate safety signage on-site	biannually	contractors	200.00	None
Safety supervision of works would be done regularly to ensure that safety conditions are met while any deviation from safety regulations is immediately reclaimed following the best practices regarding safety at work equipment	Ensures that safety conditions are meet	Presence of safety supervisor on-site	daily	Contractor	to be included in the constructors 'cost	None
Develop evacuation procedures to handle emergency situations	Minimize occupation health and safety risk on construction workers	Presence of documented Emergency Response Preparedness Plan (ERPP)	pre-construction	contractor	100.00	None
Provide appropriate personnel protective equipment (PPE) to all workers	Minimize occupation health and safety risk onconstruction workers	Proportion of workers wearing appropriate PPE	daily	Contractor	to be estimated & included in the bill of quantities	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
					BOQ)	
Impact from electrical and explosive hazards						
All electrical installations and equipment wouldbe inspected and tested regularly including earthing/ground systems	Minimize occupation health and safety risk onconstruction workers	Record of electrical installations and equipment inspected and tested	Construction phase	ESD	to be includedin furnishing BOQ	None
Specialized refrigerators would be used when storing chemicals that have explosion potential	Minimize occupation health and safety risk onconstruction workers	Record of explosive chemical stored in a specialized refrigerator consistently	Construction phase	ESD	to be includedin furnishing BOQ	None
Impact from traffic accidents						
Ensure drivers respect traffic laws and obeyspeed limits	No road accident byproject traffic	Number of accident occurs ineach month of construction duration(Should be zero)	Construction phase	ESD	200.00	None
Ensure that vehicles are regularly maintained to minimize potentially serious accidents	No road accident due to poor mechanical conditions of projectvehicles	Number of accident occurs in each month of construction duration (Should be nil)	Construction phase	ESD	Included in the overall construction cost	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
Employ safe traffic control measures, including temporary road signs , flag persons to warn ofdangerous conditions and children crossings,	No road accident byproject traffic	Number of accident occurs in each month of construction duration (Should be nil)	Construction phase	ESD	100.00	Required
Impact on air quality					**850.00**	
Dust screens or nets in windows, doorways and ventilator will be deployed where demolition or other dusty construction activities are occurring	No excessive dust emissions noted outside construction areas	Number of complaints received due to excessive dust from construction areas (Zero complaint recommended)	Construction phase	AAEPAESD Contractors	100.00	None
Ensure good housekeeping and clean construction operations where, among other necessary actions, dust would be quickly swept off cement floors and collected in covered containers	Minimize dust and exhaust emissions	Cleaned operation area including cement floor to minimize dust (in M^2) (Target: all working area should be cleaned regularly) No complaints of trucks reckless driving from communities along roads used by project vehicles	Construction phase	AAEPA ESD contractors	100.00	None
To minimize indoor dust, portable extraction systems, water sprays or other practical methods	Minimize dust levels	Number of activities conducted by the contractor	Construction phase	AAEPAESD contractors	100.00	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
are applied		to minimize dust nuisance per day				
Trucks would be covered during haulage of construction materials and would be diverted away from sensitive areas of the institute	No material spills on roads during haulage to sites	Number of waste trucks properly load and covered with sheet to prevent spill during transport	Construction phase	AAEPAESD contractors	250.00	None
Impact of noise and vibrations					**300.00**	
Construction workers will be aware of the sensitive nature of workplaces they are operating in and advised to limit verbal noise or other forms of noise. For example, metallic objects or tools can be passed on to a colleague rather than dropping or throwing them with loud bangs	No excessive noise from workers	Number of complaints received due to noise during construction Proportion of days with above the maximum recommended level of noise (in db).	Construction phase	AAEPAESD contractors	Budget included in project cost	Training Required
All heavy duty immovable equipment will be fitted with mufflers or placed in enclosures to minimize disrupting ambient noise levels	Construction activities generate permissible levelsof noise	Proportion of heavy duty immovable equipment fitted with mufflers or place in enclosures	Construction phase	AAEPAESD MoLSA	100.00	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
Contractor will ensure that equipment is properly maintained and fitted with mufflers	Construction activities generate permissible levelsof noise	Number of equipment properly maintained and fitted with mufflers	Construction phase	AAEFCC ESD MoLSA	Will be included in the overall construction cost	None
Where possible, contractors would cordon off areas under construction with noise absorbing materials, for example, plywood rather than iron sheets	Keeps noise level down	Utilization of ply wood or other noise absorbing materials for cordon off areas under construction	Construction phase	AAEPA ESD MoLSA	Will be included in the overall construction cost	None
Contractor ensures noise levels emanating from machinery, vehicles and noisy construction activities are kept at a minimum	Safety, health and protection of people in the nearby buildings	Proportion of days in which noise level below the maximum recommended is recorded Number of complain received from patients, visitors and staffs about noise during construction	Construction phase	AAEPAPHID MoLSA	-	None
Impact on social service caused by disruption of laboratory/ Sample collection services						
Plan pre-construction activities early to identify suitable rooms or adjoining buildings into which	Sample collection relocated to a conduciveroom(s) with	Number of complaints received about sample	Pre-construction	AAEPA ESD	Budget included in	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
the sample collection can be carried out with minimal inconvenience	minimal interference of sample collection services	collection servicedelivery (Should be zero)	phase		project cost	
Child labor and GBV/SEA/SH						
	No risk of child labour or SEA/SH	- Number of training session provided to staff on GBV/SH and CoC. - Number of workers violation CoC - Number of CoC-violating workers and action taken - Proportion of workers recruited according to national labour law. - Number of child abuse or sexual offense practices reported to police office	Construction Phase Monthly Weekly	Contractor/ Supervision Consultant	Budget included in project cost	
Grievances Redress Mechanism	Implement and communicate an accessible grievance	All grievances adequately treated	Regularly during	Contractor EPHI	Budget included in	Required

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
	mechanism for PAP to address any complaints	through inspection of grievance log book and interviews with PAP	construction & Operation		project cost	
Impacts from physical hazards						
All workers to be provided with appropriate PPE against exposure to infectious pathogens, hazardous chemicals and ionizing radiation in accordance with recognized international safety standards and guidelines.	Minimal work-related injuries or infections	Number of healthcare staff wear appropriate PPE according to IPC practices	Daily	EPHI safety officers & respective lab head	600.00	None
Orientation for all staff would be given on safe work practices and guidelines and ensure that they adhere to it. Training would be conducted on incident handling and prevent manage. This would involve proper handling of electricity, water etc. and sensitization on various modes of escape, conduct and responsibility during such incidences.	Minimize occupation health safety risk on staff	Number of staff oriented on safety practices and guidelines	Throughout laboratory operation	EPHI safety officers & respective lab head	1000.00	Safety practicesand guidelines
Regular drills would constantly follow on various possible incidences. This will test the response of the involved stakeholders. Such drills will keep them alert and they will become	Staff preparedness to combat possible incidences	Number of drills conducted Records of incidence prevented	Throughout laboratory operation	EPHI safety officers & respective lab head	-	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
more responsive to in the case of incidences						
Use signage to warn staff and/ or visitors that are not involved in laboratory work of dangerous places	Public and other staff safety	Presence of appropriate and clear signage in and around laboratory facility	Throughout laboratory operation	EPHI safety officers & respective lab head	200.00	None
Impact from electrical and explosive hazards						
All electrical installations and equipment would be inspected and tested regularly	Inspected and tested electrical installations andequipment	Record of electrical installations and equipment inspected and tested	Operation phase (daily)	EPHI	-	None
All laboratory electrical equipment would be earthed/grounded	All electrical equipment earthed/grounded	Record of electrical equipment earthed/grounded	Operation phase	EPHI	-	None
Disconnect equipment attached to high-voltage or high-amperage power sources	Disconnected equipment attached to high-voltage or amperage power sources	No. of equipment attached to high-voltage or amperage power sources connected	Operation phase (daily)	EPHI	-	None
Flammable liquids will not be placed in a household refrigerator	Household refrigerator free of flammable liquids	Flammable liquids in a household refrigerator placed	Operation phase (daily)	EPHI	-	None
Impact from chemical hazard						
Replacement of the hazardous substance with a less hazardous substitute	Less hazardous substance substitute	Number of hazardous materials substituted with less hazardous materials Less hazardous substance	Operation phase (daily)	EPHI	-	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
		substitute utilized				
Training workers in the use of the available information (such as MSDSs), safe work practices, and appropriate use of PPE	Safe work practices and PPE	Number of trained personnel	Operation phase (biannually)	EPHI	-	Yes
Impact of escaping of infectious agents from PTPC and Bio-bank Center						
Personnel working PTPC and biobank would be trained on sample and wastehandling, transportation, and storage	Personnel working in PTPC and biobank lab, trained on sample and waste handling, transportation,and storage	Number of personnel trained on sample and waste handling, transportation, & storage	biannually	FMOH, EPHI	1500.00	Yes
Equipment would be maintained and calibrated periodically	Equipment maintained and calibrated periodically	Certificate of Equipment maintained and calibrated periodically	Yearly	EPHI		None
BSCs HEPA filters would be tested annually and replaced as necessary.	HEPA filters maintainedand calibrated periodically	Certificate of HEPA filters maintained and calibrated periodically	Yearly	EPHI		None
Effective vaccines or therapeutic measures would be available for all risk groups	Vaccinate all staffs in therisk groups	Number of vaccinated staffs in the risk groups	Yearly	EPHI		None
All material would be sterilized by autoclave or chemical disinfection	Disinfection of contaminated materials	Observing routine disinfection activities are in place	daily	EPHI		None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
PTPC and Biobank would be lockedalways and access restricted for non-authorized personnel	Implementing access control measures in thefacilities	Observing all appropriate access control measures are in place	daily	EPHI		None
Potential impacts associated with operation of PTPC and Biobank						
All procedures involving the manipulation of infectious materials would be conducted within BSCs or other physical containment devices and	All infectious materials processed within BSCs or other containments	Observation to ensure infectious materials processing	during theentire operation phase	EPHI	cost to be included inthe construction cost	No
Personnel working in PTPC and Bio-bank centrewould receive specific training in handling pathogenic and potentially lethal agents and would be supervised by competent staff in handling infectious agents and associated procedures	Personnel working in PTPC and bio-bank trainedon sample and waste handling, transportation, and storage	Number of personnel working in PTPC and bio-bank trained on sampleand waste handling, transportation, and storage	biannually	EPHI	1500	No
Impact of handling of storage of infectious materials and specimen in the proposed PTPC and Bio-bank						
Use robust and leak-proof specimen containers	Robust and leak-proof specimen containers used	Available of robust and leak-proof specimen containers used	operation phase	EPHI	to be included in the materials procurement cost	None
Containers would be correctly labelled to facilitate identification	Proper labelling of all the containers	Observation to ensure proper labelling is in place	operation phase	EPHI		None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
Specimen request or specification forms would not be wrapped around the containers but placed in separate, preferably water proof envelopes	Appropriate specimen handling	Observation to ensure specimen handling system is in place	operatio nphase	EPHI	cost will be included in furnishing costs	None
Secondary containers, such as boxes, would be used, fitted with racks so that the specimen containers remain upright.	Avoid accidental leakageor spillage from specimens	Number of recorded Sample spills and leakages occurred	operationphase	EPHI	cost will be included in furnishing costs	None
Impact associated with the use of equipment in the PTPC and Bio-bank						
Training of workers in equipment operating and handling techniques during operation	Personnel working in PTPC and bio-bank trainedon sample and waste handling, transportation, and storage	Number of personnel working in PTPC and bio-bank trained on sampleand waste handling, transportation, and storage	biannually	EPHI	1500	Yes
Periodic maintenance and calibration of equipment according to manufacture recommendation.	Equipment maintainedand calibrated periodically	Certificate of Equipment maintained and calibrated periodically	Yearly	EPHI	3000	None
Operation of equipment according to the manufacturer's instructions	Equipment operated according to the manufacturer's	Equipment manufacturer's instructions using to	daily	EPHI	-	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
	instructions	operate equipment				
Impact of contamination of the PTPC and Bio-bank facilities						
Workers would be trained on evacuation of the contaminated area and on decontamination or disinfection	Trained staff on evacuation of the contaminated area	Number of staff trainedon evacuation of the contaminated area	biannually	EPHI	1500	Yes
Rinsing, and wiping dry of the spillage area with an absorbent cloth by personnel wearing adequate protective clothing	wiping of spillage area	Number of staff trained on wiping of spillage area	daily	EPHI		Yes
Decontamination or disinfection of the protective clothing if necessary	Decontamination or disinfection of the protective clothing	Number of staff trainedon decontamination or disinfection of the protective clothing	daily	EPHI		Yes
Handling and managing of spill and splash	Handling and managingof spill and splash	Number of staff trainedon handling and managing of spill and splash	daily	EPHI		Yes
Potential impact during the operation of central warehouse						
Implementation of engineering and administrative control measures	Authorized personnel only	Number of staff authorized	Operation phase	MOH,EPHI	-	None
Store chemicals in a well-ventilated area, do not store chemicals in a fume hood	Properly stored chemicals	Number and type of properly stored chemicals	Operation phase	MOH,EPHI	-	None
Provide training in the use of MSDSs, safe work practices and appropriate use of PPE	Advocates appropriate handling of chemicals	Number of trained staff	Operation phase	MOH,EPHI	100.00	Yes

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
Maintain an inventory of all chemicals	Type and number of chemicals used and left	Number of chemicals stored	Operation phase	MOH,EPHI	-	None
Impact of fire outbreak						
All staff will have training in fire control	Declines the risk of fire hazard	Number of trained staff	Operation phase	MOH, EPHI	500.00	Yes
Fire extinguishers would be available in accessible area and ensure that all fire-fighting equipment is regularly maintained and serviced.	facilities has basic capacity to fend off a smallor average fire outbreak	Availability of fire extinguisher in all risk area such as Biobank, PT Panel center, central warehouse & laboratory equipment maintenance center	During equipment installation, upon completion of construction	MOH,EPHI	Negligible	None
Fire emergency telephone numbers would be displayed in communal areas.	Contact fire department in case of major fireoutbreak	Number of communal area in which fire emergency telephone numbers displaced	Operation phase of laband store facility	MOH, EPHI	Negligible	None
Automatic fire alarm system for the entire laboratory will be installed	facilities has basic capacity to fend off a smalleror average fire outbreak	Presence of automatic fire alarm system, adequate water hose reel and reverse water tank	Operation phase of lab and store facility	MOH, EPHI	Included in the overall construction cost	None
Fire hazard signs such as 'No Smoking' signs will be provided	facilities will have hazard signs	Number of signs provided	Operation phase	MOH,EPHI	Negligible	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
Directions to exit in case of any fire incidence and emergency contact numbers will be provided	facilities has basic capacity to fend off a smalleror average fire outbreak	Presence of automatic fire alarm system, adequate water hose reel and reverse water tank	Operation phase of lab and store facility	MOH,EPHI	100.00	None
Contact/emergency numbers will be displayed within the laboratory.	facilities has capacity to contact fire departmentin case of major fire outbreak	Presence of fire emergency telephone numbers displaced within the facilities	Throughout operation life of facilities and store facility	MOH,EPHI	Included in the overall cost	None
Training of workers in lifting and materials handling techniques during operation	Make use of material handling techniques duringoperation	Number of trained workers	Operation phase	MOH,EPHI	1000.00	Yes
Planning work site layout	Minimize the need for manual transfer of heavyloads	Identified layouts	Operation phase	MOH,EPHI	-	None
Selecting tools and designing work stations	Reduce force requirements and holding times	Tools used and work stations designed	Operation phase	MOH,EPHI	-	None
Impact of air pollution due to waste incineration						
Waste segregation for wastes with polychlorinated would be done and these waste would never be incinerated	Waste with polychlorinated dibenzo-dioxins and polychlorinated dibenzo-furans PCDD/Fs segregated and notincinerated	Provision waste with polychlorinated dibenzo-dioxins and polychlorinated dibenzo- furans PCDD/Fs disposedwithout incinerating	Operation phase	EPHI	25.00	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
Workers will be provided with PPE and the use of PPE would be enforced	Available of adequate PPE and utilizing of PPE	Number of staff utilizing of PPE	Operation phase	EPHI	25.00	Yes
Improve incinerators and infrastructure for healthcare waste treatment and disposal	Implemented WB & WHO waste treatment and disposal requirements	Acceptable waste treatment and disposal system implemented	Operation phase	EPHI	25.00	None
Maintain the new incinerators to be installed periodically	Periodically maintained incinerators	Frequency of periodically maintained incinerators	Operation phase	EPHI	2000	None
Purchase new environmental friendly incinerator	A new environment friendly Pyrolytic incinerator purchased & installed	Presence of functional environment friendly Pyrolytic incinerator	Operation phase	EPHI	This cost will be included in the project implementation on cost	None
Misuse and/or theft of infectious agents and laboratory equipment/supplies in the facilities						
Strict Biosecurity measures would be implemented	Limits access to facilities, research materials and information	Access limited	Operation phase (daily)	EPHI	-	None
Continue the use of digital inventory system for both the microorganisms and equipment	Inventory of equipment and organisms	Number of inventories conducted in the facility	Operation phase (daily)	EPHI	-	None
Develop measures to protect against the insider threat (employees, staff, or contractors), or outsider threat (outsiders who intend to gain	Defines security and bio security in the context ofthe lab	Legal procedures developed Implementation of Ethiopian selected hazardous pathogen	Operation phase (daily)	EPHI	-	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
access to do harm) and any natural or manmade events		and toxin (ESHPT) proclamation				
Establish system for physical security, personnel security, material control & accountability, and information security	Develop security practicesand communication	System established for physical, personnel and material control	Operation phase (daily)	EPHI	1500	,None
All staff will have training in laboratory security and biosecurity	Understanding and practicing security issues	Number of staff trained	Operation phase	EPHI	1000.00	Yes
All Biobank and PTPCwould always be locked and non-authorized personnel forbidden to enter the facilitieswithout permission.	Restricts access to facilities	Number of controlled gates and doors	Operation phase	EPHI	-	None
Gender based violence impacts						
Conduct continued sensitization and awareness raising to EPHI staff on prevention of GBV	Awareness creation	Number of staff trained	Continued sensitization	EPHI	100.00	Yes
Strengthen the Gender and women office of EPHI to address GBV cases when it occurs	Strengthened office of GBV	Amount of technical and materials support given to the Gender and Women office at EPHI	Whenever necessary	EPHI	100.00	Yes
Risks associated with waste transportation within EPHI campus						
All waste bags would in-place and intact at the end of transportation	Designated pathways for waste transportation	Available routes in place	daily	EPHI	1000	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
Carts, trolley, or containers, used for the transportation of infectious waste would not be used for the transportation of any other material	Have separated trolley & carts for sharps, infectious & infectious waste transportation	Availability of color-coded Carts, trolley or containers for each type of wastes	daily	EPHI	-	None
Waste bags would be placed in containers (e.g. cardboard boxes or wheeled, rigid, lidded plastic or galvanized bins), before being placed directly into the transportation vehicle	Maintained secondary containment	Presence of appropriate secondary barrier	daily	EPHI	-	Yes
The collected waste will not be left even temporarily anywhere other than at the designated storage room	Wastes stored only at designated storage area	Presence of wastes other than designated place	daily	EPHI	-	None
Containers would be covered with lids during storage and transport.	Waste storage and transportation	Availability of waste storage and transportation bin with lid	daily	EPHI	-	None
Transport staff would wear adequate personal protective equipment (PPE)	Regular use of PPE by waste transport staff	Proportion of waste collectors wear appropriate PPE	daily	EPHI	-	None
Education and training would be provided to all waste transport workers	Trained waste handlers	Number of trained waste handlers	biannually	EPHI	1500	None
A bulky and heavy waste would be transported by using wheeled trolleys or carts that are not	A bulky and heavy wastewould be transported by using wheeled	Transportation of bulky	daily	EPHI	-	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
used for any other purpose	trolleys or carts that are not used forany other purpose	and heavy wastes by wheeled trolleys in place				
Waste, especially hazardous waste, would never be transported by hand due to the risk of accident or injury from infectious material	Waste, especially hazardous waste, wouldnever be transported byhand due to the risk of accident or injury from infectious material	Number of persons injured by infectious materials	daily	EPHI	-	None
The vehicles would be thoroughly cleaned and disinfected daily as per a written protocol	The vehicles would be thoroughly cleaned & disinfected daily as per a written protocol	Proportion of vehicles clean and disinfected daily	dialy	EPHI	250.00	None
Risk associated with off-site transport of waste						
EPHI would follow applicable national regulations and internationally accepted standards for packaging, labeling, and transport of hazardous materials and wastes	Standardized transport of hazardous materials and wastes	Availability of standardized hazardous materials transport system in place	Throughout the operation	AAEPA, EPHI		None
EPHI would use tanks and containers specially designed and manufactured	Tanks will be appropriatefor the wastes they are intended to carry	Availability of acceptable tanks for wastewater in EPHI	Throughout the operation	AAEPA, EPHI	To be included in furnishing cost	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
EPHI would adequately label all transport tanks and containers	Identifies the contents, hazards, and actions required in various emergency situations.	Proportion of waste transport tanks and container with labeling	Operation phase	AAEPA, EPHI	-	None
Containers would be covered with lids during transportation	Containers covered with lid	Number of containers with lid	Operation phase	AAEPA, EPHI	-	None
Vehicles used for transporting infectious wastewould be disinfected prior to use for any other purpose	Disinfected vehicles	Number of vehicles disinfected	Operation phase	AAEPA, EPHI	-	None
Vehicles shall carry adequate supplies of plastic bags, protective clothing, cleaning tools, and disinfectants	Minimizes hazard through cleaning and disinfection in case of any spills	Amount of cleaning supplies	Operation phase	AAEPA, EPHI	-	None
Records must be kept documenting all transport of medical waste	Recorded transported wastes	Record of transported wastes	Operation phase	EPHI	-	None
Risk associated with solid waste treatment at EPHI						
Waste segregation for wastes with polychlorinated dibenzo-dioxins & polychlorinated dibenzo-furans PCDD/Fs would be done and these waste would never be incinerated	Segregated waste with polychlorinated dibenzo-furans PCDD/Fs	Presence of Waste segregation system	Operation phase	MOH,EPH	-	None
Materials free of polychlorinated dibenzo-dioxins and polychlorinated dibenzo-furans	Purchased materials free of polychlorinated dibenzo-	Proportion of purchased materials free of	Operation phase	MOH,EPHI	-	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
PCDD/Fs would be purchased, for minimizing the environmental and health impacts.	dioxins and polychlorinated dibenzo-furans PCDD/Fs	polychlorinated dibenzo-dioxins and polychlorinated dibenzo-furans PCDD/Fs				
Impact associated with final disposal of solid and liquid wastes						
Personnel working on waste disposable would wear adequate personal protective equipment (PPE)	Reduced exposure to wastes	Availability of adequate PPE per workers Proportion of workers wearing appropriate PPE regularly	Operation phase	AAEPA, EPHI	-	None
Training would be provided to personnel working on waste disposable	Defines the concept of waste disposal and safety	Number of staff trained	Operation phase	AAEPA, EPHI	1000.00	Yes
Bottom ash would be managed separately from fly ash and other flue gas treatment	Avoid contamination ofthe bottom ash for its potential recovery	Amount of bottom ash managed	Operation phase	AAEPA, EPHI	-	None
Bottom ash would be treated on-site by screening and crushing to the extent that is required to meet the specifications set for its use or at the receiving treatment or disposal site	Helps achieve a leaching level for metals & salts that is in compliance withthe local environmental conditions at the place ofuse	Amount of bottom ash treated	Operation phase	AAEPA, EPHI	-	None
Bottom ash and residuals would be managed based on their classification as hazardous or	Classified bottom ashes	Segregation of bottom ash and residuals in place	Quarterly	AAEPA, EPHI	-	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
non-hazardous materials						
Predominantly hazardous wastes would be disposed of in safe landfills, and the land filling would be in proper double-walled containers	Safe landfill disposal	Proportion of hazardous wastes disposed in safe landfill	Quarterly	AAEPA, EPHI	1000	None
Waste disposal system would be monitored periodically	identified technical problems and technology updates	Number of monitoring conducted	Quarterly	AAEPA, EPHI	2000.00	None
Ground water monitoring within EPHI campus	identified any pollution of ground water	Record of quality of ground water periodical monitored Number of monitoring conducted on quality of ground water	Quarterly	AAEPA, EPHI	2500.00	None
Incinerators of wastewater treatment system management	identified any pollution from fly ash and flue gas	Record of emission from incinerator periodical monitored Number of monitoring conducted on emission of incinerator	Quarterly	AAEPA, EPHI	1000.00	None
The new incinerator would be monitoring for proper functionality periodically	identified any defect or malfunction of incinerator	Number of monitoring conducted on functionality of	Quarterly	AAEPA, EPHI	500.00	None

Impact and Mitigation/Enhancement commitments	Desired Outcomes	Monitoring Indicator	Frequency of monitoring	Responsibility/ Institution to monitor	Estimated Costs (USD)	Capacity Building & Training Requirements
		incinerator Record of preventive maintenance of incinerator periodical monitored				
Total cost			**38,275.00 USD**			

For the effective implementation of the ESMP a regular and period follow up is required. The objective of this is to:

- Alert project authorities by providing timely information about the success or otherwise of the Environmental management plan outlined in this ESMP. This will ensure continuous improvement to ACDCP environmental and social management process during the life cycle of the project.
- Make a final evaluation in order to determine whether the mitigation measures incorporated in the technical designs and the ESMP have been successfully implemented.

Table 8: Health Care Waste/ Laboratory Waste Management and Monitoring Plan

Mitigation measures	Responsible Authority for implementation	Responsible Authority for Monitoring	Recommended Frequency/times of Monitoring
Develop specifications and standards for waste management equipment and supplies	MoH/EPHI	EPA	One Draft and final Standards and Specification for each laboratories
Install pyrolysis incinerator with a capacity to burn 50 kg per hour with emission reduction device control (Fabric filter coated with catalyst) made from PTFE (This is planned to install with BSL 3 NRL)	MoH/EPHI	EPA	Approved Standards and installed Incinerator
Purchase initial supplies for waste management	MoH/EPHI	EPA	Purchase requisitions, delivery notes and receipts
Purchase Occupational Health and Safety /Personal Protective Equipment. (PPEs)	MoH/EPHI	Once on making estimates and requisitions Once after purchase	Once on making estimates and requisitions Once after purchase
Procure and install water storage tanks	MoH/EPHI	-	Once on making Estimates and requisitions. Once after purchase - During construction
Develop and implement public (including indigenous people) social mobilization/ awareness	MoH/EPHI	-	Continuously during preparation of plans and during implementation
Ensure set-up of the facilities are conducive for easy and safe working	Laboratory Manager	EPA/MoLSA	Monthly
Availability of appropriate laboratory chemicals / materials to avoid or minimize waste	Laboratory Manager	MoH/EPHI	Monthly
Minimize movement of people in the work area	Laboratory Manager	MoH/EPHI	All the time
Use colour coded waste bins in appropriate positions	MoH/EPHI	EPA	Quarterly

Mitigation measures	Responsible Authority for implementation	Responsible Authority for Monitoring	Recommended Frequency/times of Monitoring
Segregation and storage of waste into marked bins	Laboratory Manager	EPA	Monthly
Place disposable and re- usable materials separately	Laboratory Manager	MoH/EPHI	Monthly
Disinfect re-usable materials such as slide holders, forceps etc.	Laboratory Manager	MoH/EPHI	Monthly
Follow steps and times for waste movement, storage and internal transportation	Laboratory Manager	MoH/EPHI	Monthly
Keep infectious (e.g. TB lab specimens and wastes) away from human contact	Laboratory Manager	MoH/EPHI	Number of reported infection cases Inspection report
Sterilize or disinfect waste before it leaves the laboratory	Laboratory Manager	MoH/EPHI	Disinfections statistics, Inspection report
Discard contaminated materials and sputum containers in 5% phenol disinfectant or as recommended.	Laboratory Manager	MoH/EPHI	Number of disinfections done per day. Inspection report
Disinfect TB work surface areas with appropriate chemicals or methods.	Laboratory Manager	MoH/EPHI	Number of disinfections done per day
Ensure internal safe movement of covered carts/bins for waste	Laboratory Manager	MoH/EPHI MoH/EPHI	Quarterly
Ensure availability of staff Specifically designated for waste movement	Laboratory Supervisor	MoH/EPHI	Monthly
Ensure availability and use of appropriate tools, protective wear and safety equipment	Laboratory Manager	MoH/EPHI	Quarterly
Tightly close and secure waste bins to avoid waste spills during transportation	Laboratory Supervisor	MoH/EPHI	Daily
Provide covered trucks for movement of waste to distant disposal site where necessary	Laboratory Manager	MoH/ EPHI	Every six months
Follow defined routes of waste (loaded carts) movement	Laboratory Supervisor	MoH/EPHI	Daily
Ensure availability of washing and disinfecting material for staff	Laboratory Supervisor	MoH/EPHI	Daily
Ensure availability and use of appropriate tools and PPE for personnel at disposal sites	Laboratory Manager	MoH/EPHI	Quarterly
Ensure appropriate method of treatment is used for each type of waste	Laboratory manager	MoH/EPHI	Monthly

Mitigation measures	Responsible Authority for implementation	Responsible Authority for Monitoring	Recommended Frequency/times of Monitoring
Cover disposal pits when half full to prevent access by people, animals and birds.	Laboratory Supervisor	Laboratory Manager MoH/EPHI	As appropriate, just before pits are covered
Line disposal pits and provide under drains to prevent water pollution from leachate	Local municipal Authority	MoH/RHB	Monthly
Install incinerators with air pollution treatment facilities		MoH/EPHI	Monthly
All year round accessibility to disposal site.	Local municipal Authority / local Env'tal protection offices	MoH//EPHI/EPA	Biannually
Location of disposal site to be: • Far from habited areas • On a leeward side • Far from reach of animals • Low water table sites	Local municipal Authority / local Environmental protection offices	MoH//EPHI/EPA	As necessary during disposal facility sighting
General Compliance			
Use of appropriate technology	MoH//EPHI	EPA	Quarterly
General health and safety of workers, employees and public	MoH//EPHI	EPA	Quarterly
Nuisance (air pollution, dust, smell and aesthetics	MoH//EPHI	EPA	Quarterly
Water pollution	MOH/EPHI	Ministry responsible for Water Resources EPA	Quarterly

6. Capacity Development and Training

The development and operation of the proposed multi-purpose building (central warehouse, PT Panel Production and Biobank center and equipment maintenance centers) needs to have a strong Environment, Health and Safety monitoring and inspection capacity that will ensure installation and observance of all safety features and protocols in the proposed project. In addition, capacity is needed to ensure monitoring of the ESMP implementation both during construction and operation phases of the proposed project. At present it appears that both the EPHI and MOH ESD directorate lacks a dedicated EHS unit or dedicated personnel responsible for planning and implementing EHS activities. Thus there is a need for capacity development by providing technical support and training in the areas of laboratory safety, workers and community safety, as well as in environmental monitoring for both the EPHI and MOH ESD directorate.

The training in the areas of laboratory safety, workers and community safety, as well as in environmental monitoring for implementation monitoring will be provided to relevant staff of MoH ESD, EPHI, EPA and AABoLSA to enhance their skills in environmental monitoring during the operational phases of the proposed project services. Furthermore, training needs identified for waste management are provided on the Infection Control and Waste Management Plan (ICWMP) document. The budget for technical support and capacity building training will be **157, 000.00 USD** (See Table 10).

Table 9: Trainings plan for PT Panel production, biobank and warehouse facilities Staff and Support Staff

Capacity Needs	Target Participant	Number of participants	Estimated Cost (USD)
Training on Infection Prevention and control, and waste management	• Professionals working in PTPC, bio-bank Centre, and Central Warehouse facilities • Cleaners, waste transporters and handlers, incinerator operators, liquid waste treatment facility operators and other staff of the PTPC, bio-bank Centre, and Central Warehouse facilities	70 24	18,000.00

Training on OSHA and Environmental Safety	• Wastewater treatment Plant Operator, Incinerator Operator, Waste handler, Laboratory Director, Laboratory scientist, Laboratory quality Manager \ Biosafety and biosecurity Officer and other pertinent staff	70	18,000.0
Training on Biosecurity	• Professionals working in PTPC, bio-bank Centre, and Central Warehouse facilities, and building security person	**24**	**6,000**
Quality management system	• Professionals working in PTPC, bio-bank Centre, and Central Warehouse facilities	70	9,000.00
Specimens management	• Professionals working in PTPC, bio-bank Centre, and Central Warehouse facilities • Cleaners, waste transporters and handlers, incinerator operators, liquid waste treatment facility operators and other staff of PTPC, bio-bank Centre, and Central Warehouse facilities	70 24	10,000.00
Training on emergency preparedness and response	• Professionals working in PTPC, bio-bank Centre, and Central Warehouse facilities • Cleaners, waste transporters and handlers, incinerator operators, liquid waste treatment facility operators and other staff of the PTPC, bio-bank Centre, and Central Warehouse facilities	70 24	18,000.00
Training on handling pathogenicand potentially lethal agents	• Professional working in PTPC and bio-bank Centre	16	12,000.00
Training on use of MSDSs, safe work practices, and appropriate PPE	• Professional working in PTPC, bio-bank Centre, and Central Warehouse facilities • Cleaners, waste transporters and handlers, incinerator operators, liquid waste treatment facility operators and other staff of PTPC, bio-bank Centre, and Central Warehouse	70 24	12,000.00
Total			**157,000.00**

7. Stakeholders Engagement and Community Consultation

Stakeholder engagement, one of the basic principles of the ESMS, is one of the most important tools for the implementation of the ESMP. It provides a better understanding of the conditions in the project area and the concerns of stakeholders. It is also essential to ensure the effectiveness of the mitigation measures developed.

Consultation with relevant stakeholders (from community representatives, representatives of religious institution and with members of the different sector offices (health office, tourism and Culture Office, Civil Servant Office, EPA, Youth and Children Office), Community elder, Women Youth and participants from the EPH) was conducted in the following stages: i) during early data collection stage (January 22, 2019) ii) on the first draft ESIA (February 28, 2019) iii) on the final draft ESIA (May 2, 2019) and iv) on the updating of ESIA (May 24, 2022). The consultation helped to identify the concerns of the stakeholders. It also enabled the stakeholders to have awareness on and feedback on mechanisms proposed for management of environmental and social risks associated with the Multi-purpose building and BSL3 NRL complex. Consultations were conducted at the Ethiopian Pubic Health Institute with participants drawn from elders, representatives of religious institution and with members of the different sector offices and participants from the EPHI. Community consultation meetings have been convened to draw together the issues and concerns of the resident communities found in the neighborhoods of the EPHI campus.

The Stakeholder Engagement Plan (SEP) presented within the scope of the ESIA Package has been prepared in order to meet the Project standards by considering the following basic objectives:

- Identification of stakeholders directly or indirectly affected by the project or interested in the Project
- Identification and planning of stakeholder engagement activities that will start at the preparation and planning stages of the project and continue during the construction and operation phases
- Determining the frequency of stakeholder engagement activities, information sharing and degree of participation, content of consultation activities
- Establishing a Grievance Mechanism that will provide an open communication channel for stakeholders at every stage of the project
- Addressing concerns and expectations communicated by stakeholders in the Stakeholder Engagement Plan, ESMP and Project decision-making and planning stages.

Stakeholder and public consultation was conducted at the EPHI meeting hall with participants drawn from elders, representatives of religious institution and with members of the different sector offices from woreda 09 in Gulele Sub City; and also participants from the EPHI. The objective of the public consultation was to solicit the views and opinions of the participants towards the construction of the Multi-purpose building. A total of 22 people attended the public consultation and 15 of the participants were from the woreda sector offices and representatives of elders and religious institutions; and the other 7 participants were from the Ethiopian Public Health Institute.

During the consultation, the participants were briefed on the objectives and purpose of the proposed project construction. The positive and negative impacts of the project and its enhancement/mitigation measures were discussed. The stakeholders raised the following point during the meeting:

- ✓ The importance of the proposed project for the country and the surrounding community
- ✓ Regular participation of concerned Woreda offices in the monitoring of the construction and operation of the project
- ✓ The need of implementation of the proposed mitigation accordingly and monitor periodically for effectiveness of the proposed mitigation.
- ✓ The need of standard occupational health and safety standards during the construction phase of the project
- ✓ Proper waste disposal to prevent contamination of the environment and the public
- ✓ Presence of complaint acceptance system and grievance solving mechanisms

The following action point has been proposed to address the concerns of the community and stakeholder and they agreed on the action points during EISA study.

- EPHI/MOH will establish mechanisms that will allow woreda sector offices to carry out follow up and monitoring of the project activities (discussion will made after the project approved by WB for arrangement)
- EPHI/MOH will ensure that the contractor carries out the construction works as per the rules, regulations and standards of the Environmental Protection Agency.
- EPHI/MOH will ensure that the proposed project perform the activities as per the standard procedure and waste management procedures (CDC & WHO manuals)
- Ensure that the contractor follows occupational, health and safety standards; and labour regulations in employment of his workforce.

Details of the project's approach to stakeholder engagement and public consultations, the methods applied, and the stakeholder engagement activities that have been done and planned to be carried out

so far are considered. ESD/EPHI will ensure coordination with all Project employees, including Contractor firm staff and external consultants responsible for the implementation of the SEP. The SEP will be updated regularly and outputs and corrective actions related to the process will be reflected in the updated versions of the ESMP.

8. Chance finds and GRM procedure

8.1. Chance Finds Plan

Cultural, historical, natural or archaeological heritage may be damaged or lost during excavations and ensuing construction work activities. In addition, chance finds of heritages during excavations would be at risk of loss, unless due measures are taken to protect and save this heritage. Chance finds procedures will be an integral part of the project ESMP and civil works contracts. If the Contractor discovers archaeological sites, historical sites, remains and objects, including graveyards and/or individual graves during excavation or construction.

There is one building in the premises of EPHI which is constructed by an American missionary named Dr. Thomas Lambie in 1930. This old building is formally recognized for its heritage value by Addis Ababa city administrations.

a. Chance finds procedure for the project

The excavation activity may disturb the equilibrium of the building and cause settlement of its longitudinal exterior wall foundation, which will be resulted in cracking of the exterior walls, settlement of the floor slab-on-grade, and other distress to the old building.

In addition, during the period of the construction of the project infrastructure which involves excavations, it is possible that chance finds will be encountered. These may include the following:

- Archaeological heritage which has remained unnoticed in the past,
- An encounter with a grave containing human remains which the local residents may have not mentioned at the survey stage and
- An encounter with a sacred site which was not mentioned at the survey stage.

In order to avoid potential damage to cultural property discovered during construction, the following will apply:

Chance Find Procedures	
Step 1	Stop the construction activities in the area of the chance find;
Step 2	Delineate the discovered site or area;
Step 3	Secure the site to prevent any damage or loss of removable objects.
	In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities for Culture and Tourism or the Federal Authority for Research and Conservation of Cultural Heritages take over;

Step 4	Notify the Subproject beneficiary/implementing institution E&S Focal Persons and PIU E & S staff, Project Supervisory Engineer who in turn will notify the responsible local authorities for Culture and Tourism or the Federal Authority for Research and Conservation of Cultural Heritages (within 24 hours or less);
Step 5	The responsible local authorities for Culture and Tourism or the Federal Authority for Research and Conservation of Cultural Heritages would then be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archaeologists of the local/regional or Federal Authorities. The significance and importance of the findings should be assessed according to the various criteria relevant to Proclamation No. 209/2000 on research and conservation of cultural heritage.
Step 6	Decisions on how to handle the finding shall be taken by local authorities for Culture and Tourism or the Federal Authority for Research and Conservation of Cultural Heritages This could include changes in the layout (such as when finding irremovable remains of cultural or archeological importance) conservation, preservation, restoration and salvage.
Step 7	Implementation for the authority decision concerning the management of the finding shall be communicated in writing by the relevant authorities.
Step 8	Construction work may resume only after permission is given by the relevant local/regional or Federal Authorities concerning safeguard of the heritage

Note:

According to Article 41 of Proclamation No. 209/2000 on research and conservation of cultural heritage the measures that should be taken during chance finding of heritages (i.e. Fortuitous Discovery of Cultural Heritage) are the following:

i. Any person who discovers any Cultural Heritage in the course of an excavation connected to mining explorations, building works, road construction or other similar activities or in the course of any other fortuitous event, shall forthwith report same to the Authority, and shall protect and keep same intact, until the Authority takes delivery thereof.
ii. 'The Authority' shall, upon receipt of a report submitted pursuant to Sub-Article (I) hereof, take all appropriate measures to examine, take delivery of, and register the Cultural Heritage so discovered.
iii. Where the Authority fails to take appropriate measures within six month in accordance with Sub- Article (2) of this Article, the 'person who has discovered the Cultural Heritage may be released from his responsibility by submitting, a written, notification with a full description of the situation to the Regional government official.

iv. The Authority, shall ensure that the appropriate reward is granted to the person who has handed over a Cultural Heritage discovered fortuitously in accordance with sub-Articles (I) and (2) of this Article. And such person shall be entitled to reimbursement of expenses, if any, incurred in the course of discharging his duties under this Article.

b. Roles and Responsibilities

☛ **Construction phase**

All actions identified in the Management Plan will be examined and agreed with the competent authorities. The competent authorities are:

- Addis Ababa City Administration Museum and Monuments department; and
- Culture and Tourism or the Federal Authority for Research and Conservation of Cultural Heritages
- Minister of Culture and Sport.

EPHI will provide all information from discussions with competent authorities to the Contractor. The responsible person from EPHI will be the Project Manager. The Contractor will be responsible for any adverse cultural heritage impacts arising from the project construction activities and for putting in place any necessary measures to avoid or, if not possible, mitigate them. The Contractor will be responsible for:

- Elaborate and implement a Chance Finds procedure for Cultural Heritage;
- Assignment of a responsible person;
- Communicate the Management Plan to workers;
- Ensure compliance;
- Establish a communication line with the competent Authorities;
- Implement effective monitoring; and
- Reporting

☛ **Operatıon Phase**

All actions identified in the Management Plan will be examined and agreed with the competent authorities. The competent authorities are:

- Addis Ababa City Administration Museum and Monuments department; and
- Minister of Culture and Sport.

The responsible person from EPHI will be the Operation Manager. EPHI will be responsible for:

- Communicate the Management Plan to workers;
- Ensure compliance;
- Establish a communication line with the competent Authorities;
- Implement effective monitoring; and
- Reporting.

c. Implementation Schedule

During the construction and operation phase, the implementation schedule for the Management Plan is:

Activity	Timeline / milestone
Construction Phase	
Assignment of Contractor's and EPHI's responsible person	Prior to contract
Coordination and arrangement with Archaeological Entities in case this is required by the Environment Permit and in accordance with the provisions of Article 41 of Proclamation No. 209/2000 on research and conservation of cultural heritage	Prior to contract
Contractor adopt/prepare a Chance Finds procedure for Cultural Heritage based on this plan	prior to construction
Competent Authorities elaborate an official site survey	Prior to contract
Establishment of communication line between the Contractor and competent Authorities	Prior to contract
Communicate the Management Plan to employees	Prior to contract
Monitoring of construction activities by an archaeologist (on-call basis) of the Contract	During construction
Reporting to EPHI and competent Authorities	During construction, in case of Chance Finds
Operation Phase	
Assignment of EPHI's responsible person	Prior to commissioning
EPHI adopt/prepare the final Chance Finds procedure for Cultural Heritage from this plan	One month prior to commissioning
Reporting to competent Authorities During	

operation, in case of Chance Finds	

d. Mitigation & Management Controls

During the construction and operation phase, the following management controls will be applied:

Measure / commitment	Responsible	Means of verification
Construction Phase		
Monitoring of construction activities by an archaeologist in case it is deemed required in the Environmental Permit and pertinent legislation	Contractor's responsible person	Reporting
Alerting the personnel	Contractor's Construction Manager	Chance Finds verification by archaeologist
Stop of work in the vicinity of any Chance Finds	Contractor's Construction Manager	Chance Finds verification by archaeologist
Notification to Authorities	Contractor's responsible person	Official correspondence
Specification of temporary storage and protection means of finds	Contractor's responsible person	Defined in Contractor's Management Plan
Operation Phase		
Stop of work in the vicinity of any Chance Finds	EPHI's responsible person	Verification according to final Management Plan
Notification to Authorities	EPHI's responsible person	Official correspondence
Move the finding to the temporary storage	EPHI's responsible person	Defined in final Chance Finds procedure

e. Monitoring Approach & List of Monitoring Procedures

During the construction and operation phase and in case of archaeological findings, the following monitoring procedures will be applied:

Measure / commitment	Responsible	Periodicity
Construction Phase		
Log of archaeological monitoring in case of findings	Contractor's archaeologists	Monthly

Operation Phase		
Log of Chance Finds	EPHI's responsible person	When occur

f. Training Requirements

☛ **Construction Phase**

It is very crucial to ensure the triggering of the correct application of this process, as employees are not familiar to cultural heritage objects and finds. Contractor's archaeologist will inform the construction managers and supervisors of EPHI and of the Contractor for the identification of cultural heritage objects.

☛ **Operation Phase**

8.2. EPHI will produce a leaflet, available to all facilities, for Chance Find procedures.Grievance Redress Mechanism

One of the main requirements of the ESMP is to implement an effective mechanism to be recorded and shared in environmental and social issues. The basic principles of effective communication methods with the Grievance Mechanism are as follows:

- Accurate recording and protection of all information obtained during the implementation of the ESMP
- Sharing the information about the progress and monitoring of the project with stakeholders and all interest groups, evaluating the information for the preparation of periodic reports.
- Sharing information on the functioning of the Grievance Mechanism with affected communities as part of stakeholder engagement activities.

It is anticipated that the construction and operational phase activities of the proposed WareHouse, PT Panel Production and Biobank centers project may arise certain types of complaints by the neighborhood community in relation to construction activities (traffic & noise), waste management (both construction & operational waste), and other unpredicted sources of complaint. This section describes the procedures, roles and responsibilities for addressing such grievances and resolving disputes. Every aggrieved person shall be able to trigger this mechanism to quickly resolve their complaints. The objectives of the grievance process are:

- Ensure that appropriate and mutually acceptable corrective actions are identified andimplemented to address complaints;
- Verify that complaints are satisfied with outcomes of corrective actions;

- Avoid the need to resort to judicial proceedings.

The grievance mechanism at the EPHI will be fed from three main sources:

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

8.2.1. Steps of GRM procedure

The grievance process steps outlined below and in Figure 5 will be used to manage all the grievances. This GRM will have accountability mechanism for handling issues, disputes, and complaints. It will be accessible so that individuals, workers, communities, and/or civil society organizations that are being aggrieved by any activities of the PTPC, biobank Centre, and Central Warehouse facilities operation can use it.

Steps of the grievance process are described below. A flow chart outlining the main actions and decision points is shown in Figure 5.

Step 1: Receipt of complaint

A verbal or written complaint from a complainant will be received by the head of the complaint hearing office and recorded in a complaints log. The log will indicate grievances, date lodged, action taken to address complaint or reasons the grievance was not acted on; information provided to complainant and date the grievance was closed. Grievances should be lodged at work hours, directly to the complaint hearing office.

The process for lodging a complaint is outlined below:

- Complaint hearing officer receives complaint(s) from complainant and records it in log.
- Complaint hearing officer reads the recorded complaint to confirm correct detail ofcomplaint has been documented.
- Complainant signs the log to confirm grievance was accurately recorded.

The head of the complaint hearing office will be the focal person for the GRM process and he/she will be the first point of contact to trigger the mechanism.

Contact information will be provided via Project website, through public information meetings, consultation meetings and Project brochures to raise awareness and offer transparency of how

stakeholders can voice their grievances. Various channels for stakeholders to vocalize their grievances formally include:

- Face to face (Stakeholders can voice their grievance to assigned personnel of Contractor and/or EPHI/ESD at site office)
- Complaint register form (Stakeholders can fill the forms that will be distributed to them in advance to voice their grievances)
- Telephone (Stakeholders can call EPHI on *(+251 11 2133499/11 2751522)* and call MOH (+251-11 551 7011) request to speak to contact person)
- Email (Grievances can be sent to ephi@ethionet.et or moh@moh.gov.et)
- Online contact address of EPHI www.ephi.gov.et or Online application for the World Bank (Stakeholders can fill the forms online at the http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service)

Step 2: Determination of corrective action

A grievance can be solved at this stage; the complaint hearing office will determine a corrective action in consultation with the aggrieved person. Remedial action(s) and timeframe within which they must be accomplished has been described and the party responsible for implementing them will be recorded in the complaint log. Grievances will be resolved and status reported back to complainants within a week. If more time is required this will be communicated clearly and in advance to the aggrieved person. For cases that are not resolved within the stipulated time, detailed investigations will be undertaken and results discussed not more than 1 month from lodging a grievance.

Step 3: Meeting with the complainant

The proposed corrective action and the timeframe in which it is to be implemented will be discussed with the complainant within a week of receipt of the grievance. Maximum duration for the Consent to proceed with the corrective action will be sought from the complainant.

Step 4: Implementation of corrective action

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

Step 5: Verification of corrective action

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

Step 6: Action by MOH and project contractors

If the Work supervisor cannot solve the grievance, he will refer it to MOH/EPHI and contractor through the Supervising Engineer. It is believed all possible grievances can be solved at this level.

Project affected communities and individuals can submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints can be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org

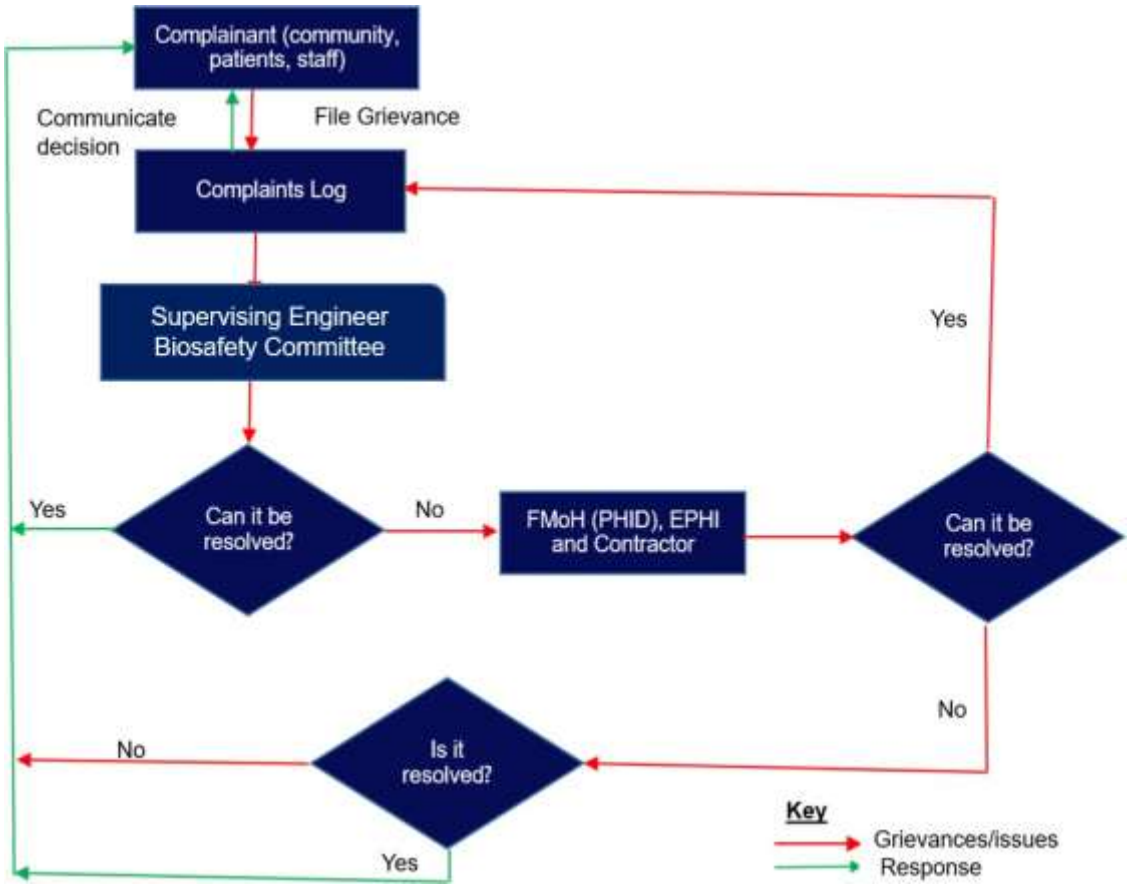


Figure 5: Grievance Management Mechanism

During the construction phase of the proposed project, the proponent (ESD/EPHI) and the contractor will jointly set up a project specific GRM with a team comprising of construction supervisor, and delegated officers from the ESD and PIU who will receive and log, and address any disputes, conflicts or concerns arising from stakeholders that may be aggrieved by the project.

9. Conclusion and Recommendations

9.1. Conclusion

From the foregoing analysis, the social and economic rating for this project is highly positive. Evaluation of alternatives has already shown that options are limited and costly. Already the proponent has sunk a substantial amount of money in the project up to design stage without significant improvement of the positive impacts. Further delay of the project is denying all stakeholders the anticipated benefits of the investment. On the other hand, redesigning or relocation will lead to loss of time and money that is already tied in the preliminary costs of the project. The project does not pose any serious and negative environmental impacts. Adequate mitigation measures have been proposed to address any of the negative impacts arising from the project. The project will create employment and improve income earnings and improve health services. The project will boost the diminishing housing supply in the country and more in urban areas. However, the ESIA study has established that the proposed project will have some negative anticipated impacts. The negative and social environmental impacts that will result from establishment of the proposed project include air, water, soil pollution, increase traffic and insecurity, noise pollution, dust emissions, solid and liquid waste generation, gender based violence, child labour, risks and accidents, occupational health and safety impacts. But no impacts are identified with high impact significance.

Based on the total impact analysis, most of the negative anticipated impacts are in the medium range and therefore, must be sufficiently mitigated.

9.2. Recommendation

The proponent of the proposed project shall be committed to putting in place several measures to mitigate the negative environmental, safety, health and social impacts associated with the life cycle of the project. It is recommended that in addition to this commitment, the proponent shall focus on implementing the measures outlined in the ESMP as well as adhering to all relevant national and international environmental, health and safety standards, policies and regulations that govern establishment and operation of such projects. It is also recommended that the project be allowed to go on provided the mitigation measures outlined in the report are adhered to, Environmental and Social Management Plan is implemented and the developer adhere to the conditions of approval of the project.

References

- AACIB 2006. Strategic Plan of Addis Ababa City (1998-2003E.C.). Addis Ababa City Administration ,Culture and Information Bureau: Addis Ababa
- Environment Policy of Ethiopia, 1997.
- Environmental Assessment Sourcebook, Vol. 3: Guidelines for Environmental Assessment of Energy and Industry Projects. World Bank Technical Paper 154, 1991.
- Environmental Impact Assessment Proclamation № 299/2002.
- Environmental Protection Organs Establishment Proclamation № 295/2002
- EPA (1997). Environmental policy of Ethiopia
- EPA (2007). Strategic Impact Assessment guideline of Ethiopia
- EPA (Environmental Protection Authority) (2000). Environmental impact Assessment Guideline document, Addis Ababa, Ethiopia.
- FDRE Constitution 1995. The Constitution of the Federal Democratic Republic of Ethiopia.-
- Federal Government of Ethiopia, Ministry of Education (FMoE) (2015) Growth and Transformation Plan II, 2015/16 – 2019/20.
- ESF/safeguards interim note: COVID-19 considerations in construction/civil works projects, April, 2020
- Technical guidance Coronavirus disease (COVID-19): Risk communication and community engagement.
- Interim Guidance: COVID-19: Occupational health and safety for health workers, February, 2021
- WHO Interim Guidance for Technical Specifications of Personal Protective Equipment for COVID-19, November 2020.

Annex I: Environmental and Social Clauses

(East Africa Skills for Transformation and Regional Integration Project (EASTRIP))

1. General

a) The Contractor shall comply with any specific Environmental and Social Management Plan (ESMP) for the works he/she is responsible for. The Contractor shall inform himself about such an ESMP, and prepare his work strategy and plan to fully take into account relevant provisions of that ESMP.

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

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

d) Besides the regular inspection of the sites by the Supervising Engineer (SE) for adherence to the contract conditions and specifications, the Owner may appoint an inspector to oversee the compliance with these environmental and social conditions and any proposed mitigation measures. Environmental Protection Authority (EPA), regional environmental authorities or other relevant stake holders may carry out similar inspection duties. In all cases, as directed by the SE, the Contractor shall comply with directives from such inspectors to implement measures required to ensure the adequacy of rehabilitation measures carried out on the bio-physical environment and compensation for socio-economic disruption resulting from implementation of all works.

e) The Contractor shall implement all measures necessary to avoid undesirable adverse environmental and social impacts wherever possible, restore work sites to acceptable standards, and abide by any environmental performance requirements specified in an ESMP.

f) If the Contractor fails to implement the approved ESMP after written instruction by the Supervising Engineer (SE) to fulfill his obligation within the requested time, the Owner reserves the right to arrange through the SE for execution of the missing action by a third party on account of the Contractor.

2. Dust abatement

a) The contractor shall minimize the effect of dust on the surrounding environment resulting from earth moving sites, concrete batching plant, heavy truck movement, vibrating equipment, temporary access roads, etc. to ensure safety, health and the protection of workers and communities living in the vicinity dust producing activities.

b) During the performance of the work and any operations appurtenants there to, the contractor shall carry out proper and efficient measures, such as sprinkling with water or other means, whenever necessary to reduce the dust nuisance, and to prevent dust which has originated from his operations from damaging crops, cultivated fields, and dwellings or causing a nuisance to persons. The contractor will be held liable for any damage resulting from dust originating from his operations.

3. Noise due to Construction Activities

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

The national noise limit standard for the residential area in day time is 55 dB while at night is 45 dB.

4. River, Stream and Creek Obstruction and flooding

a) The contractor shall ensure the existing water flow regimes in rivers, streams and other natural or irrigation channels are maintained and/or re-established where they are disrupted due to works being carried out.
b) The contractor shall take all possible steps to prevent pollution of streams, rivers and other natural water bodies / reservoirs and prevent flooding related to the construction activity,
c) Bitumen, oils, lubricants and waste water used or produced during the execution of works will not be released directly into rivers, streams, irrigation channels and other natural water bodies/reservoirs without prior treatments and also ensure that stagnant water in uncovered borrow pits is treated in the best way to avoid creating possible breeding grounds for mosquitoes.

5. Quarrying, Earth Burrowing, etc.

a) Prevent and minimize the impacts of quarrying, earth borrowing, piling and building of temporary construction camps and access roads on the biophysical environment including protected areas and arable lands; local communities and their settlements. In as much as possible restore/rehabilitate all sites to acceptable standards.
b) At the end of the construction phase, all construction sites shall be landscaped and rehabilitated to acceptable standards. The stated areas shall be first landscaped, dressed with topsoil and covered with tree planting, field sods or grass seeding.

6. Protection of Archeological and Historical Sites

a) Upon discovery of ancient heritage, relics or anything that might or believed to be of archeological or historical importance during the execution of works, immediately suspend and report such findings to the SE so that the appropriate authorities may be expeditiously contacted for fulfillment of the measures aimed at protecting such historical or archaeological resources.
b) The contractor shall take the necessary measures for preventing that any person or equipment may damage the article or things and shall provide barricades, fences, and signals and, if necessary, protect against atmospheric agents, as directed by the engineer. Also guard service may be required by the engineer.
c) The supervising engineer shall take the following measures:
   - Notify the relevant department of antiquities,
   - Request for representative to make site inspection,
   - Secession of work in the vicinity of the find until the visit of representative; and
   - Decision by the department of antiquities on possible salvage or excavation within 48-72 hours of notification

7. Vegetation and Wildlife

a) Discourage construction workers from engaging in the exploitation of natural resources such as hunting, fishing, and collection of forest products or any other activity that might have a negative impact on the social and economic welfare of the local communities.
b) The contractor shall care, in planning, constructing, maintaining and operating temporary works such as camps, roads, spoil, stockpile and construction facilities areas, to avoid unnecessary damage to areas of particular environmental interest, such as patches of remaining forest, valuable trees and erosion sensitive areas, as well as areas in which the presence of wildlife has been noted.
c) In case some part of forest or single trees has to be removed, or where erosion problems that may affect some portion of the permanent or temporary works are expected, and in any case where in the engineer's opinion it is beneficial for the land conservation, landscaping, seeding and planting of trees, as well as executing drainages and water control works may be required to the contractor, who shall carry out the work according to the prescriptions contained in the pertinent sections of these specifications.
d) No valuable trees or crops shall be damaged or removed by the contractor during the execution of the works without the prior consent of the engineer.
e) Hunting in the proximity of camps and facilities and in general in the project area is strictly prohibited, even if allowed by local rules or regulation in force in Ethiopia and or in the project region.

8. Use of Material

The contractor, in as much as possible, shall use local materials to avoid importation of foreign material and long distance transportation.

9. Worksite/Camp Site Waste Management

a) All vessels (drums, containers, bags, etc.) containing oil/fuel/surfacing materials and other hazardous chemicals shall be banded in order to contain spillage. Used oil and hydraulic fluid generated on the construction sites must be collected in a closed container and stored temporarily in a safe place and sent to an authorized recycling depot.
b) All drainage and effluent from storage areas, workshops and camp sites shall be captured and treated before being discharged into the drainage system in line with applicable government water pollution control regulations.
c) The contractor shall take all possible steps to prevent pollution of streams, rivers, and other water supplies, at or in the vicinity of the site and shall comply with applicable laws, orders and regulations in force in the country of the works concerning the control and abatement of water pollution.
d) Entry of runoff to the site shall be restricted by constructing diversion channels or holding structures such as banks, drains, dams, etc. to reduce the potential of soil erosion and water pollution.
e) Construction waste shall not be left in stockpiles along the road, but removed and reused or disposed of on a daily basis and should be also restricted within the project site.

f) If disposal sites for clean spoil are necessary, they shall be located in areas, approved by the SE, for landfill and where they will not result in material being easily washed into drainage channels. Whenever possible, spoil materials should be placed in low-lying areas and should be compacted and dressed with top soil and then planted with species indigenous to the locality.

g) The contractor shall provide all sanitary facilities (e.g. garbage collection and disposal, safety tank, drinking water facilities, etc.) are provided in construction workers camps.

10. Material Excavation and Deposit

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

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

c) New extraction sites:

- Shall not be located in the vicinity of settlement areas, cultural and historical sites, wetlands or any other valued ecosystem component, or on high or steep ground or in areas of high scenic value.
- Shall not be located in archaeological areas. Excavations in the vicinity of such areas shall proceed with great care and shall be done in the presence of government authorities having a mandate for their protection.
- Shall not be located in forest reserves. However, where there are no other alternatives, permission shall be obtained from the appropriate authorities and an environmental and social impact study shall be conducted.
- Shall be easily rehabilitated. Areas with minimal vegetation cover such as flat and bare ground, or areas covered with grass only or covered with shrubs less than 1.5m in height, are preferred.
- Shall have clearly demarcated and marked boundaries to minimize vegetation clearing and to avoid any unnecessary damage on other resources.

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

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

f) The Contractor shall deposit any excess material in accordance with the principles of these general conditions, and any applicable ESMP, in areas approved by local authorities and/or the SE.

g) Areas for depositing hazardous materials such as contaminated liquid and solid materials shall be approved by the SE and appropriate local and/or national authorities before the commencement of work. Use of existing, approved sites shall be preferred over the establishment of new sites.

11. Rehabilitation and Soil Erosion Prevention

a) To the extent practicable, the Contractor shall rehabilitate the site progressively so that the rate of rehabilitation is similar to the rate of construction.
b) Always remove and retain topsoil for subsequent rehabilitation. Soils shall not be stripped when they are wet as this can lead to soil compaction and loss of structure.
c) Topsoil shall not be stored in large heaps. Low mounds of no more than 1 to 2m high are recommended.
d) Re-vegetate the stockpiles with recommended grass species to protect the soil from erosion, discourage weeds and maintain an active population of beneficial soil microbes.
e) Locate stockpiles where they will not be disturbed by future construction activities.
f) The contractor shall reinstate natural drainage patterns where they have been altered or impaired.
g) The contractor shall collect toxic materials from construction areas and keep protect in designated sites until proper disposal. Backfill excavated areas with soils or overburden that is free of foreign material that could pollute groundwater and soil.
h) Identify potentially toxic overburden and screen with suitable material to prevent mobilization of toxins.
i) Ensure reshaped land is formed so as to be inherently stable, adequately drained and suitable for the desired long-term land use, and allow natural regeneration of vegetation.
j) Minimize the long-term visual impact by creating landforms that are compatible with the adjacent landscape.
k) Minimize erosion by wind and water both during and after the process of reinstatement.
l) Compacted surfaces shall be deep ripped to relieve compaction unless subsurface conditions dictate otherwise.
m) Re-vegetate with plant species that will control erosion, provide vegetative diversity and, through succession, contribute to a resilient ecosystem. The choice of plant species for rehabilitation shall be done in consultation with local research institutions, forest department and the local people.

12. Water Resources Management

a) The Contractor shall at all costs avoid conflicting with water demands of local communities.
b) Abstraction of both surface and underground water shall only be done with the consultation of the local community and after obtaining a permit from the relevant Water Authority.
c) Abstraction of water from wetlands shall be avoided. Where necessary, permission has to be obtained from relevant authorities.
d) No construction water containing spoils or site effluent, especially cement and oil, shall be allowed to flow into natural water drainage courses.
e) Wash water from washing out of equipment shall not be discharged into water courses without pretreated.
f) Site spoils and temporary stockpiles shall be located away from the drainage system, and surface runoff shall be directed away from stockpiles to prevent erosion.

13. Traffic Management

a) Location of access roads shall be done in consultation with the local community especially in important or sensitive environments. Access roads shall not traverse wetland areas.
b) Upon the completion of civil works, all access roads shall be ripped and rehabilitated
c) Access roads shall be watered regularly to suppress dust emission.

14. Disposal of Unusable Elements

a) Unusable materials and construction elements such as electro-mechanical equipment, pipes, accessories and demolished structures will be disposed of in a manner approved by the SE. The Contractor has to agree with the SE which elements are to be surrendered to the Client's premises, which will be recycled or reused, and which will be disposed of at approved landfill sites.
b) Unsuitable and demolished elements shall be dismantled to a size fitting on ordinary trucks for transport.

15. Repair of Private Property

a) Should the Contractor, deliberately or accidentally, damage private property, he shall repair the property to the owner's satisfaction and at his own cost. For each repair, the Contractor shall obtain from the owner a certificate that the damage has been made good satisfactorily in order to indemnify the Client from subsequent claims.
b) In cases where compensation for inconveniences, damage of crops etc. are claimed by the owner, the Client has to be informed by the Contractor through the SE. This compensation is in general settled under the responsibility of the Client before signing the Contract. In unforeseeable cases, the respective administrative entities of the Client will take care of compensation.

16. Contractor's Environment, Health and Safety Management Plan (EHS- MP)

Within 6 weeks of signing the Contract, the Contractor shall prepare an EHS-MP to ensure the adequate management of the health, safety, environmental and social aspects of the works, including implementation of the requirements of these general conditions and any specific requirements of an ESMP for the works.

The Contractor's EHS-MP will serve two main purposes:-

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

The Contractor's EHS-MP shall provide at least:-

- a description of procedures and methods for complying with these general environmental and social management conditions, and any specific conditions specified in an ESMP;

- a description of specific mitigation measures that will be implemented in order to minimize adverse impacts;
- a description of all planned monitoring activities (e.g. sediment discharges from borrow areas) and the reporting thereof; and
- The internal organizational, management and reporting mechanisms put in place for such.

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

16.1. Health and Safety

a) The contractor shall ensure that the project adheres to the Environmental, Health and Safety Guidelines in the ESMP.
b) In advance of the construction work, the Contractor shall mount an awareness and hygiene campaign. Workers and local residents shall be sensitized on health risks particularly of HIV/AIDS.
c) Adequate road signs to warn pedestrians and motorists of construction activities, diversions, etc. shall be provided at appropriate points.
d) Construction vehicles shall not exceed maximum speed limit of 40km per hour.

16.2. Traffic Safety

a) Ensure public safety, and meet traffic safety requirements for the operation of work to avoid accidents.
b) The contractor shall be responsible for the safety along the roads related to the site, and he shall take all necessary precautions for the protection of the work and the safety of the public on the roads affected by his activities.
c) Roads subject to interference by the work shall be kept open or suitable detours shall be provided and maintained by the contractor, who shall provide, erect, and maintain all necessary barricades, suitable and sufficient flashlights, flagmen, danger signals, and signs.
d) The contractor shall submit his weekly activities schedule and the locations of his work along the existing public roads to the authorities concerned, and obtain all necessary approvals prior to commencement of the respective work.
e) At the road crossings or in heavy traffic locations, the contractor shall carry out the work within the working hours as directed by the engineer, and after the completion of the work he shall immediately make the necessary backfill and pavement at the crossings.
f) The contractor shall provide temporary passes and bridges to give an access to the existing villages, houses, etc., to the satisfaction of the engineer and the authorities concerned whenever he disturbs such existing way during the execution of the works.

17. Reporting

The Contractor shall prepare monthly progress reports to the SE on compliance with these general conditions, the project ESMP if any, and his own EHS-MP. It is expected that the Contractor's reports will include information on:-

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

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

18. Training of Contractor's Personnel

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

- EHS in general (working procedures);
- Emergency procedures; and
- Social and cultural aspects (awareness creation)

19. Cost of Compliance

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

Annex II: Code of Conduct for Contractors and workers hired under the project

General Code of Conduct for Multi-purpose building project to be inserted in the ESMP and/or Tender documents and Contract

The multi-purpose building project will comply with ESS2 and ESS4 and the Environmental, Social Health and Safety Guidelines of the WB (ESHS) and the Occupational Health and Safety (OHS) and Labor regulations of Ethiopia. The following is a general Code of conduct to be inserted in the contract of contractors for civil works or other contracted activities.

1. **Company Code of Conduct for Implementing ESHS and OHS Standards, Preventing Gender Based Violence and Violence against Children**

---------- (company name) is committed to ensuring that the project is implemented in such a way which minimizes any negative impacts on the local environment, communities, and its workers. This shall be done by respecting the environmental, social, health and safety (ESHS) standards, and ensuring appropriate occupational health and safety (OHS) standards are met. The company is also committed to creating and maintaining an environment in which gender-based violence (GBV) and violence against children (VAC) have no place, and where they shall not be tolerated by any employee, associate, or representative of the company.

Therefore, in order to ensure that all those engaged in the project are aware of this commitment, the company commits to the following core principles and minimum standards of behavior that shall apply to all company employees, associates, and representatives including sub-contractors, without exception:

General

1. The company, and therefore all employees, associates, and representatives, commits to complying with all relevant national laws, rules and regulations and the World Bank Environmental and Social Standards which can read in the internet in this website:
    a. https://www.worldbank.org/en/projects-operations/environmental-and-social-framework
2. The contractor is responsible to comply with the requirements defined in ESMP which are integral part of the contract.
3. The company commits to full implementing its 'Contractors Environmental and Social

Management Plan' (C-ESMP) which will be prepared based on the ESIA/ESMP prepared by the government for the works.

4. The company commits to treating women, children (persons under the age of 18), and men with respect regardless of race, colour, language, religion, political or other opinion, national, ethnic or social origin, property, disability, birth or other status. Acts of GBV and VAC are in violation of this commitment.
5. The company shall ensure that interactions with local community members are done with respect and non-discrimination.
6. Demeaning, threatening, harassing, abusive, culturally inappropriate, or sexually provocative language and behaviour are prohibited among all company employees, associates, and its representatives.
7. Respect to reasonable work instructions (including regarding environmental and social norms)
8. Protect and ensure proper use of property (for example, to prohibit theft, carelessness or waste)
9. Prohibit illegal activities by their workers such as: polluting the soil, rivers, wetlands, hunting, poaching wildlife, setting up fires, spilling diesel, oils in the soil, cutting trees without permit.

Health and Safety

10. The company shall ensure to hire professional in occupational health and safety to implement the ESMP.
11. The company shall ensure that the project's occupational health and safety (OHS) management plan is effectively implemented, including wearing prescribed personal protective equipment, preventing avoidable accidents and reporting accidents of all type within less of 24 hours or conditions or practices in the project sites that pose a safety hazard or threaten the environment and the people.
12. The company will:
    a. Prohibit the use of alcohol during work activities.
    b. The company shall prohibit the use of illegal substances, at all times.
13. The company shall ensure that adequate eating, changing and sanitation facilities are available on site and at any worker accommodations provided by the contractor.
14. The company will obey labour, contracting and health and safety regulation in case of accidents, death and incapacity of workers (skilled or no skilled) and pay the compensation

required by law.

Gender Based Violence and Violence against Children

15. Acts of GBV or VAC constitute gross misconduct and are therefore grounds for sanctions, which may include penalties and/or termination of employment. All forms of GBV and VAC, including grooming are unacceptable, regardless of whether they take place on the work site, the work site surroundings, at worker's camps or at worker's homes.
16. In addition to company sanctions, legal prosecution of those who commit acts of GBV or VAC shall be pursued if appropriate.
17. Sexual contact or activity with children under 18—including through digital media—is prohibited. Mistaken belief regarding the age of a child is not a defense. Consent from the child is also not a defense or excuse.
18. Sexual Harassment—for instance, making unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct, of a sexual nature, including subtle acts of such behavior, is prohibited. For example: Looking somebody up and down; kissing, howling or smacking sounds; hanging around somebody; whistling and catcalls; giving personal gifts; making comments about somebody's sex life; etc. is prohibited.
19. Sexual favors —for instance, making promises or favorable treatment dependent on sexual acts—or other forms of humiliating, degrading or exploitative behavior are prohibited.
20. Unless there is full consent by all parties involved in the sexual act, sexual interactions between the company's employees (at any level) and members of the communities surrounding the work-place are prohibited. This includes relationships involving the withholding/promise of actual provision of benefit (monetary or non-monetary) to community members in exchange for sex—such sexual activity is considered "non-consensual" within the scope of this Code.

21. All employees, including volunteers and sub-contractors are highly encouraged to report suspected or actual acts of GBV and/or VAC by a fellow worker, whether in the same company or not. Reports must be made in accordance with GBV and VAC Allegation Procedures.
22. Managers are required to report suspected or actual acts of GBV and/or VAC as they have a responsibility to uphold company commitments and hold their direct reports responsible.

Implementation

To ensure that the above principles are implemented effectively the company commits to ensuring that:

23. All managers sign the 'Manager's Code of Conduct' detailing their responsibilities for implementing the company's commitments and enforcing the responsibilities in the 'Individual Code of Conduct'.
24. All employees sign the project's 'Individual Code of Conduct' confirming their agreement to comply with ESHS and OHS standards, and not to engage in activities resulting in GBV or VAC.
25. Displaying the Company and Individual Codes of Conduct prominently and in clear view at workers' camps, offices, and in in public areas of the work-place. Examples of areas include waiting, rest and lobby areas of sites, canteen areas, health clinics.
26. Ensure that posted and distributed copies of the Company and Individual Codes of Conduct are translated into the appropriate language of use in the work site areas as well as for any international staff in their native language.
27. An appropriate person is nominated as the company's 'Focal Point' for addressing GBV and VAC issues, including representing the company on the GBV and VAC Compliance Team which is comprised of representatives from the client, contractor(s), the supervision consultant, and local service provider(s).
28. Ensuring that an effective GBV and VAC Action Plan is developed in consultation with the Compliance Team which includes as a minimum:
    a. **GBV and VAC Allegation Procedure** to report GBV and VAC issues through the project Grievance Redress Mechanism (GRM);
    b. **Accountability Measures** to protect confidentiality of all involved; and,
    c. **Response Protocol** applicable to GBV and VAC survivors and perpetrators.
29. That the company effectively implements the GBV and VAC Action Plan, providing feedback to the Compliance Team for improvements and updates as appropriate.
30. All employees attend an induction training course prior to commencing work on site to ensure they are familiar with the company's commitments to ESHS and OHS standards, and the project's GBV and VAC Codes of Conduct.
31. All employees attend a mandatory training course once a month for the duration of the contract starting from the first induction training prior to commencement of work to reinforce the understanding of the project's ESHS and OHS standards and the GBV and VAC Code of Conduct.

I do hereby acknowledge that I have read the foregoing Company Code of Conduct, and on behalf of the company agree to comply with the standards contained therein. I understand my role and responsibilities to support the project's OHS and ESHS standards, and to prevent and respond to GBV and VAC. I understand that any action inconsistent with this Company Code of Conduct or failure to take action mandated by this Company Code of Conduct may result in disciplinary action.

Company name: _____

Signature: _____

2. Manager's Code of Conduct

Manager's Code of Conduct Implementing ESHS and OHS Standards and Preventing Gender Based Violence and Violence against Children

Managers at all levels have a responsibility to uphold the company's commitment to implementing the ESHS and OHS standards, and preventing and addressing GBV and VAC. This means that managers have an acute responsibility to create and maintain an environment that respects these standards and prevents GBV and VAC. Managers need to support and promote the implementation of the Company Code of Conduct. To this end, managers must adhere this Manager's Code of Conduct and also sign the Individual Code of Conduct. This commits them to supporting the implementation of the C-ESMP and the OHS Management Plan and developing systems that facilitate the implementation of the GBV and VAC Action Plan. They need to maintain a safe workplace, as well as a GBV-free and VAC-free environment at the workplace and in the local community. These responsibilities include but are not limited to:

Implementation

1. To ensure maximum effectiveness of the Company and Individual Codes of Conduct:
    a. Prominently displaying the Company and Individual Codes of Conduct in clear view at workers' camps, offices, and in in public areas of the work-place. Examples of areas include waiting, rest and lobby areas of sites, canteen areas, health clinics.
    b. Ensuring all posted and distributed copies of the Company and Individual Codes of Conduct are translated into the appropriate language of use in the work site areas as well as for any international staff in their native language.
2. Verbally and in writing explain the Company and Individual Codes of Conduct to all staff.
3. Ensure that:
    a. All direct reportees sign the 'Individual Code of Conduct', including acknowledgment that they have read and agree with the Code of Conduct.
    b. Staff lists and signed copies of the Individual Code of Conduct are provided to the OHS Manager, the Compliance Team, and the client.

c. Participate in training and ensure that staff also participate as outlined below.
d. Put in place a mechanism for staff to:
    i. report concerns on ESHS or OHS compliance; and,
    ii. confidentially report GBV or VAC incidents to the Grievance Redress Mechanism (GRM)
e. Staff are encouraged to report suspected or actual ESHS, OHS, GBV or VAC issues, emphasizing the staff's responsibility to the Company and the country hosting their employment, and emphasizing the respect for confidentiality.

4. In compliance with applicable laws and to the best of your abilities, prevent perpetrators of sexual exploitation and abuse from being hired, re-hired or deployed. Use background and criminal reference checks for all employees.

5. Ensure that when engaging in partnership, sub-contractor or similar agreements, these agreements:
    a. Incorporate the ESHS, OHS, GBV and VAC Codes of Conduct as an attachment.
    b. Include the appropriate language requiring such contracting entities and individuals, and their employees and volunteers, to comply with the Individual Codes of Conduct.
    c. expressly state that the failure of those entities or individuals, as appropriate, to ensure compliance with the ESHS and OHS standards, take preventive measures against GBV and VAC, to investigate allegations thereof, or to take corrective actions when GBV or VAC has occurred, shall constitute grounds for sanctions and penalties in accordance with the Individual Codes of Conduct.

6. Provide support and resources to the Compliance Team to create and disseminate internal sensitization initiatives through the awareness-raising strategy under the GBV and VAC Action Plan.

7. Ensure that any GBV or VAC issue warranting police action is reported to the client and the World Bank immediately.

8. Ensure that any major ESHS or OHS incidents are reported to the client and the supervision engineer immediately.

Training

9. The managers are responsible to:
    a. Ensure that the OHS Management Plan is implemented, with suitable training required for all staff, including sub-contractors and suppliers; and,
    b. Ensure that staffs have a suitable understanding of the C-ESMP and are trained as appropriate to implement the C-ESMP requirements.
10. All managers are required to attend an induction manager training course prior to commencing work on site to ensure that they are familiar with their roles and responsibilities in upholding the GBV and VAC elements of these Codes of Conduct. This training shall be separate from the induction training course required of all employees and shall provide managers with the necessary understanding and technical support needed to begin to develop the GBV and VAC Action Plan for addressing GBV and VAC issues.
11. Managers are required to attend and assist with the project facilitated monthly training courses for all employees. Managers shall be required to introduce the trainings and announce the self-evaluations, including collecting satisfaction surveys to evaluate training experiences and provide advice on improving the effectiveness of training.
12. Ensure that time is provided during work hours and that staff prior to commencing work on site attend the mandatory project facilitated induction training on:
    a. OHS and ESHS; and,
    b. GBV and VAC required of all employees.
13. During civil works, ensure that staff attends ongoing OHS and ESHS training, as well as the monthly mandatory refresher training course required of all employees to combat increased risk of GBV and VAC.

Response

14. Managers shall be required to take appropriate actions to address any ESHS or OHS incidents.
15. With regard to GBV and VAC:
    a. Provide input to the GBV and VAC Allegation Procedures and Response

Protocol developed by the Compliance Team as part of the final cleared GBV and VAC Action Plan.

b. Once adopted by the Company, managers shall uphold the Accountability Measures set forth in the GBV and VAC Action Plan to maintain the confidentiality of all employees who report or (allegedly) perpetrate incidences of GBV and VAC (unless a breach of confidentiality is required to protect persons or property from serious harm or where required by law).

c. If a manager develops concerns or suspicions regarding any form of GBV or VAC by one of his/her direct reportees, or by an employee working for another contractor on the same work site, s/he is required to report the case using the GRM.

d. Once a sanction has been determined, the relevant manager(s) is/are expected to be personally responsible for ensuring that the measure is effectively enforced, within a maximum timeframe of 14 days from the date on which the decision to sanction was made.

e. If a Manager has a conflict of interest due to personal or familial relationships with the survivor and/or perpetrator, he/she must notify the respective company and the Compliance Team. The Company shall be required to appoint another manager without a conflict of interest to respond to complaints.

16. Managers failing to address ESHS or OHS incidents or failing to report or comply with the GBV and VAC provisions may be subject to disciplinary measures, to be determined and enacted by the company's CEO, Managing Director or equivalent highest-ranking manager. Those measures may include:

    a. Informal warning.
    b. Formal warning.
    c. Additional Training.
    d. Loss of up to one week's salary.
    e. Suspension of employment (without payment of salary), for a minimum period of 1 month up to a maximum of 6 months.
    f. Termination of employment.

17. Ultimately, failure to effectively respond to ESHS, OHS GBV and VAC cases on the work site by the company's managers or CEO may provide grounds for legal actions by authorities.

I do hereby acknowledge that I have read the foregoing Manager's Code of Conduct, do agree to comply with the standards contained therein and understand my roles and responsibilities to prevent and respond to ESHS, OHS GBV and VAC requirements. I understand that any action inconsistent with this Manager's Code of Conduct or failure to take action mandated by this Manager's Code of Conduct may result in disciplinary action.

Signature: _____

Printed Name: _____

Title: _____

3. **Code of Conduct to be signed by individual workers (skilled and unskilled, casual or non-casual) for Preventing Gender Based Violence (GBV) and Violence against Children (VAC)**

I, _____, acknowledge that adhering to environmental, social health and safety (ESHS) standards, following the project's occupational health and safety (OHS) requirements, and preventing gender-based violence (GBV) and violence against children (VAC) is important. All forms of GBV or VAC are unacceptable, be it on the work site, the work site surroundings, at worker's camps, or the surrounding communities.

The company considers that failure to follow ESHS and OHS standards, or to partake in GBV or VAC activities, constitute acts of gross misconduct and are therefore grounds for sanctions, penalties or potential termination of employment. Prosecution of those who commit GBV or VAC may be pursued if appropriate.

I agree that while working on the project I will:

- Attend and actively partake in training courses related to ESHS, OHS, HIV/AIDS, GBV and VAC as requested by my employer.
- Shall wear my personal protective equipment (PPE), in the correct prescribed manner, at all times when at the work site or engaged in project related activities.
- Take all practical steps to implement the contractor's environmental and social management plan (CESMP).
- Implement the OHS Management Plan.
- Adhere to a zero-alcohol policy during work activities, and refrain from the use of illegal substances at all times.
- Consent to a police background check.
- Treat women, children (persons under the age of 18), and men with respect regardless of race, color, language, religion, political or other opinion, national, ethnic or social origin, property, disability, birth or other status.
- Not use language or behavior towards women, children or men that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate.
- Not participate in sexual contact or activity with children—including grooming or contact through digital media. Mistaken belief regarding the age of a child is not a defense.

Consent from the child is also not a defense or excuse.

- Not engage in sexual harassment—for instance, making unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct, of a sexual nature, including subtle acts of such behavior. Ex. Looking somebody up and down; kissing, howling or smacking sounds; hanging around somebody; whistling and catcalls; giving personal gifts; making comments about somebody's sex life; etc.
- Not engage in sexual favors—for instance, making promises or favorable treatment dependent on sexual acts—or other forms of humiliating, degrading or exploitative behavior.

- Unless there is the full consent[11] by all parties involved, I shall not have sexual interactions with members of the surrounding communities. This includes relationships involving the withholding or promise of actual provision of benefit (monetary or non-monetary) to community members in exchange for sex—such sexual activity is considered "non- consensual" within the scope of this Code.
- Consider reporting through the GRM (Grievance Redress Mechanism) or to my manager any suspected or actual GBV or VAC by a fellow worker, whether employed by my employer or not, or any breaches of this Code of Conduct.

With regard to children under the age of 18:

- Wherever possible, ensure that another adult is present when working in the proximity of children.
- Not invite unaccompanied children unrelated to my family into my home, unless they are at immediate risk of injury or in physical danger.
- Not sleep close to unsupervised children unless absolutely necessary, in which case I must obtain my supervisor's permission, and ensure that another adult is present if possible.
- Use any computers, mobile phones, or video and digital cameras appropriately, and never to exploit or harass children or to access child pornography through any medium (see also "Use of children's images for work related purposes" below).
- Refrain from physical punishment or discipline of children.
- Refrain from hiring children for domestic or other labor which is inappropriate given their

age or developmental stage, which interferes with their time available for education and recreational activities, or which places them at significant risk of injury.

- Comply with all relevant local legislation, including labor laws in relation to child labor.

Use of children's images for work related purposes

When photographing or filming a child for work related purposes, I must:

- Before photographing or filming a child, assess and endeavor to comply with local traditions or restrictions for reproducing personal images.
- Before photographing or filming a child, obtain informed consent from the child and a parent or guardian of the child. As part of this I must explain how the photograph or film shall be used.
- Ensure photographs, films, videos and DVDs present children in a dignified and respectful manner and not in a vulnerable or submissive manner. Children should be adequately clothed and not in poses that could be seen as sexually suggestive.
- Ensure images are honest representations of the context and the facts.
- Ensure file labels do not reveal identifying information about a child when sending images electronically.

Sanctions

I understand that if I breach this Individual Code of Conduct, my employer shall take disciplinary action which could include:

- Informal warning.
- Formal warning.
- Additional Training.
- Loss of up to one week’s salary.
- Suspension of employment (without payment of salary), for a minimum period of 1 month up to a maximum of 6 months.
- Termination of employment.
- Report to the police if wanted.

I understand that it is my responsibility to ensure that the environmental, social, health and safety standards are met. That I shall adhere to the occupational health and safety management plan.

That I shall avoid actions or behaviors that could be construed as GBV or VAC. Any such actions shall be a breach this Individual Code of Conduct. I do hereby acknowledge that I have read the foregoing Individual Code of Conduct, do agree to comply with the standards contained therein and understand my roles and responsibilities to prevent and respond to ESHS, OHS, GBV and VAC issues. I understand that any action inconsistent with this Individual Code of Conduct or failure to take action mandated by this Individual Code of Conduct may result in disciplinary action and may affect my ongoing employment.

Signature: _____

Printed Name: _____

Title: _____

Date: _____

Contractor_____

Supervisor_____

Date_____

Annex III: Emergency Preparedness and Response Plan for the project

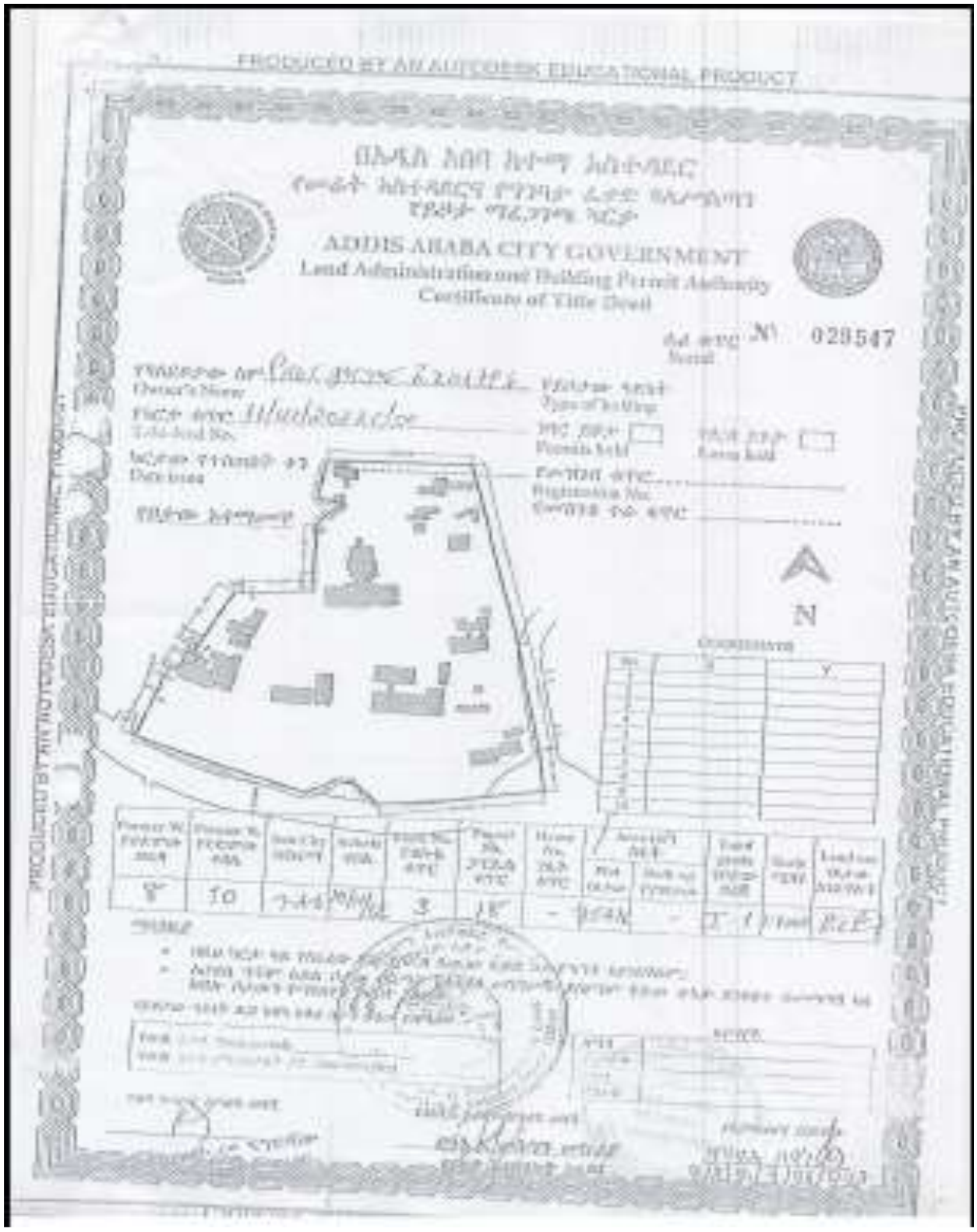
Emergencies and disasters can occur any time without warning. More so construction sites are prone to such, thus it is important for the proponent to prepare for them, and be in a good position to act to minimize panic and confusion when they occur. Emergency Preparedness and Response Plans (EPRP) will have to be instituted throughout the project cycle.The following elements of a conventional emergency response plan are recommended as summarized in table 9 below.

Table 10: Emergency Preparedness and Response Plan

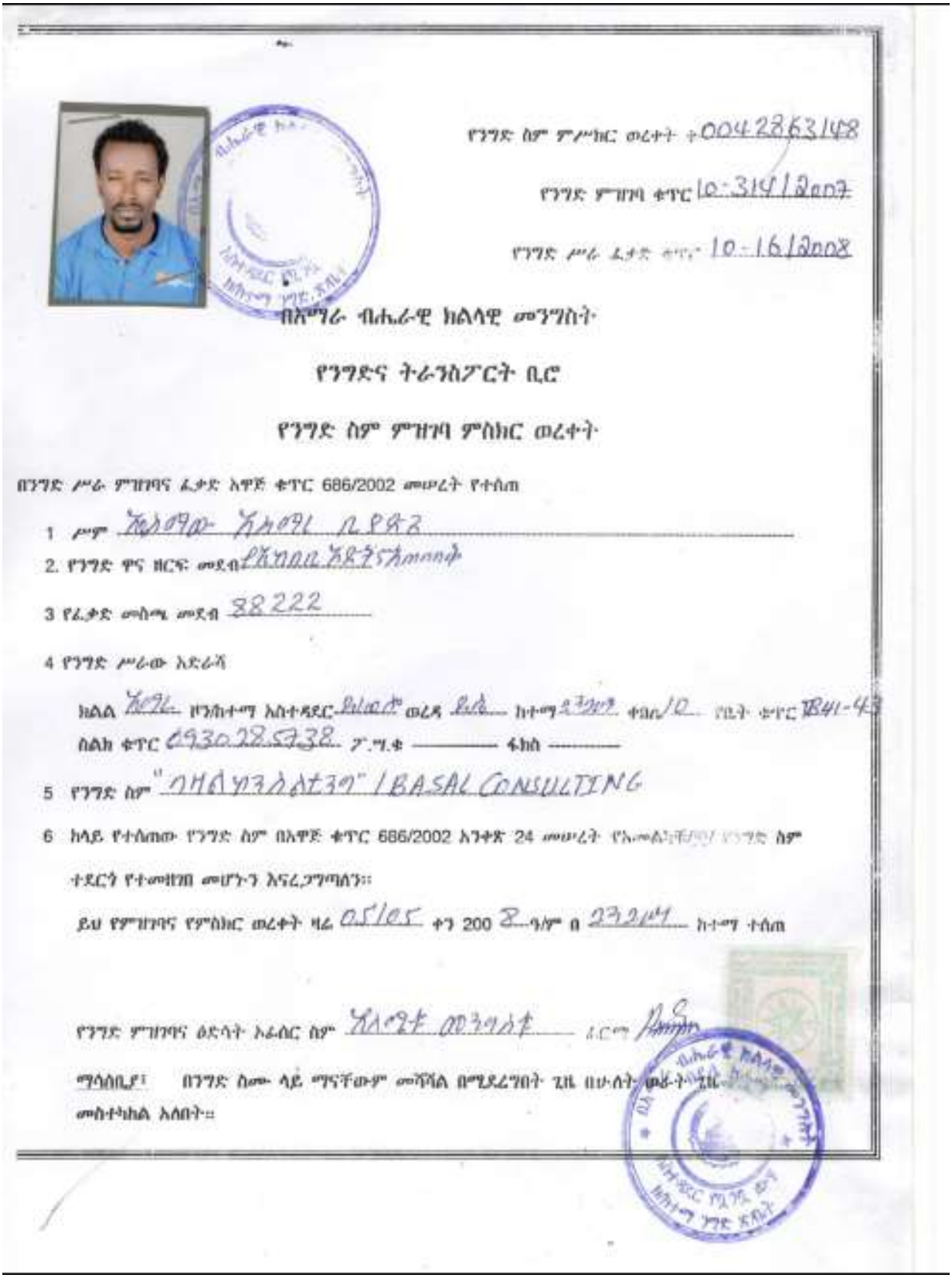
Emergency Preparedness and Response Plan Components	Actions/Requirements	Responsibility
Potential Emergency	• Identification of all potential emergencies associated with the proposed project at the project site, Include, Fires, Accidents & Incidents, and Security ***etc***.	• Contractor during construction and Decommissioning phases. • Proponent during operation phase.
Emergency Operations Coordinator (EOC)	• Designate a primary and secondary contact person.	• Contractor during construction and decommissioning phases. • Proponent during operation phase.
Emergency contact Numbers	• Give & display contact for Fire station, Ambulance, police, Hospitals, and others	• Contractor during construction and decommissioning phases • Proponent during operation phase.
Installation of emergency equipment	• Fire sensors, • Fire alarms, • Fire extinguishers, • Fire hose, • Panic alarm button, • Provision and enforcement of use of PPEs, • Emergency Communication equipment, such as Phone & alarm bells	• Contractor during construction and decommissioning phases. • Proponent during operation phase.
Training for emergency response	• Regular training for emergency response	• Contractor during construction and decommissioning phases. • Proponent ,during operation phase
Trained in the use of emergency equipment	• Employees training in the use of emergency equipment	• Contractor during construction and decommissioning phases. • Proponent during operation phase.
First Aid	• Provision of first aid kits, • First aid management training	• Contractor during construction and decommissioning phases. • Proponent during operation phase.

Signage	• Fire sensors • Signage, action poster, alarm bell/ panic button	• Contractor during construction and decommissioning phases. • Proponent during operation phase.
Procedure for Rescue and evacuation	• Evacuation plan, • Warning system, • Assembly site • Shelter in place plan.	• Contractor during construction and decommissioning phases. • Proponent during operation phase.
Occupants emergency contact information	• List of all occupants, residents & their activities	• Proponent during operation phase.
ERP review	• Annual ERP review	• Contractor during construction and decommissioning phases. • Proponent during operation phase.

Annex IV: Ethiopian Public Health Certeficate of Titled Deed (Land ownership certeficate)



Annex V: Legal Documents of the consulting firm (Basal Consulting)



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ይህ የምዝገባና የምስክር ወረቀት ዛሬ 05/05 ቀን 200 8 ዓ/ም በ ጋንጎሃ ከተማ ተሰጠ

የንግድ ምዝገባና ፅድሳት ኦፊሰር ስም ኸሰማት መንግስቱ ፊርማ

ማሳሰቢያ፣ በንግድ ስሙ ላይ ማናቸውም መሻሻል በሚደረግበት ጊዜ በሁለት ወራት ጊዜ ውስጥ ለንግድ ምዝገባ መስተካከል አለበት።

በአማራ ብሔራዊ ክልላዊ መንግስት
ንግድና ገበያ ልማት ቢሮ

Amhara National Regional State
Market Development Bureau

1390

ሲሪ ቁ./Serial № 2436902

የግብር ከፋይ መለያ ቁ. /TIN 0042863148
የንግድ ምዝገባ ቁ. AM/DES/BW/1/0000049/2008
Principal Registration No.
የቀድሞው ንግድ ፈቃድ ቁጥር 016/07
Previous License No.
የንግድ ሥራ ፈቃድ ቁጥር AM/DES/BW/03/137/5945047/2008
Business License No.
ቀድሞ ተሰጠበት ቀን 27/9/2007
Previous Date of issuance
የተሰጠበት ቀን 3/[illegible]/2008
Date of issuance
የታደሰበት ቀን: 26/1/2013
Renewal Date

የንግድ ሥራ ፈቃድ

በንግድ ምዝገባና ፈቃድ አዋጅ ቁጥር 980/2008 መሰረት ተሰጠ

Business License

Issued Under Commercial Registration and Business license proc.No 980/2016

1. የግለሰቡ/ድርጅቱ ስም ሰማዉ አስማረ ቢያድጌ
2. ዜግነት ኢትዮጵያዊ
3. የንግድ ስም
4. ሥራ አስኪያጅ ስም አቶ ሰማዉ አስማረ ቢያድጌ
5. የንግድ ድርጅቱ አድራሻ
   ክልል አማራ ዞን/ከፍለ ከተማ ደቡብ ወሎ
   ወረዳ ደሴ ቀበሌ KEBELE 10
   የቤት ቁጥር tb41-43 ስልክ ቁጥር 0913436142
   ፋክስ ---- ኢ-ሜይል ----
6. የንግድ ሥራ ዘረፍ
   (863)በተፈጥሮ ሳይንስ ዙሪያ የማማከር አገልግሎት
7. የንግድ ሥራ መስክ
   በጀርባ ገፅ ይመልከቱ
8. ካፒታል በኢት ብር 558,586.00

ይህ የንግድ ፈቃድ ዛሬ 26/1/2013 በ አማራ ተሰጠ ።

1. Owner/Company Name SEMAW ASMARE BIYADGIE
2. Nationality Ethiopian
3. Trade Name
4. General Manager Name Mr. SEMAW ASMARE BIYADGIE
5. Business Address
   Region Amhara Zone/Sub City SOUTH WELLO
   Woreda DESSIE Kebele KEBELE 10
   House No. tb41-43 Tel.No 0913436142
   Fax ---- E-mail ----
6. Sector of Business
   Natural science consultancy service
7. Field of Business
   See back page
8. Capital in ETB 558,5[illegible]00

This Business License is issued in Amhara
day 10/6/2020

ለ2013 ታድሷል

የሃላፊ ስም/Name of Official
ፊርማ/Signature

ማህተም

ማሳሰቢያ- 1. ይህ የንግድ ፍቃድ በዓዋጅ ፈቃድ ቁጥር 980/2008 መሠረት እንደ [illegible] ቀመቱ በአዋጅ በተቀመጠው መሰረት መታደስ አለበት።
N.B. This License Shall be renewed in accordance with Proclamation No. 980/2008 as per the fiscal year.
2. ይህ የንግድ ፈቃድ የምስክር ወረቀት በዋስትና ወይም በአዳ ሊያዝ አይችልም።

በጤና የማማከር አገልግሎት (86311)
በአከባቢ አዲትና አከባቢ አጠባበቅ የማማከር አገልግሎት (86312)

Health consultancy service (86311)
Environmental auditing and environmental protection consultancy service (86312)

ቁጥር : ፲፩/፲.፩/፵፯፯/፲፰
ቀን : ፲፭/፭/፳፻፲

የብቃት ማረጋገጫ የምስክር ወረቀት

የኢትዮጵያ የደንና የአየር ንብረት ለዉጥ ሚኒስቴር የአካባቢ ማኅበራዊና ተፅዕኖ፣ ግምገማ ጥናት የማማከር አገልግሎት ብቃት ማረጋገጫ ምስክር ወረቀት አሰጣጥ መመሪያ ቁጥር 03/2010 መሠረት ባዛል ኮንሰልቲንግ በአካባቢ ተፅዕኖ ግምገማ ዘርፍ ላይ በአካባቢ እና ማኅበረሰብ ተፅዕኖ ግምገማ የድርጅት የማማከር አገልግሎት ላይ ደረጃ 1 የብቃት ማረጋገጫ ምስክር ወረቀት ስጥቷል። የባለሙያዎቹ ዝርዝር ተያይዟል።

ከሠላምታ ጋር

ሽፈራዉ ነጋሽ

የአካባቢና ማህበረሰብ ተፅዕኖ ግምገማና

የአካባቢ ፈቃድ መስጠት ዳይሬክተር ጀኔራል

Ref No : ፲፩/፲.፩/፵፯፯/፲፰
Date : 23/01/2018

CERTIFICATE OF COMPETENCE

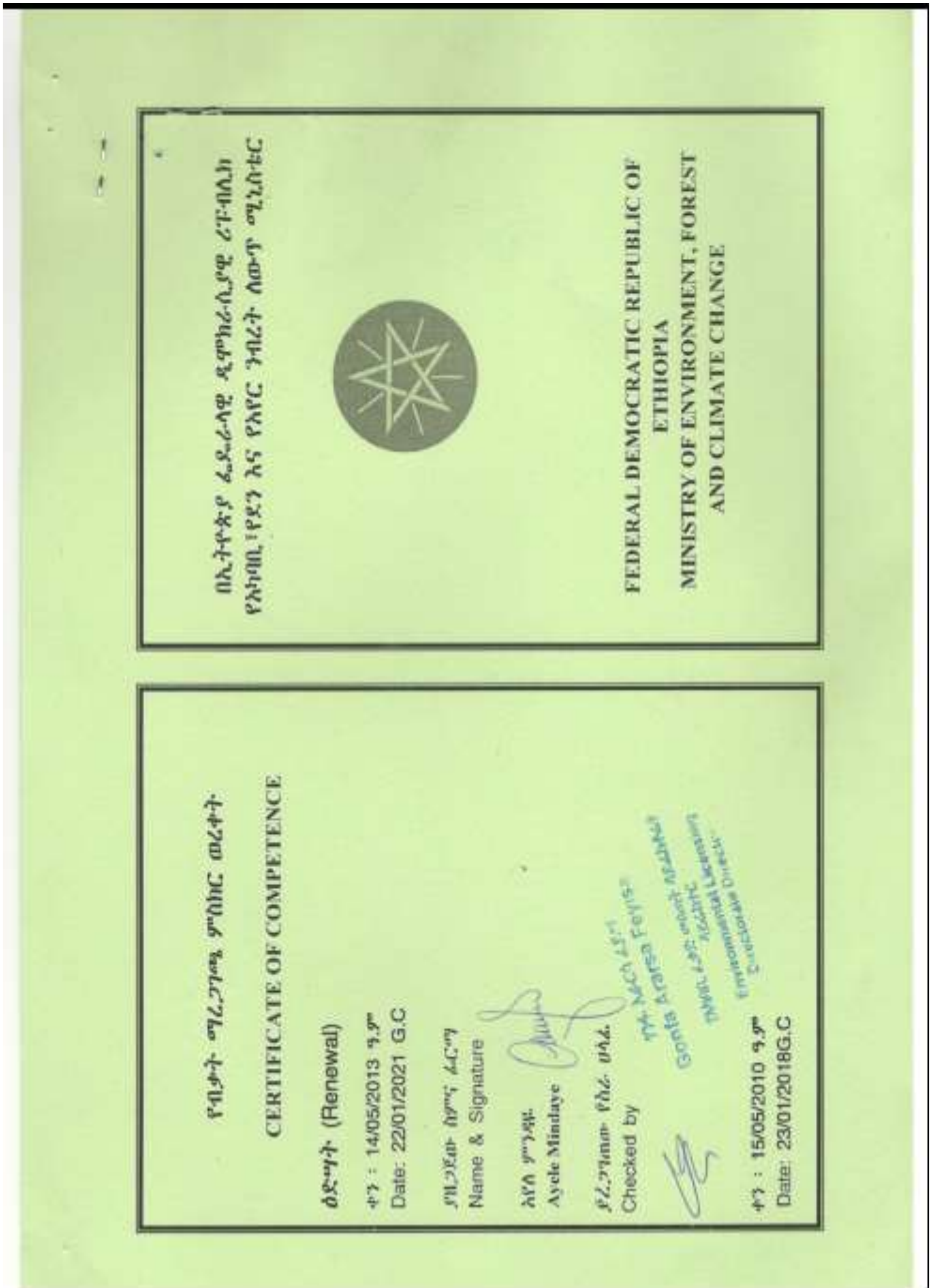
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE, BY VIRTUE OF THE POWER VESTED TO IT BY ENVIRONMENTAL COMPETENCE ISSUING DIRECTIVE NO **03/2017,** HAS ISSUED THIS CERTIFICATE OF COMPETENCE TO **BASAL CONSULTING** AS CONSULTANCY IN **ENVIRONMENTAL IMPACT ASSESSMENT AS ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT CONSULTING FIRM IN** CATEGORY OF **LEVEL 1 . LIST OF EXPERTS ARE ANNEXED WITH THIS CERTIFICATE.**

WITH REGARDS

Shiferaw Negash

Environmental and Social Assessment and Environmental Licensing

Director General



በኢትዮጵያ ፌዴራላዊ ዲሞክራሲያዊ ሪፐብሊክ
የአካባቢ፣የደን እና የአየር ንብረት ለውጥ ሚኒስቴር

FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

የብቃት ማረጋገጫ ምስክር ወረቀት

CERTIFICATE OF COMPETENCE

ዕድሳት (Renewal)

ቀን : 14/05/2013 ዓ.ም
Date: 22/01/2021 G.C

Name & Signature

Ayele Mindaye

Checked by

Gonfa Ararsa Feyisa
Environmental Licensing Directorate

ቀን : 15/05/2010 ዓ.ም
Date: 23/01/2018G.C

ለባሳል ኮንሰልቲንግ በአካባቢ እና ማህበራዊ ተፅዕኖ ጥናት ዘርፍ የአማካሪ ድርጅት የባለሙያዎች ዝርዝር

ተ/ቁ	የባለሙያዎች ስም	ደረጃ	የሚያማክሩበት ሙያ	ምርመራ
1	ማስረሻ ቸየ ሰፀ	ከፍተኛ አማካሪ	ኢኮኖሚያ ጉዳዮች ተንታኝ ባለሙያ	ጅሚ
2	የሸዋስ ጥጋፁ	ከፍተኛ አማካሪ	የማህበራዊ ጉዳዮች ተንታኝ ባለሙያ	
3	መኮንን ጌታሁን	ከፍተኛ አማካሪ	የአካባቢ ጤና ባለሙያ	
4	ሀብታሙ ማስረሻ	ከፍተኛ አማካሪ	የሙቀት አማቂ ጋዝ ልቀት ተንታኝ ባለሙያ	ጅሚ
5	ፕሀኝ ጌታቸው	ከፍተኛ አማካሪ	የብዝሀ ሕይወት እና የስርንተ-ምህዳር ተንታኝ ባለሙያ	
6	አሰፋ ተክሌ	ከፍተኛ አማካሪ	የውሃ ሀብት አጠቃቀም አጥኚ ባለሙያ	
7	መሳለ ባህረአብርሃ	ከፍተኛ አማካሪ	የአካባቢ ብክለት ተንታኝ ባለሙያ	

ከሰላምታ ጋር

አአ ሽፈራዉ ነጋሽ

የአካባቢና ማህበረሰብ ተፅዕኖ ግምገማና

የአካባቢ ፈቃድ መስጠት ዳይሬክተር ጀኔራል

በኢትዮጵያ ፌዴራላዊ ዲሞክራሲያዊ ሪፑብሊክ
የአካባቢ፣ የደንና የአየር ንብረት ለውጥ ኮሚሽን
The Federal Democratic Republic of Ethiopia
Environment, Forest and Climate Change Commission

ቁጥር 1ቢ.1/8314/13
Ref. No.
ቀን 22/6/2013
Date

ለሚመለከተዉ ሁሉ

ባዛል ኮንሰልቲንግ በቁጥር BC/039/2013 በቀን 17/06/2013 ዓ.ም በተፃፉት ደብደቤ ከኮሚሽን መስሪያ ቤታችን የተሰጣቸዉ የድርጅቱ እና የባለሙያዎች የብቃት ማረጋገጫ ምስክር ወረቀት ባለመታደሱ በስራ ላይ መቸገራቸዉን ገልያልናል።

በዚሁ መሰረት ኮሚሽን መ/ቤታችን የአካባቢና የማህበረሰብ ተፅዕኖ ግምገማ ጥናት የማማከር አገልግሎት ብቃት ማረጋገጫ ምስክር ወረቀት አሰጣጥ መመሪያዉን እያሻሻለ በመሆኑ፡-

1. የባዛል ኮንሰልቲንግ
2. የአቶ ሀብታሙ ማስረሻ
3. የአቶ ማስረሻ የቆየሰዉ
4. የአቶ የሽዋስ ጥጋቡ
5. የአቶ መኮነን ጌታሁን
6. የአቶ ገዛኸን ጌታቸዉ
7. የአቶ አሰፋ ተክሌ
8. የአቶ መሰለ ባህረ ፊታዳቸዉን ለማሳደስ አዲሱ መመሪያ እስክጸድቅ በመጠባበቅ ላይ የሚገኙ መሆናቸዉን እየገለፅን ቀደም ሲል በነበራቸዉ የድርጅቱ እና የባለሙያዎች የብቃት ማረጋገጫ ምስክር ወረቀት እንዲሰሩ የሚመለከታቸዉ አካለት ተገቢዉን ትብብር እንዲያደርጉለቸዉ እናሰዉቃለን።

ከሠላምታ ጋር

ሽፈራው ነጋሽ

የአካባቢና ማህበረሰብ ተፅዕኖ ግምገማና
የአከባቢ ፍቃድ መስጠት ዳይሬክተር ጀኔራል

☎ 251-(0)11-170-40 60
251-(0)11-170-40 39
ቴሌ ፋክስ
TELE FAX: 251-(0)11-170-4158/45
አዲስ አበባ፣ ኢትዮጵያ
Addis Ababa-Ethiopia
ፖ.ሣ.ቁ 12760
Website: www.mefcc.gov.et

Annex V: List of Contributor Experts from Basal Consulting and EPHI

List of Contributor Experts from Basal Consulting

1. **Masresha Koyesew,** Consultant in EIA Studies as Economic Affairs Analyses Expert (Professional Consultant)
2. **Yeshiwas Tigabu,** Consultant in EIA Studies as Social Affairs Analyses Expert (Professional Consultant)
3. **Mekonin Getahun,** Consultant in EIA Studies as Environmental Health Expert (Professional Consultant)
4. **Habtamu Masresha,** Consultant in EIA Studies as Gas Emission Control Analyst (Professional Consultant)
5. **Gezahegn Getachew,** Consultant in EIA Studies as Biodiversity and Ecosystem Analyses Expert (Professional Consultant)
6. **Assefa Tekle,** Consultant in EIA Studies as Water Resource Analyses Expert (Professional Consultant)
7. **Melese Bahireabrha,** Consultant in EIA Studies as Environmental Pollution Analyses Expert (Professional Consultant),
8. **Haregeweyn Haile Kassa,** Junior Consultant in EIA Studies as Water Resource Analyses Expert (Professional Consultant)

List of additional Contributor Experts from EPHI

1. **Yohannis Fetene** (BSc, MSc, MSc) Environmental and Social Safeguard Specialist, Individual Consultant, Africa CDC Regional Investment Finance Project, Ethiopian Public Health Institute, Addis Ababa, Ethiopia.
2. **Daniel Abera,** (BSc, MSc), Researcher, Ground water quality modeling expert, Ethiopian Public Health Institute, Addis Ababa, Ethiopia.
3. **Melaku Gizaw,** (BSc, MSc), Associate researcher, Environmental analytical chemist, Ethiopian Public Health Institute, Addis Ababa, Ethiopia.
4. **Mesaye Getachew,** (BSc, MSc), Associate researcher, Environmental chemist, Ethiopian Public Health Institute, Addis Ababa, Ethiopia.
5. **Moa Abate,** (BSc, MSc), Associate researcher, Occupation health and safety expert, Ethiopian Public Health Institute, Addis Ababa, Ethiopia.
6. **Yibeyin Mulualem,** (BSc, MPH, MSc), PHEM Officer, Environmental Engineer and Public Health Expert, Ethiopian Public Health Institute, Addis Ababa, Ethiopia.
7. **Abel Weldetinsae,** (BSc, MSc) Associate researcher, Environmental pollution and sanitation expert, Ethiopian Public Health Institute, Addis Ababa, Ethiopia.
8. **Anley Tadie** (BSc, MSc), Sanitary Engineer, Ethiopian Minster of Health, Addis Ababa, Ethiopia

Annex VI: Complaints Register Format

	Project Name_____							
	Complaints Register for_____							
No.	**Date Received**	**Name and Address of the complainant**	**Contact of the Complainant**	**Complaint Issue**	**Complain Channel**	**Date acknowledge**	**Action Taken**	**Complain status**

Annex VII: Complaints Summary Reporting Format

Complaints category/type (e.g service related, GBV/SEA, OSH, etc.	No. of complaints received	Main mode complaint lodged	No. of complaints resolved	No. of complaints pending	Comments
Recommendations for system improvement 1…… 2…… 3……					