PLP PROPERTIES LIMITED

(PROPOSED HAMPTON HOTEL)

PRELIMINARY ENVIRONMENTAL ASSESSMENT REPORT

FOR

PROPOSED 9 STOREY HOTEL PROJECT

AT THE AIRPORT – CAR PARK 5

IN THE LA DADE KOTOPON MUNICIPALITY OF THE GREATER ACCRA REGION.

Prepared By
GREEN RESEARCH ADVOCACY AND INITIATIVE

Table of Contents

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

Acronyms

EIA -	Environmental Impact Assessment
EPA -	Environmental Protection Agency
ISSER -	Statistical, Social and Economic Research
LI -	Legislative Instrument
GACL -	Ghana Airport Company Limited
GS -	Ghana Standards
PEAR -	Preliminary Environmental Assessment Report
PER -	Preliminary Environmental Report
PEMP -	Provisional Environmental Management Plan
STDs -	Sexually Transmitted Diseases

1.0 NON-TECHNICAL/EXECUTIVE SUMMARY

BACKGROUND

PLP Properties Limited (herein referred to as the "developer"), a duly registered company in Ghana under the Companies Act, 2019, (Act 896) and undertook this preliminary environmental assessment for it proposed 9 storey 170 guest/hotel rooms project through its assigned Environmental Impact Assessment (EIA) and development consultants, to document findings into a Preliminary Environmental Assessment Report (PEAR) or Preliminary Environmental Report (PER); to the Environmental Protection Agency (EPA) for review per regulation 9 of the Environmental Assessment Regulations 1999, (LI 1652) and sections 2(i) and 12 (1), Environmental Protection Agency Act, 1994, (Act 490) of the Environmental Protection Agency.

The cited section of the subsidiary legislation (LI 1652) requires that any proposed project or developments of this scope, to conduct a preliminary environmental assessment (PEA) to determine the likely environmental impacts of the proposed development within its immediate environment and propose mitigation and enhancement measures for all identified impacts where applicable for review and approval by the Environmental Protection Agency (herein referred to as "Agency" or EPA) and implementation by the developer.

In undertaking the PEA or PER, some identified regulatory and or legal, policy and administrative frameworks amongst others that are applicable to the proposed development include

- The Constitution of Ghana, 1992
- The Environmental Protection Agency Act 1994 (Act 490)
- The Environmental Assessment Regulations 1999 (L1 1652) and associated amendments
- Fees and Charges (Miscellaneous Provisions) Act 2022 (Act 1080)
- The Fire Precaution (Premises) Regulations 2003, LI 1724
- Workmen's Compensation Law, 1987, PNDCL 187
- Labour Act 2003 (Act 651)
- Persons with Disability Act, 2006 (Act 715)
- Local Governance Act 2016 (Act 936)
- Land Use and Spatial Planning Act, (Act 925) 2016

- Hazardous and Electronic Waste Control and Management Act, 2016 (Act 917) and associated subsidiary legislation
- Public Health Act, 2012 (Act 851)
- Local Governance Act 2016 (Act 936)
- Housing Policy and Ghana Building Code
- Ghana Environmental Quality Standards (precisely *Ghana Environment and Health Protection- Requirements for Ambient Air Quality and Point Source/Stack Emissions (GS: 1236, 2019); Ghana Environment and Health Protection- Requirements for Effluent Discharge (GS: 1212, 2019) Ghana Environment and Health Protection- Requirements for Noise Control (GS: 1222, 2018)).*

Construction Impacts

From the EIA, the following impacts were identified to be associated with the proposed development during the construction phase and these include;

- Air quality deterioration associated with dust impacts (airborne particulates, exhaust fumes) from construction activities at the project site;
- Alteration to the existing physical landscape and view of the project neighborhood as result of project implementation;
- Generation, management and disposal of construction solid and liquid waste from the presence of site workers and construction activities linked waste;
- Soil deterioration and exposure to erosion and possible contamination from excavation works, oil spillage and other sources;
- Site sanitation and related public health and safety issues (unsightly conditions, cholera, and malaria infestation) around the project site;
- Waste oil generation and oil spillage from onsite servicing of construction machinery and equipment
- Occupational Health and Safety issues (accidents, injury/ailments to workers);
- Unwanted social issues such as pregnancies and other sexually transmitted diseases (STDs), infectious diseases such as COVID-19;

- Vibration and noise nuisance in the project site due to use of construction machinery and equipment
- Traffic disruption and risk of accidents at the project site especially entry point and along haulage routes;
- Child labor and abuse of workers.
- Potential project-related fire outbreaks especially within the temporal store and construction office due to fire sources or electrical faults or poor adherence to instruction manual
- Use of crane and related risks and hazards

Operational phase impacts

From the EIA, the following impacts were identified to be associated with the proposed development under the operation phase and these include;

- Alteration to the physical landscape and aesthetic view of the project site;
- Occupational Health and Safety issues (accidents, injury/ailments to workers);
- Surface and groundwater pollution;
- Traffic disruption and risk of road accidents
- Noise nuisance from vehicles moving in and out of the project
- Possible emissions of noxious gases from vehicles resulting in poor air quality
- Underground water and soil contamination from percolation of wastewater
- Wastewater generation from project, management and disposal issues
- solid waste generation, management and disposal issues
- Infectious Diseases and related public health issues
- Waste oil generation from standby generator (proposed 1no. 500 kVA and disposal and related issues such as spillage and possible soil contamination
- Possible fire outbreaks

Environmental Monitoring

An estimated amount of Gh 116,000.00 is being proposed to facilitate environmental monitoring of identified parameters such as air quality, noise levels and occupational and public safety amongst others during the construction phase and drainage maintenance, waste management,

septic treatment system management, and fire amongst others and regulatory compliance reporting.

Provisional Environmental Management Plan

The major component of the PEMP will include the establishment of a Health Safety and Environmental team/project monitoring committee that will monitor and review the plan from time to time and for subsequent adoption. A Provisional Environmental Management Plan (PEMP) has also been proposed with an estimated average cost of Gh¢ 489,5000.00 to aid in the implementation of mitigation measures outlined in the report after year one of occupancy.

Stakeholder Consultations

The table below summaries key issues and area of consultations with relevant stakeholder. Since the project will be implemented within the Airport and overall authorization was given to the developer by the Ghana Airport Company Limited (GACL) and all structures belongs to them except the cars park

Stakeholder	Mode Of Engagement	Issues/Concerns Raised By Stakeholder	Response
		Regulatory And Government Institutions	
Environmental Protection Agency (EPA)	Registration of the proposed Project via the submission of Form EA1 to notify the Agency of the intention to develop the proposed project.	A formal request from EPA to submit the project's Preliminary Environmental Assessment Report, after site inspection.	Preliminary Environmental Assessment report compiled and submitted for review and approval.
Ghana National Fire Service (GNFS)	Formal application for Fire Assessment and permitting	Compliance with Fire prevention measures. Emergency arrangement for fire outbreaks. Fire Permit issued	Emergency Preparedness and Response Plan and fire plans. Developer to strictly adhere to recommendations and permit conditions
Works Department	Submission of required documents for review and approval	Planned inspection and Pay required statutory fees	Final design has been submitted
Physical Planning Department	Request for zoning status and land use policy for the proposed site	Zoning status is mixed use/commercial	Waiting for processing fee from them to proceed with the development and building permit
Ghana Airport Company	Formal engagement for the transfer of ownership and possession to the developer	None	Transfer completed

Ghana Civil Aviation	Request for height/air space safety permit	Airsapce safety/height zoning issued limits the project to 34.65 m	Project design height was confined to the allowable height

Conclusion

The proposed development will be developed in phases ie three (3) phases and the first and second phases when completed would have **170 Guest/hotel rooms** during the first two phases). The project had no pristine vegetation ie plants or fauna identified during the period of assessment as the site is common to the municipality and used as a car park. The proposed site shares common boundaries with an undeveloped land to the western end, airport road then car park to the eastern end, a car park to the northern end and an undeveloped/airport roundabout to the southern end.

The proposed development scheme, together with the mitigation, protection and enhancement measures will be implemented in such a manner that will significantly avoid adverse impacts on the environment and public health and safety.

2.0 INTRODUCTION

2.1 Background of Project

The Institute of Statistical, Social and Economic Research (ISSER, 2013) estimates that at least the country needs about 80,000 - 100,000 annual addition of housing units but supply is estimated at a mere 35% of the total amount needed. As the housing delivery rates have generally been very low and lagging in the face of increasing population growth rates and uncontrolled urbanization; this has been one of the major development problems faced by the successive governments of Ghana and the Municipal and District assemblies within cities, especially the Greater Accra region that is the national capital. These particularly are evident in urbanized areas such as the La Dade Kotopon Municipality which is said to be hundred per cent. While some impressive gains have been achieved in housing delivery through interventions involving the private sector, there still exists an imbalance between housing demand (whether temporary or long stays) and delivery.

In 2019 Nana Akuffo Addo led the administration's Budget Statement and Economic Policy presented by the Minister of Finance, announced an ambitious plan to establish a one (1) billion (GH¢ 1 billion) mortgage and housing finance to leverage private capital to provide affordable houses for the populace. The fund was aimed to expand access to housing and deepen the local mortgage and construction finance market to help bring down the housing deficit, which is estimated at 1.7 million units

It is against this backdrop that PLP Properties Limited (herein referred to as developer) proposes to develop a 9-storey hotel with 2-level basements on 0.48 acres of land within the Airport

Figure 1: Aerial View of the proposed development at the Airport

Figure 2: Frontal View of the proposed development at the Airport

2.2 Project Justification

The justification for the project is derived from the general lack of adequate hotel for travelers within close proximity to the Airport for clients. Also, the availability of basic utility, finances and required land size to implement the project.

Most importantly the uniqueness of the proposed location or site is ideal for the project conceptual design; coupled with the availability of labor within the Municipality and technology to implement the project.

2.3 Implementation Period and Auxiliary Facilities

The overall construction phase of the project is estimated to last more than thirty-six (36) calendar months The basement levels, ground and first three floors of the hotel are expected to be completed within the first twelve (12) months of construction (all things are equal). The project would have other ancillary facilities like potable pressurized water (hot and cold option), central air conditioning or centralized cooling system, electricity supply (to be augmented by solar energy – capacity yet to be determined), effluent waste treatment/septic treatment management system, connecting drainage stormwater drainage line and solid waste collection and holding area and

adequate car park at the ground floor. All guest rooms will have a motion-sensors to access the rooms as a security mechanism and access to be limited clients. The target for these types of rooms are the travelers and tourists are will be in the city for either a short or long stay. The construction coverage of the project on land will be 100% per cent for the basement levels and below 75 % for the super-structure with setbacks of about 6-20 feet, leaving enough space for sidewalks, greenery and emergency assembly areas, and utilities. The estimated population, at full occupancy of the project, would be about 170 persons for a total number of **170 no. rooms** with an estimated 1-person per 1-bedroom configuration (excluding 167 conference seater and 20 capacity gymnasium). The project when completed may have a functional 20 functional staff to manage the project. This project is expected to generate all sorts of waste during all phases of the project (from Construction and Occupancy Phases).

2.4 Objectives of Proposed Project

The main objective is general lack of adequate hotels for travelers within the Airport area especially in such close proximity to the international airport and generate profit from this investment while at the same time helping to reduce the housing deliver deficit, especially within the Municipality and capital.

Other objectives include the following:

- Design and implement 170 guest rooms in a 9-storey hotel project with 2 level basements
- Create conditions for economic activity that will provide employment opportunities and training skills for the unemployed within the vicinity.
- Providing improved temporal place of residences at the same time reducing the housing deficit within the Municipality

2.5 Purpose of the Preliminary Environmental Assessment

The Preliminary Environmental Assessment (PEA) as commissioned by PLP Properties Limited, is a legal requirement for the issuance of an Environmental permit to cover the construction and operations of a project compliant with regulations 9 (1) and (2) of the Environmental Assessment Regulations 1999, (LI 1652) and section 12 (1) of the Environmental Protection Agency Act, 1994, (Act 490). Regulations 9 (1) and (2) of the Environmental Assessment Regulations 1999, (LI 1652) provide that

(1) where the Agency upon consideration of an application decides that there is the need for a preliminary environmental assessment to be submitted in respect of the application, the Agency shall request the applicant to submit a preliminary environmental report on the proposed undertaking.

(2) a preliminary environmental report submitted under sub-regulation (1) shall contain details other than information submitted with the original application for the environmental permit and shall state specifically the detailed effects of the proposed undertaking on the environment.

Whiles section 12(1) of the Environmental Protection Agency Act, 1994, (Act 490) also provides that:

(1) The Agency may by notice in writing require any person responsible for any undertaking which in the opinion of the Agency has or is likely to have adverse effect on the environment to submit to the Agency in respect of the undertaking an environmental impact assessment containing such information within such period as shall be specified in the notice.

This is the primary environmental protection legal framework and its subsidiary legislation make it an offence to commence the operation of any project without an environmental permit as outlined in section 12 Environmental Protection Agency Act, 1994, Act 490; also, without, an EPA permit, it becomes illegal for any agency or department to solely issue permits or certificates for any project to be undertaken. In pursuance of the aforementioned enactments of the Environmental Protection Agency, PLP Properties Limited is submitting this Preliminary Environmental Report as an additional document for review and approval by the Agency. The period of assessment covered between 6th -10th February 2024.

The preparation and submission of the Preliminary Environmental Report (PER) is seen as a willingness of the developer to comply with legal requirements and also a demonstration of his commitment to be transparent and provide needed mitigation and management measures to identified and or anticipated environmental issues that are likely to occur as a result of implementation of the project. The developer believes that this assessment will present the company with the opportunity to recognize potential impacts (both negative and positive) as a

result of the implementation of the project and the necessary mitigation and management measures drafted to mitigate and manage such negative impacts on the host environment.

To wits, this PER documents likely impact, and alternatives and proposes mitigation and management measures to minimize, manage and or eliminate where possible such impacts likely to occur with the implementation of the proposed project as a requirement for the issuance of an Environmental permit and at the same time ensure sustainability of the proposed project.

2.6 Methodology for the Preparation of the Preliminary Environmental Report

The methodology for the preparation of the PER followed the EPA's Guidelines for EIA on development projects and format determined by the Agency. Site visits and other publications were consulted in connection with the collection, analysis, and presentation of baseline information on the demographic, socio-economic, environmental and physical characteristics of the project area.

2.6.1 Review of other relevant documents

Major documents reviewed include

- Documents from the project implementers on the scope and design, including
- District Progress Report for the La Dade Kotopon Municipal Area, 2020 Population and Housing Census;
- Drone and Satellite Images of the project area
- Field Observation of existing conditions within the project's area of influence, etc.
- And PERs of similar projects with the La Dade Kotopon area and other MMDAs.

2.7 Relevant Stakeholders Identified and Consulted

Stakeholders identified for the implementation of this proposed development are listed below and are being engaged to solicit their views and concerns on the proposed project and potential impacts that are likely to result from the project. The major stakeholders consulted include:

- Officials of the Environmental Protection Agency – Accra West Regional office
- La Dade Kotopon Municipal Assembly (Directors of the Spatial Planning Department –, Municipal Engineer's office) and the technical sub-committee of the Municipal Assembly
- Officials of the Ghana Civil Aviation Authority
- Ghana Airport Company Limited

- Lands Commission
- Ghana National Fire Service

2.8 Legislative, Regulatory and Institutional Framework

The proposed project to be executed would operate under the following key regulatory, legal and institutional/administrative frameworks. These include;

- The Constitution of Ghana
- Environmental Protection Agency Act, 1994 (Act 490);
- Ghana Environmental Assessment Procedures (1995);
- Environmental Assessment Regulations, 1999 (LI 1652);
- Fees and Charges (Miscellaneous Provisions) Act 2022 (Act 1080)
- Ghana Environmental Quality Standards, 2019 *(Ghana Environment and Health Protection- Requirements for Ambient Air Quality and Point Source/Stack Emissions (GS: 1236, 2019), Ghana Environment and Health Protection- Requirements for Effluent Discharge (GS: 1212, 2019), Ghana Environment and Health Protection- Requirements for Ambient Noise Control (GS: 1222, 2018))*
- The National Environmental Policy, 2013
- The National Environmental Sanitation Policy date April 2010
- Nation Urban Policy Framework and Action Plan, 2012
- Factories, Offices and Shops Act, 1970 (Act 328);
- Occupational Safety and Health Policy for Ghana (Draft 2004);
- National Workplace HIV/AIDS Policy;
- Labor Act, 2003 (Act 651);
- Ghana Civil Aviation Authority, 2004 (Act 678) and associated subsidiary legislation
- Fire Precaution (Premises) Regulations, 2003 (LI 1724);
- National Disability Act, 2006 (Act 715);
- Governance Act, 2016 (Act 936)
- Workmen's Compensation Law 1987, PNDCL 187
- Public Health Act, 2012 (Act 851)
- Persons with Disability Act 2006 (Act 715)
- Land Use and Spatial Planning Act, 2016 (Act 925)

- Hazardous and Electronic Waste Control and Management Act, 2016 (Act 917)
- Ghana Building Codes

2.8.1 The Constitution of Ghana, 1992

The constitution makes provision in Article 36 section (9); that the State shall take appropriate measures needed to protect and safeguard the national environment for posterity; and shall seek cooperation with other states and bodies for purposes of protecting the wider international environment for mankind. Again, Article 41 (k) of the constitution mandates every citizen to protect and safeguard the environment. PLP Properties Limited is obligated by these constitutional provisions to take all necessary steps to protect and safeguard the environment of its investment as it forms part of the larger environment of the country.

2.8.2 Environmental Protection Agency Act, Act 490

The Environmental Protection Agency (EPA) Act 1994 (Act 490) of parliament mandates the Agency to ensure all investments and undertakings fully comply with laid down Environmental Assessment (EA) procedures in the planning and execution of development projects, including compliance in respect of existing ones before the Act came to force. PLP Properties Limited has complied with this Act by submitting the required documents including this PER of its intended project to the EPA office for review and approval.

2.8.3 Ghana Environmental Impact Assessment (EIA) Procedures and Environmental Assessment Regulations

Regulation 9 (1) and (2) of the Environmental Assessment Regulations of 1999 (LI 1652) enjoins any proponent or person to register their undertaking with the Agency and obtain an Environmental Permit before the commencement of the project...

2.8.4 National Urban Policy Framework and Action Plan (2012)

The goal of the National Urban Policy (NUP) is to promote a sustainable, spatially integrated and orderly development of urban settlements with adequate housing, infrastructure and services, efficient institutions and a sound living and working environment for all people to support the rapid socio-economic development of Ghana. The proposed apartment project together with other components of the Airport city car park Area feeds into the general policy framework of the Airport plan.

2.8.5 Ghana Environmental Quality Standards

The existing Ghana Standards amongst other things are to help regulate the environment and also protect public health from pollution from the air, effluent, and noise. Primarily these Ghana Standards apply to this project include:

a) *Ghana Standards for Environment and Health Protection- Requirements for Ambient Air Quality and Point Source/Stack Emissions (GS: 1236, 2019)*

PLP Properties Limited has complied with the requirements of this Standard, by undertaking monitoring of the ambient air quality levels. To this end, ambient air quality monitoring undertaken was to establish the PM_{10} and $PM_{2.5}$ values for the proposed project site

b) *Ghana Standards for Environment and Health Protection- Requirements for Effluent Discharge (GS: 1212, 2019)*

PLP Properties Limited, again, is required to comply with the requirements of Ghana Standard 1212, 2019 by monitoring the components of effluent discharge from the proposed project. This could not be undertaken as there is neither effluent nor water source within proximity to the site at the time of assessment. Therefore, the assessment could not monitor the effluent discharge of the existing project as there was none.

c) *Ghana Standards for Environment and Health Protection- Requirements for Noise Control (GS: 1222, 2018)*

PLP Properties Limited is again required to comply with the dictates of the Ghana Standard, 1222 on Ambient Noise control. That is ambient noise should be within the stipulated or permissible level of 55 dB(A) for daytime and 48 dB(A) for nighttime as per the zoning scheme of the proposed site. Also, ambient noise levels were monitored during the assessment

2.8.7 Fees and Charges (Miscellaneous Provisions) Act, 2022, Act 1080

The Fees and Charges (Miscellaneous Provisions) Act 2022, Act 1080, Act gives regulation to fees and charges (miscellaneous provisions). The law provides a comprehensive rate, fees and charges collectable by Ministries, Departments, and Agencies (MDAs) for goods and services delivered to the public to be paid by proponents concerning Environmental Permits and Certificates to be issued by the EPA.

2.8.8 Factories, Offices and Shops Act

The Factories, Offices and Shops Act of 1970 (Act 328) requires all proponents to register every workplace with the Chief Inspector of Factories Inspectorate Division. The Act makes provision for the notification of accidents/dangerous occurrences including safe passages and the prevention of fires etc. Some aspects of the project may be regulated by this act when the project becomes operational

2.8.9 Fire Precaution (Premises) Regulations, 2003 (LI 724)

The Fire Precaution (Premises) Regulations 2003 (LI 1724) requires all premises intended for use as workplaces to have Fire Certificates. PLP Properties Limited is in the process of acquiring the fire permit as all fire-related drawings and reporting have been submitted to the GNFS for vetting and approval.

2.8.10 Land Use and Spatial Planning Act, 2016 (Act 925)

This is an Act to revise and consolidate the laws on land use and spatial planning, provide for sustainable development of land and human settlements through a decentralized planning system, ensure judicious use of land to improve quality of life, promote health and safety in respect to human settlements and to regulate national, regional, district and local spatial planning, and generally to provide for spatial aspects of socio-economic development and related matters.

2.8.11 Local Governance Act 2016 (Act 936)

The Local Government Act, 936 gives responsibility to Metropolitan, Municipal and District Assemblies (MMDAs) to enact and enforce bye-laws and implement government policies on the environment at the local level. The La Dade Kotopon Municipal Assembly has jurisdiction over the project area. The Assembly envisions a well-planned and developed municipality in which the inhabitants will enjoy the benefits of modernization and higher living standards, efficient services within a conducive socio-economic and physical environment. The developer's team of experts have begun engagement with the Municipal Assembly and an approval in principle presentation was carried out to enable the Assembly to make input into the final design and implementation of the proposed project)

2.8.12 Persons with Disability Act, 2006 (Act 715)

The act provides for the rights of disabled persons per Article 29 of the 1992 Constitution to establish a National Council of Disabled Persons to attend to the interests of disabled persons and

to provide for related matters. One of which includes making areas accessible to persons with disabilities in every development. The proposed project took into consideration persons with disabilities during the project design and will be strictly followed so that persons with disabilities can access amenities made available through the proposed project. Such designs include designated car parks among the surface car park, easy walkways for persons with disabilities and the use of a specially designed elevator that allows them to use easily.

2.8.13 Workmen's Compensation Law, 1987

The law holds employers responsible for the payment of compensation to workmen for personal injuries caused by accidents arising out and in the course of their employment. PLP Properties Limited will be required to comply with this law during the construction and operational phases of the proposed project.

2.8.14 Labor Act 2003, Act 651

Section 118(1) of the Labor Act 2003 (Act 651) stipulates that an employer must ensure that every worker employed works under satisfactory, safe and healthy conditions. PLP Properties Limited will be required to comply with this law during the construction and operational phases of the proposed project.

2.8.15 Ghana Civil Aviation Authority, 2004 (Act 678)

Section three (3) subsection 1 paragraph (h) and (o) of the GCAA, 2004 (Act 678) states that the Authority is responsible for ensuring the safety of air navigation and aircraft and taking measures for the prevention and investigation of civil aircraft accidents. The height requirement for the proposed project based on their assessment was 55m which is suitable for the current project design height (see Appendix 5 for evidence of Consultations -Airspace safety permit from the GCAA)

3.0 DESCRIPTION OF THE PROJECT

The proposed development is a ten-storey hotel facility. The development will also include facilities such as a swimming pool, gym, conference center, business center, roof bar and an administration. These facilities will be for the exclusive use of residents and not for commercial purposes. The floors are accessible via staircase and a lift. The dimension of the proposed development is about 36m high by 40m long.

3.1 Project Location

The site is located at the visitor's car park opposite to Terminal 2 of the Kotoka International Airport and has an immediate frontage to Airport Road. The surrounding area generally slopes from east to west. The location is bounded by the Ghana Airport car park 3 and Airport Road (refer to Figure 3). From the airport road, the terrain slopes gently with an estimated elevation difference of about 2.0m. At the time of conducting this investigation, the site was serving as a car park. As earlier indicated the proposed site falls within the Airport city car park 3 Area plan and would share boundaries with undeveloped land and airport roundabout to the southern end, undeveloped land to the western end, airport road then car park to the eastern end and a car park to the northern end. The western end is generally undeveloped with secondary vegetation. The project falls within geographical coordinates on **NW 5°36'24.36"N, 0°10'24.43"W, NE 5°36'23.80"N, 0°10'22.69"W, SE 5°36'22.61"N, 0°10'23.11"W and SW 5°36'23.13"N, 0°10'24.84"W**

Figure 3: Project Aerial View of Site.

Figure 4: Project Aerial View of Site.

3.1.1 Current Activities of Project Site

A visit to the proposed project site during the environmental impact assessment and environmental quality monitoring period particularly a visit to the site on the 10th February 2024 revealed that there were no construction activities on the site. The site is currently being used as a car park

3.1.2 Design Scope, Planning Scheme and Components

The PLP Properties Limited project assign the ground floor to be used as parking for about **12 cars** per design specifications (according to the ground floor designs see Appendix 1 – for architectural plans). At completion, the proposed project would have one hundred and seventy guest rooms/hotel rooms as its total number of rooms of varying configurations ranging between single, twin, king, long stay and queen guest rooms.

The layout plan was prepared by Erga Group, a private international architectural company in collaboration with Living Spaces Consult who are in good standing with the Ghana Association of Architects and vetted by officers from the Physical Planning and Works Departments of the

Assembly (see architectural drawings) and other members of the technical sub-committee of the Assembly. The proposed project would comprise of the following configurations as shown in Table 1 below and Figures 6 and 7 for the 3D rendering of the proposed project.

Table 1: Proposed Configuration of Apartments

S/N	FLOOR CONFIGURATION	NUMBER OF PARTING
	Basement 2	Water treatment area, pump room, laundry washrooms
	Basement 1	Front desk with lobby, kitchen, utility rooms, waste holding area
1	Ground Floor	Guest Rooms -4, Conference Room – 1 (169 seaters), Offices-2 Control & IT/CP Room-1, Storage & Retail Room, Pre-Function room -1, utility rooms, & Administration-1-Kitchen & Service Area and Washrooms
2	First Floor	Guest Rooms-16, Pool Deck-1, Gym-1, Electrical & Service H. Keeping-1, Changing Rooms-2, Towel Storage & Towel Dispense-2, Main LC Room-1, Pool-1, Storage Rooms-2, Juice Bar-2.
3	Second Floor	Guest Rooms-25, Accessible Rooms-2, Electrical &Service H. Keeping-1
4	Third-Seventh Floor	Guest Rooms-25, Accessible Rooms-2, Electrical & Service H. Keeping-1
5	Roof Floor	Technical, Electrical Room-1

3.2 Stages of Development and Implementation Phases

The proposed project would have three (3) implementation phases that are pre-construction, construction and operation phases. However, impacts associated with the pre-construction phases would be insignificant compared to the constructional and operational phases. Therefore, this report focused on the significant impacts associated with the construction and operation phases as listed in the next section.

3.2.1 Construction Phase Activities

Construction of the estate will involve the following activities:

i. Preparation site
ii. Construction of site offices and stores;
iii. Construction utility services.
iv. Construction of basement components
v. Construction of the 51 no. apartments (superstructure) with ancillary facilities.

vi. Roofing, fixing of doors and windows

vii. Wiring, fixing of plumbing fitting etc

viii. Plastering and painting

ix. Fixing of all other fixtures and furniture

x. Landscaping

3.3 Material Requirements

A wide range of materials will be used in various construction activities. Some of these will be obtained locally whiles others may be imported when they are not found on the local market. The materials needed and the sources of supply are shown in Table 2 for a list of other material requirements.

Table 2: Construction Materials Requirements and sources

S/N	MATERIALS	SOURCE
1.	Cement	GHACEM/Dangote/European brand
2.	Electric Poles and Cables	Local Market/Europe
3.	Sand and gravel	EPA Designated Sites
4.	Stones	EPA Designated Quarries/Europe
5.	Pipes and Conduits and Iron Rods	Local Market
6.	Cement boards	Europe
7.	Double glazed	Local market/Europe
8.	Handheld and powered Cutting machines	Europe
9.	Concrete buckets, halogen fixture, construction glow	Europe
10	Mobile and stationary Cranes	Local

3.4 Machinery and Equipment Requirement

The following machinery and equipment will be needed during the construction phase of the project. Although other machinery would be needed most of them would be rented as and when they are needed.

Table 3: Machinery and Equipment Requirements and Sources

Type Of Machine	Number	Year Of Manufacture	Capacities	Source
Dozer	2	2019	N/A	Local Market
Backhoe	1	2019	6-8 m^3	Local Market
Trucks /dumpers	5	2020	18m^3 – 20m^3	Local Market
Grader	1	2019	N/A	Local market
Concrete mixer trucks	2	2019	4-10m^3	Local Market
Pedestrian roller	2	2019	N/A	Local Market
Pick up vehicles	5	2022	5 persons	Local Market

3.5 Workforce Requirement

The construction works will engage the services of highly qualified contractors, thirty-eight (38) skilled artisans and unskilled laborers during the construction phase. The maintenance department of the company will manage the project during the operational phase. The breakdown of the labor requirement has been broken down in the table below.

Table 4: Workforce Requirement

STAFF	NUMBER
Site Manager/Engineers	1
Health and Safety Specialist	1
Architect and M&E specialist	2
Surveyor and assistants	3
Foremen, Skilled Artisans and unskilled labor	28
Security	3
TOTAL	**38**

3.6 Infrastructure and Utilities

3.6.1 Power Supply

The project will be supplied with electricity from the National Grid that runs along the road and within the other components of the Airport car park Area. Consultations with the Electricity Company of Ghana when the project management team constitutes and roles will be assigned to complete assessment and supply of electricity to the project once completed. Although there exist street lights in the project area, additional aluminum or hot dip galvanized tubular steel columns would be mounted on the project site to prevent accidents on-site at night. The project is estimated to need about 500 kVA during the operational phase. There are considerations to augment electricity supply through solar harvesting or renewable sources as shown in the design picture below.

3.6.2 Water Supply

Water to the site for construction purposes and maintenance of the development during the operational phase will mainly be from the Ghana Water Company Limited (GWCL). Water supplies from the GWCL already exist in the area. The project will explore rain harvesting to augment the water supplied by GWCL in addition to overhead water storage tanks.

3.6.3 Provision of Fire Hydrant

There are provisions for the construction of two (2) fire hydrant for the project to be located at the eastern and western ends of the site.

3.6.4 Provision of Parking lots and vehicular movement/circulation

As earlier indicated the proposed project has made provisions for adequate car parking lots for the occupants and visitors of the project. An estimated parking lot of about 12 cars have been proposed for the project. The design of entry and exit will be from the Airport Road. See below for transport circulation within the project.

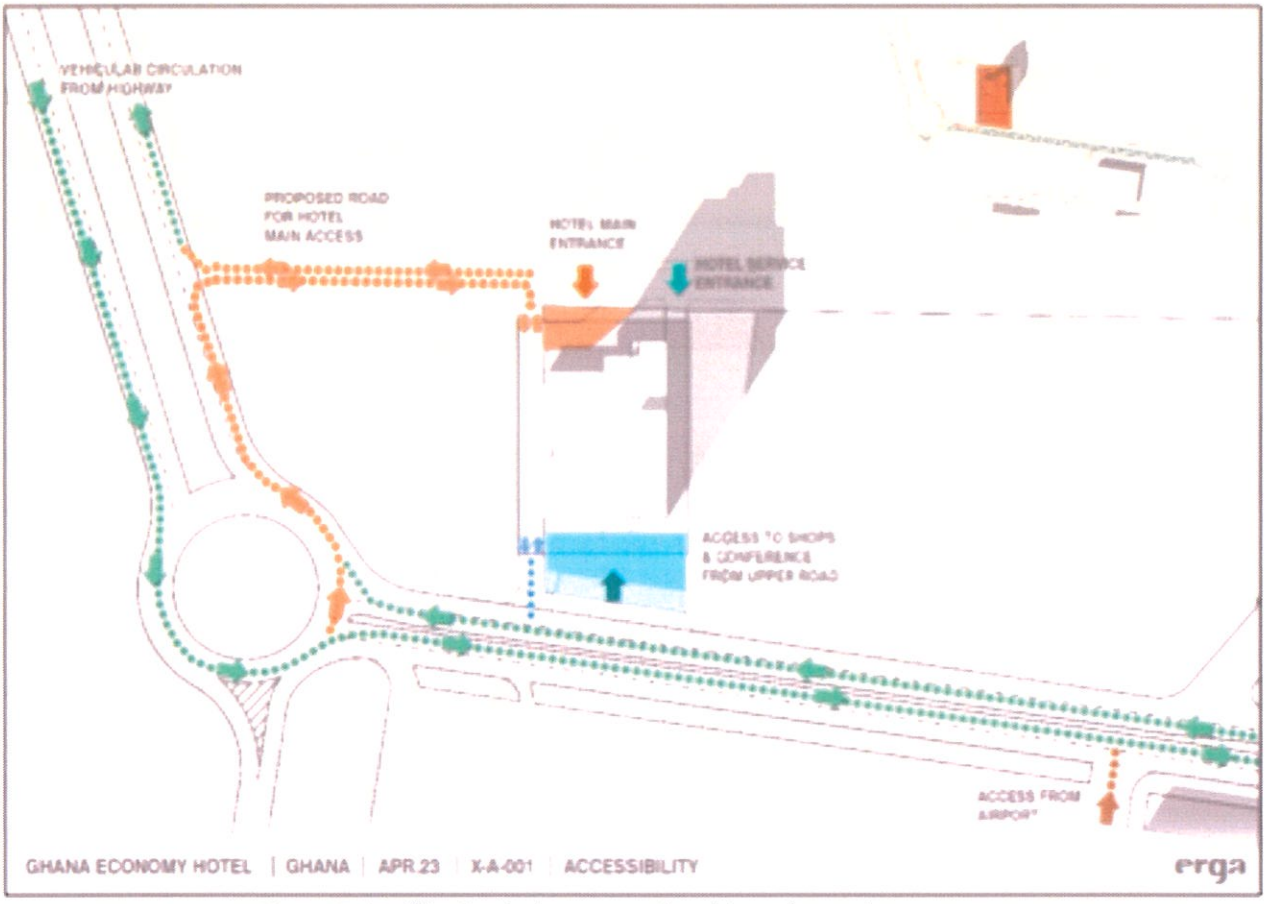

Figure 5: Traffic circulation around and into the project

3.6.5 Provision of Security

The proposed development will be fenced with security posts at both the entry and exit of the project which is the western end and eastern ends entrances.

3.7 Organizational Structure and Management

The proposed project or development organization and management structure for the implementation of the proposed development is shown in the diagram below.

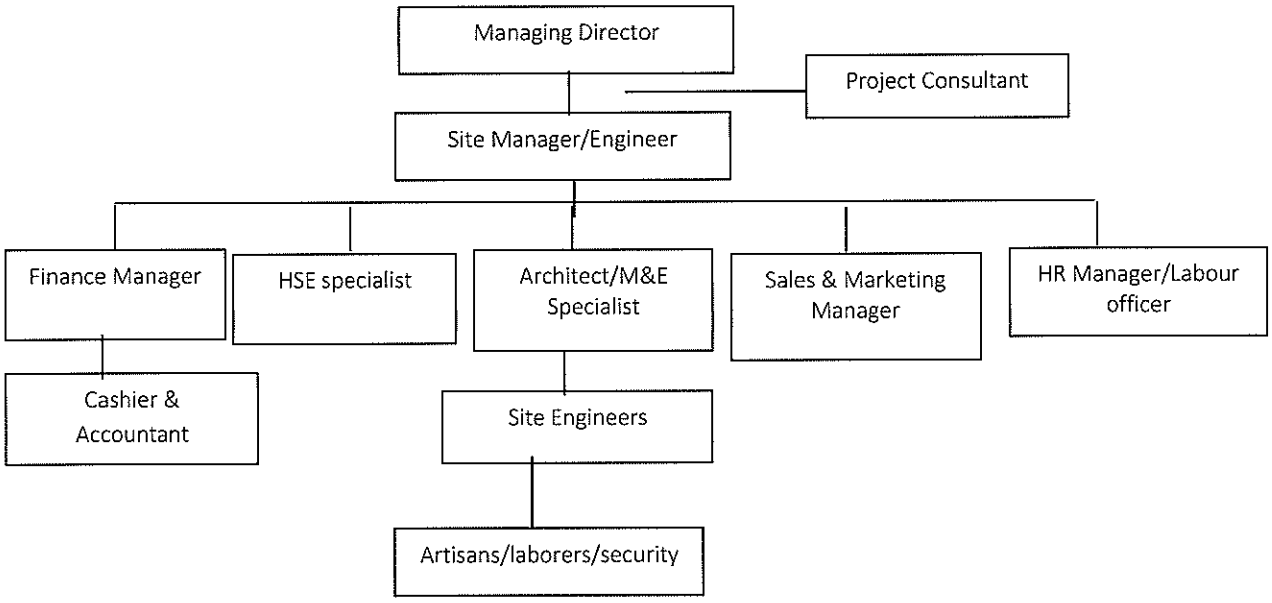

Figure 6: Proposed organogram for the construction phase

4.0 BASELINE CONDITIONS OF PROJECT ENVIRONMENT

The section will focus primarily on the environmental baseline of the proposed site. Baseline information will be limited to key features of the project environs that will be directly and indirectly affected by the project and it will cover areas such as ambient air quality, ambient noise levels, fauna and flora, and soil characteristics. This chapter generally provides information on nature as well as the characteristics of the physical environment.

4.1 Project Area of Influence

Though the assessment considered roads to be used by incoming haulage trucks to the proposed site and outgoing vehicular from the same, the project area of influence will mainly cover the proposed site and neighborhood (50m radius). Specifically, the project area of influence will be limited to:

- structures within 50 m distance. These excluded roads likely to be influenced by the proposed project as haulage material routes.

4.1.1 Project Traffic Influence

The delivery of construction materials delivery trucks may likely affect traffic movement from Airport Road onto the Airport bypass extension.

4.2 Land Use Zoning

The project site is located at the visitor's car park 5 close to Terminal 2 of the Kotoka International Airport (KIA) planning scheme area and the proposed site is zoned as mixed-use/commercial as per the Kotoka International Airport Area Scheme **(PPD/ACC/N/SEC4/KIA/78/1)** and approved by the La Dade Kotopon MA as the site is suitable and adequate for the proposed project. This zoning is also affirmed in the lease agreement letter referenced **((GACL/CSD/LRE/22/155)** from the Ghana Airport Company Limited as commercial. Therefore, the site is compatible with the proposed development by PLP Properties Limited.

Figure 7: Land-use Plan of Airport Area

LA DADE-KOTOPON
MUNICIPAL ASSEMBLY (LaDMA)

GPS: GL-036-3194

REPUBLIC OF GHANA

Ref: LaDMA. 08/10/04

Date: 31st January, 2024

CORPS GREEN ENTERPRISE
OSU LA CRESCENT STREET
OSU – ACCRA

Dear Sir,

RE: REQUEST FOR ZONING STATUS COMMENTS

Your dated 29th of January, 2024 on the above refers.

We write to inform you that the land use zoning for the site is **mixed use commercial as per the Kotota International Airport Area Scheme (PPD/ACC/N/SEC4/KIA/78/1).**

We wish to note also that site is suitable and adequate for the propose project.

Please find attached an extract of the site.

A.F. MOMPI
MUNICIPAL PHYSICAL PLNG. OFFICER
FOR: MUNICIPAL CHIEF EXECUTIVE

Adjacent Trade Fair Centre La-Accra. P. o box 395 La-Accra Tel: 0302765187/0272007081 http://ladma.gov.gh

Figure 8: Land-use Plan/zoning comment from Physical Planning Department of LaDMA

4.3 Geology of the Project Area

The geology of the LaDMA is broadly made up of four main groups: drift materials resulting from deposits by windblown erosion; alluvial and marine muted clays of comparatively recent origin derived from underlying shale; residual clay and gravel derived from weathered quartzite, gneiss and schist rocks, and lateritic sandy clay soils derived from weathered Accraian sandstone bedrock formations. The coastline of La Dade-Kotopon has a series of resistant rock outcrops, platforms, and sandy beaches near the mouth of the Kpeshie lagoon. The coastline is exposed and because of the proximity of the continental shelf and strong coastal wind action, it is subject to severe erosion. The relatively small lagoon systems and flushing, have been impeded by siltation or the construction of embankments, which have restricted tidal flow. Results from the geotechnical studies conducted on the site show that the area is underlain by the ancient igneous and metamorphosed rocks, with the relatively younger rocks and their weathered components of the Accraian Formation situated on top of these older rocks. The local geology is the Dahomeyan schist as revealed by geological boring during the geological investigation/studies. The rock head is generally encountered around 8.0m to 10.5m below ground surface. This rock is seen as low strength, reddish brown, dark grey, yellow and light grey (mottled), extremely to highly weathered SANDSTONE. It extends to a depth of about 14.5m below ground surface. A layer of low to medium strength, dark to greenish grey with yellow and reddish-brown patches, highly to moderately weathered, highly fractured, SCHIST was encountered from 10.5m to 30m where the drilling was stopped. This is a product of the Togo series, one of the geological formations found in Accra.

4.4 Flora and Fauna

The original vegetation of the project area has been altered severely human factors. The vegetation types in the proposed area for the project had been affected over the years by anthropogenic factors as there was no vegetation on site.

4.5 Metrological Data

Meteorological data was collected and analyzed as part of the hydrologic assessment. Some of the data includes the following:

- Temperature
- Rainfall

- Wind speed
- Wind Direction

4.5.1 Temperature

The mean monthly temperature within the project catchment ranges from 23°C to 33°C. The lowest monthly temperatures recorded for the project area occur during July and August due to cloud cover and in December as a result of cool northeast trade winds. The highest monthly temperatures are recorded in March when the sky is devoid of cloud cover. On the annual scale, the maxima temperature ranges between 30°C and 32°C and the minima between 23°C and 25°C.

4.5.2 Rainfall

The annual rainfall in the project catchment ranges from 300mm to 1600mm with a mean annual rainfall of 1000mm. The Trend of the maximum 24-hour annual rainfall distribution from 2011 to 2020. The mean maximum 24-hour rainfall is 187.3mm. From the maximum 24-hour rainfall distribution within the last decade, the highest daily rainfall was recorded in 2015 and the least in 2013. Within the last five years, the daily maximum rainfall remained relatively stable except in 2019 which gained 69.9mm daily rainfall above the average. The mean 24hr, Monthly rainfall distribution shows a bi-modal rainy season, the heavy rains start from February to July and the lesser one from September to November. The dry season falls from December through to January. The driest month is January followed by December. The wettest month is June. The bar chart in Figure 8 below shows the mean 24-hour monthly rainfall distribution in the project catchment. The monthly rainfall trend from 2011 to 2020

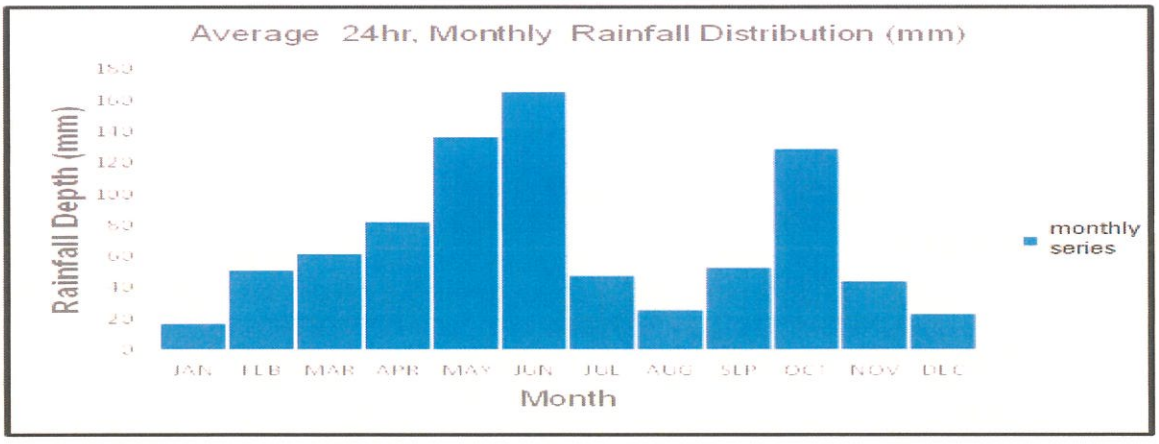

Figure 9: Monthly rainfall trend in mm for Accra 2011 – 2020 (Source: processed from Ghana Meteorological Agency (GMet)).

Table 5:Summary of the result of rainfall intensity -duration-frequency relation (Source: processed from Ghana Meteorological Agency (GMet))

ACCRA	Return Period, Yrs						
Duration (hr)	2	5	10	25	50	100	1000
0.1	138.82	197.34	236.09	285.06	321.38	357.42	376.11
0.2	87.45	124.32	148.73	179.57	202.46	225.16	330.86
0.3	66.74	94.87	113.50	137.04	154.50	171.83	295.49
0.4	55.09	78.32	93.69	113.12	127.54	141.84	267.06
0.7	37.94	53.93	64.52	77.90	87.82	97.68	207.60
1	29.91	42.52	50.86	61.41	69.24	77.00	170.08
2	18.84	26.78	32.04	38.69	43.62	48.51	106.72
3	14.38	20.44	24.45	29.52	33.29	37.02	78.08
6	9.06	12.88	15.40	18.60	20.97	23.32	43.64
12	5.71	8.11	9.70	11.72	13.21	14.69	23.46
24	3.59	5.11	6.11	7.38	8.32	9.26	12.34

4.5.3 Wind Direction

The daily wind direction at the project area largely oscillates between Southwest (SW) and Northwest (NW) during the rainy season and less in the dry season. Careful analysis of the data shows that the main directions are South-Westerly (SW), Westerly (W), and North-Westerly (NW). South-Western is the highest and North-western (NW) is the least. The wind rose in Figure 18 below shows the wind direction distribution of the proposed site.

4.5.4 Wind Speed

The average wind speed for Accra in the last 10 years is 8 knots (14 km/h), with a variation between 6.5 and 9 knots (12 – 16 km/h). On average, the highest wind speeds have been measured in July – September. Wind speeds in the project catchment are generally more than 5 knots (9km/h). The 24hr, monthly wind speed distribution at the project area is shown in Figure 10 below.

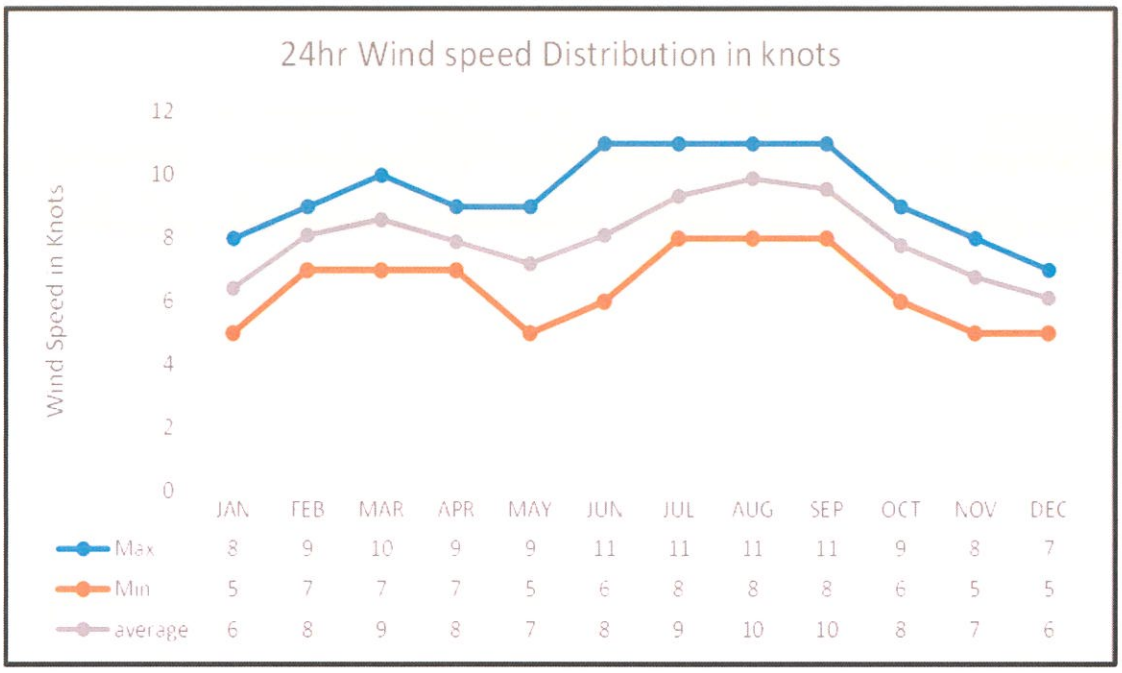

Figure 10: Maximum, Minimum and average 24hr, monthly Wind speed Distribution (Source: processed from Ghana Meteorological Agency (GMet))

4.6 Environmental Quality Monitoring

The PEA team carried out environmental quality monitoring to ascertain the air quality and noise levels within the site. The monitoring exercise was carried out in line with Ghana Standards on air quality and noise levels Ghana Environment and Health Protection- Requirements for Ambient Air Quality and Point Source/Stack Emissions (GS: 1236, 2019) and Ghana Environment and Health Protection- Requirements for Noise Control (GS: 1222, 2018). All four (4) sample points were monitored.

Table 6:Sampling Location – Air & Noise

S/N	Sampling Sites	Lat.	Long.
1.	**Point 1(North-Eastern)**	5°36'24"	0°10'24"
2.	**Point 2 (North-Western)**	5°36'23"	0°10'22"
3.	**Point 3 (South-Eastern)**	5°36'23"	0°10'24"
4.	**Point 4 (South-Western)**	5°36'22"	0°10'23"

Source: Fieldwork on 10th February 2024

4.6.1 Ambient Air Quality

The particulate matter ($PM_{2.5}$ and PM_{10}) and ambient noise levels were monitored at the Site on 10th February 2024. Particulate matter was sampled using a MiniVol air sampler; set to a flow rate of 5 L/minutes at the monitoring sites, in line with EPA's site selection criteria. Samplers were placed at a minimum height of 5 meters above ground level to prevent the collection of ground-level dust temporarily made airborne by gusting winds. Pumped air was siphoned through a quartz filter paper, mounted in the sampling unit, and sampling was undertaken for 24 hours at each sampling site/location. The quartz filter paper was stabilized for a minimum of 24 hours before and after sampling in a desiccator.

Table 7: Results of Air Quality Assessment ($PM_{2.5}$(µg/m^3) and PM_{10}(µg/m^3))

S/N	Sampling Site	Particulate Matter		GS-MPL, Ambient Air (GS 1236:2019)	
		PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
1.	**Point 1**	67.35	33.75	70.0	35.0
2.	**Point 2**	66.09	32.98		
3.	**Point 3**	74.23	37.11		
4.	**Point 4**	77.50	38.03		

Source: Fieldwork on 10th February 2024

The particulate matter concentrations of $PM_{2.5}$ recorded on the site were between 4.0 µg/m^3 to 8.0 µg/m^3. That is to say that values obtained during the monitoring exercise were very low and within the Ghana Standard limits i.e., 35 µg/m^3 for all sampled locations. Also, the concentrations of PM_{10} recorded at the same monitoring locations were within the standard limits i.e., 70 µg/m^3 and the values obtained ranged between 8.57 µg/m^3 to 13.04 µg/m^3 for both SO_2 and NO_2 respectively. Although the particulate matter was very low, ambient gaseous concentrations were somewhat high for both SO_2 and NO_2 probably due to proximity to the busy Airport Road. The volatile organic compound for the sample point in proximity to the Shell fuel station was also monitored. See Table 8 below for mean values.

Table 8:Fenceline Gases – NO2 & SO2

S/N	Sampling site	Parameters/Concentration	
		NO_2 (µg/m^3)	SO_2 (µg/m^3)
1.	Point 1	9.62	17.56
2.	Point 2	8.57	16.40
3.	Point 3	12.29	19.52
4.	Point 4	13.04	21.03
		GS-MPL Ambient Air (GS 1236:2019)	
		150.0*	150.0*

Source: Fieldwork on 10th February 2024

4.6.2 Ambient Noise Levels

The site selection procedure adopted was based on the Ghana Standards for health protection Requirement for noise control (GS1222:2018), Ghana Standard for Acoustic Guide for measurement of outdoor A-Weighted Sound levels (GS1253:2018), and International Best Practices including IFC Guidelines. A decibel (dB) is a unit for the measurement of noise levels. The zero on a decibel scale is at the threshold of hearing. The lowest sound pressure that can be heard: 20 dB is a whisper, 40 dB the noise in a quiet office, 80 dB is the level at which sound becomes physically painful. Ambient noise level measurements/recordings will be taken using a 3M High Precision Integrated Data Logging Sound Level Meter, Model Type 1 and Quest High Precision Integrated Data Logging Sound Level Meter, Model Type 1, which are compliant with ANSI S1.43 Specification for integrating-averaging Sound Level Meters which is a requirement in the GS 1253:2018.

The sound level meters have inbuilt calibrators and will be calibrated before measurements/recordings are taken. The noise meter will be either calibrated at 94 dB(A) or 114 dB (A) before the measurement based on the Ghana monitoring protocol. The sound level meters have two sets of Meters (Meter 1 and Meter 2). Only readings captured at Meter 1 will be taken and used in this report since meter-1 was set at an exchange rate of 3 dB as against 5 dB of meter-2 to ensure more accuracy. The results of the noise levels assessment are summarized in table 9below. The source of noise within the area mainly comes from the natural environment.

Table 9: Results of Noise Level Assessments

S/N	Sampling Site	Noise level dB(A)					
		LA_{EQ}	LA_{10}	LA_{50}	LA_{90}	LA_{MIN}	LA_{MAX}
1.	**Point 1**	64.8	67.5	63.6	61.2	51.1	91.2
2.	**Point 2**	66.8	69.3	64.7	62.3	52.5	86.8
3.	**Point 3**	63.7	66.4	61.0	56.2	49.3	68.0
4.	**Point 4**	72.2	75.3	68.6	63.0	55.9	86.9
	GS-MPL, Ambient Noise (GS 1222:2018)	70					

Source: Fieldwork on 10th February 2024

Legend

L_{eq} – Integrated noise level during the measurement period

L_{max} – Maximum noise level

L_{min} – Minimum noise level

L_{50} – Average noise level

L_{10} – Nuisance noise level

L_{90} – Background noise level

EPA*: Guideline value set for daytime for commercial/mixed use areas with activities - 60 dB (A).

The results of ambient noise levels (LAeq) recorded at the proposed site were generally above the limits for daytime i.e. 70 dB (A). The values obtained were 64.8dB (A) - and 72.2dB (A). These measured levels seemingly are the levels for the natural environment which may be influenced by closeness. It means that these levels are likely to go up a little as the construction of the first floor and pitch peaks and are highly likely to decrease when the project's construction phase is completed and the project becomes operational.

4.7 Site Hydrological Characteristics

4.7.1 Historical (Fluvial) Flood Information

There were no available historical hydrometric data records on the upstream section of Nima stream, where the project area falls. The only Historical flood information gathered was a verbal field historical flooding event reported in the vicinity of the proposed site. The flood was reported to inundate larger areas depending on the duration and intensity of the rainfall event. Watermarks

were observed on some structures of the catchment area and the heights were picked. Based on the field information gathered, the proposed project site is considered to be at low risk of flooding

4.8 Consideration of Project Alternatives

This section discusses alternative considerations to the proposed project in terms of location, technology, raw material sources and environmental and social factors. This is consistent with regulation 12(d) of Environmental Assessment Regulation, 1999 (LI 1652) which emphasizes on matters of site selection including a statement of the reasons for the choice of the proposed site and whether any other alternative site was considered. The "no-go" alternative is also considered in line with regulation 12(c) of the same regulation which requires consideration of the alternative where the undertaking is not executed. The potential alternatives to the proposed project will be discussed in relation to location, raw material sources, technology and the No-Go or no-action alternatives and these include:

4.8.1 Locations

PLP Properties Limited's project location falls within the planned Airport city car park 5 Area planning scheme approved by the La Dade Kotopon Municipal Assembly.

- The Airport city car park 5 Area project planning scheme was chosen based on the following factors;
- It falls within the mixed-use commercial Planning Scheme;
- Availability of required land size the proposed design;
- Availability of good infrastructure and services (stable potable water, stable electricity, tarred and access roads amongst others)

4.8.2 Alternative Machinery and Technology

An alternative technology and technical requirements for the constructional and operational parts of the project was considered because machinery, technical and technological challenges should be avoided due to the height and design and maintenance of the propose project to ensure constructional and operational efficiency. These technologies and technical needed for the project was found to be available within the city and the contractor to be engaged would be required to have the capacity and capability before the contract would be awarded.

4.8.3 Raw Material Alternative

Availability and cost of construction raw materials were also considered and these materials needed for the construction of the proposed project and its furnishing and finishing would generally be procured locally with a few construction material specifications likely to be import when not available on the local market. This was considered to be economical and likely to save the developer some money for other investment needs.

4.8.4 No Action or No-Go Alternative

The no-action alternative was also considered and assumes that the proposed project will not commence i.e., the proposed project will not be implemented or developed into an operational residential facility. Under this alternative, the proposed project will not drive any significant environmental change and result in no environmental impacts on the site and or its immediate surroundings. Implementing the 'no-action alternative entails that the developer will not be contributing to environmental and socio-economic changes (ie both positive and negative) in the proposed area via the proposed project site. The no-action alternatives mean that

- The current landscape character will not be altered.
- No influx of people (mainly job-seekers), driven by the development of the project.
- No expansion in the infrastructure and utility service delivery to the proposed site.
- No additional employment opportunities for both skilled and unskilled labour as there will be no opportunities because there will be no construction and operation of the project.
- No additional opportunities for skills transfer and training of locals who would have been employed.
- Potential positive socio-economic impacts are likely to result from the project, such as increased local spending and the creation of local employment opportunities, new revenue sources for regulatory agencies and departments too will not be realized.

Although the "No Action Alternative" does not introduce any of the perceived negative impacts of the project to the area, it does not guarantee that the existing environmental quality will continue to be maintained in the absence of the proposed project. In summary, whilst the "no-action" alternative will not necessarily drive any negative environmental and social impacts; it will neither result in any positive impact nor add any socio-economic benefits to the local and national

economy as well. Based on the above considerations, the developer considers the proposed site as a highly preferred site for the development and the implementation of the project as a better alternative.

5.0 POTENTIAL ENVIRONMENTAL IMPACTS

This section of the PER deals with the methodology used to assess the potential impacts of the proposed project, and the results from the application of this methodology to the project, using project information and baseline data available at the time this report was prepared. The proposed project has the potential to exert impacts on the environment and these potential impacts require proper management in order to minimize or eliminate the negative impacts and, if possible, maximize the beneficial ones to ensure the sustainability of the environment. In recognition of this fact and in fulfilment of the requirements of permitting and funding agencies, the developer will incorporate this Environmental Impact Assessment in its project cycle.

Impacts were evaluated based on project development analysis and available literature review of similar activities scrutinizing the project phases. The construction and operational/occupancy phases of the project as earlier stated will have both positive and negative environmental consequences on the project area. It is, therefore, necessary to identify such impacts and evaluate and develop necessary control measures to either minimize management or eliminate them where possible.

The potential impacts have been identified and assessed under the three main phases of the project. These are:

- Pre-constructional
- Constructional and
- Operational phase

The impact assessment methodology used for this project consists of five major steps:

- **Step 1**: Identification and description of project activities and their interaction with environmental media;
- **Step 2**: Comprehensive preliminary identification of potential impacts;
- **Step 3**: Screening, or comparative assessment of impact importance; identification of impacts that are likely to be significant (i.e., identification of focus areas for further study) through the application of a basic set of impact significance criteria to the preliminary information available about each impact;
- **Step 4**: Detailed assessment of the identified focus area impacts characterization techniques; quantification of impacts to the extent possible and rigorous qualitative characterization of impacts that cannot be quantified; and

- **Step 5**: Final assessment of the severity levels of impacts through application of the results of the rigorous quantitative and qualitative characterization of impacts developed in Step 4 to a set of objective impact severity criteria; identification of impacts warranting mitigation.

To ensure proper impact identification and evaluation, there were consultations with regulatory institutions such as the Environmental Protection Agency, the Municipal Assembly, and the Ghana National Fire Service amongst others. From the above actions, the potential impacts of the envisaged undertaking were assessed for the two main phases of the project cycle (constructional and operational) and are discussed below.

5.1 Phase Activities and Impacts Identification

5.1.1 Pre-Constructional Phase

The activities identified under this phase to be carried out before the regulatory approval and implementation of the proposed project include:

- Land acquisition and documentation
- Architectural and Engineering designing;
- Preparation of technical reports including Preliminary Environmental Assessment report, traffic impact assessment, etc
- Stakeholder consultations;
- Acquisition of regulatory permits and licenses.

Preparation of the Preliminary Environmental Assessment Report (PER), traffic impact assessment, etc will assist the company in identifying all potential environmental and social impacts of its operations and so commit it to take the necessary mitigation and management measures to eliminate, reduce and or manage the negative impacts on the environment as well as enhancing the positive measures.

5.1.2 The Constructional Phase Activities

Construction phase activities include among others:

- Removal of site topsoil and excavation works for basement floors
- Sourcing construction materials and equipment;
- Workshop, store, and office
- Civil works;

- Construction of foundation and super structure;
- Construction of main buildings and foundation;
- Construction of other ancillary works;
- Construction of drainage systems, wastewater, and sanitary systems;
- Installation of fire protection systems (including water supply and fire hydrant and extinguishers);
- Electrical works;
- Concrete basement parking lots;
- Disposal of construction and decommissioning debris/waste, etc.

5.1.3 Operational Phase Activities

The main operational phase activities will be:

- Habitation of completed units
- General maintenance of facilities;
- Maintenance and dislodging of effluent waste and associated impacts
- Generation and disposal of solid waste generated on-site
- Fire hazards

5.2 Criteria of Impact Evaluation

5.2.1 Extent/magnitude of the Impact

- The extent is regional if an impact on a component is felt over a vast territory or affects a large portion of its population.
- The extent is local if the impact is felt on a limited portion of the zone of study or by a small group of its population.
- The extent is site-specific if the impact is felt in a small and well-defined space or by only some individuals.

5.2.2 Intensity of the Impact

- The intensity of an impact is qualified as strong when it is linked to very significant modifications of an environmental component.
- An impact is considered of average/moderate intensity when it generates perceptible disturbance in the use of a component or of its characteristics, but not in a way to reduce them completely and irreversible.

- A weak/minor intensity is associated with an impact generating only weak modifications to the component considered, without putting at risk some of its utilization or its characteristics.

5.2.3 Duration of the Impact

- A temporary impact can last days, weeks or months, but must be associated with the notion of reversibility.
- A permanent impact is often irreversible. It is observed permanently or may last for a very long term.

5.3 Determination of significance of impacts

The impact significance rating depends upon the impact evaluation and other factors such as:

- Sensitivity and value of the receptor;
- Compliance with relevant laws, regulations and standards;
- Concerns and views of stakeholders;
- Overall worker comfort; and
- Likelihood of an occurrence.

The impacts are rated according to the following categories:

- *An impact of Low Significance* referred to as a '*Minor Impact*' is one where an effect is experienced, but the impact magnitude is sufficiently small and well within accepted standards, and/or the receptor is of low sensitivity/value and is temporary;
- *An impact of Medium Significance* referred to as a '*Moderate Impact*', is one that is within acceptable limits and standards. Moderate impacts may cover a broad range, from a threshold below which the impact is minor, up to a level that might be just short of breaching an established (legal) limit and is of longer duration; and
- *An impact of High Significance* referred to as a '*Major Impact*' is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resources/receptors.

5.4 Evaluation of Potential Positive Impacts

The potential positive impacts of the proposed project are stated below.

Employment generation during construction and operation phases;

- Engagement of skilled and unskilled labor during the construction phase.

- Engagement of skilled and unskilled labor during the operation/occupancy phase.

Improved revenue for the local economy;

- Increased tourism potential from cleaner and beautiful city and availability of accommodation for tourist.

Reduced health spending on preventable communicable diseases due to improved land use (as against illegally squatters and attendant environmental impacts on the site and environs).

Sustainable project and improved health of occupants;

- Timely collection of refuse from generation points that is components within the proposed project.
- Reduce refuse to lead to unauthorized disposal points and locations.
- Reduce the time of waste storage and breeding of disease vectors and spread of communicable diseases.

Improved waste management and sanitation; over shorter distance and time to evacuate refuse from generation point.

- Increased recycling of plastics and composting of the organic fraction due to improved waste management.
- Efficient and effective waste collection and management.

The improved drainage system and flood resilience;

- Reduced indiscriminate dumping of refuse into drains by squatters and smaller waste collection operators.
- Reduce spillage/overflow of refuse which may end up in drains and streams within the catchment area from the project.
- Reduced blockage of drains by solid waste.

Table 10: Impact identification of each environmental component

Medium	Environmental Component	Impact
Physical environment	Air Quality	Local, temporal, and intermittent deteriorating of the air quality
	Noise	Noise generation from machinery and equipment on receivers close to the project site
	Geology and Geomorphology	Removal of topsoil from excavation
	Land Use and Soil Quality	Permanent removal and loss of soil surface in already deteriorated area within the project site
	Hydrology and Hydrogeology	Possible contamination of underground water table from oils percolation
Biotic environment	Flora and Vegetation	There is no vegetation on site to clear
	Vertebrate Fauna	Alteration of habitat quality and probable collisions of birds with the structure
Human environment	Social Environment	Generation of direct employment
	Cultural and Archeological Heritage	N/A
	Landscape	Alteration of the visual quality of the landscape. Alteration of views of landscape interest and Waste generation
	Tourism	Increase migration to project location due to patronage
Built environment	Energy Infrastructure	Increased pressure on utilities
	Roads	Increase traffic flow within the project neighborhood
	Airspace	Occupants are not likely to overlook into neighboring residences

Source: Prepared by the authors.

5.5 Evaluation of Potential Adverse Impacts

The potential adverse environmental and social impacts of the proposed project are grouped under the following phases:

- Pre-construction Phase Impacts;
- Construction Phase Impacts; and
- Operational Phase Impacts.

5.5.1 Potential Pre-constructional Phase Impacts

As earlier indicated, there is no structure or vegetation on site therefore there will not be any waste or environmentally associated impact at the pre-constructional phase due to the activities associated to this phase basically being documentation and acquisition of regulatory permits for the actual construction to start.

5.5.2 Potential Construction Phase Impacts

The adverse environmental and social issues which could arise from construction phase activities may include the following;

- Air quality deterioration associated with dust impacts (airborne particulates, exhaust fumes – NO_2, SO_2) at the project site;
- Alteration to the existing physical landscape and view of the project neighborhood;
- Generation, management and disposal of construction solid and liquid waste;
- Site sanitation and related public health and safety issues (unsightly conditions, cholera, and malaria infestation) in neighbors around the project site;
- Unwanted social issues such as pregnancies and other sexually transmitted diseases (STDs), infectious diseases such as COVID 19;
- Vibration and noise nuisance in the project site;
- Soil deterioration and exposure to erosion and possible contamination;
- Occupational Health and Safety issues (accidents, injury/ailments to workers);
- Traffic disruption and risk of accidents at the project site especially entry point and along haulage routes;
- and
- Child labor and abuse of workers.
- Waste oil generation and oil spillage
- Potential project-related fire outbreak especially within the temporal store and construction office

5.5.3 Potential Operational Phase Impacts

The adverse environmental and social issues which could arise from operational phase activities may include the following:

- Alteration to the physical landscape and aesthetic view of the project site;
- Occupational Health and Safety issues (accidents, injury/ailments to workers);
- Surface and groundwater pollution;
- Traffic disruption and risk of road accidents
- Noise nuisance from vehicles moving in and out of project
- Possible emissions of noxious gases from vehicles resulting in poor air quality
- Underground water and soil contamination from percolation of wastewater

- Wastewater generation from project, management and disposal issues
- solid waste generation, management and disposal issues
- Infectious Diseases and related public health issues
- Waste oil generation from standby generator (proposed 1no.500 kvA and disposal and related issues such as spillage and possible soil contamination
- Possible fire outbreaks

5.6 Evaluation of Adverse Impacts

The potential adverse environmental and social impacts identified for the various phases of the project are evaluated in Table 11.

Table 11: Evaluation of Adverse Impacts

No.	Potential Impact	Receptor(s)	Description of Potential Impact	Impact Evaluation			Impact Significance
				Extent	Duration	Intensity	
Construction Phase							
1.	Air Quality deterioration associated with dust and vehicular fumes at the project site and haulage routes	Air, on-site workers, neighbors and public	Exhaust fumes from the use of construction machinery and movements of trucks may temporarily affect the air quality around the project site especially in areas of loose and exposed soils from land preparation works. These same areas including tipping of construction materials by trucks at the site in windy conditions may also increase airborne particulates affecting the air quality and increasing dust impacts on workers and neighbors. Trucks conveying materials to the site which are uncovered could also be a source airborne particulate matter along the haulage routes including the Airport road leading to the project site. Excavation, fumes running machinery and haulage trucks, cement handling, tipping of construction materials will generate dust that will impact negatively on the air quality in the project site. Dust generation and air quality deterioration if not properly managed can cause respiratory discomforts and infections	Local	Temporary	Strong	Major

2.	Alteration to the existing physical landscape and view of the project site	Public	Although when completed the project will increase the environmental contingent value and aesthetic view of the place. The construction works at the site will alter the landscape characteristics and view of the area. The site has been walled to screen off the construction works from public view and metallic screening will be introduced or erected to screen the place from the inquisitive eyes of the public.	Local	Permanent	Strong	Major
3.	Generation, management and disposal of construction solid and liquid waste	Land	Unusable construction materials, trenches and excavation wastes will form the bulk of construction solid waste to be generated at the project site. Construction workers may also generate human and domestic and liquid wastes such as used polythene bags, food wastes, used water sachets, and bottles that need to be properly managed and disposed of.	Site-specific	Temporary	Strong	Major
4.	Site sanitation and related public health and safety issues (unsightly conditions, cholera, and malaria infestation) in communities around the project site	Soil, workers, possible public	Poor site housekeeping at the project site and improper storage and management of waste (construction waste, food waste, polythene bags, drinking water sachets, etc.) can create sanitation problems. Open defecation around the site may be promoted if adequate toilet facilities are not provided for the construction workers. Open or improperly covered trenches may also result in stagnant water and the breeding of mosquitoes, leading to malaria infestation.	Site-specific	Temporary	Average	Major

5.	Unwanted social issues such as pregnancies and other sexually transmitted diseases (STDs), infectious diseases such as COVID 19	Workers	Irresponsible sexual behaviors from construction workers could lead to the spread of infections, other sexually transmitted diseases, and teenage/unwanted pregnancies particularly among the youth within the area. Infections such as COVID 19 from one worker or visitor can be a source of transmission to those who may come in contact with them on site	Local	Temporal	Strong	Major
6.	Vibration and noise nuisance from the project site	Air, workers, public	The ambient noise level is expected to increase slightly from its current monitored values due to noise generated by the operation of construction machinery (graders, excavators, concrete mixing machines, etc.), carpentry works and the movement and tooting of trucks will increase the noise level at the project site and immediate surroundings. Other sources of noise would be the tooting of horns and noise from the movement of haulage trucks at and around the site.	Local	Temporary	Strong	Major
7.	Soil deterioration and exposure to erosion and possible contamination;	Soil/land	The removal of on-site topsoil, excavation, and other land works will expose and loosen the soil making it susceptible to erosion during heavy down rainfall. There is also the possibility of soil contamination from fuel/oil spills from broken down and equipment during construction activities.	Local	Temporary	Average	Moderate

8.	Occupational Health and Safety issues (accidents, injury/ailments to workers)	Construction Workers	Occupational health and safety issues associated with the construction works include; exposure of workers to noise, vibration, and dust; accidents in the use and handling of equipment and machinery; and injury to the body during the use and handling of equipment and machinery.	Local	Temporary	Strong	Major
9.	Traffic disruption and risk of accidents at the site and along haulage routes	Road users	The transportation of construction materials to the site may pose a safety risk to road users along the haulage route and may induce traffic congestion. The breakdown of trucks carrying materials to the site may also cause traffic and road-related accidents.	Local	Temporary	Average	Moderate
10.	Child labour and abuse of construction workers	Construction workers, children	Improper conduct by the Contractor may result in agitations with workers. There is also a possibility of the Contractor hiring minors (child labour) for the construction works, or engaging in acts of sexual exploitation and other forms of exploitation of workers if proper checks and monitoring are not enforced.	Site-specific	Temporary	Strong	Minor
11.	Waste oil generation and Oil spillage	Contamination of land / underground water table	This can result from improper storage of oils and lubricant and or from on-site servicing of vehicles and construction machinery	Local	Temporal	Average	Moderate
12.	Fire outbreak	Site/environs	This may result from unsafe practices within the workplace	Local	Permanent	Average	Moderate

Operation Phase							
No.	Potential Impact	Receptor(s)	Description of Potential Impact	Impact Evaluation			Impact Significance
				Extent	Duration	Intensity	
1.	Alteration to the physical landscape and aesthetic view of the project site	Aviation by-pass and neighborhood	The operation of the proposed will positively affect the aesthetic view of the project area. However, poor property management will also negatively affect the aesthetic view.	Local	Permanent	Strong	Major
2.	Occupational Health and Safety issues and diseases	Workers	Injuries may also occur from assigned duties within the project components. Poor housekeeping and unsanitary conditions within the project will provide suitable conditions to attract rodents, flies, cockroaches, and other disease vectors from the undeveloped areas around the project. This can result in the spread of vector-borne diseases.	Local	Temporary	Average	Minor
3.	Traffic disruption and risk of road accidents on the access road	Patrice Lumumba road, Public	The movement to and from the project may pose a safety risk to other road users along the main road and may induce traffic congestion.	Local	Temporary	Strong	Major
4.	Risk of fire from combustible materials, electrical faults	Workers and occupants	Any fire outbreak at the proposed project may cause significant harm/damage to property, lives, and the environment.	Site-specific	Temporal	Strong	Major
5.	Noise impact from operations of the project	project environs	Noise emanating vehicles moving in and out of the project	Local	Temporal	Weak	Minor

6.	Possible emissions of noxious gases from vehicles and standby generator (proposed 500 kVA) resulting in poor air quality	Residents/Road users and neighbors	Emission and the release of gases such as SO_x, NO, CO, etc. into the atmosphere especially from stand by power generator (proposed 1no.500 kVA) and vehicles	Local	Temporal	Weak	Minor
7.	Underground water and soil contamination from percolation of wastewater	Environs	Wastewater from the project may percolate and contaminate underground water	Local	Temporal	Average	Minor
8.	Wastewater generation from project, management and disposal issues	Environs	Effluent from washrooms, toilets, and wastewater from handwashing sinks and cleaning floors may be a source of wastewater/effluent generation	Localize	Temporal	Strong	Major
9.	Solid waste generation, management and disposal issues	Living area, bedrooms, commercial areas etc	Domestic waste from wrappers, packaging plastics, office papers, and office waste, etc are likely to lead to unsanitary conditions and sites	Site-specific	Temporal	Strong	Major
10.	Infectious Diseases and related public health issues	Residents/ Visitors	Infections from one worker or visitor can be a source of transmission such as COVID SARS 2 and others	Local/ national	Temporal	Average	Moderate
11.	Waste oil generation from standby generator (proposed 1no. 1,000 kvA)(s) and disposal and related issues such as	Project	Operation of the proposed standby generator (proposed 1no. 500 kVA) may be a source of waste oil as these machines use oil which needs maintenance. That is changing the oils of this generator (proposed 1no. 500 kVA may result in spills and when	Local	Temporal	Weak	Minor

	spillage and possible soil contamination		not managed properly could sip into the soil and contaminate the soil structure and even the water table if any				
12.	Possible fire outbreaks	Project & neighborhood	Poor electrical and mechanical works would have to be avoided to ensure that fire outbreaks do not result. Poor fire and electrical appliances use practices by residents could also be a source of fire.	Local	Temporal	Strong	Major

6.0 MITIGATION OF IDENTIFIED/PREDICTED IMPACTS

6.1 Constructional Phase

This section details the mitigation and management measures (corrective actions) proposed and may be adopted for the project aimed at reducing and offsetting the potential adverse environmental consequences of the proposed development. The general aims of the corrective actions are to enhance the environmental performance of the project and to ensure that environmental parameters such as $PM_{2.5}$, and PM_{10} are within acceptable limits as prescribed by the existing standards. The preservation of the physical environment is surely a contributing factor in assuring the vitality of the project.

6.2 Proposed Mitigation and Enhancement Measures for Potential Constructional Impacts

6.2.1 Dust Impacts and Air Quality Deterioration

Dust generation during the construction phase is likely to be high in the early stages of the construction phase site clearance, basement excavation and haulage works of about 800 m^3 - 3,000 m^3 of excavated materials that about 100 - 250 round trips. Offloading and actual construction will also influence dust generation within the project site. Management practice will include the employment of dust suppression systems such as regular watering to drastically reduce dust impacts. Other measures will include:

- All trucks and other equipment will follow a planned maintenance regime to minimize exhaust fumes and records kept;
- The appropriate personal protective equipment (PPE) will be supplied and provided for painters, construction workers using cement, and machinery operators (during land clearing activities) to reduce the impacts of dust emissions in their line of work –
- Nose masks;
- Safety goggles;
- Safety overalls;
- Weekly toolbox meetings will be organized to provide safety orientation for all workers (e.g., construction workers, mechanics, painters, etc.) to raise awareness for instance on the dangers of exposure to chemicals and solvents;
- Trucks hauling excavated spoil will be covered with tarpaulin to prevent fly-offs;

- Precautionary signs showing speed limit of 30km/h will be posted at vantage points in communities and on-site;
- Haulage trucks will be required to reduce speed to 30km/h when approaching untarred sections of road and at the construction site;
- Haulage trucks and other heavy construction machinery would be serviced regularly to reduce exhaust emissions;
- Haulage trucks conveying excavated spoil and construction materials would be covered with tarpaulins to prevent fly-offs and blow-ups of fine aggregates; and

6.2.2 Alteration to the physical landscape and view of the project site

The implementation of the project will permanently change the current physical landscape of the project site and is likely to cause discomfort and reduce the existing aesthetics during the construction phase. The measures to be taken to minimize visual impacts will cover both the construction and operation phases, though this will start slightly ahead of the construction phase activities. The measures will include the creation of a vegetation screen complemented with the erected perimeter fence overlain with climber plants. The trees and vegetation within the project area will be strictly protected from the on-set during land clearing to serve as an effective vegetative screen against visual intrusion and thereby minimize the unpleasant and intrusive effect. All external lights will have fixtures on top to cover their glow so that they emit less radiance in the sky, to keep the night sky dark.

6.2.3 Management of Construction Solid Waste and Liquid sanitary waste Management

The project contractor as part of the key performance index (KPI) will be tasked to adopt efficient construction methods including re-use construction materials where possible to minimize the waste to be generated from the construction works and activities. Excavated soil material will be re-used in backfilling and levelling where possible and suitable. The contractor will ensure waste segregation at the site from the onset of the implementation by either use of different bins/skips to be provided for the different types of waste generated such as scrap metals, plastic materials, etc. Recyclable waste from segregation such as plastics/polythene and scrap metals will be sold or given to authorized recyclers for recycling.

During the construction phase of the project, mobile toilets will be used on-site. About 5-8 no mobile toilets will be rented from companies specialized in their management for use as effluent/sewage management purposes. This, therefore, means that workers and visitors would have a place of convenience at the same time this system will help manage the effluent/sewage to be generated during the construction phase. About a ton of reusable and non-usable decommission waste is anticipated during the end of the construction phase.

6.2.4 Soil Erosion and Possible Contamination

The following measures will be implemented to prevent soil erosion:

- Land clearing will be done outside the peak rainy season to minimize erosion and the risk of siltation of drains downstream and will be done in phases;
- Topsoil will be stockpiled in small heaps for a short duration, be covered with polythene sheets to prevent erosion and used for landscaping; and
- Construction of drains to precede all major civil works.

Other measures include; excavated soils may be used for backfilling of the foundation if suitable or carted away as soon as possible during the construction phase. Contamination may result in machinery works and repairs and waste oil spills which may result in the process.

- Subcontract servicing of vehicles/machinery to an accredited thirty party. That is servicing will be done off site
- Activities involving the use of oils and lubricants will be done on an impervious platform fitted with an oil sump for temporary holding of waste oils; and
- Waste oil tanks will be provided to hold spent oils and returned to suppliers for proper disposal.

6.2.5 Vibrations and Noise Impacts

Noise generation and vibrations from running machinery may occur and affect residents, workers and adjoining properties. Management of these impacts will involve limiting vehicles delivering construction materials to a speed limit of 30 km/hr and prohibiting from tooting horns unless it is necessary especially within the project site to avoid noise nuisance. All sub-contractors will be tasked/instructed to minimize noise generation during the construction period and limit their construction activities to daylight hours only. Constructional machines and equipment will be

serviced regularly to ensure that the machines do not make excessive noise. The contractor will strictly follow all protocols as it relates to us heavy equipment and machinery mostly rollers which may generate vibrations when in use and are likely to be experienced by adjoining land users. Idling machinery and equipment will be turned off. All these effects stop immediately the machinery comes to a halt or after the day's work is done. All adverse effects from vibrational impact happen within the time frame of work.

6.2.6 Occupational Health and Safety and Infectious Diseases Risks

The site engineer, foremen, and sub-contractors will be required to ensure the health and safety of their workers during the construction phase. Management will ensure that safety and health management will form an integral part of any contract and Key Performance Indicator that will be approved concerning the project during the construction and occupancy phases.

The following mitigation measures, which are also in compliance with the objectives of the international standard (Community Health, Safety and Security), will be used to minimize health and safety risks at both the construction phases:

- Provision and use of high visible clothing during construction to mark out workers to truck drivers; helmets, safety boots and gloves would be worn to prevent head injuries and cuts, and nose masks would be provided for painters, and construction workers involved in concrete works would be provided with boiler suits to reduce their exposure to wet cement;
- Good housekeeping practices will be followed to minimize risk of trips, slips and falls;
- First Aid Kits will be provided to cater for injured workers before they are sent to the nearest hospital, depending on the level of injury;
- A trained First Aid Personnel will be employed to respond immediately to all work-related injuries;
- All accidents/injury, snake bites and public concerns will be reported and recorded;
- Trolleys and wheelbarrows will be used to reduce manual handling;
- Empty containers and cans will be disposed of properly to prevent stagnation of water on which mosquitoes could breed; and
- Trenches not in use will be properly covered to prevent ponding.

- All accidents arising out of the job will be reported and investigated with appropriate feedback given to Management for necessary action to be taken.
- An Environment, Health, and Safety Officer (to be employed or assigned) will be tasked with the responsibility of ensuring that all mitigation measures and systems are working and observed for optimal benefit to the workers and the project.

The contractor will provide and enforce the use of appropriate personal protective equipment (PPE) such as safety boots, raincoats, hand gloves, earplugs, and nose masks. Sanctions will be implemented where these are not followed. First aid kits will be provided on-site and supervisors trained to administer first aid for minor ailments/injuries on-site before referrals to the nearest clinic. Major cases will be referred to the nearest hospital or health post to the project site such as Airport Women's Hospital, Nyaho Clinic, 37 military hospitals, etc. The outbreak of infectious diseases such as COVID SARS 2 popularly known as COVID 19 can also generate occupational health and safety hazards to workers who may be at risk of being infected and transmitting the same to others. Designated personnel preferably on-site security in the absence of a site HSE will ensure that the temperature of all workers is taken before the start of work and at the same time ensure strict compliance to adherence to the COVID 19 preventive protocols.

The project implementing team will as part of the contractual agreement insist on all contractor(s)/consultant(s) to institute national and internationally recognized preventive measures and protocols such as daily temperature checks, hand washing under running water, use of sanitizer, etc. These measures and protocols must be observed at all times while on-site

6.2.7 Traffic Disruption and Risk of Accidents

The Contractor will develop a Traffic Implementation Plan based on the developed Traffic Impact Assessment during the construction of the proposed project. The plan will be added to document to the building permit documents for assessment and further approval for implementation by the project. Warning signs will be used and placed from various meters to the site (10m, 30m, 50m, 100m) to warn the vehicular users and construction drivers to observe and drivers will be trained on safe driving and vehicle procedures. The contractor will ensure that all haulage trucks comply with an approved speed limit of 20-50km/hr along the haulage road and any broken-down vehicles

will be immediately removed off the road. Finally, the contractor will adjust material/equipment delivery times to avoid peak traffic periods.

6.2.8 Sanitation and public health issues

The contractor will be tasked to ensure proper housekeeping at the project site and will have to provide adequate waste bins at the project site for use to minimize indiscriminate disposal of plastic and polythene material, cans, and food waste by the workers. These bins will be frequently transported and emptied at approved dumpsites. This will prevent the littering of the project site with cans and bottles which could collect water and breed mosquitoes. The contractor will provide temporary toilet facilities for the construction period for use by workers and visitors. Workers will be educated against open defecation and any person found engaging in it will be sanctioned.

6.2.9 Management of waste oil generation and oil spill

The project management team and the contractor will ensure that the likelihood of oil spills is reduced to the barest minimum through regular monitoring and audits. In the event of an oil spill, the contractor through its assigned onsite HSE specialist would mobilize at short notice skimmers for mopping up the spill. Machinery servicing especially, all oil changes will be carried out at the closest lube bay station ie there will be a strict prohibition of oil change onsite. Oil storage for use by construction vehicles will not be stored on-site, it will be purchased at the closest fuel service station. This practice to a large extent aimed at reducing the volume or amount of oil generated and stored on-site. Other types of maintenance or service works will be done on an earmarked concrete platform to prevent oil percolation and easy cleaning of spills.

6.2.10 Management of Construction phase Fire Outbreak

The project management team must insist and monitor the contractor to use appropriate technologies and materials to minimize exposure to fire outbreaks and hazards. Again, safety awareness and training must be carried on to raise awareness in staff. Again, preparation of fire emergency action plan or emergency preparedness and response plan must be prepared and approved by the Ghana National Fire Service and training given to staff on implementing fire plan. Strict adherence to machinery and equipment use manual and maintenance schedule will be adhered to throughout the construction phase. There will also be available at designated points fire extinguishers on-site as well as ensuring all machinery have fire extinguishers in them.

6.2.11 Transmission of STDs, Unwanted pregnancies and child labor and abuse of construction workers

The company's own workplace HIV/AIDS policy to be implemented are derived from ILO Guidelines, and also in line with the National Workplace HIV/AIDS Policy, to help maintain a safe and healthy work environment include the following:

Awareness creation among workers on HIV/AIDS prevention programmes such as –

- Facilitation of voluntary testing;
- Peer counselling;
- Support for behavioural change for workers;
- Safe sex practices, condom use, abstinence, etc.;
- Provision of condoms at accessible and convenient locations for workers;
- Incorporation of the workplace HIV/AIDS policy into working conditions to prevent discrimination or stigmatisation of workers based on perceived or real HIV/AIDS status;
- Refusal of employment or dismissal would not be based on HIV status; nevertheless, testing for HIV would be encouraged to know one's status; and
- Due care and confidentiality will be exercised in handling information on HIV status of workers, on the basis of confidentiality set out in the ILO instrument;

The Contractor will be tasked to develop a Code of Conduct/Ethics to be vetted and approved by the project HSE consultant before engagement and commencement of construction activities. This will include transparency with workers, working conditions, not engaging trafficked persons and minors, etc. The Contractor would thoroughly check the background of any person to be hired to ensure they are of the right age (above 18 years and also ensure that there will not be any form of exploitation of workers including forced labour, sexual exploitation, and harassment, and prostitution. The contractor will be expected to have an on-site HSE who will report to an assigned HSE/person from the developer's team on collaborations with relevant stakeholders such as the Municipal Health Directorate, to organize awareness creation and educational programs for all construction workers on behavioural changes required to prevent teenage/unwanted pregnancies and the spread of HIV/AIDS and other STDs.

6.2.12 Crane Hazards and Scaffolds Safety

The proposed project will employ the use of both mobile and stationary cranes from time to time and there is a likelihood of a negative impact on the workers and the public and public safety. The crane will only be mounted during dry weather conditions and trained and authorized personnel will be allow to operate it. Also, the crane(s) to be used will be contracted from third parties with expertise to ensure efficient mounting, use and maintenance.

6.2.13 Management of Fire Hazards

The following measures will be instituted to prevent and control fire outbreaks:

- Post caution signs like 'No Smoking', 'Switch Engines' and 'Mobile Phones Off', 'Emergency Hotlines', etc. conspicuously at the fuel storage and fuelling areas;
- Provide firefighting equipment such as fire beaters, extinguishers, foam concentrates, hose reels, dry chemical powder and CO_2 fire extinguishers at fuel storage and generator set areas
- Restrict cooking and smoking at designated areas;
- Conduct weekly toolbox meetings on fire safety;
- Provide assembly points; and
- Prompt cleaning of accidental spills.

6.3 OPERATIONAL PHASE

6.3.1 Alteration to the physical landscape and aesthetic view of the project site

As earlier indicated the implementation of the project will permanently alter the current physical landscape of the project site. However, management of this impact will be through continuous maintenance of greenery components i.e planted trees, ornamental plants and general soft landscaping.

6.3.2 Occupational Health and Safety Issues Management

Safety and continuous improvement aimed at workers and resident health will be given high priority. Management will issue a policy to emphasize its commitment to the above objective. Estates management workers will be given adequate education and periodic training, information as well as general awareness of the hazards prevailing in their working environment as well as periodic health and safety simulations for residents. Safety instructions and signs and the control

measures designed to minimize the identified risks will also be used. Management will ensure that workers adhere to safe methods of work. Where hazards cannot be eliminated, adequate personnel protective equipment and training and toolbox meetings will be provided according to job specifications and their use will be enforced. Strict personal and general hygiene will also be enforced among workers and residents within the project. Residents and workers will be required to report all types of accidents including near-misses and accidents leading to property damage to management for a thorough investigation. High environmental management standards will form an integral part of work ethics. Management will go into a contractual agreement with the nearest clinic to provide medical services checkups/screening organized for all staff. An emergency preparedness and response plan will be developed for the operation of the project it will contain EPRP for fire, flooding etc issues. It should be noted that the OHS will be fully functional of the project as by then all other amenities would have been implemented and functional.

6.3.3 Road Traffic Impact Management options

The traffic impact assessment consultant/engineer proposed a minimum of 69 parking spaces/lots for the project. The project design provided adequate parking places for vehicles as part of traffic management provisions on the design. There will also be security at the main entrance of the project to help incoming and outgoing vehicles to navigate without issues to the adjoining lands.

6.3.4 Risk of fire from combustible materials and faulty electricals (Fire Safety and prevention issues)

During the operation phase, the initial approved fire emergency preparedness and response plan would be reviewed and updated if need be. Each unit will have an emergency exit and eligible marking of general emergency assembly point and for each unit will be undertaken during the operational phase. Fire hydrant points have been incorporated into the design to allow the Ghana National Fire Service access to an adequate source of water during firefighting. Adequate fire-fighting and prevention measures such as fire extinguishers will be installed in each unit and serviced regularly. Estate management would also implement recommendations by the Ghana National Fire Service. Residents shall be required to regularly maintain their electrical gadgets and equipment to prevent fires. Smoke and heat detectors will be installed on all floors and heat source areas Fuel for the standby generator (proposed 1no. 500 kVA)s will be stored in closed containers

in bounded areas (in the generator (proposed 1no. 500 kVA) house) and kept out of heat sources. An emergency preparedness and response plan will be developed for the site in consultation with GNFS to cater for all potential emergencies such as fire and explosion risks. All essential emergency service telephone numbers, and contact addresses will be posted at vantage points for ease of communication. All employees and residents will be adequately trained on the contents of the plan and particularly on their defined roles. Adequate resources will be provided by management for ease of execution of the plan when the need arises.

6.3.5 Noise Management Options

Nose impact or noise to be generated will be from totting of the horn by a vehicle either entering or leaving the project. Other sources will also be from the standby generator (proposed 1no. 500 kVA) to be used by residents during power outages. There will be adequate signage and security who will double as traffic wardens to assist car movement in and out of the project this will help reduce or prevent unnecessary tooting of horns. Loud outdoor music will be prohibited and will not be entertained within the estate especially the playground area as it is supposed to serve only residents.

6.3.6 Air/fumes Emissions management options (Air Quality)

The PEA consultants have recommended mixed power (national grid, generator (proposed 1 no. 500 kVA) and solar) for the project. This can greatly reduce emissions from the use of diesel-powered generator (proposed 1no. 500 kVA. The air quality of the project site and area will be further reduced such impacts and or be improved through soft (proposed tree planting initiative) and hard landscaping. Some parts of the walkways will be paved with concrete paving blocks and trees species would be planted to improve the quality of the air. The management will make it a policy to insist on scheduled maintenance and servicing to further reduce its emissions. The position of the stand by generator (proposed 1no. 500 kVA) will be away from adjoining facilities. Also, good housekeeping practices and proper management and maintenance of the septic treatment systems which will be connected to the existing sewer serving the Airport city car park 5 Area.

6.3.7 Wastewater and effluent generation Management

For this project, the developer intends to implement an individual centralized septic treatment management system, though, a centralized biodigester system was considered during the design stage. However, due to management design, management opted for the use of a central septic treatment management system. It is expected that all human waste including sullage and sewage from washrooms will be channeled into the system to be constructed. This system of wastewater/effluent management will ensure that all wastewater from the washrooms, sinks and WCs are channeled through the plumb line at the required pressure and gradient to ensure all wastewater ends in the well-constructed chambers/tanks. The system is expected to manage an average volume of 15 m^3 per day based on the occupancy rate of at full occupancy of the project, of about 501 persons for the 170 guest rooms and 170 persons to 250 persons per week including the commercial components of the project of 0.06 m^3 per daily water consumption per person at a 60% discharge rate. The anticipated wastewater to be generated by the occupants of the project at full occupancy is estimated to be about 9 m^3 per day for the project. Cumulatively, the project is based on 170 residents for the guestrooms and 180 persons per week as visitors to the commercial areas are expected to generate about 63.17 m^3 (at 60% discharge rate) of effluent waste weekly. This was is expected to be treated by two (2) well-designed septic treatment systems. Kitchen sinks will be fitted with sieves to prevent decomposable particles from choking the system. Wastewater from the kitchen will be channeled into the septic treatment system.

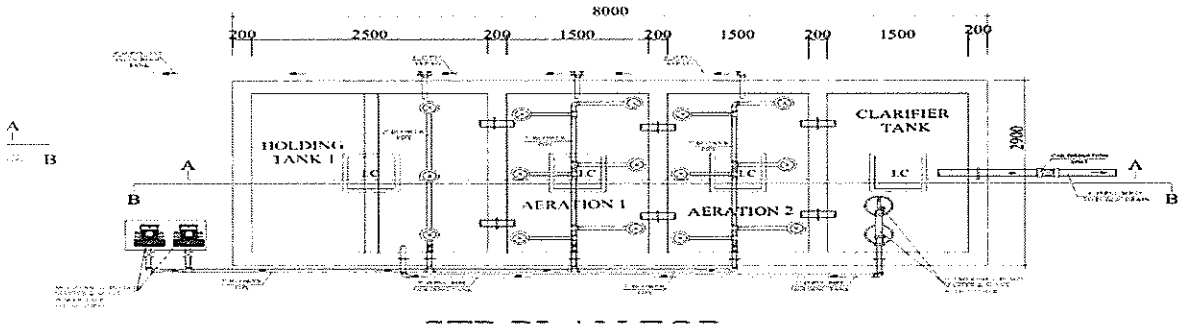

Figure 11: Proposed Septic System Design

6.3.8 Surface and Groundwater Contamination

Poorly constructed septic treatment tanks may result in leakages which could potentially contaminate groundwater, especially in areas where the water table is high. This could have serious health implications for people who depend on groundwater as the leakage may occur for long periods without being detected. This impact can be prevented/minimized through proper design and construction and the use of a competent and qualified engineering team. No areas have been identified through the field visits by the Engineering Consultant to have a high-water table. However, the probability of the impact is therefore minimal from experience from existing on-site residences. Stormwater would be taken care of by the onsite drainage system.

6.3.9 Solid Waste Management

The management option chosen is the decentralized waste management system and waste would not be treated on-site. The major solid wastes that would be generated during the operational phase include domestic waste, deformed packaging cartons, deformed plastic bottles and other materials. Management will engage the services of a private waste management company, accredited by the Municipal Assembly, for transportation and disposal of all waste collected from the project. Residents will be encouraged to practice waste segregation to encourage maximum recovery of reusable waste during the operational phase. Adequate waste bins will be provided for every occupant within the project; however, the replacement of such receptacles will be borne by residents when they are damaged requiring new ones. The estimated solid waste to be generated will be 162.5 kg – 333.33 kg per day (an average of 5.28 tons per capita per month using the World Bank Group estimated of 0.65-0.75 kg/capita/person) of waste is anticipated during the construction phase excluding excavated waste which will form bulk of the initial construction waste. Anticipated waste during the operation phase per week is expected to be 1.32 tons of waste (taking into consideration 250 persons at full occupancy)

6.3.10 Management of infectious Diseases and related public health issues

The system to be adopted for the management of waste management to ensure a high level of sanitation and public health within the estate weekly schedule for waste will be collected and strictly followed to ensure regular waste collection to prevent/minimize over-spillage of household and communal points. The project management notes that even though tricycles are operational

within the Municipal Area they will not engage any as by practice many of such operators are unable to prevent wind-blown garbage during the transport of waste. Authorized visitors and clients to the facilities would be permitted within and or limited to reception blocks no person will be allowed beyond these points without proper authorization. This is to ensure the health and safety of visitors and residents at all times. As standard practice, the company that will be awarded the contract to construct all on-site sewage management systems will be also required to supply the project management with a well-prepared emergency preparedness and maintenance plan for onward submission to relevant authorities as references.

6.3.11 Fire Prevention and Control Measures

The measures to help prevent and control fire outbreaks at the operation phase will include the following:

- Provide firefighting equipment such as fire beaters, extinguishers, foam concentrates, hose reels, dry chemical
- Install smoke detectors and heat alarms at various offices and facilities;
- Conduct annual firefighting drills and search-and-rescue operations to check the efficiency of emergency response and preparedness plans;
- Secure a fire certificate for the development from the GNFS;
- Restrict cooking and smoking to designated areas; and
- Conduct weekly toolbox meetings on fire safety.

7.0 PROVISIONAL ENVIRONMENTAL MANAGEMENT PLAN

A provisional environmental management plan that will ensure sound environmental practices during the various stages of the project are discussed in this section. The provisional plan discussed in this section took into consideration guidelines for construction and managing provided in the Building Regulations 1999, LI 1630, and Municipal Assembly bye-laws on Noise, health and Safety, and Sanitation. The Environmental Management Plan (EMP) outlines the mitigation and monitoring measures and other related safeguards commitments in an actionable mode for sustainable project implementation. The EMP includes individual provisional action plans and respective objectives to address the evaluated risks and adverse impacts associated with the project. The potential risks and adverse impacts, which cover both the construction and operation phases, include:

- Destruction of Vegetation and Fauna
- Waste Generation
- Socio-Economic Impacts
- Soil and Land Degradation
- Vehicular Traffic and Safety
- Air Pollution
- Nuisance from Noise and Vibrations
- Health and Safety Risks
- HIV/AIDS Transmission Risks
- Risk of Contracting and Spreading of Coronavirus Disease
- Potential Fire Risks
- Visual Intrusion

The PEMP is expected to guide the implementation of the mitigation measures for a period of three years from the date of commencement of project operations and thereafter will be replaced by a substantive Environmental Management Plan (EMP) in accordance with section 24(1) of the Environmental Assessment Regulations, 1999 (LI 1652). The average implementation cost estimates per annum of the PEMP is one hundred and eighteen thousand, three hundred and thirty-three cedis and thirty-three pesewas (GH¢434,5000).

7.1 Purpose of Environmental Management Plan

The mitigation measures outlined must be adequately implemented to prevent the occurrence of the identified negative impacts of the project or to minimize their effect if they do occur. However, the effective implementation of these mitigation measures will, to a large extent, be dependent on the development of a Provisional Environmental Management Plan (PEMP). The purpose of this plan is to assign responsibilities and timelines to the mitigation measures proposed. This PEMP presents the mitigation measures in a brief but coherent manner with clearly identified responsible persons. The PEMP will act as an abridged Operational Manual for the project concerning environmental issues during the implementation and operation of the project. It sets out in practical terms, how the mitigation measures proposed should be implemented.

7.2 Implementation Plan

The specific environmental, and related safeguards action plans cover the following:

- Vegetation and Fauna Protection Plan
- Waste Management Plan
- Erosion Control Plan
- Traffic and Road Safety Plan
- Dust and Emission Minimization Plan
- Noise and Vibration Plan
- Health and Safety Plan
- HIV/AIDS Prevention Plan
- Coronavirus Prevention Plan
- Fire Prevention and Control Plan
- Greenhouse Gas Emissions and Odour Reduction Plan
- Visual Intrusion Minimization Plan

Every management plan should have an associated cost estimate and the PEMP for this project is not excluded. Table 13 spells out the details of the PEMP's estimated budget.

Table 12: Vegetation and Fauna Protection Plan

Identified Action	Actual Action	Objective	Target	Budget (GH¢)	Proposed Time Frame	Responsibility
Construction Phase						
Pre-clearing	Incorporate discussion on flora and fauna impacts and mitigation measures into Site Induction. Ensure areas to be cleared are identified, defined and inspected prior to construction commencing	Prevent unnecessary killing of existing fauna	Ensure that fauna is given reasonable time to escape	20,000	Construction phase	HSE Officer of Contractor
Clearing	The method used to clear vegetation should be specific to the location and type of vegetation. Clearing will be a two-step process where non-habitat trees are removed first allowing fauna time to move to other areas and then following a minimum duration period of one (1) night, habitat trees are removed. Prior to felling, trees will be 'tapped' by the excavator bucket (or other clearing equipment apparatus) to provide an opportunity for animals to escape.					
Operation Phase						
Re-vegetation	Use of green landscaping and planting additional ornamental and beneficial trees	Project green position and foliage	Increase re-vegetation	50,000	Operation phase	Environmental Manager

7.3 Waste Management Plan

The plan defines the appropriate strategies for the collection, transportation, and disposal of various waste types in compliance with national sanitation codes and environmental regulations. The objective of the plan is to ensure that mitigation measures are adequately implemented by identifiable individuals (Table 13).

Table 13: Waste Management Plan

Identified Action	Actual Action	Objective	Target	Budget (GHS)	Proposed Time Frame	Responsibility
Construction Phase						
Re-use of vegetative waste	Big size twigs and shrubs portion of the vegetative waste to be given out to locals as fuel wood. The twigs and leaves to be disposed of at vantage points on the irrigable area to undergo natural decomposition at the disposal points	To re-use the vegetative waste	Re-use all vegetative waste produced	50,000	Construction phase	HSE Officer of Contractor
Segregation and reuse of Construction waste	Excavated materials will be used for back filling and road works Construction waste to be segregated into paper, plastics, wood, and pieces of concrete. Wood to be given to locals as fuel wood. Broken pieces of concrete for back filling when found to be suitable.	To re-use construction waste	Re-use about 80% of the waste produced			

Identified Action	Actual Action	Objective	Target	Budget (GHS)	Proposed Time Frame	Responsibility
	Non-recyclable portion to be disposed of by an accredited waste management company.					
Domestic Waste segregation	Segregation of domestic waste into plastics and other waste. Plastics to be given to recycling companies. Other wastes to be disposed of by an accredited waste company	To prevent littering and indiscriminate disposal of waste	Reduction of to be disposed of by 50%			
Provision of toilet facility	Workers to be provided with mobile toilet units for use	To prevent open defecation	No case of open defecation to be recorded			
Subcontracting maintenance of machinery	Sub-contract servicing of vehicles/machinery to a thirty party	To prevent soil and groundwater contamination with waste oil	0% oil spillage on bare floor			
	Activities involving the use of oils and lubricants to be performed on an impervious platform fitted with an oil sump					
	Provide waste oil tanks to hold spent oils					
Operations Phase						
Provision of bins for segregation of domestic waste	Segregation of waste into plastic and other waste. Plastic waste to be given for recycling. Other waste to go to the district dump	To reduce the waste to be sent to the dumpsite	50% reduction of waste	50,000	Operation phase	Maintenance officer

Identified Action	Actual Action	Objective	Target	Budget (GHS)	Proposed Time Frame	Responsibility
Maintenance of machinery	Septic treatment plant will be serviced regularly	To prevent spillage	0% spillage of septic treatment system		Operation phase	

7.4 Erosion Control Plan

The plan (Table 14) is to protect the soil from erosion from potential runoff during the construction and operational phases of the project. The plan establishes as core components provision of sediment and grease traps, earth bunds and channels.

Table 14: Erosion Control Plan

Identified Action	Actual Action	Objective	Target	Budget (GHS)	Proposed Time Frame	Responsibility
Construction and Operational Phase						
Clearing in the dry season	Clearing activities to start in the dry season to minimize erosion and siltation risk	To prevent erosion and possible siltation of downstream waterbodies	Construction to commence in January 2025	30,000	Construction and operation phases	HSE Officer of Contractor Environmental Manager
Covering stockpiled topsoil	Covering of stockpiled topsoil with polythene sheets in demarcated areas	To prevent erosion	Greater portion to be use of stockpiled topsoil			
Creation of drainage systems	Drainage system channels will be constructed around the perimeter of the site to convey excess runoff	To prevent waterlogging on adjacent lands	Collection of runoffs for other uses			

Identified Action	Actual Action	Objective	Target	Budget (GHS)	Proposed Time Frame	Responsibility
Construction and Operational Phase						
Rainwater harvesting	Roof and surface water run-off will be controlled by means of sloped surfaces into concrete channels and harvested for landscaping and other uses	To prevent flood and erosion from excess runoff	Use harvested water for other uses			
Green landscaping	Employing soft landscaping systems	To reduce speed storm water runoff	Increase percolation by 50%			

7.5 Traffic and Road Safety Plan

The Traffic and Road Safety Plan defines the appropriate strategies for managing the potential traffic impacts and accident risks associated with the project in compliance with national traffic management and road safety regulations. The objective of the Plan is to ensure that the mitigation measures provided are adequately implement by identifiable individuals (Table 15).

Table 15: Traffic and Accident Safety Plan

Identified Action	Actual Action	Objective	Target	Budget (GHS)	Proposed Time Frame	Responsibility
Traffic safety and vehicular accidents	Use of high visibility safety jackets by all workers on site Trucks and vehicles will be equipped with reflective breakdown triangle, fire extinguishers, etc.;	To avoid traffic and vehicular accidents	Eliminate accidents completely	25,000	Construction and operation phases	HSE Officer of Contractor Environmental Manager

	Trucks and vehicles deployed will not be older than 5 years to avoid any breakdown in transit;					
	Vehicle fleet management system or haulage timetable to prevent hauling in fleets, peak traffic periods, and driver fatigue;					
	All trucks and other equipment will follow a maintenance regime and records kept;					
	Posting reflective signs such as "Heavy Trucks Turning" and also speed limits at approaches to the junction to the site;					
	Trucks and vehicles will be labelled with complaints and emergency phone numbers for reporting irresponsible driving;					
	Impromptu tests on alcohol consumption levels of truck drivers;					
	Compliance with the 30km/h speed limit driving through towns;					

	Only licensed (Class E) drivers will be qualified to drive trucks; and					

7.6 Dust and Emission Minimization Plan

The plan in Table 16 below is intended to protect the workers and general public from dust generated and its effects.

Table 16: Dust and Other Emissions Monitoring Measures

S/n	Parameter	Frequency	How to Monitor	Who Monitors	Budget (GHS)
1.	Records of maintenance	Half-yearly	Review maintenance schedule for machinery	Safeguards Specialist of OFGL	25,000
2.	Effectiveness of mitigation measures	Quarterly	Review the effectiveness of toolbox meetings		
3.	Quantities of PPEs supplied	Monthly	Inspect records of PPEs supplied		
4.	Adherence to the use of tarpaulin	Half-yearly	Impromptu checks on haulage trucks on adherence to the use of tarpaulin		
5.	Number and position of signs posts	Quarterly	Check presence and visibility of signage		
6.	Incidences of over speeding	Quarterly	Impromptu check on the adherence to the 30km/h speed limit		
7.	Records of registration documents	Quarterly	Inspect vehicle registration documents		
8.	Records of dousing	Weekly	Review road dousing schedule/records		

7.7 Noise and Vibration Plan

The plan outlined in Table 17 will guide the implementation of measures to reduce noise and vibration impacts. The plan will ensure the effective use of PPE, among others.

Table 17: Noise and Vibration Reduction Plan

Identified Action	Actual Action	Objective	Target	Budget (GHS)	Proposed Time Frame	Responsibility
Reduction of exposure to noise	Use of earplugs/earmuffs and high dexterity hand gloves	To minimize the exposure of the general public to excessive noise generated due to the project	Minimize exposure of the general public to noise by 90%	15,000	Construction and operation phases	HSE Officer of Contractor Environmental Manager of OSSA
	Operators of machinery and vehicles will be required to switch off idling engines					
	Padded seats will be fitted in mobile equipment and worn-out pads promptly replaced to limit the effect of vibration transmission to drivers					
	Operators of heavy-duty machinery and equipment such as bulldozers, compactors, and backhoes to take intermittent breaks after every 4-hour operation					
	Construction machinery, trucks, and vehicles deployed for the project would be less than 5 years old for maximum efficiency					

	Haulage trucks and other construction machinery, equipment, and vehicles would be required to follow a strict maintenance regime and recording					
	Haulage and working hours will be restricted to daytime (8:30 to 17:00)					

7.8 Health and Safety Plan

The plan in Table 18 below will guide the implementation of measures to safeguard the overall health and safety of workers and the general public.

Table 18: Health and Safety Plan

Identified Action	Actual Action	Objective	Target	Budget (GHS)	Proposed Time Frame	Responsibility
• Protection from sprains, trips, and falls • Accident prevention • Malaria prevention	Provide PPE - hard hats, high-visible clothing, gloves, boots, nose masks, goggles	To minimize the risk of workers and general public getting involved in accidents	Eliminate accidents on-site completely	30,000	Construction and operation phases	HSE Officer of Contractor Environmental Manager of OSSA
	Observe good housekeeping practices					
	Provide First Aid Kits					
	Record all accident/injury and snakebite cases					

	Use of trolleys and wheelbarrows to carry heavy items					
	Proper disposal of empty cans to prevents mosquito breeding on stagnant water					
	Covering of open trenches not in use					

7.9 HIV/AIDS Prevention Plan

The plan in Table 19 defines the mechanisms to prevent the potential risk of spread of HIV/AIDS and protect the population of the nearby community from exposure, as well as from increasing the prevalence of HIV/AIDS at the district level.

Table 19: HIV/AIDS Prevention Plan

Identified Action	Actual Action	Objective	Target	Budget (GHS)	Time Frame	Responsibility
Contraction and spread of HIV/ AIDS through: • An influx of non-local workers into the project area • Enticement of locals by workers	Awareness creation among workers on HIV/AIDS risks and dangers through preventive programmes including, peer counselling, facilitation of voluntary testing and support for behavioral change for workers, safe sex practices, condom use, abstinence, etc	To reduce the contraction and spread of HIV/AIDS	Achieve UNAIDS/ national	15,000	Construction and operation phases	HSE Officer of Contractor Environmental Manager of OSSA
	Provision of condoms at accessible and convenient locations for workers					
	Incorporation of HIV/AIDS prevention clauses in the workplace policy					

Identified Action	Actual Action	Objective	Target	Budget (GHS)	Time Frame	Responsibility
• Luring of high-earning workers by females	Enhanced awareness programme for the nearby communities on HIV/AIDS risks					
	Support to Health Directorate in its community education campaign on HIV/AIDS					
	Distribution of awareness leaflets in the project beneficiary communities					

7.10 Prevention Plan for Infectious diseases

The plan outlined in Table 20, serves as a guideline for reducing the risk of contraction and spread of COVID-19 and others among the workers and general public with measures such as constant hand washing, use of nose masks, and education on preventive measures.

Table 20: Infectious Prevention Plan

Identified Action	Actual Action	Objective	Target	Budget (GHS)	Time Frame	Responsibility
Contraction and spread of COVID-19 through close interaction	Sensitization on COVID-19 preventive measures and symptoms WHO requirements	To reduce the contraction and spread of COVID-19	Complete avoidance of contraction of the disease	15,000	Construction and operation phases	HSE Officer of Contractor Environmental Manager of OSSA
	Hand washing stations, with soap, clean water, and hand tissues on the project site for workers, to constantly wash their hands					
	Personal alcohol-based hand sanitizers will be given to each worker for use and refilled weekly					

Identified Action	Actual Action	Objective	Target	Budget (GHS)	Time Frame	Responsibility
	An infrared thermometer gun will be used to check the temperature of each worker daily					
	Nose masks will be provided to each worker for use and wearing enforced					
	Informative signages spelling out safety practices to prevent contraction and spread of COVID-19 at various points on-site and in communities					
	Workers will be made to observe social distancing of at least 2 metres apart					
	Frequently touched objects and tools will be cleaned and disinfected daily					
	Workers will avoid contact with sick people and avoid going to the site if they are feeling sick					

7.11 Fire Prevention and Control Plan

The objective of the plan is to ensure fire prevention and effective fire safety in the project site. The plan establishes core components processes such as awareness creation and training of fire volunteers (Table 21).

Table 21: Fire Prevention and Control Plan

Identified Action	Actual Action	Objective	Target	Budget (GHS)	Proposed Time Frame	Responsibility
Awareness creation	Support GNFS to create awareness and educate occupant	To minimize the incidence of bushfire	Reduce bushfire by 95%		Construction and	HSE Officer of Contractor

Identified Action	Actual Action	Objective	Target	Budget (GHS)	Proposed Time Frame	Responsibility
Mounting of signage	Post caution signs like 'No Smoking', 'Switch Engines' and 'Mobile Phones Off', 'Emergency Hotlines', etc. conspicuously at the fuel storage and fuelling areas;	To caution workers of the dangers associated with likely ignition or heat sources identified	100% elimination of ignition sources	25,000	operation phases	Environmental Manager of OSSA
Firefighting equipment	Provide firefighting equipment such as fire beaters, extinguishers, foam concentrates, hose reels, dry chemical powder and CO_2 fire extinguishers at fuel storage and generator set areas;	To be able to fight fire and contain it in the event of any outbreak	Available equipment to fight fire			
Cooking and smoking at designated areas	Restrict cooking and smoking to designated areas;	To prevent fire out break	No smoking and cooking anywhere outside designated area			
Tool box meeting	Conduct weekly toolbox meetings on fire safety	To educate workers on fire and its prevention	0% fire incident on-site			

7.12 Visual Intrusion Minimization Plan

The objective of the plan is to minimize the visual impact from the project on the public. Table 26 outlines the responsibilities and supervisory roles for safeguards actions required.

Table 22: Visual Intrusion Minimization Plan

Identified Action	Actual Action	Objective	Target	Budget (GHS)	Proposed Time Frame	Responsibility
Visual impact	Creation of a vegetation screen around perimeter of site	To minimize visual impacts on the public	95% reduction of visual impact from project	15,000	Construction and operation phases	HSE Officer of Contractor Environmental Manager of OSSA
	50m buffer zone developed around project site					
	External lights with fixtures on top to cover their glow maintain dark sky					

7.13 Greenhouse Gas Emissions and Reduction Plan

The objective of the plan to be developed in line with final resident and auxiliary and complementary machinery to minimize GHGs emissions and associated impacts as far as possible from the project on the environment. Table 27 outlines the responsibilities and supervisory roles for safeguards actions required.

Table 23: GHGs Minimization Plan

Identified Action	Actual Action	Objective	Target	Budget (GHS)	Proposed Time Frame	Responsibility
Green House Gases emission	Building of on-site waste system and possible harvesting and use of gases from it	To minimize GHGs on the environment	50-70% reduction of GHGs impact from project	80,000	Construction and operation phases	Environmental Manager of OFGL
	Increasing the project foliage especially plants and trees that are capable of acting as carbon sinks					
	Reduction in animal feed with higher GHGs generation elements					

The total estimated budget for the PEMP implementation, amounting to GH¢ 570,5000.00, is given in Table 28 below.

Table 24: PEMP Budget Summary

S/n	Plan	Estimated Amount (GHS)
1.	Vegetation and Fauna Protection Plan	70,000
2.	Waste Management Plan	100,000
3.	Erosion Control Plan	30,000
4.	Traffic and Road Safety Plan	25,000
5.	Dust and Emission Minimization Plan	25,000
6.	Noise and Vibration Plan	15,000
7.	Health and Safety Plan	30,000
8.	HIV/AIDS Prevention Plan	15,000
9.	Infectious Disease Prevention Plan	15,000
10.	Fire Prevention and Control Plan	25,000
11.	Greenhouse Gas Emissions and Reduction Plan	15,000
12.	Visual Intrusion Minimization Plan	80,000
Sub-Total		445,000.00
Contingency (10%)		44,500.00
TOTAL		489,500.00

7.14 Environmental Management Responsibility of the Project's Management (Pre-Construction, Construction, and Operational Phases)

As indicated in the organogram in Figure 5, the project shall be supervised by the site manager or engineer. He will report directly to the Managing Director and will be in charge of the day-to-day success of the project especially during the pre-construction and construction phases. The environment, health, and safety officer will report daily to the site engineer. The environmental management responsibilities of management and officers of the project are described below:

(i) Environment, Health, and Safety Officer

The Managing Director in consultation with the site manager will appoint an EHS Officer (or the contractor will be tasked to employ an EHS officer who will lead, supervise and coordinate all activities at the project site about the environment, health and safety. S/he will be responsible for guiding the various workers to ensure employees and construction activities comply with the company's commitments and national and international guidelines EHS Officer shall ultimately be responsible for resolving environmental management issues at the facility. S/he will be responsible for the overall implementation of the EMP and monitoring plan of the facility. This will include supervising the implementation of environmental management measures and daily as well as routine monitoring of activities such as waste

management, health, and safety. S/he will, in addition, be responsible for ensuring hygienic and sanitary conditions prevail on the premises of the facility. H/She will finally be responsible to assign personnel responsible for traffic control within and around the project area including implementation of the recommendations of the GNFS; the efficient maintenance and operation of the generating set. He will also be responsible for the daily routine inspections of the proposed project.

7.14.1 Waste Management

EHS Officer will:

- Ensure that drainage systems for liquid waste are adequate and efficient for the purpose;
- Ensure that different waste streams – paper, glass, plastics, and food leftovers are segregated at source by providing well-labelled colour-coded waste bins at appropriate locations on the premises;
- Ensure that all waste management facilities including the temporary waste storage area remain in good working condition;
- Arrange with the waste management unit of the company/waste management unit of the Assembly or contracted waste management company to collect these waste streams at least once every week;
- Undertake daily visual inspection of all waste collection and storage areas for evidence of rodents and insect infestation.

7.14.2 Public Health and Safety

Environmental Health and Safety (EHS) issues shall be the responsibility of the EHS Officer with the support of the supervising engineers and foremen, especially during the construction phase.

They shall:

- Ensure the continuous provision and proper use of all necessary PPEs by the workers;
- Ensure the organization of fire prevention education and drills, at least, once a year
- Organize an HIV/AIDS awareness program at least once every year for the workers;
- Provide staff with public education materials on HIV/AIDs, other Sexually Transmitted Infections (STI) and diseases as well as communicable diseases.

7.14.3 Fire Prevention

Fire prevention programs and activities will be the responsibility of the EHS Officer. S/he will:

- Ensure the implementation of the recommendations of the Ghana National Fire Service;
- Liaise with officials from the Ghana National Fire Service to organize fire drills and fire prevention talks every year;
- Inspect all firefighting equipment every quarter to ensure that they remain in good working condition at all times;
- Visually inspect all electrical cables and sockets regularly to detect electrical faults which could be potential sources of electrical fires;
- Ensure that recommendations of the GNFS are fully implemented.

7.14.4 Traffic Management

Traffic management would be the responsibility of the personnel assigned by the EHS in consultation with the site engineer and approval by the Managing Director. They will

- Liaise with the Urban Roads Department for the erection of appropriate traffic warning signage at appropriate locations in the project area to prevent pedestrian - vehicular conflicts and accidents;
- Help direct or manage traffic and vehicular movement into the proposed site
- Ensure the provision of appropriate clothing and equipment for the traffic wardens/flagmen.

7.14.5 Noise Reduction

The Head of Transport and Machinery will be responsible for the smooth operation and servicing of all machinery on-site including generator (proposed 1no. 1,000 kvA) sets and the operational vehicles and machinery at the construction phase. S/he will ensure that the operation and servicing of such machinery conform to the manufacturer's guide. Also, s/he would ensure that noise generating machines are reduced and services are done on time.

7.14.6 Public Complaints Unit

Management of the project will set up public complaints or grievance redress mechanisms where general complaints on its activities and operations and other complaints would be investigated and resolved amicably. This will be the responsibility of the EHS committee which will be made up of the Managing Director serving as the chairman, Site engineer, EHS Officer, site supervisor and head of all the foremen as members; will be in charge of amicable

resolution of complaints especially during the construction phase. The work of the EHS committee's work will come to an end immediately after construction is completed. The project management team/administration will be in charge of complaint resolution during the operational phase.

7.14.7 Emergency Response and Disaster Management

In case of disaster due to fire, unforeseen accidents and general emergencies during the construction phase the nearest supervisor, and/or Site engineer / EHS Officer will be informed regarding the disaster.

In case of fire, this officer or worker should immediately inform the Ghana National Fire Service, giving as much information as possible on suspected causes and/or types of fire. They should also adhere to the following procedures;

- Sound emergency alarms.
- Switch off the power supply to all equipment in the area.
- Workers should evacuate to pre-assigned spots or Emergency Assembly Points for roll calls to ascertain the number of people trapped/affected in the area.
- Rescue/evacuate the people from the affected area in consultation with the Production Manager / EHS Officer after a risk assessment of the fire.
- If people outside the project are affected by the disaster, then keep Police and Authorities informed of details of the disaster so that rescue/evacuation could be set in motion.
- Ensure that first aid is rendered to victims and make arrangements for quick transportation to the nearest hospital.
- After a disaster, cordon off affected areas so that evidence is not tampered with, for a thorough accident investigation by either the Ghana Police Service, Ghana National Fire Service or the National Disaster Management Organization (NADMO). The results of such investigations must be used to prevent any future occurrence of accidents.

Other measures to be adopted in addition to the above include;

- List of trained personnel in first aid, firefighting, rescue, etc. should be prominently displayed at vantage points to help quickly locate such personnel in emergencies. Cautionary display signs should be prominently displayed on the premises.

- A suggestion box would be installed for use by employees for feedback on the effectiveness of safety and environmental policy and suggestions and inputs from all sections of the facility.

In addition to the appropriate emergency procedures stated above the management of the facility would provide the following facilities to deal with emergencies during the operational phase.

- Alarm systems (Flame arrestors, smoke detectors)
- Appropriate fire extinguishers (foam, dry chemical, CO_2, sand buckets, etc.)
- Emergency evacuation procedures
- First-aid equipment
- A well maintained internal and external communication
- Arrangement and procedures for mobilizing company equipment, facilities and personnel and third-party resources for emergency support.

A well-prepared emergency preparedness and response plan breakdown of wastewater/effluent, terrorist attack, stuck lift, etc would be carried out by contracted consultants and staff and management of the facility will be trained on how to detect and report on them.

7.15 Decommissioning

The operational phase of the project is intended to be a life-long facility and decommissioning of the project is not foreseeable in the future. However, when all the works for infrastructure development and the construction of the project have been completed, a program of decommissioning will be put in place. The program for the decommissioning prior to occupancy would include the following amongst others:

- Disconnection of electricity supply to all temporary structures, e.g. workshops and sheds before dismantling of these structures.
- Dispose of debris from the dismantled parts at authorized landfill sites.
- Move serviceable equipment and machinery to new sites or to a packing yard. Sell unserviceable equipment and machinery as scrap to the metal industries and other interested persons.
- Rehabilitate and landscape.

8.0 Monitoring Objectives

Monitoring of environmental likely effects and identified vital activities in the project is necessary to ensure that proposed management and mitigation measures are effectively and efficiently able to address the anticipated environmental impacts. The main objective of monitoring is to ensure that the proposed project is environmentally compliant.

Specific Objectives include the following amongst others:

- To ensure that the proposed management and mitigation measures are appropriate and helped address the predicted impacts
- To ensure that unforeseen impacts during the impact identification and assessment are addressed timely.
- To supply information back to management for appropriate modifications to be made on relevant phases of the project.

The monitoring of the project will cover both the constructional and operational phases of the project.

8.1 Constructional Phase Monitoring

Construction activities will be monitored to ensure strict compliance with design specifications and contract conditions. In the case of deviation identification, the design engineer and contractors shall work closely for swift action in the case deviations are noticed for corrective measures to be implemented without delay. The periodic meeting will be held between the contract supervision engineer, contractor, and management to determine the progress of work and adherence to safety and quality standards. Issues and concerns of stakeholders and adjoining properties to the project would also be considered.

Environmental quality parameters that will be monitored to track the effectiveness of the proposed mitigation will focus on the following:

- Vegetation and Fauna Protection Monitoring Plan
- Waste Management Monitoring Plan
- Erosion Control Monitoring Plan
- Traffic and Road Safety Monitoring Plan
- Dust and Emission Minimization Monitoring Plan
- Noise and Vibration Monitoring Plan
- Health and Safety Monitoring Plan

- HIV/AIDS Prevention Monitoring Plan
- Infectious Disease Prevention Monitoring Plan
- Fire Prevention and Control Monitoring Plan
- Greenhouse Gas Emissions and Reduction Monitoring Plan
- Visual Intrusion Minimization Monitoring Plan

8.2 Vegetation and Fauna Protection Monitoring Plan

The actions to be monitored to ensure that vegetation and fauna protection concerns are adequately addressed as shown in Table 25.

Table 25: Vegetation and Fauna Protection Monitoring Plan

S/N	Parameter	Frequency	How to Monitor	Who Monitors	Budget (GHS)
1.	Clearing activities	Weekly	Inspect the schedule of work	Safeguards Specialist	5,000
2.	Stockpiling	Monthly	Checking covering of stockpiled topsoil		
3.	Drainage	Quarterly	Inspect drain for adequacy		
4.	Rainwater harvesting	Quarterly	Inspect pipes and channels		

8.3 Waste Management Monitoring Plan

The actions to be monitored to ensure that waste disposal concerns are adequately addressed as shown in Table 26.

Table 26: Waste Management Monitoring Plan

S/n	Parameter	Frequency	How to Monitor	Who Monitors	Budget (GHS)
1.	Big twigs and woody portion of vegetative waste to locals	Daily	Checking quantities that have been given out	Safeguards Specialist	10,000
2.	Excavated material for backfilling	Weekly	Check quantities of materials used		
3.	Segregation and re-use of construction waste	Weekly	Inspect quantities of waste segregated, re-used, and sent to a dumpsite		
4.	Domestic waste segregated and given to recyclers or sent to dumpsite	Monthly	Check quantities of waste segregated and given to recyclers or sent to a dumpsite		
5.	Oily waste	Monthly	Check quantities of waste oil produced and stored Check for signs of oil spillage on the bare floor		

6.	Liquid waste	Weekly	Check for state and adequacy of mobile toilet Check for signs of open defecation		
7.	E-waste	Half yearly	Review records of quantities stored and returned to the suppliers		

8.4 Erosion Control Monitoring Plan

The measures to be monitored, and actions to execute the monitoring to facilitate the effectiveness of implementation are addressed in Table 27.

Table 27: Erosion Control Monitoring Plan

S/n	Parameter	Frequency	How to Monitor	Who Monitors	Budget (GHS)
1.	Clearing activities	Weekly	Inspect the schedule of work	Safeguards Specialist	5,000
2.	Stockpiling	Monthly	Checking covering of stockpiled topsoil		
3.	Drainage	Quarterly	Inspect drain for adequacy		
4.	Rainwater harvesting	Quarterly	Inspect pipes and channels		

8.5 Traffic and Road Safety Monitoring Plan

The following mitigation measures and actions will be monitored to ensure that traffic and accidents concerns are adequately addressed as shown in Table 28.

Table 28: Traffic and Accident Safety Monitoring Plan

S/n	Parameter	Frequency	How to Monitor	Who Monitors	Budget (GHS)
1.	Records of jackets provision and use	Monthly	Impromptu checks on provision and use of jackets	Safeguards Specialist	7,000

2.	Records of registration documents	Quarterly	Inspect vehicle registration documents		
3.	Records of maintenance	Half-yearly	Review maintenance schedule for machinery		
4.	Availability of First Aid box, fire extinguisher, triangles	Quarterly	Impromptu checks on the state of safety kit		
5.	Records of registration documents	Quarterly	Inspect vehicle registration documents		
6.	Number and position of signs posts	Half-yearly	Check presence and visibility of signage		
7.	Emergency phone numbers and reflectors on trucks	Half-yearly	Check position and visibility of labels		
8.	Records of alcohol levels of drivers	Half-yearly	Impromptu checks of alcohol levels of drivers		
9.	Incidences of over speeding	Quarterly	Check vehicle speed using tracking systems		
10.	Records of the expiry date of licenses	Half-yearly	Check the validity of licenses		

8.6 Dust and Emission Minimization Monitoring Plan

The plan outlined in Table 29 is to ensure effective compliance with mitigation measures to minimize the dust generation and its effects.

Table 29: Dust and Other Emissions Monitoring Measures

S/n	Parameter	Frequency	How to Monitor	Who Monitors	Budget (GHS)
9.	Records of maintenance	Half-yearly	Review maintenance schedule for machinery	Safeguards Specialist of OFGL	5,000
10.	Effectiveness of mitigation measures	Quarterly	Review the effectiveness of toolbox meetings		
11.	Quantities of PPEs supplied	Monthly	Inspect records of PPEs supplied		

12.	Adherence to the use of tarpaulin	Half-yearly	Impromptu checks on haulage trucks on adherence to the use of tarpaulin		
13.	Number and position of signs posts	Quarterly	Check presence and visibility of signage		
14.	Incidences of over speeding	Quarterly	Impromptu check on the adherence to the 30km/h speed limit		
15.	Records of registration documents	Quarterly	Inspect vehicle registration documents		
16.	Records of dousing	Weekly	Review road dousing schedule/records		

8.7 Noise and Vibration Monitoring Plan

The plan is intended to protect the workers and the general public from potential hearing impairments from the noise generated. The key measures to safeguard this are outlined in Table 30 below

Table 30: Noise and Vibration Monitoring Plan

S/n	Parameter	Frequency	How to Monitor	Who Monitors	Budget (GHS)
1.	Records of provision and use of earplugs	Monthly	Impromptu checks on the use of earplugs and hand gloves	Safeguards Specialist of OFGL	5,000
2.	Adherence to switching off idle machinery	Monthly	Impromptu checks on machine operators		
3.	Compliance with use and replacement of worn-out pads	Quarterly	Checks on use and records of replacement of padded seats		
4.	Review records of breaks of operators	Quarterly	Records of breaks of operators		
5.	Records of registration documents of trucks	Quarterly	Inspect vehicle registration documents		

6.	Records of maintenance	Quarterly	Review records of serviced trucks and conditions		
7.	Records of logbook	Monthly	Inspect logbook of haulage trucks		

8.8 Health and Safety Monitoring Plan

The plan is intended to protect people from potential harm from the project. The measures to safeguard health and safety are outlined in Table 31.

Table 31: Health and Safety Monitoring Plan

S/n	Parameter	Frequency	How to Monitor	Who Monitors	Budget (GHS)
1.	Records of PPEs provision and use	Monthly	Impromptu checks on provision and use of PPEs	Safeguards Specialist of OFGL	15,000
2.	Cases of accident/ injury recorded	Monthly	Review records of accidents/injuries and near misses		
3.	Patronage and type of cases reported	Monthly	Review adequacy and patronage of First Aid		
4.	Records of supplies to centre	Monthly	Records and availability of supplies		
5.	Treatment records	Monthly	Review records of cases of snakebites and accidents		
6.	Records of wheelbarrow/trolley provision and use	Monthly	Impromptu checks on provision and use		

8.9 HIV/AIDS Prevention Monitoring Plan

The effectiveness of HIV/AIDS prevention measures and support programme implementation will be monitored through the measures outlined in Table 32.

Table 32: HIV/AIDS Prevention Monitoring Plan

S/n	Parameters	Frequency	How to Monitor	Who Monitors	Budget (GHS)
1.	Awareness programmes organized	Yearly	Review types and number of awareness programmes organized and records of attendance	Safeguards Specialist of OFGL	5,000
2.	Availability of condoms	Monthly	Checks for availability and supply of condoms to workers		
3.	HIV/AIDs policy implementation	Yearly	Review policy implementation		
4.	Effectiveness of educational campaigns	Yearly	Review number of educational campaigns organized		
5.	Leaflets distributed	Quarterly	Review the number of leaflets distributed		

8.10 Infectious Disease Prevention Monitoring Plan

The measures in Table 33 will aid the monitoring of the effectiveness of the COVID-19 preventive measures, protecting the workers and general public from the disease.

Table 33: Coronavirus Prevention Monitoring Plan

S/n	Parameters	Frequency	How to Monitor	Who Monitors	Budget (GHS)
1.	Sensitization programmes organized	Monthly	Review types and number of sensitization programmes organized, records of attendance	Safeguards Specialist of OFGL	5,000
2.	Availability of handwashing stations and supplies	Weekly	Records of stock of handwashing supplies		
3.	Availability of hand sanitizers	Weekly	Records of stock and distribution of hand sanitizers		
4.	Records of temperature readings	Weekly	Review records of temperature readings		
5.	Records of provision and use of nose masks	Weekly	Review records of nose masks provided		
6.	Signages posted	Monthly	Review number of signages posted		
7.	Records of daily cleaning	Weekly	Inspect cleaning logbook		
8.	Records of workers who report sick	Weekly	Review records of workers who report sick		

8.11 Fire Prevention and Control Monitoring Plan

The aspects of mitigation measures to be monitored and the execution of other monitoring actions to facilitate the effectiveness of implementation are outlined in Table 34.

Table 34: Fire Prevention and Control Monitoring Plan

S/n	Parameter	Frequency	How to Monitor	Who monitors	Budget (GHS)
1.	Extent of awareness creation	Half yearly	Review and evaluation of the effectiveness of education of locals on bush fire	Safeguards Specialist of OFGL	7,000
2.	Availability of signage	Weekly	Inspection of the adequacy and effectiveness of signage		
3.	Availability of firefighting equipment	Monthly	Review the accessibility and availability of firefighting equipment		
4.	Cooking and smoking at designated areas	Impromptu checks	Review records of offenders		
5.	Tool box meeting	Weekly	Review participation of workers in tool box talks		

8.12 Visual Intrusion Minimization Monitoring Plan

The monitoring measures and parameters to apply in checking visual intrusion minimization are provided in Table 35.

Table 35: Visual Intrusion Minimization Monitoring Plan

S/n	Parameter	Frequency	How to Monitor	Who Monitors	Budget (GHS)
1.	Clearing activities	Weekly	Inspect the schedule of work	Safeguards Specialist of OFGL	5,000
2.	Stockpiling	Monthly	Checking covering of stockpiled topsoil		
3.	Drainage	Quarterly	Inspect drain for adequacy		
4.	Rainwater harvesting	Quarterly	Inspect pipes and channels		

8.13 Greenhouse Gas Emissions and Odour Reduction Monitoring Plan

The monitoring plan and parameters to apply in checking GHGs emissions and odour reduction monitoring are provided in table 36 below.

Table 36: Visual Intrusion Minimization Monitoring Plan

S/n	Parameter	Frequency	How to Monitor	Who Monitors	Budget (GHS)
1.	Regular inspection and maintenance on-site septic	Bi-Weekly	Inspect the maintenance schedule of seotic	Safeguards Specialist of OFGL	5,000
2.	50m buffer zone developed around project site	Annual	Checking for effectiveness of the strategy		
3.	Increasing the project foliage especially plants and trees that are capable of acting as carbon sinks	Annual	Growth of this plants and trees		
4.	Reduction in animal feed with higher GHGs generation elements	Weekly	Inspect feed component		

The total estimated budget (Table 37) for monitoring the effectiveness of the proposed mitigation measures is GHS 81,400.00.

Table 37: Monitoring Plan Budget Summary

S/n	Plan	Estimated Amount (GHS)
1.	Vegetation and Fauna Protection Monitoring Plan	
2.	Waste Management Monitoring Plan	10,000
3.	Erosion Control Monitoring Plan	5,000
4.	Traffic and Road Safety Monitoring Plan	7,000
5.	Dust and Emission Minimization Monitoring Plan	5,000
6.	Noise and Vibration Monitoring Plan	5,000
7.	Health and Safety Monitoring Plan	15,000
8.	HIV/AIDS Prevention Monitoring Plan	5,000
9.	Coronavirus Prevention Monitoring Plan	5,000
10.	Fire Prevention and Control Monitoring Plan	7,000
11.	Greenhouse Gas Emissions and Odour Reduction Monitoring Plan	5,000
12.	Visual Intrusion Minimization Monitoring Plan	5,000
Sub-Total		**74,000.00**
Contingency (10%)		**7,400.00**
TOTAL		**81,400.00**

8.14 Operational Phase Monitoring

The major environmental issues that will require regular monitoring include the effectiveness of the fire prevention plan, periodic check of level in waste treatment system ensuring testing at the appropriate time, housekeeping in offices, etc, efficient use of utilities, traffic management, and use of occupational health and safety equipment, ambient air quality and ambient noise.

Table 38: Environmental Monitoring Plan

Activity	Environmental Aspect	Environmental Impact and Parameters to be monitored	Specific Action	Frequency	Annual Budget (GH₵)	Responsibility
Operational Phase	Drainage	Blocking of the flow of stormwater	✓ Construction of adequate drainage ✓ Monitoring of drainage system	Weekly	15,000.00	Facility Management team
	Waste Management	Solid wastes generation	✓ Provision of waste bins ✓ Collection & disposal of refuse	Weekly	25,000.00	Facility Management team
	Fire Prevention and fighting Equipment	Fire hazard	Provision of effective and functioning fire extinguishers and servicing	Annually	56,000.00	Facility Management team
	Wastewater Quality	pH, COD, BOD, etc	Testing of wastewater	Periodically	20,000.00	Facility management team
	Total				**116,000.00**	

8.13 Regulatory Monitoring

The relevance of an environmental monitoring plan for a project is to provide room for judging the accuracy of assessed impacts, implement mitigation measures and allow for prompt remedial action to be taken to correct deviations in the impacts and mitigation measures. It is also to help discover new impacts that might have been overlooked during the environmental assessment so that appropriate mitigation measures are put in place to ensure efficiency and sustainability. Monitoring which will be done throughout the implementation stage of the project. The monitoring responsibilities are presented in Table 39 below:

Table 39: Monitoring Responsibilities of Major Stakeholders

RESPONSIBILITY	PARAMETERS TO BE MONITORED	OUTPUT	TIME FRAME
EPA	Over environmental performance of the project	Instructions/ directives to manage the impact	Throughout the project cycle
Management of the company	Overall performance of the project including waste management, accidents of any kind, etc	Environmental reports	During the operational phase of the project
Environmental Health and Sanitation Department of the Assembly and EPA	Environmental performance of the project including health and waste	Environmental Health audits	During the operational phase of the project
Ghana National Fire Service	Monitoring of fire precautions and fighting measures	Fire certificate renewal	Annually

Works Department and Physical Planning Departments of the LaDMA	Inspection of structures and facilities as per approved designs	Certificate of Habitation	After construction (5 years)
Ghana Civil Aviation Authority	Structures not to be mounted on height more than approved height of 42.0m	Confirmation of the height of highest mounted point	After completion of project
Department of Urban Roads	Drainage systems and project road and entry and exit of project vehicles from the project site onto adjoining road network		

9.0 Consultations

9.1 Introduction to Stakeholders Consultation

During the impact identification of the project, several activities were carried out by the consultant including the social consequences of the implementation of the proposed project at the proposed site.

9.2 Stakeholder Participation and Consultation

The Environmental Impact Assessment (EA) Specialist/consultant and his team had interactions and discussions on possible environmental and socio-economic impacts of the proposed project. These informal discussions focused on the following issues among others;

- Commitment by project proponents to pursue the best environmental and social practices to ensure minimal adverse impacts on the surrounding
- Project location concerning traffic generation, control, and management
- The potential economic impact of the proposed project on the income levels of the indigenes and local during the development phases
- The justification for the project on the proposed site

Consultations were held with only relevant institutions and their correspondence are attached.

9.3 Methodology

The Environmental Assessment Regulations, 1999 (LI 1652), request for the participation of stakeholders in the identification of the potentially significant impacts of a proposed development. The general methodology for EIA was mainly official correspondences and documentation as there was no residence or private structures.

9.4 National Institutions, Departments and others

As earlier indicated government institutions, departments and agencies were consulted. These identified stakeholders with whom discussions were held included the following:

- Officials of the Environmental Protection Agency – Accra West Regional office
- La Dade Kotopon Municipal Assembly (Departments of the Spatial Planning Department – formerly Town and Country Planning and Works)
- Officials of the Ghana Civil Aviation Authority for comments on height zoning/air safety permit on the proposed location and permit as well if necessary
- Ghana Airport Company Limited
- Ghana National Fire Service

9.4.1 Environmental Protection Agency (EPA)

Consultations with the EPA led to the registration of the project and submission of the payment of the required processing fees for the proposed project. The Environmental Protection Agency, as part of the EIA procedure, carried out a screening exercise and requested a preliminary environmental assessment report for the project in other to aid the Agency in decision-making for the issuance of an Environmental Permit.

9.4.2 Physical Planning Department/La Dade Kotopon Municipal Assembly

The required zoning request letter was submitted to the office of the Physical Planning Department of the Municipal Assembly for their comments on the suitability of the project in the area.

9.4.4 Civil Aviation Authority

The Ghana Civil Aviation Authority was also officially consulted for their clearance on the site for the project. The issued correspondence by the GCAA ie Airspace safety permit earmarked the place as 34.65 meters

Ghana Civil Aviation Authority

GCAA

Our ref: GCAA/ASAS/OE/2024/076/02 19th January, 2024

Dig. Add: GL-135-7178

PLP PROPERTIES LIMITED
P.O. BOX 190,
TRADEFAIR CENTRE,
ACCRA

Aeronautical Study No(s): *2024-ASAS-0001*

AIRSPACE SAFETY PERMIT

The Ghana Civil Aviation Authority (GCAA) has concluded an aeronautical study under the provisions of the Ghana Civil Aviation (Aerodrome) Directives and, on the basis of the information provided on the Form GCAA/SRD/ASAS -01 and other submissions to the Authority.

Concerning:

Structure:	*Building*
Location:	*Kotoka International Airport, Greater Accra Region*
Latitude:	*05°36' 23.31"N*
Longitude:	*000°10' 23.69"W*
Height Requested:	*34.65m (113.68ft)*

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace. A determination made under this section does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any local government body as well as environmental, land title issues or land use compatibility impacts.

The structure would have no substantial adverse effect on the safe and efficient utilization of navigable airspace provided the following condition(s) are observed:

(a). The structure shall be mounted to a height ***not more than 34.65m (113.68ft)*** above ground level (AGL).

All other heights including any parapets, obstruction lighting, appurtenances, antennas, flagpoles, mechanical equipment, window washing equipment, etc., whether temporary or permanent, frangible or not are to be restricted to the determination made.

Temporary construction equipment such as cranes, derricks etc. which may be used during actual construction of this structure shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the GCAA.

(b). The structure shall be provided with any mandatory obstruction marking and lighting and perpetually maintained in accordance with the attached lighting guidance.

(c). This determination is based, in part, on the foregoing description which includes specific coordinates & heights. Any changes in coordinates or height will void this determination. Any future construction or alteration, including but not limited to height increase, require a separate application to the GCAA.

(d). Please note that the initial issuance of a determination is not absolutely final and permanent. Within the first 40 days of issuance, a party who opposes the structure height

Private Mail Bag
Kotoka International Airport
Accra, Ghana

Tel: (233)-(30) 2776171
Fax: (233)-(30) 2773293
E-mail: info@gcaa.com.gh

SITA: ACCXTYF
AFTN: DGAAYFYX
Website: www.gcaa.com.gh

Figure 12: Ghana Civil Aviation Permit

9.4.5 Ghana National Fire Service

The developer through consultations with the Ghana National Fire Service has procured fire permits for the proposed development. Again, the GNFS has approved recommendations in the fire assessment report for the project and these recommendations will be strictly adhered to and implemented to ensure that all necessary precautionary and preventive measures are taken to avert the occurrence of fire throughout the project life

9.4.6 Utility Service Providers

The availability and adequacy of services provided by telecommunication companies such as MTN and Vodafone Ghana Limited at the project site were assessed to ensure that the requirements of the project were reasonably met. Utility Service Providers. The Electricity Ghana Company and Ghana Water Service were also consulted for their view on the connection of the project to utility. The Electricity Company of Ghana indicated that as part of the requirement they may require the M&E drawings to enable them assess the project for the required connection and transformers. The developer will work closely with officials of utility providers to ensure that the project is connected to the national grid and water services without harm to surrounding properties.

9.4.7 Additional Stakeholders Consultation Feedback

- Car Washing Group

A member of the car washing group that operates within the car park 5 with approval from GACL indicated they have no problem with the propose development as the lands belongs to the GACL. But he refused to volunteer his name for the records.

- A5 Security in charge of Security at Car park 5

Again, the supervisor of the A5 Security assigned to the area of the proposed project at the time of the assessment had no objection to proposed project. He also indicated that since the land belongs to GACL and they are security contractor assigned to safeguard the car park, he is sure GACL had informed his bosses.

.

Table 40: Summary of Stakeholder Engagement, Issues and Response Matrix

Stakeholder	Mode Of Engagement	Issues/Concerns Raised By Stakeholder	Response
Regulatory And Government Institutions			
Environmental Protection Agency (EPA)	Registration of the proposed Project via the submission of Form EA1 to notify the Agency of the intention to develop the proposed project.	A formal request from EPA to submit the project's Preliminary Environmental Assessment Report, after site inspection.	Preliminary Environmental Assessment report compiled and submitted for review and approval.
Ghana National Fire Service (GNFS)	Formal application for Fire Assessment and permitting	Compliance with Fire prevention measures. Emergency arrangement for fire outbreaks. Fire Permit issued	Emergency Preparedness and Response Plan and fire plans. Developer to strictly adhere to recommendations and permit conditions
Works Department	Submission of required documents for review and approval	Planned inspection and Pay required statutory fees	Final design has been submitted
Physical Planning Department	Request for zoning status and land use policy for the proposed site	Zoning status is mixed use/commercial	Waiting for processing fee from them to proceed with the development and building permit
Ghana Airport Company	Formal engagement for the transfer of ownership and possession to the developer	None	Transfer completed

Ghana Civil Aviation	Request for height/air space safety permit	Airspace safety/height zoning issued limits the project to 34.65 m	Project design height was confined to the allowable height	

10.0 CONCLUSION

PLP Properties Limited is committed to implementing actions that have been proposed in this report and other reports which will make the project environmentally sustainable and would also welcome other recommendations from regulatory agencies like the EPA as proposed mitigation and management measures are not exhaustive and such recommendations are necessary for residual impacts.

The proposed project development will likely have impacts on the environment and existing neighbouring structures and occupants in the forms of noise and dust impact, traffic and vehicular congestion due to activities on the proposed site. Other impacts to be experienced within the project site are occupational health, and safety on workers, and visitors including regulatory personnel; solid, and liquid generation if properly not managed can lead to unsanitary sight on site and other poor sanitation-induced problems amongst others. However, appropriate mitigation measures have been outlined in this report to help mitigate to the barest minimum if not eliminate these impacts.

Additionally, PLP Properties Limited believe the project is commendable and hopes that the information provided in this report will meet the all requirements of the Agency to grant it an environmental permit for its proposed project which forms part of the overall Airport city car park 5 Area project as the issuance of the Environmental Permit for the proposed project forms part of the national requirements before the project is implemented.

We believe that the information provided in this PEA report meets the requirements of the Agency to grant it an environmental permit for its proposed development. .

Appendix 1: Site Plan & Architectural Drawings and Master Plan

Appendix 2: Sub-lease Agreement from Ghana Airport Company Limited

Appendix 3: Correspondence with Ghana Civil Aviation Authority

Appendix 4: Correspondence with Ghana Airport Company Limited

Appendix 5: Soil Investigation Report

Appendix 6: Site Photographs including Environmental Monitoring and Assessment