

DRAFT COPY

**ENVIRONMENTAL IMPACT
ASSESSMENT (EIA)**

OF

**THE PROPOSED CONSTRUCTION AND ESTABLISHMENT OF MULTIPURPOSE
CRUSADE GROUND IN ASEESE COMMUNITY, OGUN STATE**

BY

BLW NIGERIA LIMITED

SUBMITTED TO

FEDERAL MINISTRY OF ENVIRONMENT, ABUJA

Prepared by



(Accredited by FME, NESREA, OGSME, DPR and NOSDRA)

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LIST OF ABBREVIATIONS AND ACRONYMS

GENERAL

API	Area of Potential Influence
ASL	Above Sea level
BAP	Biodiversity Action Plan
BAT	Best Available Technology
BDL	Below Detection Limit
BOD	Biochemical Oxygen Demand
CAGR	Compound Annual Growth Rate
CAPA	Corrective and Preventive Actions
CBOs	Community Based Organizations
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COD	Chemical Oxygen Demand
COPD	Chronic Obstructive Pulmonary Disease
CSR	Corporate Social Responsibility
DD	Data Deficient
DO	Dissolved Oxygen
DS	Dissolved Solids
EC	Electrical Conductivity
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EN	Endangered
EA	Environmental Assessment
FA	Factories Act 1990
FDI	Foreign Direct Investments
FNC	First National Communication

GDP	Gross Domestic Product
GIIP	Good International Industry Practice
Hc	Hydrocarbon
HSE	Health, Safety and Environment
IT	Information Technology
IUCN	International Union for Conservation of Nature and Natural Resources
ITCZ	Inter- tropical Convergence Zone
ITD	Inter-Tropical Discontinuity
ITN	Insecticide Treated Nets
LC	Least Concern
NDC	Nationally Determined Contributions
NE	Not Evaluated.
NFE	Non-Formal Education
NGOs	Non-Governmental Organization
NOSCP	National Oil Spill Contingency Plan
NUPRC	Nigerian Upstream Petroleum Regulatory Commission
PA	Paris Agreement
PACs	Project Affected Communities
PPE	Personal Protective Equipment
PS	Performance Standards
QA	Quality Assurance
QC	Quality Control
SS	Suspended solids
STDs	Sexually Transmitted Diseases
TDS	Total Dissolved Solids
THC	Total Hydrocarbon
ToR	Terms of Reference

TSP	Total Suspended Particulate
TSS	Total Suspended Solid
USD	United State of America Dollar
VES	Vertical Electrical Sounding
VOCs	Volatile Organic Compoun

UNITS of MEASUREMENT

%	Percentage
µm	micrometer
µs	micro Siemen
cfu/ml	Colony forming unit per milliliter
cl	centilitre
cm	Centimetre
dB(A)	Decibel
g/cm	Gramme per Centimetre
kg	Kilogramme
Km	Kilometer
MT	Metric Tonnes
m	Metre
m/s	Metre per second
m ³	Metre Cube
meq	Milliequivalent
mg	Milligramme
mg/kg	Milligramme per kilogramme
mg/l	Milligramme per litre
ml	Millilitre
mm	Millimetre
NTU	Nephelometric Turbidity Unit

pH	Hydrogen ion concentration
ppb	parts per billion
ppm	parts per million
°C	Degrees Celsius
TU	Turbidity

CHEMICAL ELEMENTS AND COMPOUNDS

Al	Aluminum
C	Carbon
CaCO ₃	Calcium Carbonate
Cl	Chloride
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
Cr	Chromium
Cu	Copper
Fe	Iron
H	Hydrogen
H ₂ S	Hydrogen Sulphide
Hg	Mercury
K	Potassium
Mg	Magnesium
Mn	Manganese
N	Nitrogen
Na	Sodium
Na ₃ PO ₄	Sodium phosphate
NaOH	Sodium hydroxide
NH ₃	Ammonia

NH ₄	Ammonium ion
Ni	Nickel
NO ₂ ⁻	Nitrite ion
NO ₃ ⁻	Nitrate ion
NO	Nitrogen Oxides
P	Phosphorus
Pb	Lead
PO ₄ ³⁻	Phosphate
SiO ₃ ²⁻	Silicate
SO ₂	Sulphur dioxide
SO ₄ ²⁻	Sulphate ion
Zn	Zinc

STRUCTURES AND EQUIPMENT

AAS	Atomic Absorption Spectrophotometer
GPS	Global Positioning System

ORGANIZATIONS

APHA	America Public Health Association
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
BIS	Bank for International Settlements
BNL	BLW Nigeria Limited
CDA	Community Development Association
CEM	Commission on Ecosystem
FAQ	Food and Agricultural Organization of the United Nations
FEPA	Federal Environmental Protection Agency
FME _{env}	Federal Ministry of Environment

IFC	International Finance Corporation
ILO	International Labour Organisation
ISO	International Organisation for Standardization
IUCN	International Union for Conservation of Nature and Natural Resources
NAFDAC	National Agency for Food and Drugs Administration and Control
NBS	Nigeria Bureau of Statistics
NSCDC	Nigerian Security and Civil Defence Corps
NDLEA	National Drug Law Enforcement Agency
NFPA	National Fire Protection Association
NESREA	National Environmental Standards and Regulations Enforcement Agency
NiMet	Nigeria Meteorological Agencies
NOSDRA	National Oil Spill Detection and Response Agency
NPC	National Population Commission
NUPRC	Nigerian Upstream Petroleum Regulatory Commission
SON	Standard Organisation of Nigeria
TCN	Transmission Company of Nigeria
UNDP	United Nations Development Programme
UNEP	United Nation Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
USEPA	United State Environmental Protection Agency
WB	World Bank
WHO	World Health Organisation

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We appreciate assistance received from all sources of data and information for this project which have contributed immensely towards the success of the field studies and the preparation of this Environmental Impact Assessment (EIA).

Diskol Environmental Consulting Limited however wishes to emphasize in line with its policy, that all the information contained in this report would be accorded the strictest confidentiality.

EXECUTIVE SUMMARY

This document is a report of the Environmental Impact Assessment (EIA) of Believers' Loveworld Nigeria Limited (BLW) proposed crusade ground multipurpose (residential and commercial) project in Aseese community, Ibafo, Obafemi – Owode LGA, Ogun state. The Believers Loveworld Nigeria Limited (BLW) is a mega church and a Christian denomination founded by Pastor Chris Oyakhilome in 1987. The Church, with headquarters in Lagos, Nigeria, has since become a global network of churches with congregations in many countries and approximately 13,000,000 followers all over the world. This Environmental Impact Assessment was carried out to predict the impacts of the proposed construction, operation and management of ultramodern crusade ground on the environment and propose mitigation measures that will be incorporated at every stage of the project. A one – season data gathering was carried out for this report between 7th and 30th November, 2022.

The Believers Loveworld Nigeria Limited (BLW) proposes to undertake the project as an extension of its religious frontiers by breaking new ground in modern and environment friendly Christians praying ground in order to increase its operational capability and output to meet the need of Nigerians and other nationals spread across the world while assisting the government towards foreign exchange conservation through inward migration of worshippers for spiritual rejuvenation and upliftment including moral and spiritual prosperity with multi-dimensional effects on socio-economic development. The project is also aimed towards achieving employment opportunities for greater utilization of local manpower skills at the propose mega crusade. It also intends to key into the Federal Government of Nigeria policy on employment generation through its private sector driven economy.

However, Sustainable Development and Environmental Management are being pursued by Believers Loveworld Nigeria Limited (BLW) as goals of equal importance. Consequently, compliance with environmental regulations and proactive corporate policy on health, safety and environmental issues are key factors that characterize

contemporary economic and civil development decision-making. The need to carry out this development in accordance with the principles of sustainable development and in conformity with existing regulatory requirements of the World Bank, Federal Republic of Nigeria and Ogun State government has necessitated this Environmental Impact Assessment (EIA) study.

LEGAL FRAMEWORK FOR THE EIA PROCESS

The EIA was carried out in accordance with regulations, guidelines and standards of the Federal Ministry of Environment (FMEnv) and applicable National legislations, and International Agreement and Convention including:

- FMEnv's Guidelines on EIA Act Cap E12 LFN 2004
- *Land Use Act 2004*
- Labour Act, Cap L1, Laws of the Federation of Nigeria 2004:
- The Factories Act CAP FI, LFN 2004
- *National Policy on Environment, 1989(revised in 1989 and 2017)*
- *National Environmental (Domestic and Industrial Plastic, Rubber and Foam Sector) Regulations, 2011. S. I. No. 17.*
- Ogun State Environmental Management (Miscellaneous Provisions) Law 2004
- Ogun State Environmental Protection Agency Regulation 2005.
- Ogun State Waste Management Authority (OGWAMA) 2021
- Ogun State Ministry of Physical Planning & Urban Development law of 2012
- International Union for Conservation of Nature and Natural Resources (IUCN) Guidelines (1996)
- United Nation Framework Convention on Climate Change (UNFCCC) 1992

NEED FOR PROJECT

Religious centers are not a just place where worshipers connect with their creator, it is also a place for social gathering, connect with other believers of same faith and build a spiritual community. Today, religious centers have become integral part of life, as they offer counseling, a place of comfort, a place to worship, a place to connect, learn and socialize. However, with growing human population and increase in the number of

converts, the demand for religious camps (holy cities) is on the rise. These camps help promote unity among faithful, boost economic of host communities and drive development. Believers' Loveworld (BLW) proposed crusade ground multipurpose (residential and commercial) project was borne to evolve as a community where multi-activities or functions and services could take place, to build a world class community that meets the spiritual needs of members of Christ Embassy and Christians at large, provide employment opportunities for Nigerians especially Ogun state indigenes through direct and indirect involvement of contractors, consultants, suppliers and other professionals especially during the construction and operation phases of the project and finally to drive development and boost economic growth of the host community.

VALUE OF THE PROJECT

The project's estimated cost is #250,000,000,000;00 and will be largely funded by Believer's Loveworld ministry and its stakeholders. A considerable amount of this fund will be injected into the local and national economy through various contracts and sub-contracts awarded to qualified indigenous companies and individuals. The project will increase employment opportunities for various categories of Nigerian artisans/professionals, especially skilled and semi-skilled craftsmen, and technicians based in Ogun state and Nigeria in general as their services are important at every phase of the project.

ENVISAGED SUSTAINABILITY

The sustainability of any facility lies in the strength, durability, viability, acceptability of the activities of the facility and the management strategies employed by the management of the facility. The proposed Crusade ground project envisaged sustainability hinges on its Technical Sustainability, Environmental Sustainability, Economic Sustainability and Social Sustainability

Technical sustainability

The lifespan of structures and facilities is dependent on the design, expertise and materials employed during its construction. The technical sustainability of the project

will be ensured through the use of the latest environmental friendly designs, equipment and best available technologies in the real estate and construction sector with strict adherence to applicable national and international engineering design codes, guidelines and standards. The technicalities involved in all construction activities for the proposed project with regards to soil type and geological characteristics of the area shall be guided by these measures. Routine maintenance shall be carried out within the city by contracted experts as well as general scheduled maintenance alongside judicious use of all resources within the city will assure an enduring structure thereby conferring on it technical sustainability.

Economic sustainability

The Project will boost the economic activities within Aseese community and its environs. Uninterruptedly, it will be generating revenue for the government through tax remission from facilities such as mini marts, hotels, halls etc. which will be housed within the city. The project will provide employment opportunities and support the local communities and the national economy as a whole.

The church has millions of followers worldwide. Several other ministries around the world participate in its programs and conferences like the International Pastors and Partners Conference (IPPC) which holds every November; the International Cell Leaders' Conference (ICLC) which holds in the middle of the year; the International School of Ministry and the Healing School among others which shall be conducted at the new crusade ground.

Social Sustainability

The proponent through its activities will provide employment opportunities for many skilled and unskilled Nigerians from the host communities who will provide their services at different phases of the facility's lifecycle. The crusade ground management will have continuous consultations with stakeholders including host communities and institutions to build a cordial relationship which shall be maintained with the people.

This no doubt, will create a sustainable social relationship between the proponent and the host communities and will in turn ensure social sustainability of the project.

Environmental sustainability

Integrating the results and recommendations of this Environmental Impact Assessment (EIA) and enforcing an effective Environmental Management Plan (EMP) at all stages (planning, design, construction, operation and abandonment) of the project is bound to ensure environmental sustainability. In addition, the acquisition of project site, construction activities and all activities and components associated with the proposed project shall be in line with local regulatory requirements and international standards. The Health, Safety and Environment (HSE) policy of the proponent shall also be transferred for implementation, to ensure project executions are carried out in an environmentally responsible manner.

PROJECT LOCATION

Project Location

Believers' Loveworld (BLW) Nigeria Limited proposed crusade ground multipurpose (residential and commercial) project, in Aseese community, Obafemi Owode LGA, Ogun State is located in a mixed use area at Latitude 06°45'26.30"N and Longitude 003°26'4.17"E, Latitude 06°45'26.34"N and Longitude 003°25'50.38"E, Latitude 06°44'53.78"N and Longitude 003°26'2.36"E and Latitude 06°45'20.19"N and Longitude 003°26'12.42"E, on landmass of approximately 131.91Hectares. It could be described as being on the Lagos – Ibadan Expressway, Nigeria primmest national route, having the largest all-hour traffic flow. The nearest communities are Ibafo, Pakuro, Mowe, Olowotodo, Orimerunmu and Magboro, all of which host a large working population of Lagos Metropolis. The boundary of the site in the north is with other parts of Aseese community with concentration of built parts within 1.5 kilometers to the Expressway. In its west, its boundary is largely with Lagos – Ibadan Expressway and Nehemial Grace Developers Limited. However, there are parts of Aseese community between the site and the Expressway. The boundary of the site in the east is with parts of Redemption Camp. The facility is accessible via

the Lagos – Ibadan Expressway and alternatively through and it is surrounded by facilities such as Rainbow college boarding school, Ibafo Community school, RCCG redemption camp, Firstbank Nigeria among others.

PROJECT DESCRIPTION

Project Activities

The proposed project will be divided into the following phases

- Land acquisition
- Site Preparation
- Construction of the buildings and adjoining structures within the camp ground
- Construction and installation of ancillary facilities/utilities
- Operations and management
- Decommissioning

Land Acquisition:

The land for the proposed crusade ground multipurpose (residential and commercial) project was acquired by following all legal requirements and there was no record of forceful displacement of human settlements on the site as at the time of acquisition.

Project Phases and Activities

The activities of the proposed Believer’s Loveworld city involve the pre-construction phase, construction phase, Operation phase and decommissioning phase:

Pre-construction

The pre-construction phase includes survey of site, development of site plan, soil test report and geotechnical survey, site clearing, mobilization and movement of equipment and people to the site. Heavy-duty and other pieces of equipment will be moved to the proposed project site at the beginning of construction activities for civil work activities. The environmental aspects associated with this project phase include clearing of vegetation, dust generation, vehicular emission, vibration and noise generation. This pre – construction phase will have a workforce of 200 people which will include site

security, manual labour, civil works, transportation of goods and other similar services. This workforce will largely be drawn from the local labour pool. It is anticipated that this phase will be completed within three months in the first quarter of this project schedule.

Construction phase

The construction phase includes; building and installation of structures, landscaping, sub structures and superstructures. This will also include mechanical and plumbing fittings, roofing, electrical installation, finishes such as screeding, external works such as installation of water storage, septic tank, landscaping, painting, testing and commissioning as well as site clean-up.

The construction materials that will be used in this phase will be sourced locally and will include steels, cement, sand, concrete mix, binding wires, wood, glass, tiles, blocks/bricks, water, chipboard, tar, aluminum, pipes, ropes, plastics, rubber, gypsum, granite, copper, carbon fibre, foam, electrical wire and fittings. Construction phase of this project will make use of best available technologies, environmentally friendly designs and green architecture to mitigate impacts on the environment.

Operation Phase

This phase includes all activities and programs that will be held in proposed crusade ground multipurpose (residential and commercial) project including religious and social activities organized by Believers' Loveworld ministry. This phase will also include maintenance activities, ancillary operations including waste and transport management including safety programmes. Safety programmes within this phase are routine and preventive measures such as training and installation of safety signs and firefighting equipment. The land use of the Worship City is broadly categorized as highlighted below.

- Worship
- Residential
- Administration

- Recreational / Conservation
- Circulation / Road and Parking
- Commercial
- Communal
- Canal/Bay
- Utility/Services
- High Density Residence

Decommissioning phase

Decommissioning refers to the process of removing all the operating assets of a project from active status after completion of its life cycle (30-50 years). Typically, the following steps would be followed during the facility decommissioning:

- All Structures and equipment will be removed
- Electrical fittings and wirings and all underground cable runs (where applicable) will be removed and recycled.
- Associated facilities such as generating sets will be removed.
- Disturbed land areas will be rehabilitated

Alternatively, good administrative and management practices, sustainable corporate social responsibility for the host community, fiscal integrity, workers' welfare and continued profitable social engagement with host community alongside regular maintenance, and structures upgrade, will keep the camp ground operational for a long time. In the event of decommissioning, the camp ground will be rehabilitated, as much as practicable to its original state or to a safe status with negligible residual effects.

Project Schedule

The pre construction and construction phase of this proposed project is scheduled for eighteen (18) months (6 quarters). Full operations will commence after the completion of the construction phase, following the receipt of relevant permits and approvals from

the relevant regulatory authorities. The lifespan of the project is thirty (30) years, after which it will be decommissioned and structures demolished.

ENVIRONMENTAL BASELINE DATA

Field investigations were carried out for baseline data gathering between 7th and 30th November, 2022. The possible air pollutants from the operations at Believers' Loveworld (BLW) proposed crusade ground multipurpose (residential and commercial) project in Aseese community, Obafemi - Owode LGA, Ogun state were determined using pre-calibrated digital handheld Air Quality Monitoring Equipment.

Air Quality Analysis

Ten locations and two controls points were sampled for air quality parameters

- The following gases sampled during the air quality analysis namely; CO, SO₂, NH₃, O₂, H₂S, SPM, VOC, CO₂, NO_x for all locations as well as the control are within compliance Limits of **FMEnv** respectively
- Temperature values recorded in all sampled locations were within the recommended **FMEnv Limit**.
- Particulate matter especially PM_{10.0} was within both recommended **NESREA Limit** and **FMEnv Limit** respectively.
- Noise level values recorded at all sampled locations were within the recommended limit of both **NESREA Limit** and **FMEnv Limit** respectively.

GEOLOGY

Geologically, the site is situated on Ewekoro deposit. The ewekoro is characterized by shale and Limestone with lenses of sand deposits. The shales are of various grades: organic, clayey and compacted in nature. Hydrogeologically, there are surface stream courses and attendant useful amounts of ground water within the silty shales or shaly limestones. There is a meandering River with its source from North of the site, crossing the ever-busy expressway and flowing South with a bend west at the rare section of site.

WATER QUALITY ANALYSIS

For this Environmental Impact Assessment, the result of the raw ground water analyzed showed *In-situ* water temperatures recorded ranged from 31.6°C to 32.0°C, which fell within the FMEnv limit of <40°C. The pH values of the groundwater and surface water samples ranged from 9.7 to 10.5. The pH values recorded in all groundwater samples from the study area are above the FMEnv limit of 6.5 – 8.5 for drinking water. This may be due to contamination from leachates in the host community. High concentrations of total dissolved solids beyond the permissible limits may affect taste adversely and possibly adverse health effects. The TDS values recorded in the groundwater and surface water from the study area ranged from 98.0mg/l to 101.0mg/l. The values were below the FMEnv limit of 2000mg/l. The electrical conductivity recorded in the ground water samples ranged from 0.016µS/cm to 0.12 µS/cm. The EC values were within the FMEnv limit of 200 µS/cm. The turbidity level in the groundwater samples from the study area was <0.1NTU and 0.3NTU. Total suspended solids in the water ranged from <1mg/l to 1.4mg/l.

The concentrations of heavy metals in the groundwater samples were either below the detection limit of equipment used for analysis (i.e., <0.001mg/l) or recorded in trace amount which fall within the WHO and FMEnv limits. Lead (Pb), Manganese (Mn), and Copper (Cu), falls within the FMEnv limits as prescribed for drinking water. Iron (Fe) ranged from 0.02mg/kg-0.03mg/kg while Cadmium (Cd), Nickel (Ni), Cobalt (Co) and Arsenic (As) had values of <0.01mg/l.

Microbial contents of the water samples were dominated by heterotrophic bacteria which may have been introduced by natural sources. Microbial matter is a natural constituent of groundwater. The heterotrophic bacterial count ranged between 4.4×10^1 cfu/ml and 7.5×10^1 cfu/ml. Similarly, no coliform bacteria were detected in the groundwater samples indicating the absence of faecal contamination.

SOIL QUALITY ANALYSIS

Ten (10) soil samples and two (2) controls were sampled within the facility at two depths (Topsoil 0cm-15cm and subsoil 15cm-30cm). Analysis of soil sample from the

facility showed the soil colour ranges from dark brown, black to brown indicating rich humus content.

Conductivity of the soil samples range between 9.8 μ s/cm to 48.30 μ s/cm, while its permeability range between 0.0084cm/s to 0.300cm/s. Porosity range from 39.33% to 55.87%. Bulk density of the soil samples was between 1.16 to 1.62. Total organic carbon range between 1.08% and 1.56%.

Microbiology Analysis

Total heterotrophic bacteria detected in the soil samples range from 4.9 x 10³cfu/g to 7.4 x 10³cfu/g. Total hydrocarbon utilizing bacteria range from 4.8 x 10¹cfu/g to 8.2 x 10¹cfu/g, Total heterotrophic fungi 1.0 x 10²cfu/g to 3.1 x 10², Total hydrocarbon utilizing fungi 1.3 x 10¹cfu/g to 3.3 x 10¹cfu/g and Total coliform in the soil sample range from 1.3 x 10²cfu/g and 2.5 x 10²cfu/g.

FLORA AND FAUNA

The project area is located in an urbanized setting with sparse flora and fauna distribution. However the following flora species were found at the project site: A total of sixteen non-tree/non-shrub species were observed with quadrant sampling. These included succulent herbs, grasses and wood herbs. However, further efforts towards discovering other plant species in this category that were not captured by the quadrants revealed 26 additional species. Among the 42 species that are non-tree/shrub, the most widely-distributed in terms of their relative frequencies in the study area were *Chromolaena odorata* (12.5%), *Amaranthus spinosus* (11.6%), *Acalypha ciliata* (9.5%), *Phyllanthus amarus* (8.1%), *Axonopus fissifolius* (7.6%), *Ageratum conizoides* (6.8%), *Andropogon gayanus* (6.0%), *Boerhaavia diffusa* (6.0%) and *Cassia mimosoides* (6.0%). Out of the 28 tree and shrub species present in the study area, the most frequent were *Newbouldia leavis*, *Roystenia regia*, *Cocos nucifera*, *Securinega virosa*, *Morinda lucida*, *Elaeis guinensis*, *Ficus sur*, and *Cola* sp. some of which had been deliberately planted for ornamental, fruit, medicinal and cultural purposes. Regarding the 26 tree/shrub species whose densities were determinable by direct counting method, the alpha diversity of the vegetation cover in the project area was calculated in terms of Shannon

- Wiener index of diversity to be 3.0087 while species evenness (i.e. E) obtained using equation (1) was 1.1015. For fairly large sample size, the Shannon – Wiener Index values (H) can range between '0' and approximately 4.6.

SOCIO-ECONOMICS

A total of a hundred and forty five (145) questionnaires were administered within 3km radius of the project area predominated by residential and commercial buildings and One hundred and Thirty (130) were recovered while Fifteen (15) were rumbled, torn or not returned. More than 50% of the population is likely to fall below the age bracket of target respondents' age (18 and above).

Ogun State enjoys a relatively homogenous ethnicity with the inhabiting ethnic groups of Egbas, Ijebus, Yewas, Aworis, Eguns and a host of other settlers and non-Yorubas such as Igbo, Hausa and people from Southern Benue, amongst others. Ogun State indigenes belong to the Yoruba ethnic group, comprising mainly the Egba, the Yewa, the Awori, the Egun, the Ijebu and the Remo. The language mostly spoken by the indigenes are Yoruba of the Remo dialect. It is believed that a common heritage exists among the various ethnic groups hence the prevalence of customary solidarity among them.

The traditional system of government and socio-cultural practices/pattern of social organization found in Aseese Community is characterized by having a Baale as the head of settlement and being supported by the Baale-in-council drawn from family heads, the CDC, the youth and women organization in maintaining orderliness, peace, unity, religious tolerance, inter-family interaction and security in the study area. There exist in Aseese community occupational guilds, social clubs and religious units which maintain an important role in commerce, social control, and vocational education in the village. There are no scared or archaeological sites within the community or around the location of the project.

The preservation of festivals in a community is the most important aspect of a people's culture. There is freedom of worship in the community. The Eid el-Malud, Ed el-Fitri and Eid el-Kabir are Muslim festival observed in the community, while Easter and Christmas are main Christian celebration. There are various Christian denominations

with places of worship in the host community and project affected communities as there is also for the Muslims. Some of the Christian denominations include Redeemed Christian Church of God, Assemblies of God Church, Deeper Life Bible Church, Christ Freedom Evangelical Ministry and White-garment Churches of CAC, Apostolic and C&S, among others. The main traditional festival is celebrated in December in Aseese. Their ancient religious practices and culture is found in periodic/yearly festivals dedicated to certain types of masquerades. The major festivals include those of the community include Igbo Iggunnu, Igbo Oshun, Oju Alele, Igbo Oro and Igbo Ologboni including Youth carnival in December.

The Yoruba are the predominant ethnic group resident in Aseese Community. They account for about 80% of the population. Other ethnic nationalities found in the study area included Ibibio, Igbo, Igbira, Igala, Idoma, Hausa, Edo, Delta and Togolese/Beninese which accounted for the remaining 20% population. These non-natives comprise of traders, factory and commercial workers. All these people reside and pursue their various livelihood activities in the community.

Ogun State has a total of nine registered universities, the highest in any state in Nigeria. It has five private universities (which were amongst the first private universities in the country). The study area has quite a number of private primaries and secondary schools. It also has prominent universities in the area of influence which includes the Mountain Top University, Ibafo and the Redeemers University, Mowe.

Male respondents across the communities within the spatial boundary constitute 35% of the total number of people interviewed while 65% of the respondents were female. Majority of the respondents have attained full adulthood with age bracket of 40 to 60years representing approximately 68% of the total number (130) of the respondents. The remaining 32% of the respondents are youths within the age range 20 - 39years.

Respondents were asked if they had ever been married or lived with a man, currently married, living with a man, widowed, divorced or separated. Of the total respondents, 53% were married, 20% were single while 17% of the respondents were divorced and 10% were separated or widowed. All the respondents claimed to be resident or working in the project area all year round. The collated data indicates that most of the respondents have stayed in the study area for between 6-10years (48%). Some 21% of

the respondents had stayed in the area for more than 10 years while 31% had lived in the area for 3-5 years. From this information, it is assumed that out-migration is minimal. Occupation of population in the proposed project area is dominated by entrepreneurs (mostly traders) and employees in different companies around the project area constituting 25% and 55% respectively. Student population pursuing first degree and other post-secondary education was 15% while 5% claimed to be civil servants at various local and state government establishments of the respondents interviewed in the area. The residents of the project area depend on national grid supply and use of privately owned power generating sets, Most of the respondents (21.5%) claimed to depend solely on national grid while 68.8% depend on both national grid and generator sets while 9.7% depend on only generator sets. The project area and neighboring community make use of boreholes as their main source of water supply. They mostly depend on boreholes and wells as sources of water for domestic purposes and few use water vendors.

The respondents were asked about their waste disposal methods. 76.8% of the respondents use OGWAMA accredited vendors, while 23.2% dispose their wastes through Private cart pushers.

From responses of the people interviewed across the communities, Government hospital is the preferred option in terms of seeking medical assistance for ailments. Most of the respondents (75.3%) claimed to prefer visiting government hospitals and healthcare clinics for treatment and medical consultation for major health challenges. 16.1% of the respondents self-medicate with orthodox medicine for treatment, while 1.6% usually resorts to self-medication by purchasing traditional medicine.

Adverse Environmental Effects

At all stages of the project, on the environment including air quality, noise level, groundwater quality, health, livelihood and the socio - economics of the area will be adversely affected. From the stage of site clearance and excavation, to construction, operation and demolition stages, the environment will be adversely affected as they will be receiving grounds for pollutants generated from these activities.

Beneficial Effects

The project will also have positive impacts on the surrounding environment and host community as it will be a source of employment and a generator of business opportunities to vendors within the project site. The project will also be a source of revenue for both the government through tax remittance and the proponent via income generation.

Mitigation Measures Approach

Cost-effective measures that are environmentally, socially and technically acceptable to manage and mitigate the identified project impacts have been defined, developed. In developing these measures, the first consideration was on measures that are aimed at preventing or reducing identified negative impacts that may occur through the design and management of this project. Hence, specific measures will be taken to mitigate impact at the construction, operational and decommission phase of this project to combat identified potential impacts associated with the project.

ENVIRONMENTAL MANAGEMENT PLAN

- The environmental management Team and representatives of regulatory bodies throughout the project life shall carry out regular inspection of sites and facilities. The main objective of such inspections shall be to assess compliance level with mitigation measures and recommendations of the EIA.
- The proponent shall monitor the proposed development from pre-construction all through operation stages to keep track of the entire project development life cycle.
- In event of unlikely need to decommission the project, a well-articulated plan shall be developed in consultation with all relevant regulators and institutions to ensure that the site is restored and improved if possible, beyond its current level. It will involve removal of all metal panel pillars and frames which would be sold off to recyclers who will melt it and put it to other uses.
- The proponent of the proposed project shall be committed to putting in place several measures to mitigate the negative environmental, safety, health and social impacts associated with the life cycle of the project. It is recommended that in addition to this

commitment, the proponent shall focus on implementing the measures outlined in the EMP as well as adhering to all relevant national and international environmental, health and safety standards, policies and regulations that govern establishment and operation of such projects. It is expected that the positive impacts that emanate from such activities shall be maximized as much as possible as exhaustively outlined within the report. These measures will go a long way in ensuring the best possible environmental compliance and performance standards.

CONCLUSION

The EIA of Believers' Loveworld (BLW) proposed crusade ground multipurpose (residential and commercial) project in Aseese community, Obafemi - Owode LGA, Ogun state has been undertaken in accordance with the EIA Act CAP E12 LFN2004 as well as extant laws in Nigeria and relevant State and international guidelines. It is recommended that Believers Loveworld A.K.A Christ Embassy shall ensure that the proposed Project is developed and operated in an environmentally sustainable manner, in compliance with National and International Standards by properly managing the processes/activities that may bring about disturbances to the environment through the implementation of the recommended mitigation measures and the Environmental Management Plan. Continuous monitoring of environmental and social performance of the Project shall also be maintained, including periodic consultation with the relevant stakeholders.

CHAPTER ONE
INTRODUCTION

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INTRODUCTION

1.1 BACKGROUND INFORMATION

The Believers Loveworld (BLW) is a mega church and a Christian denomination empire founded by Pastor Chris Oyakhilome in 1987. The Church, with headquarters in Lagos Nigeria, has since become a global network of churches with congregations in many countries, and approximately 13,000,000 followers all over the world. The Church has ministries in Canada, Nigeria, South Africa, the United States and the United Kingdom. The church has 145 branches on five continents.

BLW otherwise known as Christ Embassy has been described as one of the fastest growing ministry not only in Nigeria but throughout the world. The Church is quite attractive to the youths and has grown in bounds beyond Nigeria. Through the years, various arms of the Ministry have been established to proclaim the gospel. The Ministry has a vibrant Television Ministry, Internet Ministry, the Healing School, Rhapsody of Realities, and an Inner-city mission; where children “without hope of a future” are fed, housed, clothed, educated and given a chance to live out their dreams.

Several other ministries around the world participate in its programmes and conferences like the International Pastors and Partners Conference (IPPC) which holds every November in Lagos, Nigeria; the International Cell Leaders' Conference (ICLC) which holds in the middle of the year; the International School of Ministry; the Healing School, etc. The Ministry also hosts various crusades in the largest arenas in various countries where millions have been brought into the kingdom of God. The venues of such meetings are filled to capacity. This global mission has led to the establishment of network of hundreds of churches and fellowships worldwide in all continents, affecting millions of people with a unique and timely revelation of the new creation in Christ Jesus.

The Vision of the Ministry is “to take the divine presence of God to the nations and peoples of the world; and to demonstrate the character of the Spirit.” Believers' Loveworld (Christ Embassy) proposed crusade ground multipurpose (residential and

commercial) project in Aseese community, Obafemi – Owode LGA in Ogun State branded “proposed crusade ground multipurpose (residential and commercial) project. The project is proposed to be developed on a 522.233 acres of land acquired by outright purchase by the church. The proposed project will comprise of edifices such as; Shopping Mall, Church Auditorium, Residential area, Recreation and conservation areas, Packing lots, Hotel, Schools, Road networks, Security post etc.

This report is required to provide the Environmental Impact Assessment Baseline Study results for the existing environmental condition of the proposed project area to identifying and quantifying the significant effects/impacts (positive and negative; short and long term; primary or secondary) of any prospective development activity and to mitigate, minimize, or reduce adverse impacts, where practicable to benefits.

Therefore, in consonance with the relevant mandatory requirement of government regulatory bodies such as Federal Ministry of Environment (FMEnv), National Environmental Standards and Regulations Enforcement Agency (NESREA), the respective State Environmental Protection Agencies, Believers Loveworld A.K.A Christ Embassy has commissioned Diskol Environmental Consulting: a Federal Ministry of Environment (FMEnv), National Environmental Standards and Regulations Enforcement Agency (NESREA) and Ogun State Ministry of Environment (OGMOE) accredited Environmental Consultant, to carry out this Environmental Impact Assessment (EIA) of the proposed project.

1.2 PROJECT PROPONENT

Believers Loveworld A.K.A Christ Embassy has signed a construction project contract with her building contractor to develop proposed crusade ground multipurpose (residential and commercial) project for multi activities, ameliorate the livelihood of her members and to contribute immensely to infrastructural development in the Aseese, the host community sited at Obafemi Owode Local Government, Ogun State and Nigeria at large.

1.3 OBJECTIVES OF THE EIA

The main objective of the Environmental Impact Assessment study is to ensure that infrastructures and other activities being considered under the proposed project are environmentally benign and sustainable. The secondary objective is to ensure that in-country capacity; regulatory framework; principles and procedures are established to provide a basis for environmental assessments of all sub-projects to be carried out under this additional financing.

Specifically, the objectives of the proposed will properly evaluate the potential environmental impacts and other associated impacts (including health and socio-economic impact) of the proposed facility. This is to ensure that the planned project activities exert minimal impacts on the environmental and nearby communities. The specific objectives of this EIA are:

- i. To gather from existing data /homologous sources, field survey and sampling, relevant background data/information on the general environmental (physical, biological, chemical and socioeconomic) components of the site that are likely to be impacted by the proposed crusade ground activities.
- ii. To analyze the data obtained and describe the present environmental status of the study area prior to the proposed activities, with particular reference to all the environmental development significant to such development and expansion activities.
- iii. To identify adverse and potential environmental impacts that may arise from the proposed activities in the study area and recommend appropriate mitigation measures and environmental management and monitoring plan for their amelioration.
- iv. To promote the concept of environmental sustainability and eco-development.

The objectives of the proposed study as addressed above are dictated by the requirements of FMEnv/NESREA/ State Ministry of Environment, and the Local

Government. The format of the EIA report is adapted after these regulatory bodies. Hence, in general the EIA seeks to:

1. Obtain baseline information and conditions of the bio-geophysical, socio-economic cum cultural and socio environment around the planned facility site;
2. Assess the associated and potential impacts of the proposed project on the biological, physical, chemical and socioeconomic characteristics of the host environment;
3. Recommend, as appropriate, mitigation measures to minimize the identified, envisaged environmental impacts and damages;
4. Develop and recommend environmental management plans including monitoring programmes for the operations of the project and
5. Comply with environmental regulations of the FMEnv/NESREA/OGSMEnv. and OGEPA

1.4 EIA TERMS OF REFERENCE (ToR)

As statutorily required, the regulatory requirements of the Federal Ministry of Environment (FMEnv), relevant Ogun State Environmental laws were taken into full cognizance, in developing the Terms of Reference (ToR) for this study. The EIA is expected to establish the environmental issues associated with the project; predict their impacts and magnitude; suggest and evaluate project alternatives; and recommend mitigation measures in addition to developing an Environmental Management Plan (EMP) to ensure environmental friendliness and sustainable development. The summary of the ToR includes:

- Outline the general scope of the EIA study including the overall data requirement on the proposed ultra modern crusade ground Project and affected environment.
- Define the procedures and protocols first for identification and assessment of associated and potential impacts and also for developing an effective Environmental Management Plan (EMP) for the proposed project.

- Define the framework for interaction and integration of views of a multidisciplinary EIA team with regulators, host communities and other stakeholders.
- Define the relevant framework of legal and administrative requirements of the proposed Project.
- Develop decommissioning and closure plan after project ends including site restoration plans.

1.5 SCOPE OF THE EIA

The scope of the EIA covers the following:

- Review of the national and international laws regulation and codes applicable to the study.
- Descriptions of actions/activities that will be carried out in the course of the proposed project.
- Review the existing literature on the project area and its influence, identifying the data gap as well as undertaking field survey and laboratory analysis to complement the existing data.
- Analysis of data obtained and description of the study area prior to the proposed project activities, with particular regard to the significant environmental components and/ or receptors.
- Identification and evaluation of adverse environmental impacts of the project on the nearby communities including impacts on cultural properties, social infrastructure and impacts on lifestyle/ values in the study area.
- Identification of health hazards that may result from the different phases of the project during execution including construction, operation and decommissioning; and evaluation of local population exposure to these hazards.
- Preparation of EIA Report in conformity with the national and international guidelines and standards on EIA.
- Procurement of provisional or other relevant approvals and EIA certificate from FMEnv.

1.6 EIA METHODOLOGY

The method adopted in conducting the EIA for the proposed crusade ground multipurpose (residential and commercial) project along Lagos-Ibadan Expressway, Aseese, Obafemi Owode LGA, Ogun State project is illustrated in the flowchart presented in Figure 1.1

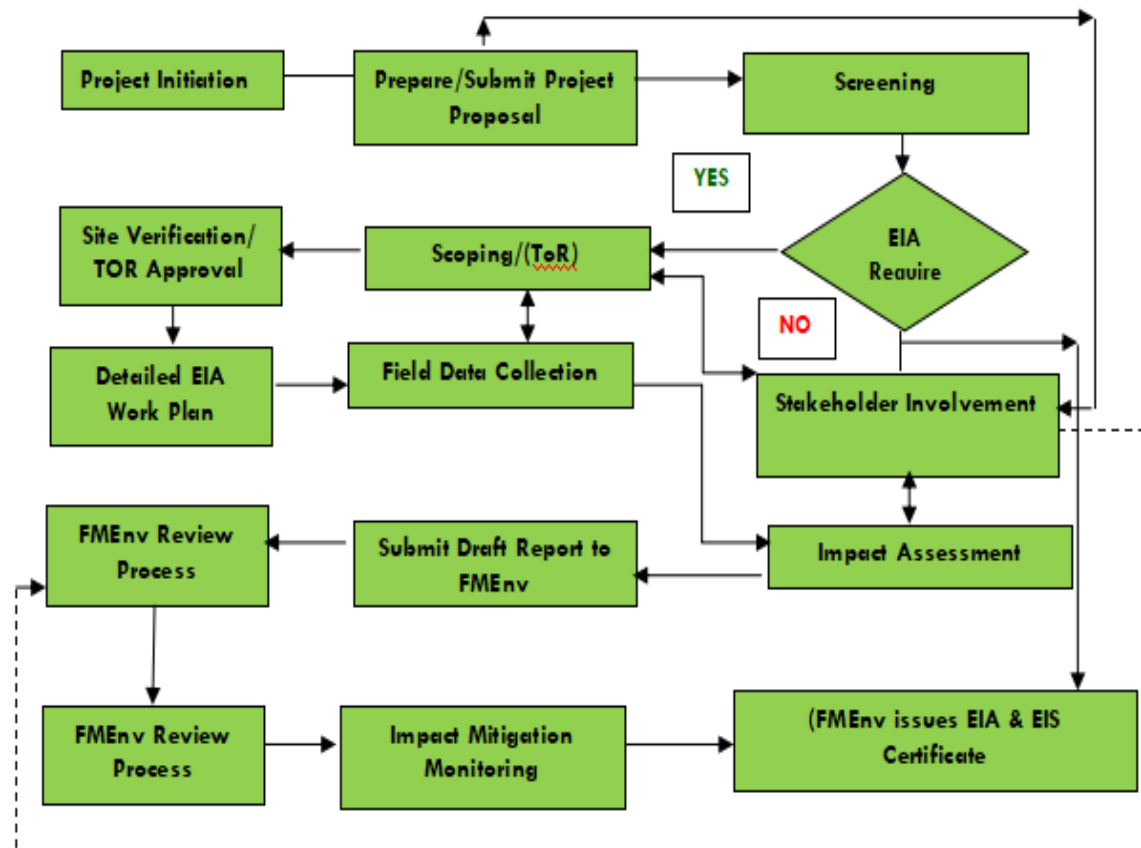


Figure: 1.1: Federal Ministry of Environment EIA Process

1.7 LEGAL AND ADMINISTRATIVE FRAMEWORK

This section of the report provides the relevant Nigerian legislation and policy context as well as international legislations, good industry practices, standards and guidance that are applicable to the proposed project in general and EIA study in particular. Various environmental studies and related strategic initiatives would meet or surpass the relevant Nigerian and international environmental legislative requirements and guidelines. These include but not limited to:

1.7.1 National Policy Guidelines and Regulations Federal Ministry of Environment Act No 58 of 1988

Federal Environmental Protection Agency (FEPA) now Federal Ministry Environment Act No 58 of 1988 established the Federal Environmental Protection Agency (FEPA) as the chief regulatory body for environmental protection in Nigeria ensuring that all industries meet the limits prescribed in the national guidelines and standards and the associated various regulations of environmental pollution management in Nigeria (e.g. effluent limitation, management of solid hazardous waste, etc.). FMEnv may update the National Guidelines and Standards from time to time. Relevant specific standards, discharge limits, and other environmental requirements of the FEPA guidelines (1991) and subsequent relevant directives were reviewed. In 1992, the Federal Government released the Environmental Impact assessment (EIA) Act CAP E12 LFN 2004. The Act makes the EIA process mandatory for any major development project and prescribes the procedures for conducting and reporting EIAs.

FMEnv's Guidelines on EIA Act Cap E12 LFN 2004

The EIA Act Cap E12 LFN 2004 (formerly known as EIA Act No. 86 of 1992) makes Environmental Impact Assessment mandatory for all new major public and private projects in Nigeria. Federal Ministry of the Environment developed National EIA procedures following the enablement of the EIA Act CAP E12 LFN 2004. The procedure indicates the steps to be followed from project conception to commissioning to ensure that the project is implemented with maximum consideration for the environment. The EIA Act sets out to:

- Consider the likely impacts and the extent of these impacts on the environment before embarking on any project or activity;
- Promote the implementation of appropriate policy in all federal lands consistent with all laws and decision-making processes through which the goal of this Act may be realized.

EIA Sectoral Guidelines of the Federal Ministry of Environment

Federal Environmental Protection Agency (FEPA) was established by Act 58 of 1988 to monitor and prevent the pollution of the environment following the Koko toxic

waste dump incident. This status empowered the then FEPA to prepare Environmental Guidelines and Standards as instruments for prevention of environmental pollution. This Act also gives specific powers to FMEnv to facilitate environmental assessment of projects.

In addition, FMEnv regulations S.I.8, S.I.9 and S.I.15 of 1991 provide guidelines and standards for the following:

- Solid and Hazardous waste management
- Effluent limitations
- Pollution abatement in industries generating waste.

In September 1995, EIA Sectoral Guidelines for proposed projects in Nigeria were published. The guidelines are intended to assist the proponent to conduct proper and detailed EIA Studies in compliance with the EIA Act of 1992.

The procedure for EIA involves the project proposal stage where the project proponent officially notifies FMEnv of the proposed project. This proposal is to contain concise information of the project including a land use map. The legal and regulatory frameworks for carrying out EIA of the proposed project are contained in relevant national statutes and international environmental conventions to which Nigeria is a signatory.

This stage is followed by the screening phase, whereby an Initial Environmental Examination (IEE) is executed by the FMEnv then the projects are assigned into categories based on the following criteria:

- Magnitude
- Extent or Scope
- Duration and Frequency
- Risks
- Potential Environmental Impacts

Another stage of FMEnv's EIA procedure is the scoping stage, the main feature of which the proponent is required to submit the Terms of Reference (ToR) for the proposed EIA. In some cases, the FMEnv may demand a Preliminary Assessment Report from the proponent to assist in vetting the scope and the ToR of the proposed EIA.

This stage is followed by:

- Actual Implementation of the EIA
- Preparation of Draft Report
- Final EIA Reports
- Review Process and Approval/Certification.

Apart from the general EIA Guidelines, the Ministry has issued sectoral guidelines for EIA in different infrastructural sectors.

National Environmental (Air Quality Control) Regulations, 2014. S. I. No. 64.

The purpose of this Regulation is to provide for improved control of the nation's air quality that would enhance the protection of flora and fauna, human health, and other resources affected by air quality deterioration.

The Nigerian Urban and Regional Planning Act CAP N138, LFN 2004

This law established a Development Control Department (DCD) charged with the responsibility for matters relating to development control and implementation of physical development plans at Federal, State and Local Government levels within their respective jurisdiction.

Land Use Act 2004

The Land Use Act, the Constitution of 1999 and the Public Lands Acquisition Laws of the States of the Federation make up the governing policy for land acquisition in Nigeria and these enable the State to acquire land (i.e. to abrogate leases and other authorizations to occupy land). The Act was promulgated in 1978 and it vests all land in each State of the Federation (except land already vested in the Federal Government of Nigeria or its agencies) in the Governor of the State. It makes the State Government the authority for allocating land in all urban areas for residential, agricultural, commercial and other purposes, while it confers similar powers regarding non-urban areas on the local governments in such cases. The Governor of a State can revoke a right of occupancy for overriding public interest. The right for building of residential and other structures, farmlands, and shrines for traditional worship, among others, are rights permitted under Section 51 of the Land Use Act.

According to the Land Use Act all lands in the state is vested in the Governor of the State but the Decree categorically stated that the land is to be held in trust for the citizens and the means of enforcing such rights are provided in sections 39 and 41. The principle of alienability was generally recognized and so was the concept of private ownership of land. The State Government, by virtue of the Land Use Act, may acquire a land for the overriding interest of the public.

Labour Act, Cap L1, Laws of the Federation of Nigeria 2004:

This Act is the principal and most direct legislation on employment matters in Nigeria. It is a piece of legislation, which seeks to protect the employment rights of individual workers and it includes matters such as classification of worker types, wages, contracts, employment terms and conditions, and recruitment. Additional legal frameworks for labour administration in Nigeria are:

- *Trade Unions Act, Cap T14, LFN, 2004.*
- *Trade Disputes Act, Cap T8, LFN, 2004*
- *National Minimum Wage Act, 2010.*

The Factories Act CAP FI, LFN 2004

The factories Act of 2004 is the primary law regulating health, safety and welfare of worker in factories in the country. The Acts seeks to make adequate provisions for the health and safety of workers and generally bring safety legislation in line with requirements of modern industrial setting.

Public Health Law (LN 47 of 1995, Cap 103)

In Nigeria the Public Health Law (L.N 47 of 1955, Cap 103) provides justification for the execution of development projects under guidelines that promotes health by protecting the Medical Officers of Health (operating at the local government council, under the supervision of the state and Federal Ministry) to ensure the promotion of good health (Subsection 6 and 7).

1.7.2 State Environmental Legislation

In accordance with Section 24 of the FEPA Act, Chapter 131 of the Laws of the Federal Republic of Nigeria, 1990, the State Environmental Protection Edicts were enacted. The Edict empowers the State Environmental Protection Agencies (SEPA) to establish such environmental criteria, guidelines/specifications or standards for the protection of the state's air, lands and waters as may be necessary to protect the health and welfare of the people. The functions of SEPA among others include:

- Routine liaison and ensuring effective harmonization with the FMEnv in order to achieve the objectives of the National Policy on the Environment;
- Co-operate with the FMEnv and other relevant regulatory agencies in the promotion of environmental education;
- Be responsible for monitoring compliance with waste management standards; and
- Monitor the implementation of the EIA and Environmental Audit Report (EAR) guidelines and procedures on all developmental policies and projects within the State.

The Ogun State regulations guiding Environmental management includes but not limited to the following:

Ogun State Environmental Management (Miscellaneous) Provisions Law, 2004

The Ogun State Ministry of Environment is responsible for the oversight of the environment in Ogun State. This law was enacted and signed by the State's House of Assembly and the Governor respectively in the year 2004. Sections 3 and 4 of the law, states in clear, the terms, function and powers of the Ministry of Environment.

According to the sections:

- The Ministry shall be responsible for administering the provisions of this law and for ensuring within the State, the protection, maintenance and development of the environment, environmental 9 technology and initiation of policy in relation to environmental research and technology;
- The Ministry shall formulate and enforce policies, statutory rules, and regulations on waste collection and disposal, general environmental

protection, control and regulation of the ecological system and all activities related thereto;

- Advise the government on environmental policies and priorities and on scientific and technological activities affecting the environment;
- Establish and take measures to ensure effective environmental structures in the in the State for flood and erosion control, solid and liquid waste collection and disposal, water and air pollution eradication, noise control and general sanitation;
- Initiate appropriate policy action on the environment impact implications of environment related activities;
- Initiate measures to ensure pollution free air, water and land throughout the State and take steps to obviate, mitigate or eliminate environmental discomfort to individual or groups, or danger to lives and properties;
- Establish such environmental criteria, guidelines, specifications or standards for the protection land, water and air as may be necessary to protect to protect the health and welfare of the population from environmental degradation; 8) Establish such procedure for industrial or agricultural activities in order to minimize damage to the environment from such activities.

Ogun State Environmental Protection Agency Regulation 2005.

The Agency registers and monitors development projects throughout the state, and also manages matters relating to waste generated within the State. The Agency is the key to the development of governmental policies for environmental sustainability, and the regulation and enforcement of Federal and State policies regulations.

Specific functions of OGEPA include:

- Carrying out public enlightenment and educating the general public on sound methods of environmental sanitation and management;
- Carrying out an appropriate test on insecticides, herbicides and other agricultural chemicals;
- Monitoring and controlling disposal of solids, gaseous and liquid wastes generated by both government operations;

- The setting, monitoring and enforcing standards and guidelines on vehicular emission;
- Surveying and monitoring surface underground and potable water, air land and soil environments in the state to determine the pollution level in them and collect baseline data.
- Promoting co-operation in environmental science and technologies with similar bodies in other countries international bodies connected with the protection of the environment; and Cooperating with the federal, state and local Governments, Statutory Bodies and research agencies on matters and facilities relating to environmental protection

Ogun State Waste Management Authority (OGWAMA) 2021

OGWAMA was established in October, 2019 through an Executive order and promulgated into law by the State House of Assembly in July, 2021. Prior to the creation of OGWAMA, the Ministry of Environment and OGEPA were the agencies saddled with the responsibilities of managing waste in the State, Waste Management is at the forefront of Environment but there was no coordinated template in place to match up with standard best practices in Waste Management. OGWAMA was established to co-ordinate the approach to effective waste collections, waste reduction, and ensuring individual/corporate responsibilities through sustainable waste management practices. They provide professional, efficient and sustainable waste management services through; Public Waste Collection, Household Waste Collection, Industrial/ Commercial Waste Collection, Daily Street Sweeping and Medical Waste Management.

Ogun State Ministry of Physical Planning & Urban Development law of 2012

The Ministry of Physical Planning and Urban Development came into existence on the 5th of November, 2012. It came into being upon the upgrading of the Bureau of Urban and Physical Planning into a full-fledged Ministry. This was in fulfillment of the "Mission to Rebuild", as well as the desire to promote physical development orderliness in the State.

The Ministry is the apex body of Physical Planning in Ogun State. It is responsible for the formulation of Physical Planning policies and the coordination of physical development within the State. It derives its statutory functions from section 3 line 246 of the State Urban and Regional Planning Law No.20 of 2005. Though the Ministry is the policy making body, it has the Urban and Regional Planning Board as its parastatal.

1.7.3 International Laws

International Policies, Guidelines and Conventions in addition to the national laws/regulations which Nigeria is signatory or party to that support the use of EIA as the key tool for achieving sustainable development include but not limited to the following:

World Bank Group Environmental and Social Standards

The World Bank Group Environmental and Social Standards emphasize the importance of managing social and environmental performance throughout the life of a project (any business activity that is subject to assessment and management). It provides operational procedures for a project's social and environmental management system as a dynamic, continuous process initiated by management and involving communication between the client, its workers, and the local communities directly affected by the project (the affected communities). The standard therefore applies to projects with social or environmental risks and impacts that should be managed, in the early stages of project development, and on an ongoing basis.

In addition, the World Bank has developed specific safeguard operational policies that identify various aspects of the environment that a developmental project may likely impact.

IFC Environment, Health and Safety Guidelines

The 2007 version of this guideline provides general technical approach towards achieving Good International Industry Practice (GIIP) in the implementation of environmental, health and safety risk potential projects. The guidelines contain the

performance levels and measures that are generally considered to be achievable in new facilities / projects by existing technology at reasonable cost.

The Rio Declaration on Environment and Development

The UN Conference on Environment and Development met at Rio de Janeiro in June 1992, at which time it reaffirmed the 1972 declaration on the Human Environment, and sought to build upon it. This is with the goal of establishing a new and equitable global partnership through the creation of new levels of cooperation among States, key sectors of societies and people. It is also to aid work towards international agreements, which respect the interests of all, protect the integrity of the global environmental developmental system, and recognize the integral and interdependent nature of the earth.

Other Conventions to Which Nigeria is Signatory includes but not limited to:

United Nations Framework Convention on Climatic Change (1992)

In order to achieve sustainable social and economic development, energy consumption for developing countries needs to grow taking into account the possibilities for achieving greater energy efficiency and for controlling greenhouse gases. In order to achieve sustainable social and economic development, energy consumption for developing countries needs to grow taking into account the possibilities for achieving greater energy efficiency and for controlling greenhouse gases.

Nigeria became a Party to the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, the Kyoto Protocol in 2004 and also ratified the Paris Agreement (PA) in March 2017, which was approved by the UNFCCC on the 16th May 2017 and entered into force on 15th June 2017.

Nigeria's Intended Nationally Determined Contribution demonstrates its determination to grow its economy sustainably while reducing carbon pollution. The Federal Government's economic growth plan, Nigeria Vision 20:2021, Economic Transformation Blueprint (2009), recognizes the changing climate as a threat to sustainable growth in the next decade. It sees climate change as a critical challenge

globally and, in Nigeria, as a potential driver of “damaging and irrecoverable effects on infrastructure, food production and water supplies, in addition to precipitating natural resource conflicts.”

Vienna Convention for the Protection of the Ozone Layer

The convention was instituted in 1985 and places general obligations on countries to make appropriate measures to protect human health and the environment against adverse effects resulting from human activities which tend to modify the ozone layer. BLW shall carry out its activities in an environmental friendly manner minimizing emissions.

Montreal Protocol on Substances that Deplete the Ozone Layer

The protocol was adopted in 1987 as an international treaty to eliminate ozone depleting chemicals production and consumption.

- UN Framework Convention on Climate Change, 1992
- Agenda 21, 1992
- WHO Health and Safety Component of EIA, 1987
- WHO Health for All Strategy and Policy, 1978

United Nations Guiding Principles on the Human Environment

The law was developed in 1997 to develop national strategies for the conservation and sustainable use of biodiversity.

Convention on Biological Diversity (CBD)

This convention deals with the conservation of biodiversity, the sustainable use of its component and the fair and equitable sharing of the resulting benefits.

International Union for Conservation of Nature and Natural Resources (IUCN) Guidelines (1996): The World Conservation Union - IUCN Red List of Threatened Animals provides taxonomic, conservation status and distribution information on species that have been evaluated using the IUCN Red List categories. This system is designed to determine relative risk of extinction and the main purpose of the red list is to catalogue the species that are regarded as threatened at the global level, that is,

at risk of overall extinction. The 1996 red list also included information on species that are categorized as extinct; on species that cannot be assessed because of insufficient data; and on certain species in the lower risk category. Nigeria, as a member of this body, categorizes species using the red list.

1.8 THE REPORT STRUCTURE

The report format and outline of the EIA study is in line with the provision of the Federal

Ministry of Environment's EIA Guidelines. Accordingly the structure of the report is as follows:

EXECUTIVE SUMMARY: A non-technical summary of the EIA report

CHAPTER ONE: Provides introduction to the project; objectives and scope of work of the EIA; legal and administrative framework as well as information on the project proponent.

CHAPTER TWO: Provides the rationale for the proposed project and analysis of various alternative scenarios.

CHAPTER THREE: Describes the project location, project activities development phases and schedule.

CHAPTER FOUR: Describes the current baseline environment (biophysical, chemical, socioeconomic and health) characteristics of the project site and its influence.

CHAPTER FIVE: Identifies and presents the associated and potential environmental impacts of the proposed project.

CHAPTER SIX: Highlights the recommended mitigation measures for ameliorating any significant adverse environmental impacts and enhancing beneficial impacts.

CHAPTER SEVEN: Defines the environmental management plan that will be adopted by the church throughout the project lifecycle.

CHAPTER EIGHT: Sets out procedures and remediation plans that will be followed in the event of decommissioning the project.

CHAPTER NINE: Conclusion and recommendation

1.9 DECLARATION

Believers Loveworld A.K.A Christ Embassy hereby declares her intention to install mega religious city known as “proposed crusade ground multipurpose (residential and commercial) project” at Lagos-Ibadan Expressway, Aseese, Obafemi-Owode Local Government Area, Ogun State in strict adherence to the existing international and national laws and relevant extant regulations peculiar to the entire life cycle (Construction, Operation and Decommissioning) of the proposed project. Also, Environmental Management Plan (EMP) proposed in the EIA report shall be seemingly accorded much attention by the proponent. Believers Loveworld A.K.A Christ Embassy hereby declares that it has prepared this EIA report using the best available expertise in personnel, equipment, and internationally acceptable methods that ensures sustainability of quality environmental standards.

CHAPTER TWO
PROJECT JUSTIFICATION

CHAPTER TWO

PROJECT JUSTIFICATION

2.1 INTRODUCTION

This chapter provides information on the project in terms of the need for the project and the benefits. It also presents a number of project alternatives that were considered during the project design. The Federal Government is committed to religion tolerance and freedom, industrialization, conservation of foreign exchange and employment generation to boost the economy. One of the most viable options to achieving this is to encourage the establishment and growth of facilities that attracts direct and indirect inflow of foreign currencies through spiritual tourism.

2.2 NEED FOR PROJECT

Religious centers are not a just place where worshipers connect with their creator, it is also a place for social gathering, connect with other believers of same faith and build a community. Today, religious centers have become integral part of life, as they offer counseling, a place of comfort, a place to worship, a place to connect, learn and socialize. However, with growing human population and increase in the number of converts, the demand for religious camps (holy cities) is on the rise. These camps help promote unity among faithful, improve morality, encourage peace, boost economic of host communities and drive development. Believer's Loveworld City project was borne to evolve a community where multi-activities or functions and services could take place, to build a world class community that meets the spiritual needs of members of Christ Embassy and Christians at large, provide employment opportunities for Nigerians especially Ogun state indigenes through direct and indirect involvement of contractors, consultants, suppliers and other professionals especially during the construction and operation phases of the project and finally to drive development and boost economic growth of the host community.

2.3 VALUE OF THE PROJECT

The project's estimated cost is #250,000,000,000 and will be largely funded by Believer's Loveworld ministry and its stakeholders. A considerable amount of this

fund will be injected into the local and national economy through various contracts and sub-contracts awarded to qualified indigenous companies and individuals. The project will increase employment opportunities for various categories of Nigerian artisans/professionals, especially skilled and semi-skilled craftsmen, and technicians based in Ogun state as their services are important at every phase of the project.

2.4 ENVISAGED SUSTAINABILITY

The sustainability of any facility lies in the strength, durability, viability, acceptability of the activities of the facility and the management strategies employed by the management of the facility. The proposed project envisaged sustainability hinges on its Technical Sustainability, Environmental Sustainability, Economic Sustainability and Social Sustainability.

2.4.1 Technical sustainability

The lifespan of structures and facilities is dependent on the design, expertise and materials employed during its construction. The technical sustainability of the project will be ensured through the use of the latest environmental friendly designs, equipment and best available technologies in the real estate and construction sector with strict adherence to applicable national and international engineering design codes, guidelines and standards. The technicalities involved in all construction activities for the proposed project with regards to soil type and geological characteristics of the area shall be guided by these measures. Routine maintenance is also being carried out within the holy city by contracted experts as well as general scheduled maintenance alongside judicious use of all resources within the city will assure an enduring structure thereby conferring on it technical sustainability.

2.4.2 Economic sustainability

The Project will boost the economic activities within Aseese community and its environs. Uninterruptedly, it will be generating revenue for the government through tax remission from facilities such as mini marts, hotels, halls etc. which will be housed

within the city. The project will provide employment opportunities and support the local communities and the national economy as a whole.

2.4.3 Social Sustainability

The proponent through its activities will provide employment opportunities for many skilled and unskilled Nigerians from the host communities who will provide their services at different phases of the facility's life cycle. The Proposed project management team will have continuous consultations with stakeholders including host communities and institutions to build a cordial relationship which shall be maintained with the people. This no doubt, will create a sustainable social relationship between the proponent and the host communities and will in turn ensure social sustainability of the project.

2.4.4 Environmental sustainability

Integrating the results and recommendations of this Environmental Impact Assessment (EIA) and enforcing an effective Environmental Management Plan (EMP) at all stages (planning, design, construction, operation and abandonment) of the project is bound to ensure environmental sustainability. In addition, the acquisition of project site, construction activities and all activities and components associated with the proposed project shall be in line with local regulatory requirements and international standards. The Health, Safety and Environment (HSE) policy of the proponent shall also be transferred for implementation, to ensure project executions are carried out in an environmentally responsible manner.

2.5 PROPOSED PROJECT ALTERNATIVES AND DEVELOPMENT OPTIONS

An important requirement of the Federal Ministry of Environment is for proponents of a project to exhaustively consider alternatives including location, technology, design, operations etc. Despite best intentions, a project can only be truly considered sustainable if due considerations have been given to alternative views, techniques etc. Effective assessment and consideration of alternatives will help avert time and resource wastages and therefore enhance the value and acceptability of a project. At

each stage of this project from pre – construction to decommissioning, alternatives and available options will be considered and the most sustainable alternative will be implemented. To this end, a number of alternative options were considered prior to the project discussion.

For each of these alternatives all the necessary structures, installations and utilities were roughly designed, and their costs estimated, also taking account of the transfer compatibility of certain products, as well as batch operation, safety and environmental aspects.

2.5.1 Location/Site Alternatives

An important consideration for citing religious camps is availability of space and access to good road networks. The proposed project site is close to the commercial hub of the Nation and the country most populous city Lagos. The site is easily assessable to thousands of worshippers from across the country and within the West African sub region. Other site considered for this project is the headquarter of Believer’s Loveworld (Christ’s embassy) at 8 Billings way Oregun, Ikeja, Lagos. However, the challenge of this site is the lack of available space for expansion. Hence, the site at Aseese community was picked.

2.5.2 Project Alternatives

An important requirement of the Federal Ministry of Environment is for proponents of a proposed project to exhaustively consider alternatives including location, technology, design, operations etc. Despite best intentions, a project can only be truly considered sustainable if due consideration have been given to alternative views, techniques etc. Effective assessment and consideration of alternatives will help avert time and resource wastages and therefore enhance the value and acceptability of a project. At each stage of this project from pre – construction to decommission, alternatives and available options will be considered and the most sustainable alternative will be implemented. To this end, a number of alternative options were considered prior to the project discussion.

2.5.3 Option One- No Development Option

The no-development option simply means that the proponent does nothing to commence the construction of the infrastructure/structures designed for or associated with the project. No development entails the environmental component of the area will be left undisturbed. However, this option will deprive the necessary development that would accompany such a project and would bring about a negative effect on economy of the community and slow down the pace of development the camp would otherwise have brought. This would put a major constraint to socio-economic growth and opportunities associated with such an establishment. This alternative was rejected on the basis that, while all of the project's associated impacts can be mitigated to the barest minimum, the no-development option would deprive the state, as well as Nigeria, of all the project's benefits.

Decision: Not Recommended

2.5.4 Option Two - Delayed Project Option in Construction of the Camp

This option entails carrying out the proposed project at a later date thereby offsetting its impacts to that date. The only benefit is if there is an improvement in baseline conditions and technologies that may be involved with the proposal. However, these are not guaranteed and it may only lead to delays in development, therefore carrying out the project with mitigation would be a preferred option due to this uncertainty. In addition, carrying out the project at later time may lead to more logistic costs due to increasing inflation and standards of living.

Decision: Not Recommended

2.5.5 Option Three-To proceed with the Project Option

This option means going ahead to implement the construction of the proposed project. This option is accepted and recommended for implementation. Apart from the fact that all envisaged impacts can be checkmated, the project will provide employment, improve the economy of the state, promote social security and help foster development to neighbouring communities. Thus, the preferred option for the proponent, which is to go ahead as planned, does overshadow the other options of no project as earlier underscored.

Decision: Recommended

CHAPTER THREE

PROJECT DESCRIPTION

CHAPTER THREE

PROJECT DESCRIPTION

3.1 TYPE OF PROJECT

The proposed project is an ultra modern and state-of-earth crusade ground for multipurpose (residential and commercial) spiritual activities for the Believers' Loveworld (Christ Embassy) at Aseese Community, Obafemi - Owode LGA, Ogun State. The crusade ground will be the site of worship, leaning, training and relaxation for many faithfuls and members of Believers' Loveworld, the crusade ground will also serve as residential homes as well as provide social services such as shopping malls, recreational centers etc, the camp will have a medical facility for its members. The proposed project will serve as hosting ground for Believers' Loveworld major religious activities welcoming visitors and its members from across the country and abroad. The project which will help enhance infrastructural development of the community as it will attract visitors, fast track real estate development and boost the economy of the community. The project will also be a source of revenue for the government through taxation of associated services the project will attract. The construction and operation of the project will provide employment to community natives as well as residents of Ogun state.

Specifically, proposed structures / buildings of BLW are as listed below.

- Main Auditorium
- Church Building
- Church Office
- Ministers' Quarters
- Shopping Center
- Event center
- Hotel/Lounge
- Bank
- Youth Center
- Children Church
- Studio

- Site Office(s)Toilets Block
- Security Post
- Fountain
- Waste management center
- Medical facility
- Parking Lots
- Recreation and conservation
- Circulation road

3.2 PROJECT LOCATION

Believers' Loveworld (BLW) proposed crusade ground multipurpose (residential and commercial) project, in Aseese community Obafemi Owode LGA, Ogun State is located in a mixed use area at Latitude 06°45'26.30"N and Longitude 003°26'4.17"E, Latitude 06°45'26.34"N and Longitude 003°25'50.38"E, Latitude 06°44'53.78"N and Longitude 003°26'2.36"E and Latitude 06°45'20.19"N and Longitude 003°26'12.42"E, on landmass of approximately 131.91Hectares. It could be described as being on the Lagos - Ibadan Expressway, Nigeria primmest national route, having the largest all-hour traffic flow. The nearest communities or towns are Ibafo, Pakuro, Mowe, Olowotedo, Orimerunmu and Magboro, all of which host a large working population of Lagos Metropolis. Owode, the headquarters of Obafemi / Owode LGA is at about 36 Kilometers to the site. The axis has a rich history of been host to many popular / major Christian facilities or centers like the Redemption Camp in Mowe, The Deeper Life Convention Center, Orimerunmu and Mountain of Fire and Miracles Ministry's Prayer City, Magboro. These centers or facilities have also taken advantage of the Lagos - Ibadan Expressway. There is a direct link by road between Redemption Camp and the site.

The boundary of the site in the north is with other parts of Aseese community with concentration of built parts within 1.5 kilometers to the Expressway. In its west, its boundary is largely with Lagos - Ibadan Expressway and Nehemiah Grace Developers Limited. However, there are parts of Aseese community between the site and the Expressway. The boundary of the site in the east, is with parts of Redemption Camp. The facility is accessible via the Lagos - Ibadan Expressway and alternative route through community road off the expressway. it is surrounded by facilities such as Rainbow college boarding school, Ibafo Community school, RCCG redemption camp, Firstbank Nigeria etc.

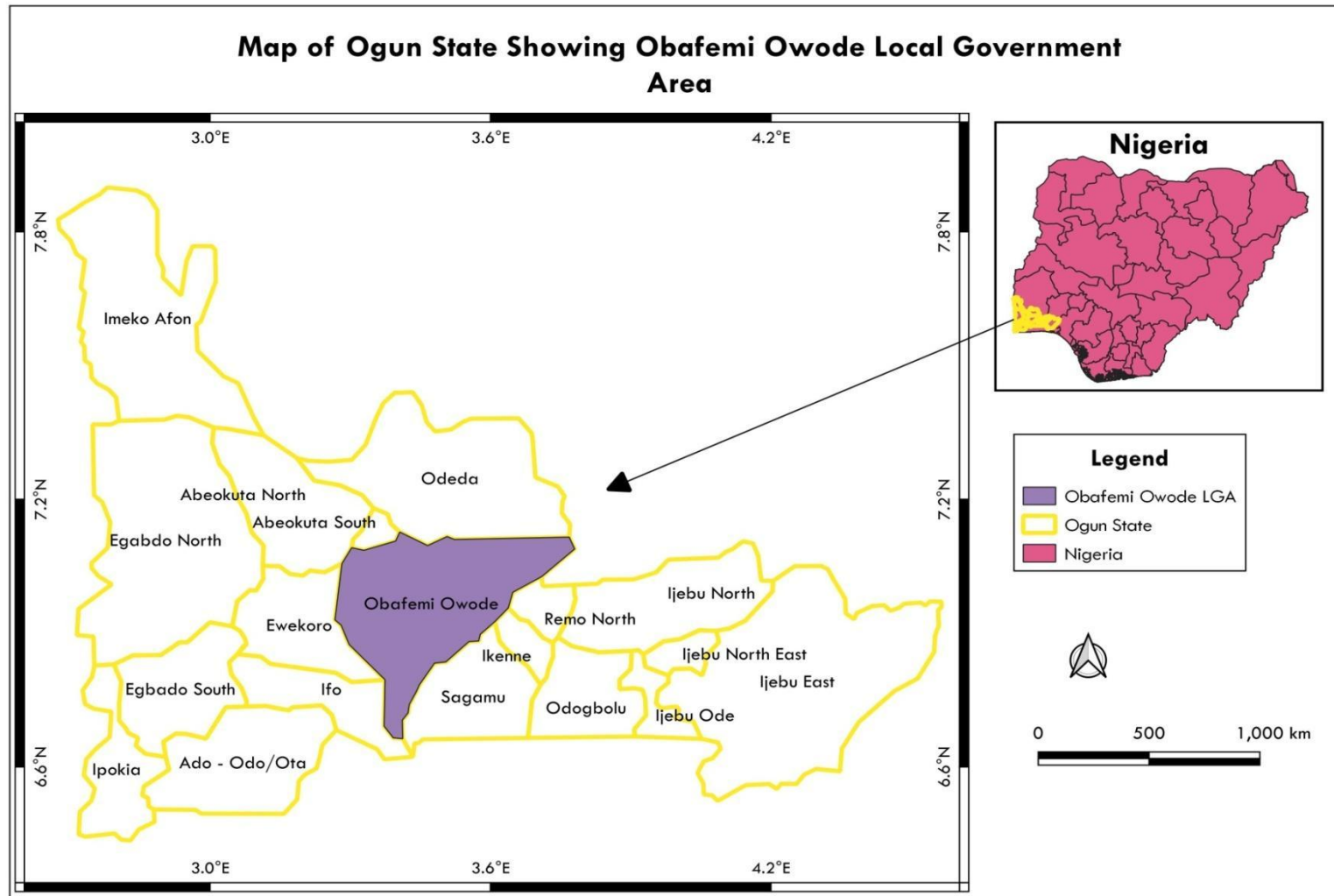


Figure 3.1: Map of Ogun State Showing Obafemi Owode Local Government Area



Plate 3.2 Aerial View of Believer Loveworld City, Aseese Community, Ogun State

Source: Google Earth, 2022



Figure 3.3: Master Plan of proposed crusade ground multipurpose (residential and commercial) project

3.3 PROJECT ACTIVITIES

The proposed project will be divided into the following phases

- Land acquisition
- Site Preparation
- Construction of the buildings and adjoining structures within the camp ground
- Construction and installation of ancillary facilities/utilities
- Operations
- Decommissioning

3.3.1 Land Acquisition

The land for the proposed crusade ground multipurpose (residential and commercial) project was acquired by following all legal requirements and there was no record of forceful displacement of human settlements on the site as at the time of acquisition.

3.3.2 Project Phases and Activities

The activities of the proposed Believer's Loveworld prayer city involve the pre-construction phase, construction phase, operation phase and decommissioning phase:

3.3.2.1 *Pre-construction*

The pre-construction phase includes survey of site, development of site plan, soil test report and geotechnical survey, site clearing, mobilization and movement of equipment and people to the site. Heavy-duty and other pieces of equipment will be moved to the proposed project site at the beginning of construction activities for civil work activities. The environmental aspects associated with this project phase include clearing of vegetation, dust generation, vehicular emission, vibration and noise generation. This pre - construction phase will have a workforce of 200 people which will include site security, manual labour, civil works, transportation of goods and other similar services. This workforce will largely be drawn from the local labour pool. It is anticipated that this phase will be completed within three months in the first quarter of this project schedule

3.3.2.2 Construction phase

The construction phase includes; building and installation of structures, sub structures and superstructures. This will also include mechanical and plumbing fittings, roofing, electrical services Installation, finishes such as screeding, external works such as installation of water storage, septic tank, sewage treatment system, water treatment system, landscaping, painting, testing and commissioning as well as site clean-up.

The construction materials that will be used in this phase will be sourced locally and will include steels, cement, sand, concrete mix, binding wires, wood, glass, tiles, blocks/bricks, water, chipboard, tar, aluminum, pipes, ropes, plastics, rubber, gypsum, granite, copper, carbon fibre, foam, electrical wire and fittings. Construction phase of this project will make use of best available technologies, environmentally friendly designs and green architecture to mitigate impacts on the environment.

3.3.2.3 Operation Phase

This phase includes all activities and programs that will be held in proposed crusade ground multipurpose (residential and commercial) project including religious and social activities organized by Believers' Loveworld ministry. This phase will also include maintenance activities, ancillary operations including landscaping, transport, waste management and safety programmes. Safety programmes within this phase are routine and preventive measures such as installation safety signs and firefighting equipment. The land use of the prayer city is broadly categorized as highlighted below.

- Worship
- Residential including High density residence
- Administration
- Recreational / Conservation
- Circulation and Parking
- Utility services
- Commercial

Worship:

As a religious development, the core function of the City is essentially worship centered. The worship centers occupy the central area in the City and represent 19.34% (25.51 hectares) of the entire prayer City, which is one of the largest land use. Therefore, in accordance with the concept underlining the creation of the holy City, ample space is allocated to this category of land use. The activity areas consist of the following:

- Main Auditorium
- Healing School / School of Ministry
- Youth Center
- Expo Center
- Oasis Park

Residential

To achieve a balanced and functional development, residential areas are provided to complement the worship land uses. Thus, 13.21 hectares (10.02%) is earmarked for the purpose. The use constitutes the fourth largest land use category within the City. Residential areas are in three categories, viz: Ministers' Lodge, Golf Estate and Medium Density Residential.

The Ministers' Lodge is to be utilized as residence for the clergy and other senior members of the Ministry. The Golf Estate, also for residential development, is a partnership between the Believers Loveworld and a private developer. The last in the category, Medium Density Residential, as the name connotes is for residential development. The residential area had been located strategically close to the worship area, as well as in the southern axis. This is done to provide easy access to the worship areas.

Commercial

This occupies 8.39 hectares, which is 6.36% of the site. Commercial land use in the City comprises of the following:

- Shopping / Retail Center
- Petrol Filling Station
- Vehicle Service Center
- 3A Events Limited

The commercial uses are distributed within the three sectors, with the highest concentration in Sector A. Development or uses such as offices, shopping malls, hotels among others will be accommodated as permitted structures.

Administration

The land use hosts technical and administrative support facilities for the prayer City, distributed within the 11.90 hectares allocated space. The Media Center, Publishing Ministry and Central Administration are key activity areas. Indeed, these three functions are pillars on which Christ Embassy has propagated their messages to millions of people worldwide. The land use has within it, many buildings erected within it. Office buildings and media studio are two of the buildings, already built on part of the allotment.

Communal / Institutional Facilities

A major goal of the project is to provide infrastructure / services of highest standard. Accordingly, efforts were made in the design to ensure that lands were allocated for provision of facilities or amenities. Indeed, as implied in their name, such facilities are those, which will require that all worshippers, visitors and workers should have unhindered access to them. Communal facilities are sine - qua - non for sustainable living. They are also referred to as public use. For BLW City, land provision was made for a medical center, school / academy, as well as cemetery. These three facilities are located on 5.05 hectares. This is 3.83% of the entire site.

Indeed, these facilities are strategically located away from the core worship functions, largely to eliminate noise and other forms of intrusions. The Cemetery are close to the north main entrance. It is envisaged that it would necessarily attract people or activities which are not directly related to BLW events and services.

Utilities / Services

A land of 4.01 hectares, representing 3.04% of the site is devoted for Utilities and Services. There are six sites earmarked for this use which is expected to accommodate water treatment facility, power supply system like Independent Power Plant (IPP) / electricity substation, sewage treatment plant, as well as gas distribution terminal. Also, the fire and emergency service(s) station and main telecommunication hub of the City are planned for the area. To effectively serve their purposes, without constituting risk to nearby uses, these facilities are located strategically in such a way that they will complement, rather than constitute nuisance to adjoining development. The provision of land for this development will further guarantee a self-sustaining and almost self-sufficient City, albeit with other support land uses.

Car Park / Bus Park

Experiences from similar facilities in the corridor have shown challenges in managing heavy traffic during some programmes. The Redemption Camp and Prayer City often have spilled over traffic from their premises to the Lagos - Ibadan Expressway. Indeed, this is as a result of inadequate parking spaces. Accordingly, in order to prevent such occurrence there are provisions for large or sector specific car parks. There are three clusters of car parks in the City with a total land area of 7.5 hectares. The car parks are located close to the worship core areas, which are expectedly the activity areas in the City that will draw the most traffic. It is worthy to note that all other land uses have some car parking spaces imbedded within them. The three car parks are planned to accommodate a minimum of 2,500 cars. Equally provided under this land use category are Taxi / Bus Parks. Three clusters of the facility are designated and they occupy 2.20 hectares. A Park each is located close to each of the main entrance areas, while another is close to the Main Auditorium. The parks are envisaged for the use of visitors, workers or worshippers that will rely on public transport. Accordingly, they are to use bus shuttles operated in the City from the main entrance gates into the inner area.

Decommissioning phase

Decommissioning refers to the process of removing all the operating assets of a project from active status after completion of its life cycle (30-50 years). Typically, the following steps would be followed during the facility decommissioning:

- All Structures and equipment will be removed
- Electrical fittings and wirings and all underground cable runs (where applicable) will be removed and recycled.
- Associated facilities such as generating sets will be removed.
- Disturbed land areas will be rehabilitated

Alternatively, good administrative and management practices, fiscal integrity, workers' welfare and continued profitable social engagement with host community alongside regular maintenance, and structures upgrade, will keep the camp ground operational for a long time. In the event of decommissioning, the camp ground will be rehabilitated, as much as practicable to its original state or to a safe status with negligible residual effects.

3.4 WASTE GENERATION AND MANAGEMENT

Believers' Loveworld shall develop a robust waste management plan for its proposed crusade ground multipurpose (residential and commercial) project. This plan shall incorporate effective waste management practices which would be implemented during all phases of the project to avoid or minimize potential impacts on the environment and protect the public health and safety. Waste management principles and priorities shall be based on an integrated approach which involves a combination of techniques and programs to manage waste. Believers' Loveworld shall work alongside Ogun State Waste Management Authority (OGWAMA) accredited vendors to dispose and manage its waste. The proposed waste management strategy at the facility shall be reduction at source, waste segregation, repair, and reduction, reuse of materials, recycling and disposal using licensed operators.

3.4.1 Waste Types, Sources and Management

The operational process will include Solid and liquid waste (waste water) which will be expelled from sectors. Indeed, the volume of these waste waters will be very high during any of the major events that will be held in the City from time to time. They will be largely organic, because of the consistency of carbon composites like vegetables, human wastes, paper and so on. Pollution from these sources can be dangerous for human health and the environment, hence the need for effective treatment. Bagging of solid waste into aquatic environment shall be prevented.

The contemporary policy on waste water management focused on delivering a sustainable and healthy environment for the people to live on. In order to reduce the risk of water pollution and health hazard, a sewerage system will be constructed within the City. Indeed, this becomes apposite in view of the terrain of the site. The volume of waste water that will be generated in the City if allowed to filter into the underground water or flow into the surface water, the neighbourhood will be prone to epidemic and other health hazards. Accordingly, a Central Waste Water Treatment Plant (WWTP) will be built within the City. The WWTP will be the core of the waste water system that will connect all parts of the City.

The waste water treatment plant shall consist of the following;

- A water-system of toilet and bath
- An inspection chamber that connects the points to the sewer
- The sewer (pipes) that convey the raw sewage to the treatment plant
- Manholes that connects the sewer at junctions or at different levels.
- Pump station where the contents of the sewer are discharged into for pumping into the treatment plant which is always at a higher level
- The treatment plant
- The digester where usable gas is produced
- Dry beds where the sludge undergoes dryness
- The effluent chamber.

Since wastewater will be generated from all parts of the City, a network of sewer will be laid in different sizes along the right-of-way at self-cleansing velocity of 0.65m/sec with manholes so as to allow each plot to connect to the main sewers. The main sewer will lead into the pump station where the contents will be discharged and pumped in to the treatment plant.

The WWTP shall be located on the southern part of the City so as to allow minimum inconveniences in the discharge of its effluent into natural drainages. The WWTP will be accommodated in the Utility Yard.

The Solid waste generated shall be evacuated by OGWAMA accredited waste manager. Table 3.1 shows the waste streams and management methods

Table 3.1: Waste streams and management methods

Waste Source	Waste type	Unit	Management
Domestic activity	Food	Kg	Disposed as garbage by OGWAMA
Domestic activity	Paper	Kg	Disposed as garbage by OGWAMA
Domestic activity	Sewage (Human/Organic)	Litre s	Held in a septic tank and OGMOE evacuates annually
Domestic activity	Grass clippings	Kg	Disposed as garbage by OGWAMA
Operations	Nose masks	Kg	Disposed as garbage by OGWAMA
Operations	Electric bulbs	Kg	Maintenance contractor manages it
Domestic activity	Electronic waste	Kg	Disposed as garbage by OGEPA
Operations	Spent oil	Litre s	Disposed as garbage by OGEPA

Operations	Packaging material	Kg	Disposed as garbage by OGWAMA
Operations	Dust	Kg	Disposed as garbage by OGWAMA
Operations	Replaced parts	Kg	Maintenance contractor manages it

3.5 TRAFFIC MANAGEMENT PLAN

This Traffic Management Plan (TMP) outlines the traffic control and traffic management procedures to be implemented by Believers' Loveworld to manage potential hazards associated with the moving vehicles during the project. Traffic Management Plan is to ensure:

- The safety of the road users as well as visitors within the city.
- All pedestrians and road users are safely guided around, through or past the city.
- The performance of the road network is not unduly impacted and the disruption and inconvenience to all road users are minimized.
- Impacts on users of the road reserve and adjacent properties and facilities are minimized.

In an effort to meet these objectives, the Traffic Management Plan will incorporate the following strategies:

- Providing a sufficient number of traffic lanes to accommodate vehicle volumes.
- Ensuring delays are minimized.
- Ensuring all road users are managed including motorists, pedestrians, cyclists, people with disabilities and people using public transport.
- Ensuring work activities are carried out sequentially to minimize adverse impacts.
- Provision will be made for works personnel to enter the work area in a safe manner in accordance with safety procedures.
- All entry and exit movements to and from traffic streams shall be in accordance with the requirements of safe working practices.

3.6 ELECTRICITY SUPPLY / TELECOMMUNICATIONS

Power supply and telecommunication facilities are considered as *sine – qua – on* to the objectives of the plan. The existence of 33KVA line along Lagos -Ibadan Expressway has facilitated the provision of electricity for the area and for future need of the City in particular. The City will be connected with the power lines already serving the community. The proximity of power distribution lines has facilitated the “powering” of the City at this take – off stage. Indeed, power facilities and distribution lines are being installed through funding by BLW. Thus this guarantee eases of connection to the power grid. An electricity transmission line in the eastern axis of the city is shown in Plate3.2 below.



Plate 3.2: Power transmission lines in the City

To enhance the supply, distribution facility like transformers will be installed. Already, these have been installed in parts of the city. In addition, the design of the electricity supply system will also consider its adaptability to alternative sources like solar. Solar system for the street lighting power will be considered,

this will make for more efficient energy consumption pattern. The unreliable nature of public power supply in the country requires that alternative source of power supply for the city be considered. Installation of Independent Power Plant (IPP) will be most desirable for the City. Gas powered facility is most favoured. Indeed, this will be easily achieved, as there is network of gas pipeline in the vicinity. However, the design concept of power system including other electrical service infrastructure shall take into serious consideration issues of safety of material and equipment, ease of operation and maintenance, as well as flexibility of supply for ease of expansion of the system.

3.7 WATER USAGE

Water in the facility will be from boreholes drilled on the premises. Water on the facility will primarily be used for domestic activities like housekeeping and sanitation.

3.8 PROJECT SCHEDULE

The pre-construction and construction phase of this proposed project is scheduled for eighteen (18) months (6 quarters). Full operations will commence after the completion of the construction phase, following the receipt of relevant permits and approvals from the relevant regulatory authorities. The lifespan of the project is fifty (50) years, after which it will be decommissioned and structures demolished.

Table 3.2: Project Implementation Schedule.

S/N		2022			2023		
		3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1	Geotechnical subsoil investigation						
2	Conducting EIA Study						
3	Site Clearing / Early Works						
4	Financing						
5	Construction Phase						
6	Electrical Installations						
7	Commissioning of Crusade Ground						

CHAPTER FOUR
DESCRIPTION OF EXISITING
ENVIRONMENT

CHAPTER FOUR

DESCRIPTION OF THE EXISTING ENVIRONMENT

4.1 INTRODUCTION

This section is the description of the physical, chemical, biological and socio-economic characteristics of the project area. The studies were carried out in order to establish current environmental conditions and projected impacts as a result of the proposed project operation.

4.2 BASELINE DATA ACQUISITION METHOD

The approach adopted in collecting the baseline data incorporates all relevant disciplines. The baseline data of the project area was acquired by visitation of Diskol Environmental Consulting (Consultant) Multi-disciplinary Fieldwork Specialists to the facility between 7th and 30th November, 2022 using the following methods;

- Literature/desktop research
- Field observation
- Sampling and measurements
- Laboratory analysis of samples collected in the field
- Satellite Imagery of the study area

4.2.1 Literature/Desktop Research

- This involves the consultation of all relevant textbooks, journals, articles, research publications, previous study reports on similar projects, etc. The data generated from this process include meteorological data, maps, geologic/hydrogeology data and geographic data of the area.

4.2.2 Field Observation/Sampling

Field Sampling and observations was aimed at determining the ecological characteristics and variations peculiar to the study area. Visual observations were

made and documented in the field notebook. Photographs of important features were taken with a digital camera.

Environmental samples were collected at strategic locations within the premises using calibrated Global Positioning System (GPS) and these were properly preserved and stored before being transferred to a Federal Ministry of Environment (FMEnv) accredited and Institute of Public Analyst of Nigeria (IPAN) registered laboratory, SEARCHGATE Laboratories Limited, 38 Diya Street, Ifako, Gbagada, Lagos State.

The environmental components observed include;

- ✓ Climate and meteorology
- ✓ Air quality and noise levels
- ✓ Geology
- ✓ Ground water
- ✓ Flora& fauna and
- ✓ Socio economics/health impact, demography and community characteristics
- ✓ Land use
- ✓ Transportation

4.2.3 Laboratory Analysis

Water samples were collected from the existing boreholes at the project area using sampling bottles (1litre) for the raw ground water and control samples. A hand-held Global Positioning System (GPS), Garmin eTrex 10 was used in determining the coordinates and geo-referencing the sampling points of the area. The water sample was well lidded and put into the ice box immediately. The water samples were taken to a Federal Ministry of Environment accredited and Institute of Public Analysts of Nigeria (IPAN) registered laboratory for physico-chemical and microbial analysis.

To ensure the reliability and non-degeneration of some unstable physico-chemical parameters, in-situ measurement of pH, turbidity, conductivity, TDS, salinity, dissolved oxygen and temperature were carried out in the field. All field instruments were regularly cleaned and recalibrated after each use.

Table 4.1: Geographical Coordinates of Air quality/Noise levels and Soil sampling locations at proposed crusade ground multipurpose (residential and commercial) project, Ogun State

S/ N	LOCATIONS	LATITUDE	LONGITUDE
1	SS1 & AQ1	06°45.4764N	003°25.5421'E
2	SS2 & AQ2	06°45.0385'N	003°25.5428'E
3	SS3 & AQ3	06°45.4764'N	003°25.9773'E
4	SS4 & AQ4	06°45.0385'N	003°25.5421'E
5	SS5 & AQ5	06°45.3357'N	003°25.5431'E
6	SS6 & AQ6	06°45.2200'N	003°25.3907'E
7	SS7 & AQ7	06°45.4765'N	003°25.9774'E
8	SS8 & AQ8	06°45.4775'N	003°25.9789'E
9	SS9 & AQ9	06°45.4782'N	003°25.7849'E
10	SS10 & AQ10	06°45.4765'N	003°25.9774'E
11	SS1 1& AQ11 (Control)	06°45.4653'N	003°25.1328'E
12	SS12 & AQ12 (Control)	06°45.4823'N	003°25.3822'E

4.3 DESCRIPTION OF THE EXISTING ENVIRONMENT

The details of the environmental data acquired during this study are presented in the following subsections;

4.3.1 Climatic Conditions

The meteorology of the proposed ultra modern Crusade Ground Multipurpose (Residential and Commercial) project in Aseese, Obafemi Owode LGA, Ogun State project area was discussed using the meteorological data of 30 years (1991-2021) long-term data measurements of Ogun state as obtained from the Nigeria Meteorological Agency (NiMet, 2021). Ogun State is located in the moderately hot, humid tropical climate zone of South-West Nigeria. The climate of the area has alternating wet and dry season which are strongly influenced by Inter- Tropical Convergence Zone (ITCZ)

weather patterns. In Ogun State, the wet season period is usually from April to October while the dry season is from November to March. Meanwhile during the dry season there are periods characterized by dry dusty winds and relatively low temperatures referred to as harmattan. This occurs in the months of December and January. A summary of the monthly mean climatic characteristics of the project area located in Ogun State as obtained from Nimet (1991 – 2021) is as shown below (Table 4.2).

Table 4.2: Monthly mean climatic characteristics of the project area in Ogun State (1991 – 2021)

MONTH S	Temperature °C		Rainfall (mm)	Humidity (%)		Sunshin e Hours	Wind Speed (m/s)
	Min.	Max.	Mean	09:00Hr	15:00Hr		
January	24.29	31.12	23.86	77.72	69.76	5.54	3.5
February	26.07	32.27	36.61	79.48	71.96	5.40	3.7
March	26.61	32.48	64.96	79.76	73.92	5.24	4.1
April	26.37	32.26	139.22	80.84	75.32	5.74	4.1
May	25.64	31.53	216.86	82.40	76.80	5.65	3.9
June	24.37	29.72	413.06	87.12	81.12	4.27	3.7
July	23.96	28.34	232.73	87.88	82.92	3.01	4.9
August	23.88	28.16	115.24	87.68	82.00	2.59	5.1
September	24.18	28.76	232.13	87.92	82.80	3.10	4.7
October	24.62	29.99	192.31	84.72	79.64	4.84	4.1
Novembe r	25.80	30.14	52.31	81.76	75.84	6.18	3.8
December	25.36	31.56	13.70	80.44	71.36	5.74	3.7
Total			1,732.99			57.3	
Min.	23.88	28.16	13.7	77.72	69.76	2.59	3.5
Max.	26.61	32.48	413.06	87.92	82.92	6.18	5.1
Mean	25.09	30.53	144.42	83.14	76.95	4.78	4.1

4.3.2 Rainfall

Annual rainfall variations recorded in Ogun State from 1991-2021 is characterized by high precipitation in the months of April and October (wet season). However, the lowest mean rainfall amount is recorded in the month of December. The Total annual average rainfall in Ogun State was measured as 1,732.99mm (Table 4.3) while the maximum and minimum annual total rainfalls were measured as 1,541.55mm (April - October) and 191.44mm (November - March) as recorded for wet and dry season periods respectively (Table 4.2; Figure 4.1)

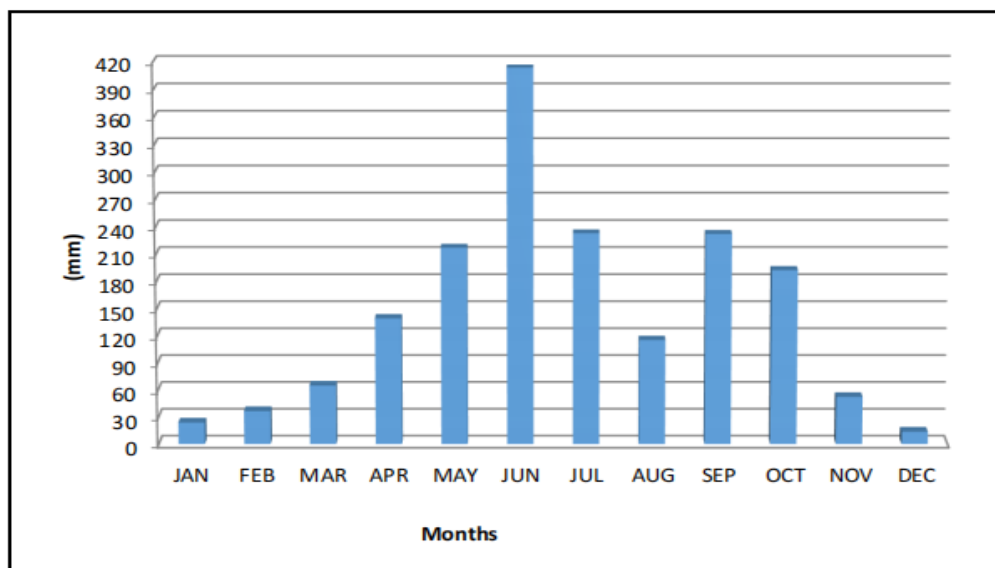
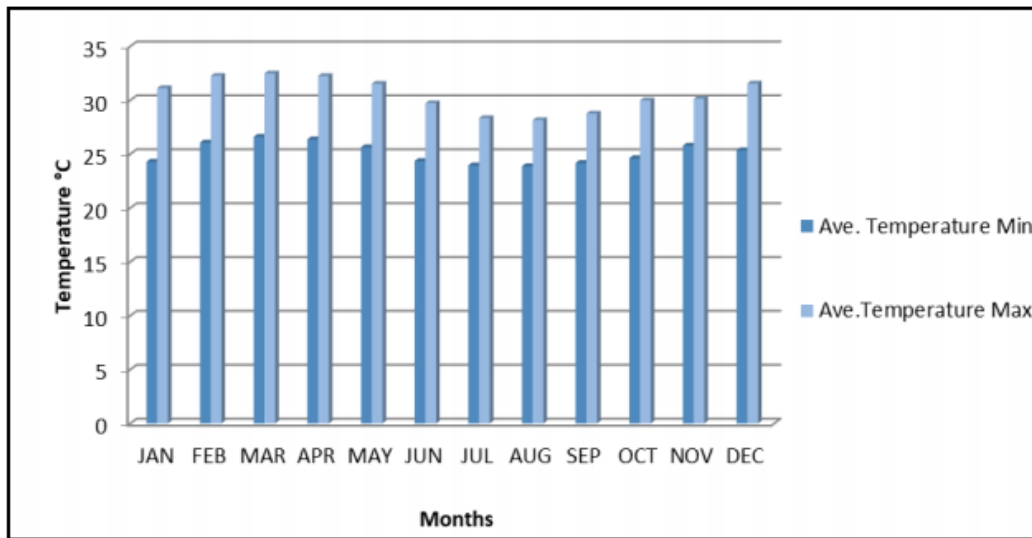


Figure 4.1: Average rainfall characteristics in the project area (1991 - 2021)

Source: NiMet 2021

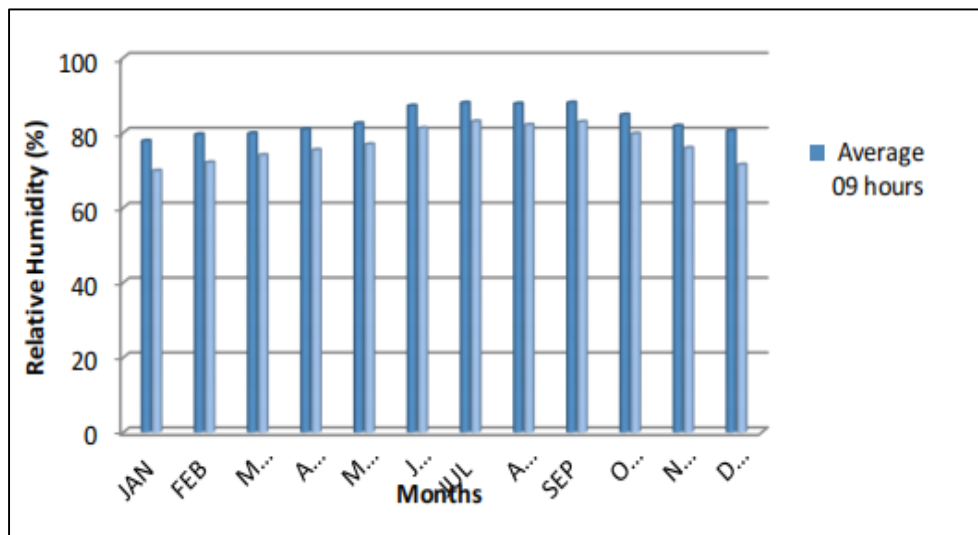
4.3.3 Ambient temperature

Monthly average ambient air temperatures recorded in Ogun State were generally high all year round based on the fact that the study area is situated in the tropics (Table 4.3). The maximum and minimum monthly average temperature was measured as 30.53°C and 25.09°C for dry and wet season periods respectively (Table 4.2; Figure 4.2).



Source: NiMet 2021

Figure 4.2: Monthly mean Temperature characteristics in the project Area (1991 - 2021)



Source: NiMet 2021

Figure 4.3: Monthly mean Relative Humidity characteristics in the Project area (1991 - 2021)

4.3.4 Relative humidity

The prevailing Tropical Maritime(Tm) air mass that blows over the proposed project area almost all year round causes high relative humidity to be observed in the terrain. The maximum and minimum annual average values were measured as 83.14% and 76.95%, respectively. Moreover the relative humidity measured in the morning was in

the range 77.72% in the month of January as compared to 87.92% recorded in September. Similarly, for the night period the range was 69.76% (January) to 82.92 % (July). Table 4.2; Figure 4.3

4.3.5 Wind Direction and Speed

Annual average wind speed (ms^{-1}) recorded for Ogun State from 1990 to 2019 was 4.1 ms^{-1} . The maximum and minimum annual average wind speed was 5.1 m/s^{-1} and 3.5 m/s^{-1} . The dominant wind direction in the project area was South West. (Table 4.2 and Figures 4.4 to 4.5).

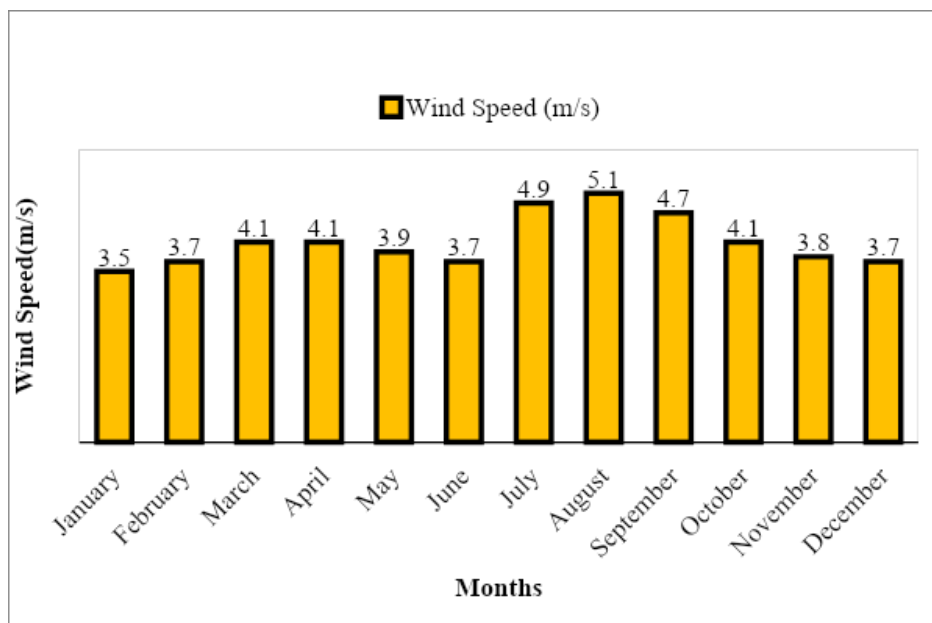


Figure 4.4: Monthly average wind speed in the project area (1991 – 2021)

Source: NiMet 2021

4.3.6 Sunshine Hours

The minimum and maximum monthly average sunshine hours were measured as 2.59 hours and 6.18 hours. Meanwhile the lowest sunshine hours was recorded at the peak of the rainy season (July and September) while the highest sunshine hours were in November. The average sunshine hour is 4.7 hours. This presents very high, the potential for harnessing solar energy to generate electricity in the study area if

considered. However, the total annual sunshine hours was 57.3 hours showing an average of about 5 hours bright sky per day (Figure 4.6).

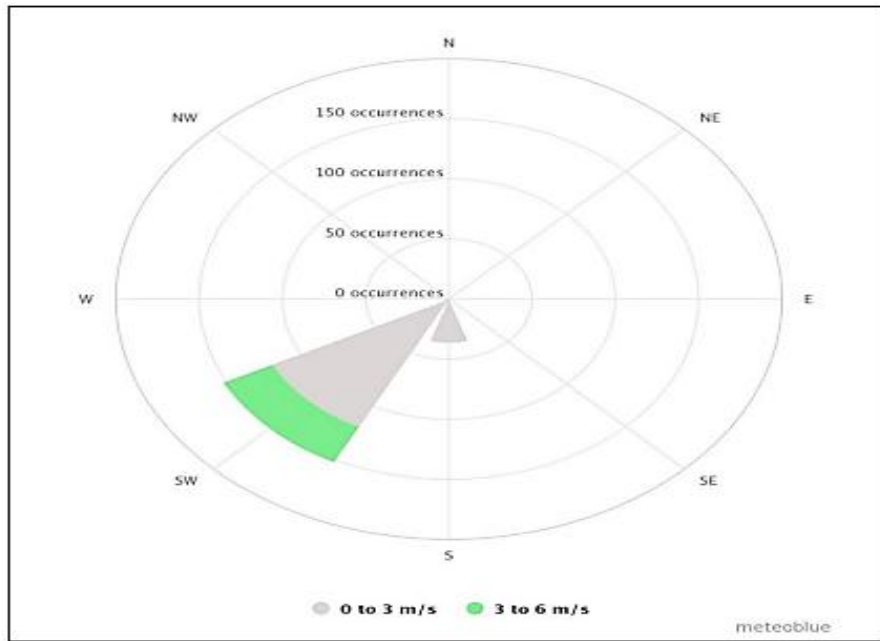


Figure 4.5: Wind rose of the project area (1991 - 2021)

Source: NiMet 2021

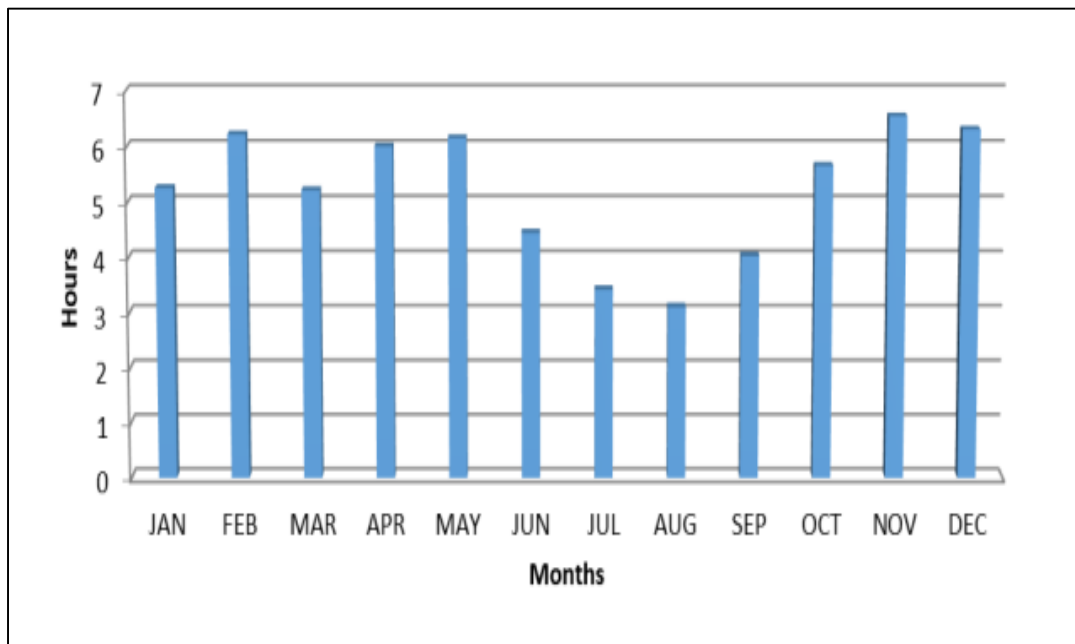


Figure 4.6: Monthly average sunshine hours in the project area (1991 - 2021)

Source: NiMet 2021

4.3.7 Study Team

Field studies, analyses and report writing were undertaken by a multidisciplinary team from Diskol Environmental Consulting Limited. The key experts involved in this study include Environmental scientists, air quality specialists, soil quality and water quality analysts, microbiologist, botanist, geologist, geographic information scientist and socio-economic experts. The full team list, their qualifications and designation is as shown in the List of EIA preparers.

4.3.8 Precaution/Quality Assurance/Quality Control

In marking sampling location, special preference was given to the following:

- Accessibility
- Availability of open space with good configuration free from shed
- Areas with minimal local influence from vehicular movement.
- In sampling, consideration was given to: Sensitivity and stability of equipment used
- Re-calibration of equipment
- Reproducibility of results.

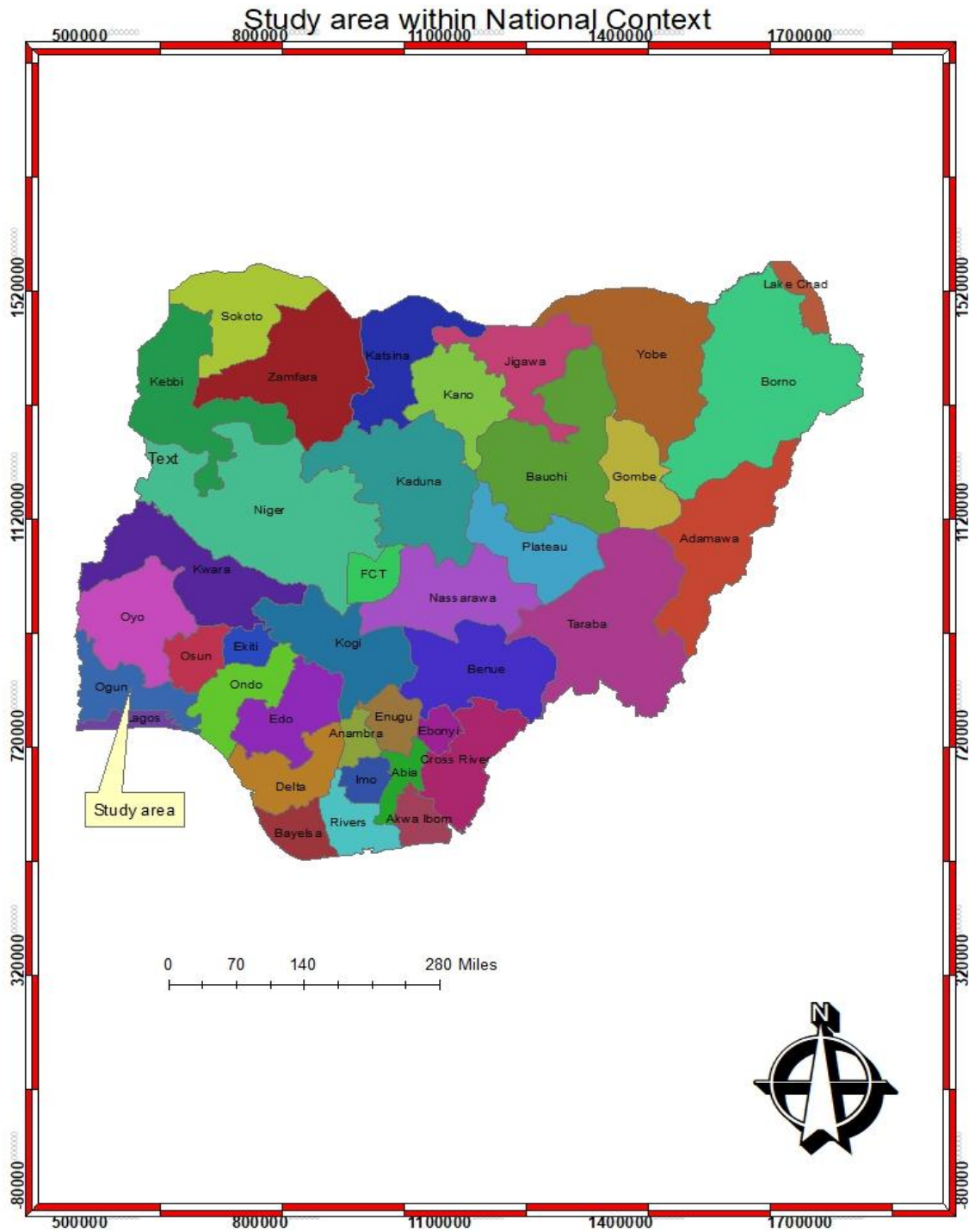


Fig 4.7: Showing the national map

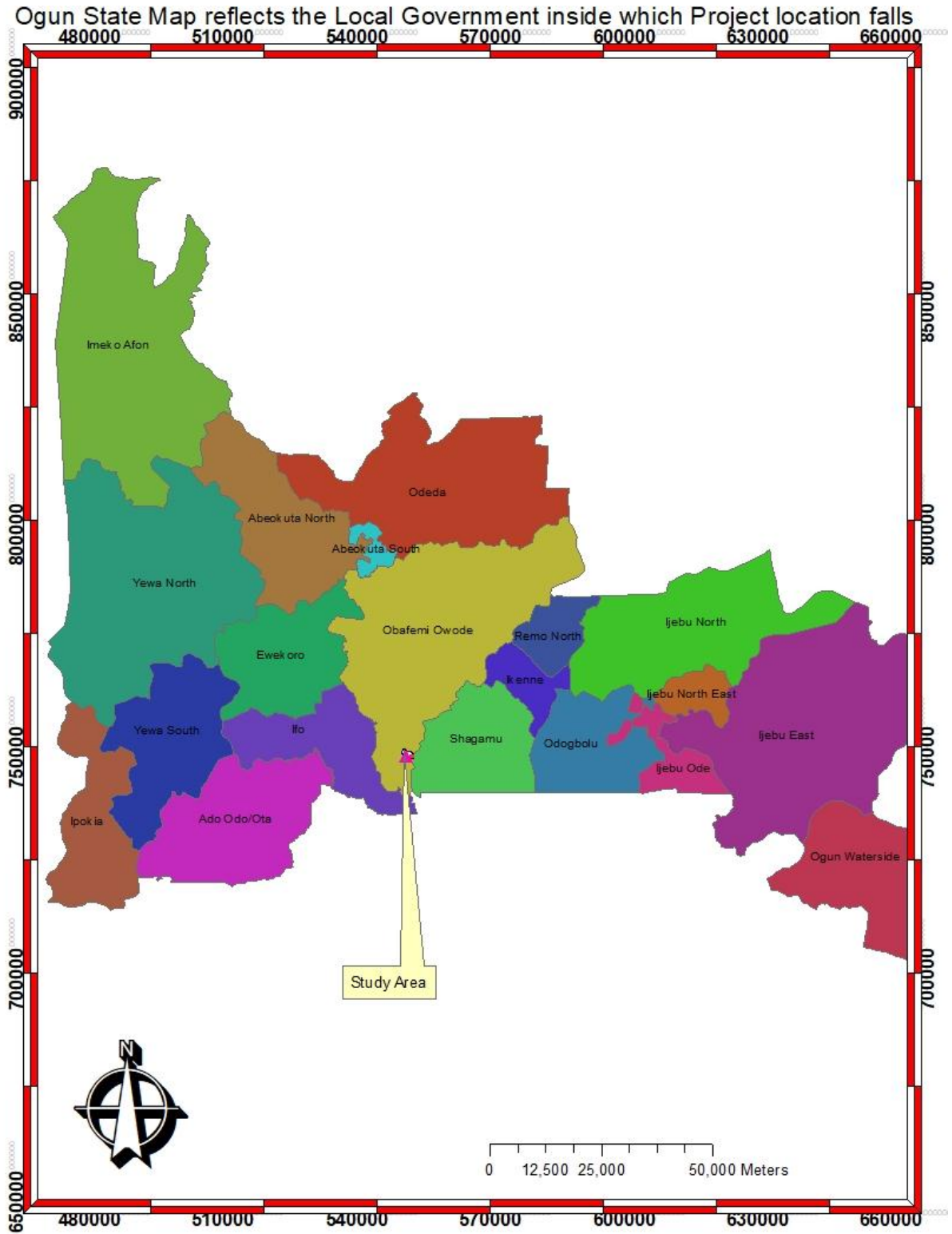


Fig 4.8: Showing the national map

Location of the Study area within Obafemi Owode Local Government Area, Ogun State

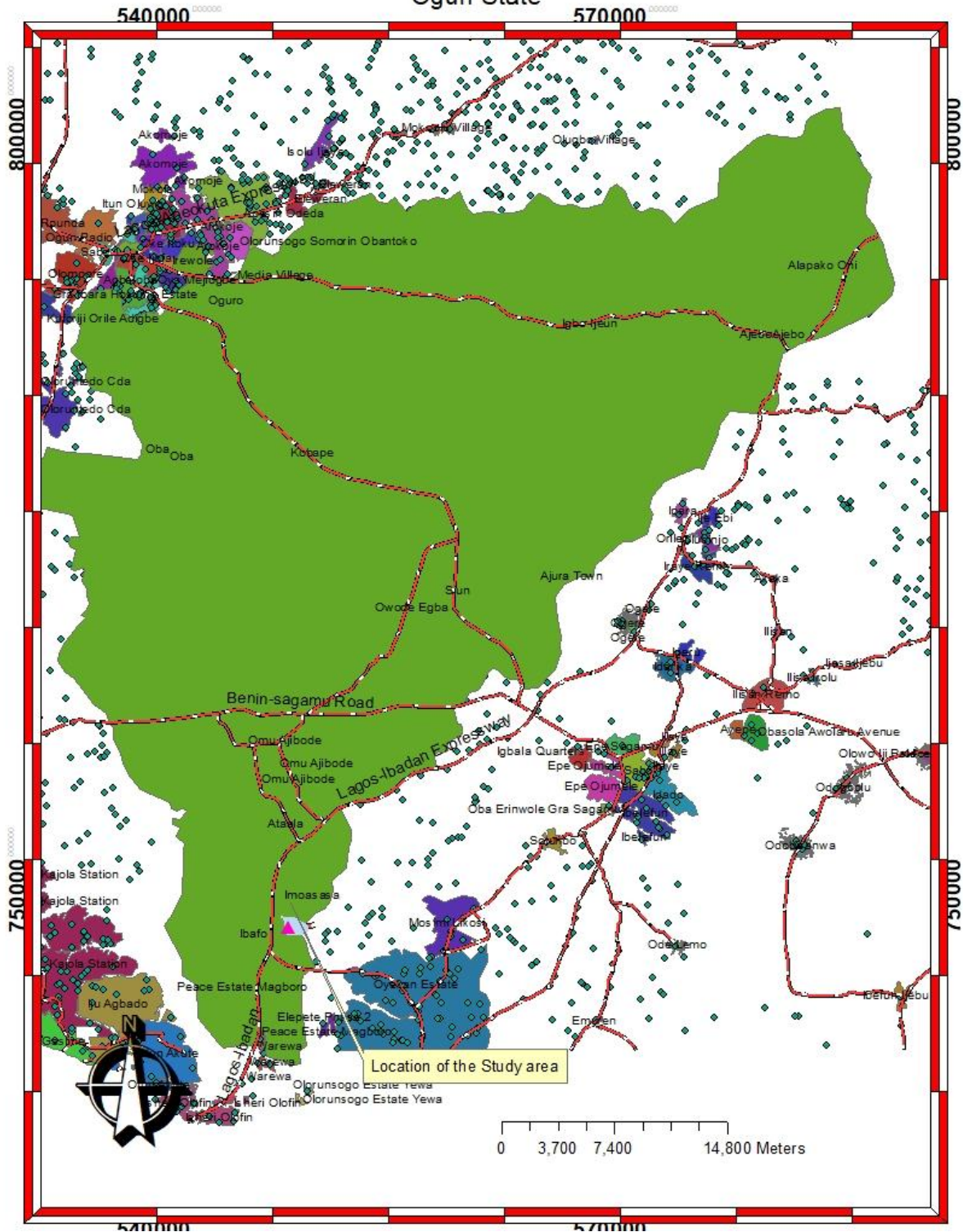


Fig 4.9: Showing location of study area within Obafemi Owode Local Government

Topographic Characteristics of the Study area

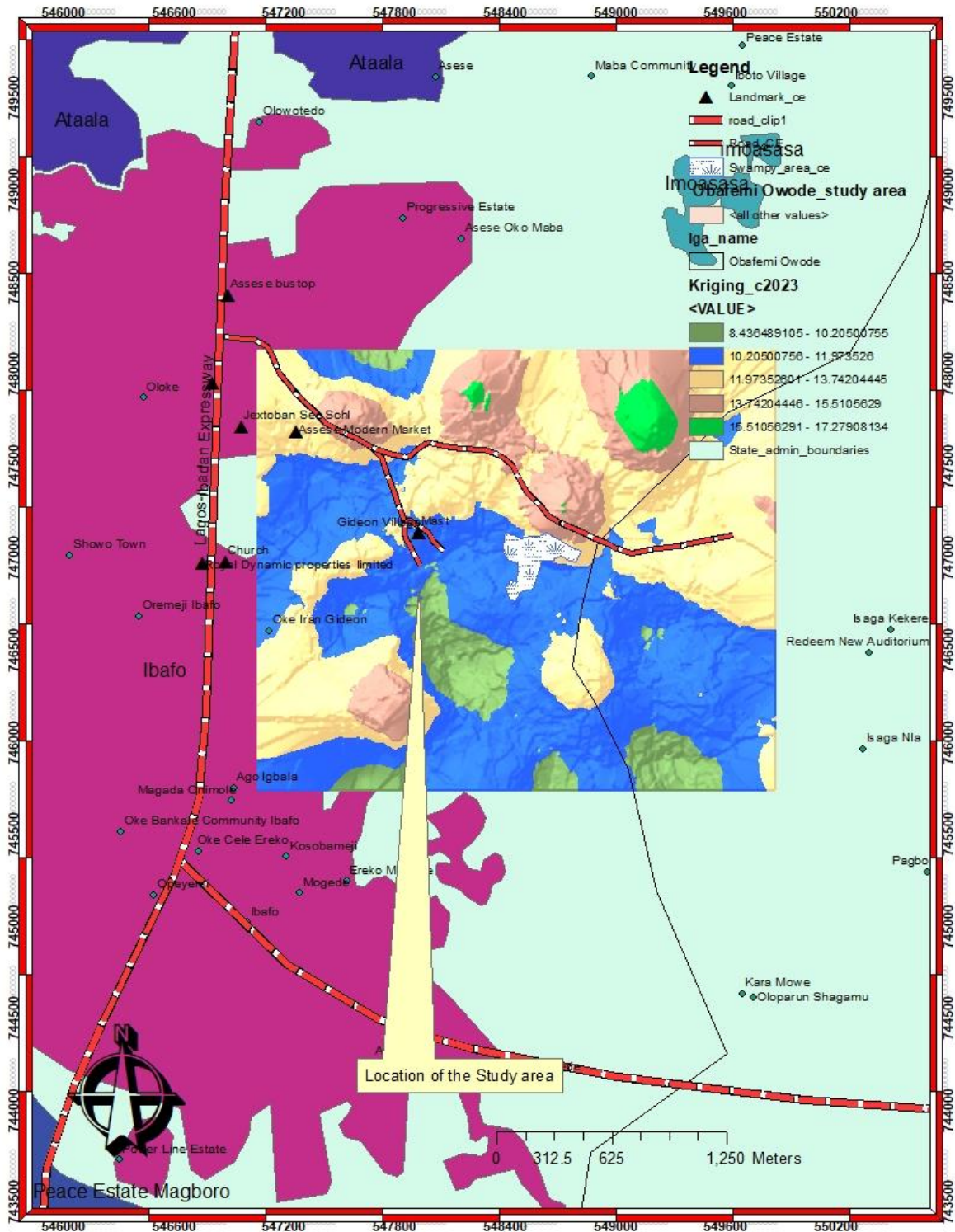


Fig 4.10: Showing topographic characteristics of the study area

Existing Elements on the site

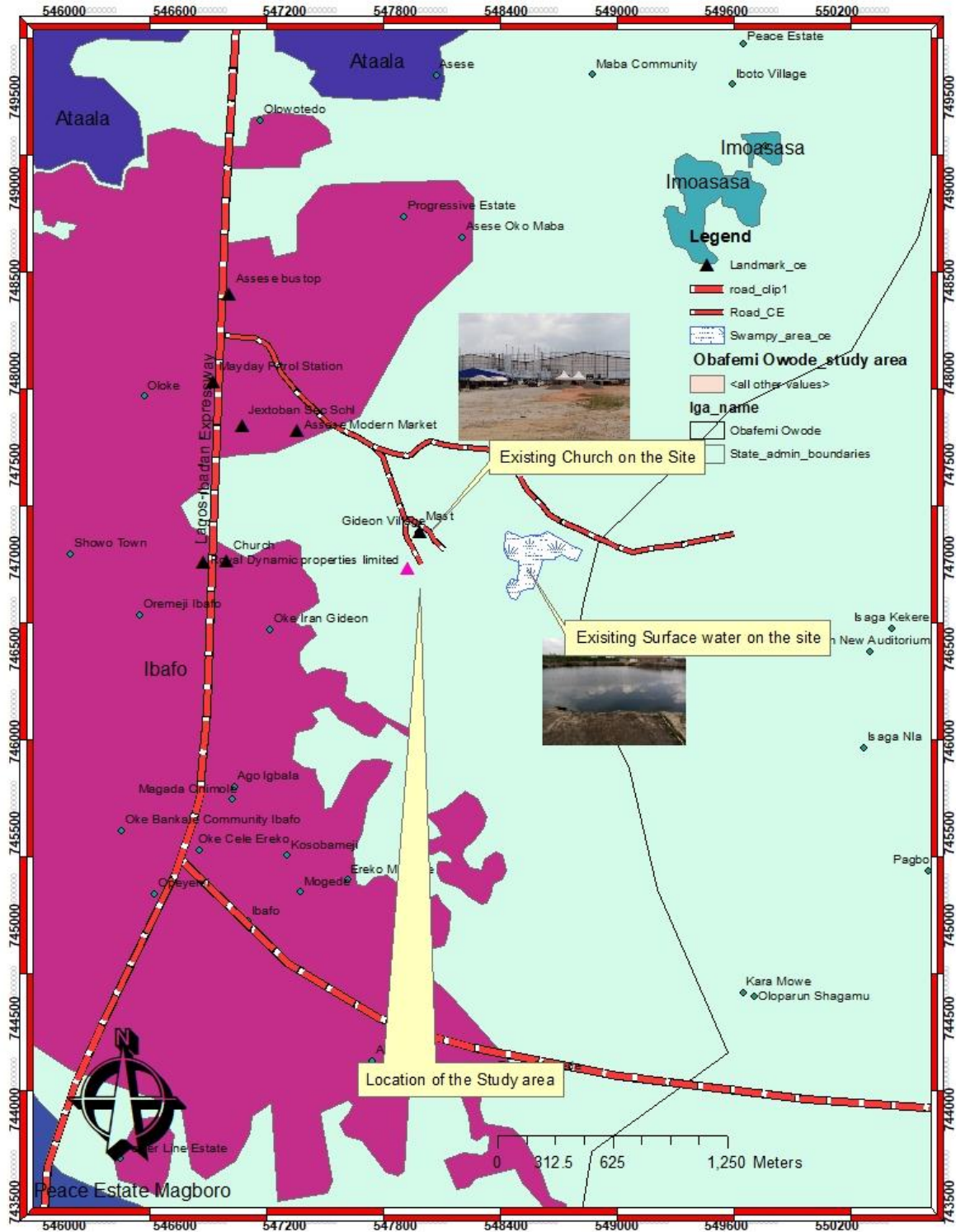


Fig 4.11: Showing elements existing on site

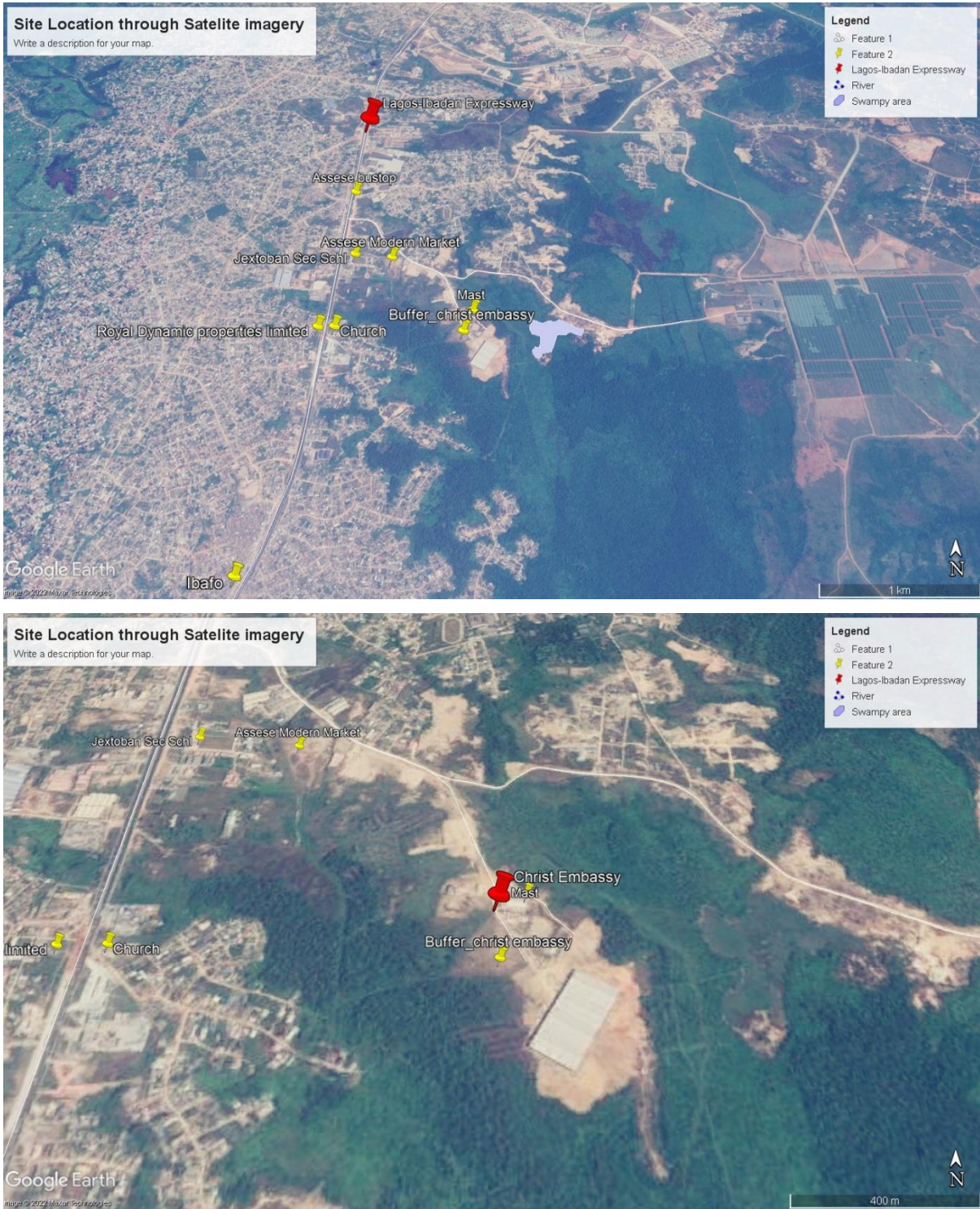


Fig 4.12: Showing site location on satellite imagery

4.4 AIR QUALITY ANALYSIS

The atmosphere is the gaseous envelope that surrounds the earth and constitutes the transition between its surface and the vacuum of space (Bhatia, 2009). The atmosphere is composed primarily of nitrogen and oxygen and is made up of many layers of air, each are identified by their thermal characteristics or temperature changes, chemical composition, movement and density. Life on earth is supported by the layers of air, solar energy and our planet's magnetic fields and the quality of air is very essential to its sustenance (Ojo and Awokola, 2012).



Plate 4.1: Showing air quality monitoring equipment during the studies

4.4.1: Sampling and Analysis Methods

A one season data gathering was carried at the project site between 7th and 30th November, 2022 and compared with data gathered at Redeemed Christians Church of God Power plant EIA exercise. The site of the secondary data is within 5km radius of the project site. The possible air pollutants from the proposed project site were determined *in-situ*. Air quality parameters measured at Ten (10) locations including Two (2) control locations at the study area includes; Nitrogen dioxide (NO₂), Sulphur dioxide (SO₂), Carbon dioxide (CO₂) Carbon

monoxide (CO), Oxygen (O₂), Hydrogen Sulphide (H₂S), Particulate matter (PM_{2.5} & PM₁₀) and Methane (CH₄) and the values obtained were compared with NESREA and FMEnv's Ambient Air Quality Standards as presented in **Table 4.3**.



Plate 4.2: Showing representatives of BLW, FMEnv, OGMOE and Diskol during data gathering at site



Table 4.3: Ambient Air Quality results at the proposed project site (Dry Season)

LOCATION	TEMP (°C)	SO ₂ (mg/m ³)	VOC (mg/m ³)	CH ₄ (mg/m ³)	RH (%)	O ₂ (%)	H ₂ S (mg/m ³)	CO (mg/m ³)	CO ₂ (mg/m ³)	Air speed (m/s)	SPM _{2.5} (mg/m ³)	SPM ₁₀ (µg/m ³)	NOISE LEVEL dB(A)
AQ1	31.1	0.020	<0.01	<0.1	53.7	20.8	<0.01	<0.01	0.025	1.5	210	29	47.5
AQ2	30.0	0.015	<0.01	<0.1	56.8	20.8	<0.01	0.01	0.018	4.2	121	35	45.0
AQ3	30.1	0.020	<0.01	<0.1	58.5	20.8	<0.01	0.02	0.021	5.3	142	63	49.0
AQ4	30.2	0.022	<0.01	<0.1	56.6	20.8	<0.01	0.01	0.051	4.9	204	82	58.3
AQ5	30.5	0.025	<0.01	<0.1	51.3	20.8	<0.01	0.02	0.025	1.8	110	80	60.8
AQ6	30.3	0.023	<0.01	<0.1	52.8	20.8	<0.01	0.01	0.028	1.5	413	69	46.8
AQ7	31.0	0.021	<0.01	<0.1	60.7	20.8	<0.01	0.01	0.024	1.4	612	75	53.2
AQ8	30.1	0.018	<0.01	<0.1	62.5	20.8	<0.01	0.01	0.017	1.8	401	28	51.1
AQ9	30.5	0.013	<0.01	<0.1	59.9	20.8	<0.01	<0.01	0.023	3.5	430	210	57.8
AQ10	30.5	0.014	<0.01	<0.1	61.5	20.8	<0.01	<0.01	0.021	2.8	20	10	55.1

MEAN	30.3	0.019	<0.1	<0.1	57.4	20.8	<0.01	0.01	0.025	2.87	266.3	68.1	52.46
AQ11 (Control)	30.8	0.013	<0.01	<0.1	60.6	20.8	<0.01	0.01	0.015	1.9	140	78	56.3
AQ12 (Control)	30.1	0.030	<0.01	<0.1	61.3	20.8	<0.01	0.02	0.010	2.3	131	22	58.2
FME_{env}	32	0.026	NS	NS	NS	21	14	11.5	NS	NS	NS	250	90

Table 4.4: Ambient Air Quality results from Secondary data (Wet Season)

LOCATION	NH ₃ (ppm)	SO ₂ (mg/m ³)	VOC (mg/m ³)	CH ₄ (mg/m ³)	H ₂ S (mg/m ³)	CO (mg/m ³)	SPM _{2.5} (mg/m ³)	SPM ₁₀ (mg/m ³)
AQ1	<0.01	<0.01	<0.01	<0.1	<0.1	<0.1	12.7	62.8
AQ2	<0.01	<0.01	5.0	3.0	<0.1	<0.1	15.0	58.0
AQ3	<0.01	<0.01	11.0	10.0	<0.1	<0.1	22.2	60.9
AQ4	<0.01	<0.01	20.0	15.0	<0.1	<0.1	18.3	56.3
AQ5	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	17.2	54.9
AQ6	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	17.1	52.7
AQ7	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	18.4	53.1
AQ8	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	19.4	53.0
AQ9	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	11.2	51.7
AQ10	<0.01	<0.01	<0.1	7.0	<0.1	<0.1	16.9	51.6
AQ11	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	18.1	49.6
	0	0	5.0	3	0	0	11.2	49.6
	0	0	20.0	15	0	0	22.2	62.8
MEAN	<0.01	<0.01	12.0	8.8	<0.01	<0.01	16.8	55.5
AQ12 (Control)		0.03	<0.1	<0.1	<0.01	0.02	13.2	45
FME_{env}		0.01	NS	NS	14	10	NS	250
NESREA		0.35	NS	NS	NS	8.73	NS	150

4.4.2: Air Quality Results Discussion

Temperature

Temperature tells how hot or cold an environment is at a given period. Temperature has been found to affect the living organisms in various ways, for example it has significant role on the cells, morphology, Physiology, behaviour, growth. Most of metabolic activities of microbes, plants and animals are regulated by varied kinds of enzymes and enzymes in turn are influenced by temperature, consequently increase in temperature, up to a certain limit, brings about increased enzymatic activity, resulting in an increased rate of metabolism. In humans, high temperature increases stress and sometimes leads to stroke. Monitoring of temperature levels ensures safety and compliance limits are not exceeded.

The mean temperature recorded was 30.0°C with a range of 30.1°C – 31.1°C while 30.1°C and 30.8°C were recorded at the control points. All sampled locations were within **FME_{env}** limit 32.0°C during the dry season.

Sulphur dioxide

Sulfur dioxide (SO₂) is a colorless, smelly gas in the sulfur oxide family of gases. Sulfur dioxide is formed when sulfur-containing fuels, such as coal and oil, are burned. The primary sources of sulfur dioxide emissions are power plants, refineries and copper smelting facilities. Sulfur dioxide is also found in the exhaust of diesel fuel and gasoline. Volcanoes and decaying organic matter also produce sulfur dioxide. However, man-made emissions of sulfur dioxide have been the cause of some of the worst air pollution episodes in the last century in Nigeria.

Dejmek et al., (2000) found exposure to very high levels to be life threatening. Low concentrations of sulfur dioxide in outdoor air can irritate the eyes, nose, throat, and respiratory tract, causing coughing and shortness of breath. Long-term exposure to low concentrations can cause headache, nausea, dizziness, and temporary loss of smell. Breathing sulfur dioxide in polluted outdoor air may heighten sensitivities to other allergens, particularly in asthmatics. Breathing high levels of sulfur dioxide can

constrict airways, causing wheezing, chest tightness, coughing, and breathing problems. Exposure to extremely high concentrations of sulfur dioxide can cause severe shortness of breath and pulmonary edema, a medical emergency characterized by fluid building up in the lungs.

The ambient concentration of sulphur dioxide recorded in the study area during the dry season range between 0.013 mg/m³ to 0.025 mg/m³ with an average of 0.019 mg/m³. However, all the sampled locations including control were in compliance with **FMEEnv's limit (0.5mg/m³)**, whereas during the wet season, SO₂ levels were below the detectable limit of the equipment used.

Relative Humidity

The relative humidity of an air-water mixture is defined as the ratio of the partial pressure of water vapor in the mixture to the equilibrium vapor pressure of water over a flat surface of pure water at a given temperature. It is expressed as a percentage; Relative humidity can affect the incidence of respiratory infections and allergies. The influence of relative humidity on the abundance of allergens, pathogens, and noxious chemicals suggests that indoor relative humidity levels should be considered as a factor of indoor air quality. The majority of adverse health effects caused by relative humidity would be minimized by maintaining indoor levels between 40% and 60%. The mean relative humidity concentration recorded was 66.9% with the range of 51.3% - 62.5% and a value of 60.6% and 61.3% at the control points.

Oxygen

Oxygen is the only component present in air we breathe capable of supporting life. Workers can become asphyxiated by exposure to atmosphere deficient of oxygen that can lead to serious injury or loss of life. The oxygen concentrations recorded at the sampled locations within the project site including control were 20.8% which were in compliance with the recommended **FMEEnv** limit of **21.0%**.

Hydrogen Sulphide

Hydrogen sulphide is a colourless, flammable gas with a characteristic odour of rotten eggs. It is produced both naturally and through human activity. Hydrogen sulphide

is one of the key compounds in protein and it occurs in volcanic gases. Some natural gas fields and geothermal active areas have found significant concentrations of hydrogen sulphide. Inhalation of high concentrations of H₂S may lead to collapse instantaneously, respiratory paralysis, cyanosis, convulsions, coma, cardiac arrhythmias and death within minutes.

Prolonged exposure causes respiratory tract irritation, with rhinitis, pharyngitis, bronchitis, dyspnea and pulmonary oedema. Systemic effects include vomiting, diarrhea, headache, nystagmus, dizziness, agitation, drowsiness, tremor, muscular weakness, seizures, tachycardia and hypotension. Dermal exposure causes discoloration, pain, itching, erythema and local frostbite. Ocular effects may be delayed and include irritation, inflammation, lacrimation, conjunctival hyperemia, photophobia, conjunctivitis, keratitis and blepharospasm. Recovery is usually complete but Exposure to concentrations of about 700 mg/m³ (500 ppm) hydrogen sulphide and above may be fatal.

Respiratory failure is the most common cause of death, but a wide range of health effects have been reported following exposure to high concentrations including respiratory, neurological and cardiovascular effects (IPCS, 2003; ATSDR, 2006). Neurological effects at high exposure have included nausea, headache, delirium, disturbed equilibrium, poor memory, neurobehavioral changes, olfactory paralysis, loss of consciousness, tremors and convulsions. In those surviving exposure to high concentrations some of the neurological effects may be permanent or persistent. Cardiac irregularities including arrhythmias as well as hypertension have been reported (IPCS, 2003; ATSDR, 2006) permanent damage. Hydrogen Sulphide concentration at all sampled points including control were <0.01ppm and below the detection limit of the instrument used. These values including control were in compliance with **FMEnv limit (14ppm)**.

Carbon dioxide

According to Jarrell et al. (2002), CO₂ a colorless, odorless, non-flammable gas at room temperature, and is required for plant and animal life. It is produced naturally in the body and during the burning of fossil fuels. Decaying vegetation and rotting carbon-containing wastes also produce CO₂. It can exist as a liquid or a solid (dry ice), depending on the temperature and pressure. CO₂ is used in fire extinguishers, as a coolant in the form of dry ice, and to produce artificial fog used in theatre productions. CO₂ is also used to carbonate sodas and seltzer water.

In research by BierWirth (2018), CO₂ is considered to be minimally toxic by inhalation. The primary health effects caused by CO₂ are the result of its behavior as a simple asphyxiant. A simple asphyxiant is a gas which reduces or displaces the normal oxygen in breathing air. Symptoms of mild CO₂ exposure may include headache and drowsiness. At higher levels, rapid breathing, confusion, increased cardiac output, elevated blood pressure and increased arrhythmias may occur. Breathing oxygen depleted air caused by extreme CO₂ concentrations can lead to death by suffocation (Zhang *et al.*, 2017). The mean concentration of carbon dioxide recorded from the project site was 0.03mg/m³ having a range of 0.02mg/m³ - 0.05mg/m³ with 0.01mg/m³ and 0.02mg/m³ at the control point.

Carbon monoxide

Increased levels of carbon monoxide reduce the amount of oxygen carried by hemoglobin around the body in red blood cells. For healthy people, the most likely impact of a small increase in the level of carbon monoxide is that they will have trouble concentrating. Some people might become a bit clumsy as their coordination is affected, and they could get tired more easily. People with heart problems are likely to suffer from more frequent and longer angina attacks, and they would be at greater risk of heart attack. The mean concentration of Carbon monoxide at sampling points within the study area was 0.01mg/m³ with a range of 0.01mg/m³ - 0.02mg/m³ and 0.01mg/m³ and 0.02mg/m³ at the control which were within **FMEnv**

limit 5.0mg/m³ during the dry season, whereas during the wet season CO levels were below the detectable limit of the equipment used.

Particulate Matter

Particulate Matter (PM) is a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke are large or dark enough to be seen with a naked eye. Others are so small that they can only be detected by using electron microscope. Particulate matters are considered to be a primary contributor to air pollution, smog formation and environmental contamination. They are emitted from various source including power stations, industrial activities and vehicles. During the dry season, the mean particulate matter (PM_{2.5}) was 266.3µg/m³ having a range of 20µg/m³ - 612µg/m³ and a value of 140 µg/m³ and 131µg/m³ at the control while mean particulate matter (PM₁₀) recorded was 68.1µg/m³ with a range of 10µg/m³ - 210µg/m³ having a value of 78µg/m³ and 22µg/m³ at the control point. All sampled locations including control complied with the **FMEnv** limit of **250µg/m³**. However, during the wet season, the mean particulate matter (PM_{2.5}) was 16.8µg/m³ having a range of 11.2µg/m³ - 22.2µg/m³ and a value of 13.2 µg/m³ at the control while mean particulate matter (PM₁₀) recorded was 55.5µg/m³ with a range of 49.6µg/m³ - 62.8µg/m³ having a value of 45.0µg/m³ at the control point. All sampled locations including control complied with the **FMEnv** limit of **250µg/m³**.

Volatile Organic Compounds (VOC)

VOC include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOC are consistently higher indoors (up to ten times higher) than outdoors. Organic chemicals are widely used as ingredients in household products. Paints, varnishes and wax all contain organic solvents, as do many cleaning, disinfecting, cosmetic and degreasing products. Fuels are made up of organic chemicals. All of these products can release organic compounds while you are using them, and, to some degree, when they are stored. Health effects of exposure to VOC include; eye, nose and throat irritation, headaches,

loss of coordination and nausea, damage to liver, kidney and central nervous system and in some cases may lead to cancer. As with other pollutants, the extent and nature of the health effect will depend on many factors including level of exposure and length of time exposed. VOC concentrations within the project site were below the detectable limit of the equipment used during the dry season.

4.4.3 Noise Level Analysis

The positions of facility plants and machineries as well as their movements, alongside the roads and traffic patterns in a facility affect the level of noise pollution produced by that facility. The acoustic qualities of organizations and factories need to be analyzed for optimal performance of its workforce and to prevent noise pollution. To prevent noise pollution and maintain noise level below set limits and standards, systematic noise monitoring and analysis of results of noise level measurements are necessary to assess the noise levels.

The noise level monitoring was done using the UNI - T UT352 sound detector to measure the maximum and minimum noise levels from strategic points within the facility. The average noise levels were computed and compared against the noise level standards.

Noise Levels shall not exceed Leq of

- i) Facility/Workshops 85 dB (A)
- ii) Offices 50 dB (A)
- iii) Facility/Workshop Compound 75 dB (A)

Note: Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.

Table 4.5: Maximum Permissible Noise Levels (Continuous or intermittent noise from a Facility or Workshop)

Leq dB (A)	Duration (Daily)	Duration (Weekly)
85	8hours	40hours
88	4hours	20hours
91	2hours	10hours
94	1hour	5hours
97	30minutes	2.5hours
100	15minutes	1.25hours
106	7.5minutes	37.5 minutes
109	1.875 minutes	9.375 minutes

Source: NESREA (2009)

The mean noise level at Project site was 72.0dB (A) with a range of 66.7dB (A) – 83.4dB (A) having a value of 73.2dB (A) at the control point. All locations including control were in compliance with **FMEEnv limit [90dB(A)] and NESREA limit [85dB(A)]**.

4.5 Geology of Project Area

4.5.1 Regional Geology

Regionally, the site is a sedimentary environment laid on a transition zone comprising of Alluvium, Coastal Plains Sand, Ilaro, Ewekoro and the deeper horizon Abeokuta sedimentary formations. The sediments are variously exposed at variance with approach from the Redeemed Camp nearby. At some part, it is Alluvium just as it is on this site. To some other parts within 1km radius it is coastal plain sands and at other parts it is either Ilaro or Ewekoro or Abeokuta sedimentary formations. While the Alluvium is recent and young sediment deposits; the Ilaro is older while Ewekoro is much older and the Abeokuta sediments are even much older in geological dating or geochronology than the Ewekoro.

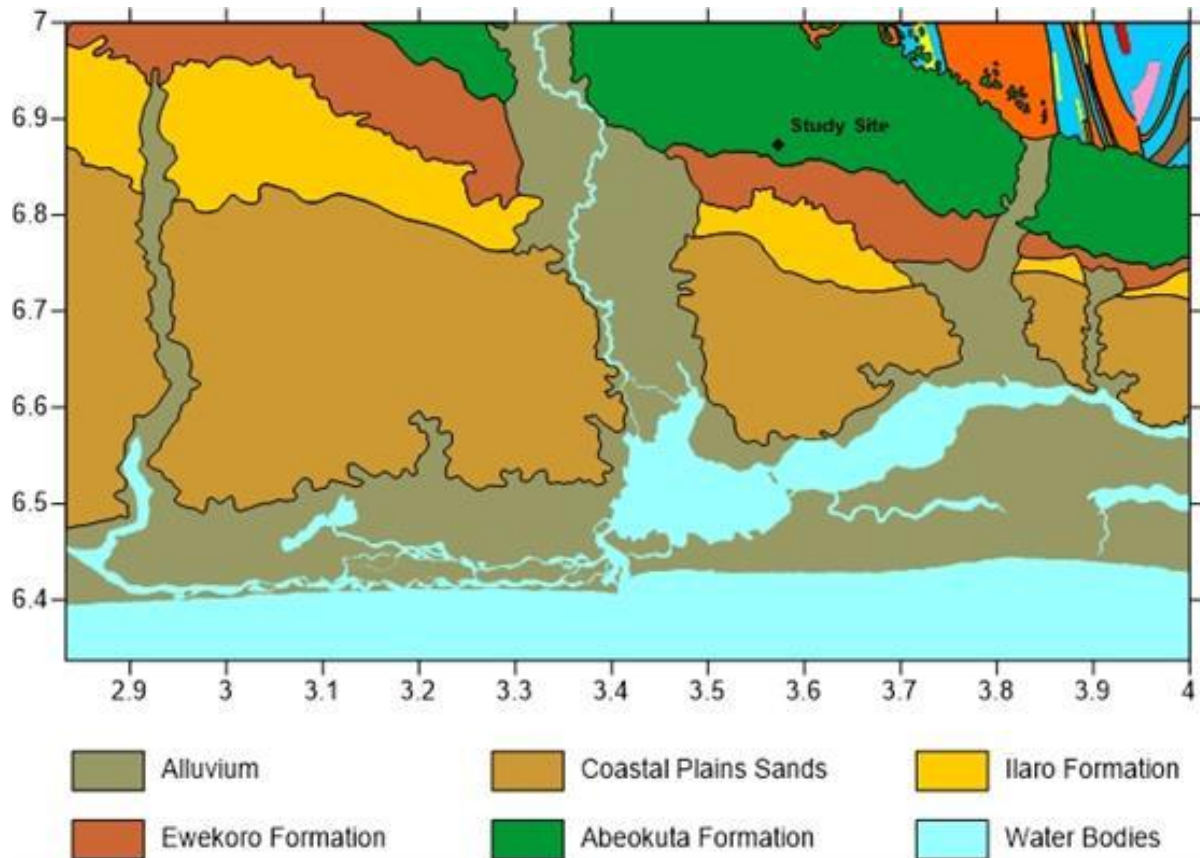


Figure 4.13: Geological Map of Part of Southwestern Nigeria Showing Project Site

The coastal plains sands are predominantly sands and clays in nature with thin layers of peat and sandstone. The Ilaro formation is predominantly shales silts and clays while the Ewekoro formation is predominantly limestones, shales, clays and silts. The Abeokuta sediments are mostly sands, sandstones, siltstones, mudstones and clays in nature. Unconformity has been reported within these sediments by regional geological researchers. Peculiar geological features of the area are detailed below.

•Surficial Soil Deposit

The surficial soil layers or deposit are the topmost soils which are present at site or may have been transported or emplaced on the natural soil coverage. Therefore, aside from the naturally transported alluvial soils noticed at the rare part of the site, about 1.5m thickness of transported soils dominates the site layout.

• Superficial Soil Deposit

The superficial soil deposits are the near surface soil deposits within and below the vadose zone which may host significant amount of near surface groundwater. Due to the low elevation of this terrain; the site filling (with transported soil has implaced laterite, cobbles, otherwise referred to as 'hard core', quarry dust otherwise referred to as 'stone base' and rehabilitated road scrapings, called Asphalt) on the natural swampy clay soil. Both the surficial and superficial soil layers are here described by hand-specimen and field measurements characteristics of the soils in terms of; profile, pattern, colour, texture, porosity, permeability and resistivity.

4.5.2 Local Geology

Geologically, the site is situated on Ewekoro deposit. The Ewekoro is characterized by shale and Limestone with lenses of sand deposits. The shales are of various grades: organic, clayey and compacted in nature. Hydrogeologically, there are surface stream courses and attendant useful amounts of ground water within the silty shales or shaly limestones. There is a meandering River with its source from North of the site, crossing the ever-busy expressway and flowing South with a bend west at the rare section of site. From experience, shallow groundwater aquifers within 30m depth horizon delivers not less than 5m³/hr, while borehole depths that penetrate 60m depth horizon delivers not less than 20m³/hr and usually free flowing or artesian due to pressure of overlying compacted shales and shaly sandstones.

4.6 WATER QUALITY ANALYSIS

One of the most challenging problems of development is improper management of the huge quantity of wastes accompanied by human developmental activities. More worrisome is the unsafe disposal of these wastes into the environment and its chronic effects. Water bodies especially freshwater reservoirs are usually the most affected by these wastes. This menace has often rendered these water bodies unsafe for both primary and/or secondary usage (Fakayode 2005). Contamination of natural water bodies by industrial effluent has emerged as a major worry in developing and densely populated states like Ogun state.

Population explosion, ill-managed rapid urbanization, industrial and technological expansion, energy utilization and wastes generation from domestic and industrial sources have rendered most aquatic resources in Ogun state unsafe and hazardous to man and other living organisms. Water pollution is now a significant global problem. Effluents and waste water from industries and developmental activities are main sources of direct continuous input of pollutants into aquatic ecosystems. This has a long-term implication on ecosystem functions including changes in food availability, shortening of the food chain and an extreme threat to the self-regulating capacity of the biosphere. These effluents from industries and other human activities are mostly composed of heavy metals, pesticides, polychlorinated biphenyls (PCBs), dioxins, poly-aromatic hydrocarbons (PAHs), petrochemicals, phenolic compounds and microorganisms (Fakayode 2005). These wastes are usually discharged into water bodies and the cumulative hazardous effects it has on the environment have received much attention. Industrial wastes containing high concentration of microbial nutrients would obviously promote an after growth of significantly high coliform types and other microbial forms. Some heavy metals contained in these effluents have been found to be carcinogenic while other chemicals equally present are poisonous depending on the dose and duration of exposure. Undoubtedly, wastewaters from industries and residential areas discharged into another environment without suitable treatment could disturb the ecological balance of such an environment. Historically, great civilizations like that of Egyptian civilizations flourished around the river Nile. In Nigeria cities like Kaduna, Aba and Lagos depends largely on aquatic resources, hence the need to pay special attention to the protection of this resource. However, rapid industrialization and urbanization comes at its own costs; the discharge of partially treated or raw wastes into the surrounding bodies of water. The effect of this discharge is worsened during the dry season as they make up a larger portion of inland waters during the dry season, further deteriorating the water quality. However, with constant monitoring, a robust waste management strategy and effluent treatment plan, this menace can be cut to the barest minimum.

4.6.1 Sampling Methodology and Analysis Methods

In order to assess the quality of groundwater in the study area, groundwater samples were collected from one borehole existing within the facility and one borehole in project community during the field sampling, while surface water was sampled from the nearest aquatic ecosystem. Prior to collecting the groundwater and surface water samples, each container was first rinsed with the water from the borehole and river respectively. For the groundwater, the tap was allowed to flow for at least 30 seconds before groundwater was collected into the appropriate containers. Groundwater sample was collected at the project site with geographical coordinate of latitude $06^{\circ}45.4878'N$ and longitude $003^{\circ}25.9827E$ with elevation 16m and a control at; latitude $06^{\circ}45.6248'N$ and longitude $003^{\circ}25.1045E$ with elevation 7m and surface water sample at latitude $06^{\circ}45.47647'N$ and longitude $003^{\circ}25.9773E$ with elevation 15m stored in an ice box on site and transported to a Federal Ministry of Environment (FMEnv) accredited and Institute of Public Analyst of Nigeria (IPAN) registered laboratory – SEARCHGATE Laboratories Limited, 38, Diya Street, Ifako, Gbagada, Lagos- for analysis of other physico-chemical and microbiological parameters.

The physico-chemical characteristics of the samples were analyzed to ascertain the quality of water. Standard methods of analysis of water and wastewater contained in the handbook "*Standard Methods for the Examination of Water and Wastewater*" 22nd Edition of 2017 was used. Some parameters such as; pH, temperature Dissolved Oxygen (DO), Electrical conductivity, Salinity, Total Dissolved Solids (TDS), Conductivity were determined *in-situ*.

Table 4.6: Methods for the Analysis of Water Samples

PARAMETERS	STANDARD REFERENCE	TEST METHODS	PRESERVATION
pH	APHA 4500-H B	Electrometric Method	Analyze immediately.
Conductivity	APHA 2510-B	Electrometric Method	Analyze immediately.
Turbidity	APHA 2130 B	Nephelometric Method	Analyze same day; store in dark up to 24h, Cool $\leq 6^{\circ}\text{C}$
Total hardness	APHA 2340-C	EDTA Titrimetric Method	Add HNO_3 to H_2SO_4 to $\text{pH} < 2$
Dissolved Oxygen	APHA 4500-O G	Membrane Electrode Method	Analyze immediately.
Fluoride	APHA 4500-F C	Ion-Selective Electrode Method	None
Chloride	APHA 4500-Cl B	Argentometric Titration Method	None
Acidity	APHA 2310-B	Titrimetric Method	Cool $\leq 6^{\circ}\text{C}$
Salinity	APHA 2520 B	Electrical Conductivity Method	Analyze immediately.
Alkalinity	APHA 2320-B	Titrimetric Method	Cool $\leq 6^{\circ}\text{C}$
Nitrate	APHA 4500 NO_3 -B	UV Spectrometric Method	Analyze as soon as possible; Cool $\leq 6^{\circ}\text{C}$
Nitrite	APHA 4500 NO_2 -B	Colorimetric Method	Analyze as soon as possible; Cool $\leq 6^{\circ}\text{C}$
Sulphate	APHA 4500 SO_4 E	UV Spectrometric Method	Cool $\leq 6^{\circ}\text{C}$
Total solids	APHA 2540 B	Gravimetric Method	Cool $\leq 6^{\circ}\text{C}$

Total Dissolved Solids	APHA 2540 C	Gravimetric Method	Cool $\leq 6^{\circ}\text{C}$
Total Suspended Solids	APHA 2540 D	Gravimetric Method	Cool $\leq 6^{\circ}\text{C}$
Total Phosphorus	APHA 4500-P E	Ascorbic Acid Method	Add H_2SO_4 to pH < 2 , Cool $\leq 6^{\circ}\text{C}$
Total Nitrogen	APHA 4500-N C	Persulphate Digestion Method	Add H_2SO_4 to pH < 2 , Cool $\leq 6^{\circ}\text{C}$
Total Hardness	APHA 2340 B	EDTA Titrimetric Method	Add HNO_3 or H_2SO_4 to pH < 2
Chemical Oxygen Demand	HACH	HACH	Analyze as soon as possible or add H_2SO_4 to pH < 2 , Cool $\leq 6^{\circ}\text{C}$
Biochemical Oxygen Demand	HACH	HACH	Cool $\leq 6^{\circ}\text{C}$
Oil & Grease	APHA 5520 B	Gravimetric Method	Add HCl or H_2SO_4 to pH < 2 , Cool $\leq 6^{\circ}\text{C}$
BTEX	APHA 5520 B	Gas Chromatographic-Mass Spectrometric Method	Add HCl or H_2SO_4 to pH < 2 , Cool $\leq 6^{\circ}\text{C}$
PAHs	APHA 6440 C	Gas Chromatographic-Mass Spectrometric Method	Add HCl or H_2SO_4 to pH < 2 , Cool $\leq 6^{\circ}\text{C}$
Calcium	APHA 3500-Ca B	Titrimetric Method	Cool $\leq 6^{\circ}\text{C}$
Sodium	APHA 3500-Na B	Flame Photometric Method	Cool $\leq 6^{\circ}\text{C}$
Potassium	APHA 3500-K B	Flame Photometric Method	Cool $\leq 6^{\circ}\text{C}$
Magnesium	APHA 3500-Mg B	Atomic Absorption Spectrophotometry	Cool $\leq 6^{\circ}\text{C}$

Zinc	APHA 3111 B	Atomic Absorption Spectrophotometry	Add HNO ₃ to pH <2
Nickel	APHA 3111 B	Atomic Absorption Spectrophotometry	Add HNO ₃ to pH <2
Mercury	APHA 3112	Atomic Absorption Spectrophotometry	Add HNO ₃ to pH <2
Manganese	APHA 3111 B	Atomic Absorption Spectrophotometry	Add HNO ₃ to pH <2
Lead	APHA 3111 B	Atomic Absorption Spectrophotometry	Add HNO ₃ to pH <2
Iron	APHA 3111 B	Atomic Absorption Spectrophotometry	Add HNO ₃ to pH <2
Copper	APHA 3111 B	Atomic Absorption Spectrophotometry	Add HNO ₃ to pH <2
Chromium	APHA 3111 B	Atomic Absorption Spectrophotometry	Cool ≤6°C
Cadmium	APHA 3111B	Atomic Absorption Spectrophotometry	Add HNO ₃ to pH <2
Barium	APHA 3113 B	Atomic Absorption Spectrophotometry	Add HNO ₃ to pH <2
Arsenic	APHA 3113 B	Atomic Absorption Spectrophotometry	Add HNO ₃ to pH <2
Aluminum	APHA 3113 B	Atomic Absorption Spectrophotometry	Add HNO ₃ to pH <2
Total Coliform Count	APHA 9221 B	Pour Plate	Cool 6°C
<i>E. Coli</i>	APHA 9221 E	Pour Plate	Cool 6°C
Total Plate Count	APHA 9221 B	Pour Plate	Cool 6°C

Source: American Public Health Association (APHA), 2017.

Table 4.7: Water Results at the Project site

PARAMETERS	BLW GW1	BLW SW	BLWGW C
PHYSICO-CHEMICAL TEST			
pH@25°C	9.7	10.5	10.1
Colour (pt.co)	3.1	2	1
Temperature (°C)	32	31.4	31.6
Conductivity (µs/cm)	0.016	0.04	0.12
Turbidity (NTU)	0.1	0.1	0.1
TDS (mgL)	98	84	101
Salinity (ppt)	0.01	0.02	0.02
TSS (mgL)	<1	1.4	1.22
THC (mgL)	0.005	0.142	0.106
Alkalinity (mg/L)	12	14	14
BOD (mg/L)	1.8	1.95	2.3
COD (mg/L)	28.6	8.5	0.55
Heavy Metals (mg/kg)			
Iron	0.02	0.03	0.03
Zinc	0.011	0.193	0.0108
Lead	<0.001	0.0941	0.045
Copper	0.05	0.062	0.044
Cadmium	0.0008	0.0094	0.001
Mercury	<0.001	<0.001	<0.001
Nickel	<0.001	<0.001	<0.001
Manganese	0.001	0.0015	0.002
Vanadium	0.001	0.001	0.001
Chromium	<0.001	<0.0001	0.0062
Cobalt	0.0074	0.0088	0.0053
Titanium	<0.001	<0.001	<0.001
Arsenic	<0.001	<0.001	<0.001

Microbiological Test (cfu/g)			
THB	7.5×10^1	4.5×10^1	4.4×10^1
Coliform	5.1×10^1	4.2×10^1	1.5×10^1
E.coli	ND	ND	ND

The analysis of the groundwater and surface water results is discussed below:

Groundwater Appearance and Odour

The groundwater sample was found to be clear, colourless and the odour was unobjectionable.

Temperature and pH

In-situ water temperatures recorded in the groundwater samples from the study area ranged from 31.6°C to 32.0°C, which fell within the FMEnv limit of <40°C. High water temperature in a well is likely to increase the extent at which elements dissolve in the water hence potentially affecting its quality. The pH values of the groundwater and surface water samples ranged from 9.7 to 10.5. The pH values recorded in all groundwater samples from the study area are above the FMEnv limit of 6.5 – 8.5 for drinking water. This may be due to contamination from leachates in the host community.

Electrical Conductivity and Total Dissolved Solids (TDS)

High concentrations of total dissolved solids beyond the permissible limits may affect taste adversely and possibly adverse health effects. The TDS values recorded in the groundwater and surface water from the study area ranged from 98.0mg/l to 101.0mg/l. The values were below the FMEnv limit of 2000mg/l.

Electrical conductivity (EC) is a measure of the ability of the groundwater sample to pass an electrical current. The electrical conductivity recorded in the ground water samples ranged from 0.016µS/cm to 0.12 µS/cm. The EC values were within the FMEnv limit of 200 µS/cm.

Turbidity and Total Suspended Solids

Turbidity measures the light scattering properties of water samples relative to a standard while total suspended solids (TSS) measurement determines the amount of matter suspended in the water samples. High turbidity and TSS levels beyond the recommended standards affect the aesthetic qualities of water and may indicate problems such as silt. The turbidity level in the groundwater samples from the study area was <1NTU and 0.3NTU (Nephelometric Turbidity Unit). Total suspended solids in the water ranged from <1mg/l to 1.4mg/l.

Heavy Metals

The concentrations of heavy metals in the groundwater samples were either below the detection limit of equipment used for analysis (i.e., <0.001mg/l) or recorded in trace amount which fall within the WHO and FMEnv limits. Lead (Pb), Manganese (Mn), and Copper (Cu), falls within the FMEnv limits as prescribed for drinking water. Iron (Fe) ranged from 0.02mg/kg-0.03mg/kg while Cadmium (Cd), Nickel (Ni), Cobalt (Co) and Arsenic (As) had values of <0.01mg/l.

The concentrations of heavy metals recorded in the groundwater samples indicate that the groundwater environment of the study area is not polluted with heavy metals since the values recoded were well within the permissible limits.

Microbial Contents

Microbial contents of the water samples were dominated by heterotrophic bacteria which may have been introduced by natural sources. Microbial matter is a natural constituent of groundwater. The heterotrophic bacterial count ranged between 4.4×10^1 cfu/ml and 7.5×10^1 cfu/ml. Similarly, no coliform bacteria were detected in the groundwater samples indicating the absence of faecal contamination.

4.7 SOIL QUALITY

Soil is an important component of the ecosystem that serves as a footprint of impacts. Therefore, it is imperative that soil environmental conditions are one of the baselines upon which potential impacts of an activity can be measured. The critical properties of soil that usually form the basis for impact evaluation include: physical properties, chemical and microbial composition. A total of Ten (10) locations and two (2) controls comprising topsoil and subsoil were collected from the study area. Soil samples were collected using stainless steel hand auger. Sampling was carried out by augering to a depth of 0-15cm for the surface samples and 15-30cm for the subsurface samples. Surface litter of non-decomposed plant materials were removed before sampling to ensure that only soil samples were collected. The soil sampling locations are provided in Table 4.7. The control point for soil sampling was established outside the immediate surroundings of the facility. The essence was to document the characteristics of soil quality outside the facility's area of influence.



Plate 4.3: Soil Sampling by Diskol Environmental Consulting Field Specialists

Table 4.8: Geographical coordinates of soil sampling locations at the proposed project site

S/ N	LOCATIONS	LATITUDE	LONGITUDE
1	TS1 & SS1	06°45.4764N	003°25.5421'E
2	TS2 & SS2	06°45.0385'N	003°25.5428'E
3	TS3 & SS3	06°45.4764'N	003°25.9773'E
4	TS4 & SS4	06°45.0385'N	003°25.5421'E
5	TS5 & SS5	06°45.3357'N	003°25.5431'E
6	TS6 & SS6	06°45.2200'N	003°25.3907'E
7	TS7 & SS7	06°45.4765'N	003°25.9774'E
8	TS8 & SS8	06°45.4775'N	003°25.9789'E
9	TS9 & SS9	06°45.4782'N	003°25.7849'E
10	TS10 & SS10	06°45.4765'N	003°25.9774'E
11	TS11 & SS11 (Control)	06°45.4653'N	003°25.1328'E
12	TS12 & SS12 (Control)	06°45.4823'N	003°25.3822'E

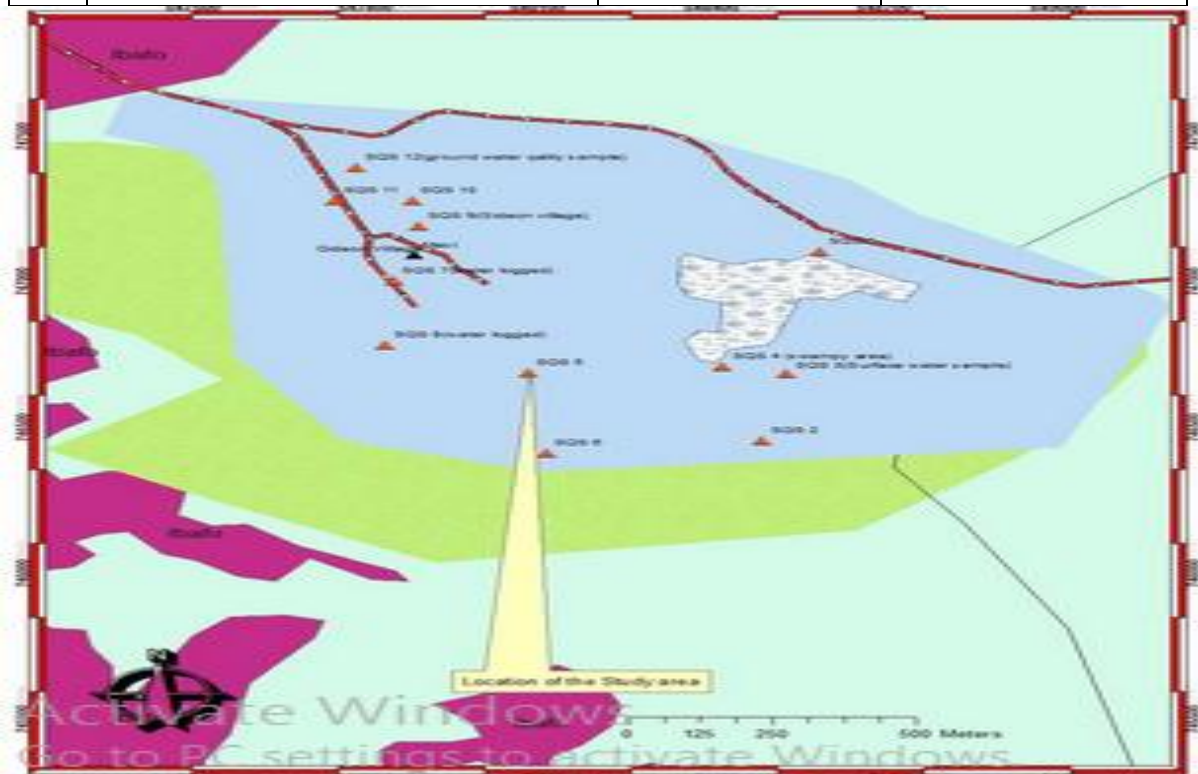


Table 4.9: Physico-chemical Analysis report of soil samples collected at the project site

S/N	PARAMETERS	TS1	SS1	TS2	SS2	TS3	SS3	TS4	SS4	TS5	SS5
1	pH (soil: water ratio, 1:2)	5.66	5.89	5.14	5.47	5.18	5.00	6.94	6.70	5.43	6.03
2	Conductivity ($\mu\text{s}/\text{cm}$)	31.70	60.50	11.97	38.40	26.80	27.70	44.30	38.70	25.80	29.10
3	Salinity (ppt)	0.02	0.03	0.01	0.02	0.02	0.01	0.02	0.02	0.01	0.01
4	Colour (Munsellcolor chat)	Dark Brown	Brown	Light Brown	Light Brown	Dark Brown	Dark Brown	Light Brown	Light Brown	Dark Brown	Dark Brown
5	Permeability (cm/s)	0.220	0.160	0.068	0.031	0.095	0.100	0.085	0.150	0.280	0.130
6	Porosity (%)	49.44	43.82	46.82	44.57	45.32	40.07	48.68	45.69	43.82	43.80
7	Bulk Density (g/cm^2)	1.35	1.50	1.42	1.48	1.46	1.60	1.37	1.45	1.50	1.50
8	Texture	Clayey	Clayey	Clayey	Clayey	Clayey	Clayey	Fine Sand	Fine Sand	Sandy Clay	Sandy Clay
	Particle Size Distribution:										
9	Sand (%)	9.68	3.62	5.50	7.50	38.90	12.60	49.34	52.60	58.70	50.48
10	Silt (%)	1.90	2.53	1.00	1.30	1.08	2.10	1.58	1.90	0.50	1.90
11	Clay (%)	88.42	93.85	93.50	91.20	60.02	85.30	49.08	45.50	40.80	47.62
12	Moisture Content (%)	1.75	1.90	1.86	1.92	1.80	1.92	0.86	0.92	2.10	2.40

13	Cation-Exchange-Capacity (%)	3.80	3.41	2.68	3.10	2.56	1.82	2.41	2.52	2.00	2.10
14	Total Organic Carbon (%)	1.06	1.30	1.16	1.27	1.20	1.11	0.98	1.25	0.94	1.30
15	Sulphate (mg/kg)	18	33	5	22	60	57	21	30	66	72
16	Phosphate (mg/kg)	0.51	0.59	0.87	0.96	1.08	1.18	0.56	0.68	0.98	0.84
17	Nitrate (mg/kg)	6.50	8.12	5.8	4.2	1.59	2.10	4.80	3.30	1.86	2.18
18	Sodium (mg/kg)	33.85	38.20	51.80	42.0	17.12	23.0	28.10	31.04	18.64	17.60
19	Potassium (mg/kg)	1.02	1.15	1.54	1.27	0.54	0.73	0.89	0.97	0.59	0.56
20	Magnesium (mg/kg)	5.55	10.20	2.06	6.36	5.89	6.36	8.16	7.28	6.53	8.04
21	Calcium (mg/kg)	15.25	28.04	5.67	17.50	16.20	17.50	22.44	20.04	17.95	22.12
22	Oil & Grease (mg/kg)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
23	Iron (mg/kg)	32.50	40.80	27.0	22.0	28.42	37.50	45.61	52.50	32.10	14.80
24	Nickel (mg/kg)	0.140	0.165	0.086	0.110	0.140	0.165	0.126	0.150	0.040	0.080
25	Lead (mg/kg)	0.071	0.041	0.054	0.079	0.0009	0.015	0.022	0.031	0.005	0.005
26	Zinc (mg/kg)	5.50	4.75	7.20	5.21	6.80	8.12	4.25	6.05	4.70	5.99
27	Cadmium (mg/kg)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Copper (mg/kg)	1.94	2.15	2.42	2.48	1.68	2.41	0.98	1.15	0.86	1.17
29	Chromium (mg/kg)	0.035	0.040	0.016	0.023	0.041	0.048	0.035	0.040	0.014	0.026

30	Vanadium (mg/kg)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.005	<0.005
31	Total Petroleum Hydrocarbon (mg/kg)	0.0018	0.0026	0.0035	0.0040	0.0015	0.0006	0.0028	0.0031	0.0059	0.0071
32	Aliphatic Hydrocarbons (mg/kg)	0.0018	0.0026	0.0035	0.0040	0.0015	0.0005	0.0000	0.0001	0.0046	0.0052
33	Poly Aromatic Hydrocarbon (mg/kg)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0013	0.0019
34	BTEX (mg/kg)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	MICROBIOLOGY TEST										
35	Total Heterotrophic Bacteria (cfu/g)	3.1 x 10 ³	5.2 x 10 ³	4.5 x 10 ³	4.8 x 10 ²	4.4 x 10 ²	6.1 x 10 ³	3.8 x 10 ³	3.5 x 10 ³	5.0 x 10 ³	7.2 x 10 ³
36	Total Hydrocarbon Utilizing Bacteria (cfu/g)	4.9 x 10 ¹	5.4 x 10 ¹	6.5 x 10 ¹	4.1 x 10 ¹	5.3 x 10 ¹	7.8 x 10 ¹	5.5 x 10 ¹	4.8 x 10 ¹	6.6 x 10 ¹	8.4 x 10 ¹
37	Total Heterotrophic Fungi (cfu/g)	2.8 x 10 ²	3.4 x 10 ²	3.0 x 10 ²	2.1 x 10 ²	2.0 x 10 ²	4.1 x 10 ²	2.3 x 10 ²	1.9 x 10 ²	1.8 x 10 ²	3.0 x 10 ²
38	Total Hydrocarbon Utilizing Fung (cfu/g)	1.1 x 10 ¹	2.0 x 10 ¹	1.0 x 10 ¹	ND	2.3 x 10 ¹	2.5 x 10 ¹	ND	ND	3.1 x 10 ¹	5.3 x 10 ¹
39	Total Coliform (cfu/g)	1.8 x 10 ²	2.4 x 10 ²	1.9 x 10 ²	2.2 x 10 ²	2.5 x 10 ²	1.4 x 10 ²	1.8 x 10 ²	1.3 x 10 ²	2.6 x 10 ²	2.1 x 10 ²

S/ N	PARAMETERS	TS6	SS6	TS7	SS7	TS8	SS8	TS9	SS9	TS10	SS10
1	pH (soil: water ratio, 1:2)	5.64	5.68	6.13	5.75	5.63	5.89	5.33	5.90	7.25	4.88
2	Conductivity ($\mu\text{s}/\text{cm}$)	48.30	46.40	11.15	21.10	26.10	33.56	16.69	9.68	16.31	16.08
3	Salinity (ppt)	0.02	0.02	0.01	0.01	0.01	0.02	0.01	0.00	0.01	0.01
4	Colour (Munsellcolor chat)	Dark Brown	Light Brown	Light Brown	Light Brown	Black	Brown	Brown	Brown	Brown	Brown
5	Permeability (cm/s)	0.141	0.061	0.018	0.300	0.190	0.240	0.0084	0.120	0.115	0.210
6	Porosity (%)	55.87	45.32	51.31	50.19	47.57	39.33	48.31	46.82	41.95	49.06
7	Bulk Density (g/cm^2)	1.16	1.46	1.30	1.33	1.40	1.62	1.38	1.42	1.55	1.36
8	Texture	Sandy	Sandy	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay
	Particle Size Distribution:										
9	Sand (%)	44.86	58.40	69.20	63.80	53.50	58.20	53.20	50.40	60.70	55.85
10	Silt (%)	0.30	0.86	0.10	0.25	0.70	0.30	1.00	1.65	0.40	0.65
11	Clay (%)	54.84	40.74	30.70	35.95	45.80	41.50	45.80	47.95	38.90	43.50
12	Moisture Content (%)	1.94	2.20	1.85	0.98	1.00	1.20	0.96	1.05	2.60	2.00

13	Cation-Exchange-Capacity (%)	2.40	1.75	2.10	2.40	1.08	1.33	1.94	2.08	2.15	2.22
14	Total Organic Carbon (%)	1.46	1.27	1.56	1.08	1.30	1.46	1.27	1.40	1.31	1.30
15	Sulphate (mg/kg)	95	83	27	39	45	57	23	14	20	28
16	Phosphate (mg/kg)	1.74	2.07	0.36	0.42	0.76	1.08	0.69	0.60	1.20	1.56
17	Nitrate (mg/kg)	2.07	1.60	1.86	1.40	1.20	2.40	1.60	2.20	3.20	2.48
18	Sodium (mg/kg)	23.85	17.20	8.10	13.46	17.50	21.46	9.82	6.45	9.40	10.05
19	Potassium (mg/kg)	0.75	0.54	0.25	0.43	0.56	0.68	0.31	0.24	0.30	0.32
20	Magnesium (mg/kg)	10.25	8.91	7.06	8.41	10.94	13.10	3.93	2.92	3.07	4.48
21	Calcium (mg/kg)	28.20	24.50	19.42	23.15	30.08	36.0	10.80	8.04	8.44	12.32
22	Oil & Grease (mg/kg)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
23	Iron (mg/kg)	22.00	26.15	28.0	42.50	57.30	45.50	25.20	38.10	30.50	36.40
24	Nickel (mg/kg)	0.126	0.140	0.092	0.085	0.041	0.062	0.080	0.084	0.016	0.030
25	Lead (mg/kg)	0.013	0.020	0.014	0.021	0.073	0.086	0.045	0.038	0.041	0.055
26	Zinc (mg/kg)	5.08	6.14	8.40	9.70	6.00	8.20	5.10	7.70	7.30	9.58
27	Cadmium (mg/kg)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.07.70 5	<0.05	<0.05
28	Copper (mg/kg)	4.20	2.15	1.90	2.30	2.70	2.78	0.94	0.80	1.42	1.96
29	Chromium (mg/kg)	0.012	0.018	0.041	0.036	0.021	0.033	0.010	0.013	0.011	0.009
30	Vanadium (mg/kg)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.005	<0.005

31	Total Petroleum Hydrocarbon (mg/kg)	0.0048	0.0014	0.0023	0.0038	0.0017	0.0021	0.0062	0.0091	0.0058	0.0063
32	Aliphatic Hydrocarbons (mg/kg)	0.0038	0.0008	0.0018	0.0026	0.0009	0.0018	0.0047	0.0051	0.0039	0.0043
33	Poly Aromatic Hydrocarbon (mg/kg)	0.0010	0.0006	0.0004	0.0011	0.0008	0.0003	0.0015	0.0028	0.0019	0.0020
34	BTEX (mg/kg)	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000
	MICROBIOLOGY TEST										
35	Total Heterotrophic Bacteria (cfu/g)	6.3 x 10 ³	5.7 x 10 ³	7.0 x 10 ³	6.5 x 10 ³	4.9 x 10 ³	6.8 x 10 ³	5.5 x 10 ³	6.5 x 10 ³	7.4 x 10 ³	6.5 x 10 ³
36	Total Hydrocarbon Utilizing Bacteria (cfu/g)	5.8 x 10 ¹	6.1 x 10 ¹	7.9 x 10 ¹	8.2 x 10 ¹	4.8 x 10 ¹	5.9 x 10 ¹	5.0 x 10 ¹	7.2 x 10 ¹	6.8 x 10 ¹	7.5 x 10 ¹
37	Total Heterotrophic Fungi (cfu/g)	1.5 x 10 ²	2.9 x 10 ²	2.3 x 10 ²	2.1 x 10 ²	1.1 x 10 ²	2.4 x 10 ²	1.0 x 10 ²	2.8 x 10 ²	3.1 x 10 ²	2.4 x 10 ²
38	Total Hydrocarbon Utilizing Fung (cfu/g)	3.2 x 10 ¹	2.4 x 10 ¹	3.3 x 10 ¹	2.8 x 10 ¹	ND	2.4 x 10 ¹	ND	1.6 x 10 ¹	ND	1.3 x 10 ¹
39	Total Coliform (cfu/g)	2.3 x 10 ²	2.2 x 10 ²	1.3 x 10 ²	1.5 x 10 ²	2.0 x 10 ²	2.4 x 10 ²	1.6 x 10 ²	1.8 x 10 ²	2.0 x 10 ²	2.5 x 10 ²

4.7.1 Soil Physico-Chemistry

The result of analysis conducted on the sample the physico-chemical quality of the soil samples did not show any levels of contamination (Table 4.8).

An overview of the soil results is provided below:

Appearance

The appearance of the soil in the project area ranged from grey to brown and silty sandy to sandy clay both at the surface and subsurface soil respectively while at the control point, it is brown and clay.

pH

The pH values of a soil have effects on plants by influencing the availability of macro and micro-nutrients, which are building blocks of sugars and proteins needed by plants. Soil pH of 4.8 is regarded as the lower limit for optimum growth of crops while pH of 9.5 is regarded as the upper limit of alkalinity beyond which crops may become stressed.

The pH of the soil samples is purely alkaline at the surface and sub-surface soil. The values ranged from 4.88-5.64.

Electrical Conductivity

The electrical conductivity of soil expresses its total ionic strength (both cations and anions). Low total ionic strength indicates low dissolved salt content and vice versa. The electrical conductivity of the soil samples ranged from 9.68 to 60.5 μ S/cm, which falls within the FME_{env} limit of <200 μ S/cm.

Soil Moisture

Nutrient uptake by plants is determined by the soil moisture content. Very low moisture content may lead to plants reaching their permanent wilting point (PWP). The mean moisture content value of the soil in the project area ranged from 0.86% - 2.60%.

Nitrate

Nitrogen exists in the air spaces in the soil, but most plants and microbes cannot make use of this gaseous form until it is "fixed" into a more available, soluble form (either ammonium or nitrate). Nitrate values obtained from soils in the project area ranged from 1.20 - 207mg/kg. From extensive soil analysis, the nitrate nitrogen in Nigeria soils has been classified as low (< 20mg/kg), medium (20mg/kg - 40mg/kg) and high (>40mg/kg) (Agboola, and Sobulo, 1981).

Sulphate

Sulphate is an essential macronutrient for plants where certain proteins, lipids, and other compounds contain sulphur. Sulphate levels in the soil samples ranged from 5mg/kg to 95mg/kg.

4.7.2 Heavy Metals

The heavy metal profile of the soil samples is as follows:

- Iron ranged from 14.8mg/kg to 57.3mg/kg.
- Arsenic and cadmium were not detected at the soil respectively as they were below the equipment detection limit of <0.01mg/kg.
- Chromium ranged from <0.01mg/kg to 0.048mg/kg
- Lead ranged from 0.005mg/kg to 0.086mg/kg
- Nickel at the soil ranged from <0.01 to 0.165mg/kg.
- Zinc ranged from 4.25mg/kg to 9.70mg/kg.

The concentrations of heavy metals recorded in the soil samples suggest that the soil environment of the study area is not polluted with heavy metals since the concentrations recorded were within regulatory limits.

4.7.3. Microbiological Contents of Soil Samples

The total heterotrophic bacteria in the soil samples ranged from 3.1×10^3 to 7.4×10^3 cfu/g.. *E. coli* bacteria were not detected in the soil samples. Total heterotrophic bacteria 4.9×10^3 cfu/g to 7.4×10^3 cfu/g. Total hydrocarbon utilizing bacteria range from 4.8×10^1 cfu/g to 8.2×10^1 cfu/g. Total heterotrophic fungi 1.0×10^2 cfu/g to $3.1 \times$

10². Total hydrocarbon utilizing fungi 1.3 x 10¹cfu/g to 3.3 x 10¹cfu/g. Total coliform in the soil sample range from 1.3 x 10²cfu/g and 2.5 x 10²cfu/g.

4.8 VEGETATION

Natural vegetation varies from region to region on the earth; depending on the availability of sunlight and rainfall. Plants occur in distinct groups in areas having similar climatic conditions. A region with naturally occurring flora and fauna, plants and animal life that have adapted them to their environment forms a biome. The word biome is a short term of biological home. Biome may be defined as a large natural ecosystem wherein we study the total assemblage of plant and animal communities. In the biosphere living beings are inter-related and interdependent on each other for survival.

Nigeria is unique for its widely varying ecological regions and thousands of plant species within her political boundaries. A total of 7,895 plant species from 338 families and 2,215 genera have been identified in Nigeria (FMEnv, 2006), including about 1,489 species of micro-organisms. Furthermore, the Biodiversity Country Study estimated that there are 3,423 fungi species in Nigeria, 134 plankton species, more than 500 virus species, more than 848 algae species and 55 bacteria species in Nigeria (FEPA, 1992). In Cross River state alone, the Forestry Research Institute of Nigeria lists 85 endangered tree species, and many of these are endemics, found only in this region. Five of them are mono specific, that is, the only representative of a particular genus found in the world (Oguntala, *et al*, 1996).

Table 4.10: Inventory of Plant Species in Nigeria

Group of Plants	No. of families	No. of Genera	No. of Species
Algae	67	281	1335
Lichen	-	14	17
Fungi	26	60	134
Moses	-	13	16
Liverwort	-	16	6
Pteridophytes	27	64	165
Gymnosperm	2	3	5
Chlamydosperms	2	2	6
Monocotyledons	42	376	1575
Dicotyledons	172	1395	4636
TOTAL	338	2215	7895

Source: Nigeria's First National Biodiversity Report, FMEnv. (2006)

Sampling of the vegetation around the project site was carried out to determine the baseline status of the study area vis-à-vis the species composition, diversity, and abundance of the flora species. The density and percentage of the key tree species and the herbaceous layers were determined while rare and endangered plant species and all those of special significance to the ecosystem and the local economy were categorized.

The flora observed in the data during the dry season include the following; *Elaeis guineensis* (Oil palm tree), *Carica papaya* (Pawpaw) *Manihot Esculenta* (Cassava), *Mangifera indica* (Mango), *Aspilia Africana* (Haemorrhage plant), *Axonopus compressus* (Carpet grass), *Eleusine indica* (Wiregrass), *Tridax procumbens* (Coat buttons).

Table 4.11: List of Flora Species Encountered in Project Area.

Scientific Name	Family	Common name	Medicinal uses	IUCN status
<i>Albizia ferrugineasp</i>	Mimosoideae	Musase	Used for treatment of cough, diarrhoea, insomnia, rheumatism, tuberculosis etc	Not evaluated
<i>Alchornea cordifoliasp</i>	Euphorbiaceae	Christmas bush	Treatment of respiratory problems such as sore throat, cough, and bronchitis, impotency and female sterility	Not evaluated
<i>Carica papayasp</i>	Caricaceae	Pawpaw	Used for treatment of numerous diseases like warts, corn, sinuses, eczema, glandular tumor, blood pressure, constipation etc.	Not evaluated
<i>Mangifera indicasp</i>	Anacardiaceae	Mango	Used to treat diarrhoea, anaemia, dysentery, tumour, toothache, haemorrhage, pile etc Also used as laxative	Not evaluated
<i>Anthocleista vogeliisp</i>	Loganiaceae	Cabbage	Anti-oxidant, anti-inflammatory, oedema, stomach ache, leprosy, analgesic properties etc	Least concern

<i>Aneilema beniniensesp</i>	Commelinaceae		Laxative for children	Not evaluated
<i>Anthocleista djalonensissp</i>	Loganiaceae	Sapo (y)	Strong purgative and diuretic. Commonly used to treat intestinal problems including constipation, regulate menstruation, and as abortifacient	Not evaluated
<i>Anthothona macrophylla sp</i>	Caesalpinioideae	Abata (y)	The bark is used for the treatment of venereal disease and as a vermifuges. The roots are used to treat intestinal related discomfort while gum extractable from the bark have analgesic properties.	Not evaluated
<i>Antidesma sp.</i>	Euphorbiaceae	Hame	It can be used to treat various disease due to having cytotoxic, anti-diabetic, antioxidant, antiradical, thrombolytic activity, antihypertensive, anticancer and sudorific activity.	Not evaluated
<i>Aspilia Africana sp</i>	Asteraceae	Haemorrhage plant	Also known as haemorrhage plant as it is applied on wounds to stop bleeding and for cleaning	Not evaluated

			of surfaces of sores. It also helps to reduce febrile headache. The leaf is important as pain-killers, sedatives and ecbolics.	
<i>Axonopus compressus</i> sp	Poaceae	Carpet grass	The plant is used treat heart problems. The whole plant is used as a curative herbal bath	Not evaluated
<i>Blighia sapida</i> sp	Sapindaceae	Akee apple	Used in the treatment of anaemia and itching. It is also used for the treatment of yellow fever, epilepsy, laxative, diuretic and oedema	Not evaluated
<i>Brachiaria deflexa</i> sp	Poaceae	False signal grass	None known	Not evaluated
<i>Canna indica</i> sp	Cannaceae	Wild Canna Lily	Plant is used for the treatment of women's complaints, fevers, gonorrhoea and amenorrhoea	Not evaluated
<i>Capsicum annum</i> sp	Solanaceae	Pepper	Due to presence of capsaicin compounds, chilli pepper is used in preparation of ointment,	Not evaluated

			also used in arthritic pain and sore muscles.	
<i>Carpolobia luteasp</i>	Polygonaceae	Cattle stick	Used as analgesic, and to cure rheumatism, fever, insanity, dermal infections, venereal diseases and sterility.	Not evaluated
<i>Celosia argenteasp</i>	Amaranthaceae	Plumed cockscomb	Used for treating of infected sores, wounds and skin eruptions, cooling application to inflamed areas and painful affections such as buboes and abscesses, relieve gastrointestinal disorders and are antipyretic, improves vision, relieves fever associated with liver ailments	Not evaluated
<i>Centrosema pubescenssp</i>	Papilionoideae	Butterfly pea	None known	Not evaluated
<i>Chromolaena odoratasp</i>	Asteraceae	Siam weed	The leaves are said to be antibiotic, antimalarial and febrifuge An infusion of the leaves is taken to cleanse the blood, treat skin wounds, treat eye pains	Not evaluated

<i>Cleistopholis patens v sp</i>	Annonaceae	Salt and Oil tree	An infusion is used in the treatment of fevers, sometimes combined with lemon grass (<i>Cymbopogon spp.</i>), papaya (<i>Carica papaya</i>) or other plants and used in the treatment of infective hepatitis. A decoction of the leaves is drunk and also used as a wash in the treatment of sleeping sickness.	Not evaluated
<i>Clerodendrum splendenssp</i>	Verbenaceae	Glory tree	The leaves are used to treat shingles, spleen in children, asthma, rheumatism, ulcers and malaria.	Not evaluated
<i>Cnestis ferrugineasp</i>	Connaraceae	Oko Aja (local name)	Different parts are used for treating infectious diseases such as dysentery, bronchitis, eye troubles, conjunctivitis, sinusitis, gonorrhoea, and syphilis.	Not evaluated
<i>Combretum sp.</i>	Combretaceae	Bush willows	A fresh or dried leaf infusion and root decoction is widely taken as a cholagogue, diuretic and purgative and also to treat	Not evaluated

			gastro-intestinal problems, including diarrhoea, dysentery, stomach-ache and ascariasis.	
<i>Commelina sp.</i>	Commelinaceae		Used to heal swelling, treatment of urinary tract infection and respiratory tract infections, diarrhea, enteritis, and hemorrhoids, fever, malaria, insect, bug bites, rheumatoid arthritis, gonorrhoea, influenza, and bladder infection, etc.	Not evaluated
<i>Cyperus rotundus</i> sp	Cyperaceae	Nut grass	Considered astringent, diaphoretic, diuretic, analgesic, antispasmodic, aromatic, carminative, antitussive, emmenagogue, litholytic, sedative, stimulant, stomachic, vermifuge, tonic and antibacterial	Least concern
<i>Elaeis guineensis</i> sp	Arecaceae	Oil palm tree	Preparations made from the palm heart are used to treat gonorrhoea, menorrhagia, and perinatal abdominal pain, and are considered laxative, anti-emetic and diuretic. The	Least concern

			leaf sap is used in preparations used to treat skin affections.	
<i>Eleusine indicasp</i>	Poaceae	Wiregrass	Used as a diuretic, anti-helminthic, febrifuge and for treating cough	Least concern
<i>Eulophia speciosasp</i>	Orchidaceae	Terrestrial orchid	Used to treat cough and diarrheal symptoms, madness, promote conception, relieve pain, induce nausea, and expel intestinal worms and for many cultural practices	Not evaluated
<i>Ficus exasperata sp</i>	Moraceae	Sandpaper tree	Used as analgesic, antiarthritic, diuretic, wound healing, antiparasitic, vermifuge, abortifacient, ecbolics and for treating hemorrhoids and venereal diseases. The plant parts are also used as animal fodder.	Least concern
<i>Ficus sursp</i>	Moraceae	Fig	Bark decoctions or infusions are used against pain, rheumatism, diarrhoea, stomach problems, oedema in	Not evaluated

			children, infertility and as a galactagogue	
<i>Icacina trichanthasp</i>	Icacinaceae	Gbegbe (y)	Used as a common household medicine for emergency and first-aid treatment for food poisoning. Tubers and leaves of the plant are allegedly aphrodisiacs. The leaves and seeds, when crushed and macerated in local gin, can be used for the treatment of hypertension and asthma.	Not evaluated
<i>Ipomoea involucre</i>	Convolvulaceae	Morning glory	The most common use of the roots of <i>Ipomoea</i> species is to treat constipation	Not evaluated
<i>Ludwigia erecta</i>	Onagraceae	Primerose-willow	A bath made with the boiled plants is given to relieve fever caused by malaria. An infusion of the leaves is used for treating weak but rapid heart rate, particularly when combined with the leaves of <i>Annona muricata</i> . The leaves are boiled, and the liquid used to make a	Least concern

			porridge with oatmeal, plantain, flour or sago flour then used to treat thrush	
<i>Lygodium microphyllum</i> sp	Lycopodiaceae	Climbing fern	The aerial parts contain dihydrocaffeic acid, which has a blood pressure lowering effect as well as alkaloids which cause increase in blood pressure. Used to induce vomiting after food poisoning.	Least concern
<i>Macaranga spinosa</i> sp	Euphorbiaceae	Foliage	Used internally to treat stomach-ache, dysentery, cough and fever, and externally to treat wounds and ulcers.	Not evaluated
<i>Mimosa pudica</i> sp	Mimosoideae	Sensitive plant	Used with other leaves in treating haemorrhoids and urinary infection	Least concern
<i>Mollugo nudicaulis</i> sp	Euphorbiaceae	Naked stem carpet weed	The whole plant is used as a mild laxative, also as stomachic, antiseptic and emmenagogue. In China, it is made into a soup to promote appetite, while a decoction of the roots is used to treat eye diseases.	Not evaluated

<i>Morinda lucidasp</i>	Rubiaceae	Brime stone tree	Used in cases of diabetes, hypertension, cerebral congestion, dysentery, stomach-ache, ulcers, leprosy and gonorrhoea.	Not evaluated
<i>Myrianthus arboreussp</i>	Moraceae	Soup tree	Used in the treatment of dysentery and diarrhoea with bark infusions. Seeds are used for boils. The bark decoction is administered for diabetes. Other medicinal uses are for headaches, swellings and tumors.	Not evaluated
<i>Nephrolepis bisseratasp</i>	Davalliaceae	Macho fern	The plant is used to avoid miscarriage, fetus development and various microbial infections (boils, abscess, sore, and blisters), treat stomach pain, bleeding, and wounds	Not evaluated
<i>Newbouldia laevis</i>	Bignoniaceae	Akoko (y)	Used in the treatment of coughs, diarrhoea and dysentery, whilst it is also given to children for treating epilepsy and convulsions. The bark is given in the form of an	Not evaluated

			enema as a treatment for constipation and piles.	
<i>Palisota hirsuta</i> <i>sp</i>	Commelinaceae	Jagborokun (y)	Used as positive controls, showed significant dose-dependent anti-arthritic properties prophylactically, curatively and also in combination therapy.	Not evaluated
<i>Panicum maximum</i> <i>sp</i>	Poaceae	Guinea grass	It is used in the treatment of heartburn and tympanitis Sap from the crushed fresh plant is used as a cicatrisant on wounds and sores.	Not evaluated
<i>Paullinia pinnata</i> <i>sp</i>	Sapindaceae	Bread and Cheese	Used to treat Sexual weakness	Not evaluated
<i>Pleioceras barteri</i> <i>sp</i>	Apocynaceae	Dagba (y)	Uses include as an emmenagogue, abortifacient and also in the treatment of rheumatism and malaria.	Not evaluated
<i>Raphia vinifera</i> <i>sp</i>	Arecaceae	Raphia palm	Used for construction, household materials and medicine.	Least concern
<i>Rauwolfia vomitoria</i> <i>sp</i>	Apocynaceae	Devils pepper	Used for convulsions, fever, weakness, inability to sleep, mental disorders,	Least concern

			pain, arthritis, cancer, high blood pressure, diabetes, and health of the stomach, intestines, and liver. It is also used to promote sleepiness and vomiting.	
<i>Securinega virosasp</i>	Euphorbiaceae	Bush weed	used as an aphrodisiac and in the treatment of impotence, which is one of the manifestations of diabetes mellitus.	Not evaluated
<i>Senna occidentalis</i>	Caesalpinioideae	Coffee Senna	All plant parts are said to have tonic, diuretic, stomachic and febrifuge properties and are especially used for dropsy, rheumatism, fevers and venereal diseases	LC
<i>Sida acuta</i>	Malvaceae	Common wire weed	Useful in treating urinary diseases and blood disorders, bile, liver and as treatment for nervous diseases.	Not evaluated
<i>Smilax anceps</i>	Smilacaceae	Greenbriers	Have potential anti-inflammatory and diuretic properties, hence could be utilized in the treatment of	Not evaluated

			inflammation and diuretic problems.	
<i>Solanum turoumsp</i>	Solanaceae	Turkey berry	Its fruit and leaves can be used to control a range of microbial activities. The glycoalkaloid solasodine that is found in its leaves and fruits is used in India in the manufacture of steroidal sex hormones for oral contraceptives	Not evaluated
<i>Sterculia tragacanthasp</i>	Sterculiaceae	Alawefon (y)	This gum has recently been shown to stimulate the immune system and to suppress tumours The gum has been employed externally as a dressing for burns and also used in lozenges in order to bind the ingredients and impart consistency to the product	Least concern
<i>Tetracera alnifolia sp</i>	Dilleniaceae	Shawere pepe (y)	It is used to 'purify' both mother and child immediately after birth and is given to a baby with its first suckle and regularly to twins to strengthen them. The plant is held in Ivory	Not evaluated

			Coast to have high therapeutic value in treatment of pain.	
<i>Tridax procumbens sp</i>	Asteraceae	Coat buttons	Used in India for wound healing and as an anticoagulant, antifungal, and insect repellent. The juice extracted from the leaves is directly applied on wounds. Its leaf extracts were used for infectious skin diseases in folk medicines.	Not evaluated
<i>Triumfetta sp.</i>	Tiliaceae	Burbark	Root preparations are applied on burns, and the powdered root is mixed into food for the treatment of diarrhea	Not evaluated
<i>Vernonia cinereasp</i>	Asteraceae	Purple fleabane	A decoction of it is also given in diarrhea, stomachache and for cough and colic pain. Plant possess anti cancerous property. Seeds: Cures diseases caused by roundworms and threadworms, coughs, flatulence, intestinal colic, dysuria, leukoderma,	Not evaluated

			psoriasis and other chronic skin-diseases.	
<i>Myrianthus arboreus</i> sp	Moraceae	Soup tree	Seeds are used for boils. The bark decoction is administered for diabetes. Other medicinal uses are for headaches, swellings and tumors.	Least concern
<i>Psidium guajava</i> sp	Myrtaceae	Guava tree	Edible fruits, used for beauty products and soil stabilization	Not evaluated
<i>Cochorus</i> sp	Malvaceae	Jute plant	Edible. Fibre can be used for construction	Not evaluated



Plate 4.4: *Elaeis guineensis* sp(Oil Palm)



Plate 4.5: *Anthocleista vogelii* sp(Cabbage tree)



Plate 4.6: *Carica papaya* sp(Pawpaw)



Plate 4.7: *Mangifera inidica* sp(Mango)



Plate 4.8: *Eleusine inidica* sp (wiregrass)



Plate 4.9: *Pennisetum purpureum* sp (Elephant grass)



Plate 4.10: Picture of *Chromolaena odorata* sp (Siam weed)

A total of sixteen non-tree/non-shrub species were observed with quadrat sampling. These included succulent herbs, grasses and wood herbs. However, further efforts towards discovering other plant species in this category that were not captured by the quadrats revealed 26 additional species, all of which are enumerated in Table 4.12. Among the 42 species that are non-tree/shrub, the most widely-distributed in terms of their relative frequencies in the study area were *Chromolaena odorata* (12.5%), *Amaranthus spinosus* (11.6%), *Acalypha ciliata* (9.5%), *Phyllanthus amarus* (8.1%), *Axonopus fissifolius* (7.6%), *Ageratum conizoides* (6.8%), *Andropogon gayanus* (6.0%), *Boerhaavia diffusa* (6.0%) and *Cassia mimosoides* (6.0%). The nine species enumerated therefore constituted 74.1% of this category of vegetation cover. These species are essentially weeds of soils that have been heavily farmed or lands that have undergone much transformation due to developmental projects. Although most of the species enumerated from the study are weeds of agricultural fields, some are of medicinal value or useful as fodder, and a few others such as maize, cassava and plantain are important food crops. Few others such as *Elaeis guinensis* and *Cocos nucifera* are trees of commercial value.

Table 4.12: Relative Abundance of the Non-Trees and Shrubs Plant Species encountered at the Project Site

S N	Species Name	% Frequency	Relative Frequency (%)	Cumulative Relative frequency (%)
1.	<i>Acalypha ciliata</i>	63	9.5	9.5
2.	<i>Ageratum conizoides</i>	45	6.8	16.3
3.	<i>Amaranthus spinosus</i>	77	11.6	27.9
4.	<i>Andropogon gayanus</i>	40	6.0	33.9
5.	<i>Axonopus fissifolius</i>	50	7.6	41.5
6.	<i>Boerhaavia diffusa</i>	40	6.0	47.5
7.	<i>Cassia mimosoides</i>	40	6.0	53.5
8.	<i>Chromolaena odorata</i>	83	12.5	66.0
9.	<i>Dactyloctenium aegyptium</i>	20	3.0	69.0
10.	<i>Digitaria horizontalis</i>	25	3.8	72.8
11.	<i>Panicum maximum</i>	20	3.0	75.8
12.	<i>Phyllanthus amarus</i>	53	8.1	83.9
13.	<i>Senna occidentalis</i>	32	4.8	88.7
14.	<i>Sida acuta</i>	25	3.8	92.5
15.	<i>Tridax procumbens</i>	20	3.0	95.5
16.	<i>Urena lobata</i>	30	4.5	100.0
	TOTAL	663	100.0	100.0

Out of the 28 trees and shrub species present in the study area, the most frequent were *Newbouldia leavis*, *Roystenia regia*, *Cocos nucifera*, *Securinega virosa*, *Morinda lucida*, *Elaeis guinensis*, *Ficus sur*, and *Cola* sp. some of which had been deliberately planted for ornamental, fruit, medicinal and cultural purposes. Preponderance of members of the grass family as well as ornamental and economic trees in the study area is confirmatory of prolonged anthropogenic influences due to human occupation. Regarding the 26 tree/shrub species whose densities were determinable by direct

counting method, the alpha diversity of the vegetation cover in the project area was calculated in terms of Shannon – Wiener index of diversity to be 3.0087 while species evenness (i.e. E) obtained using equation (1) was 1.1015. For fairly large sample size, the Shannon – Wiener Index values (H) can range between ‘0’ and approximately 4.6. A value near ‘0’ indicates that every species in the sample is the same (i.e. least diversity), while a value near 4.6 would indicate a marked diversity (Chang Bioscience, 2011). Going by the results obtained from this study, the vegetation of the neighbourhood of Believers Loveworld crusade ground project can be described as being of substantial (65.4%) richness and diversity.

Table 4.13: Relative Abundance of Some Non-Woody Plant Species

S/ N	Tree/Shrub species	Habit	Location/Site	Number of individuals	Relative frequency (%)
1.	<i>Araucaria columnaris</i>	Tree	A	1	0.5
2.	<i>Azadirachta indica</i>	Tree	C	2	1.3
3.	<i>Carica papaya</i>	Tree	C	9	5.7
4.	<i>Citrus aurantifolia</i>	Tree	C	6	3.8
5.	<i>Cocos nucifera</i>	Tree	C	12	7.5
6.	<i>Cola sp.</i>	Tree	C	10	6.3
7.	<i>Elaeis guineensis</i>	Tree	B, C	11	6.9
8.	<i>Ficus exasperata</i>	Tree	C	4	2.5
9.	<i>Ficus polyphylla</i>	Shrub	A	NA (hedges)	NA
10.	<i>Ficus sur</i>	Tree	C	10	6.3
11.	<i>Gmelina arborea</i>	Tree	C	6	3.8
12.	<i>Ixora coccinea</i>	Shrub	A, C	NA (hedges)	NA
13.	<i>Jatropha curcas</i>	Shrub	C	2	1.3
14.	<i>Lawsonia inermis</i>	Tree	C	3	1.9
15.	<i>Mangifera indica</i>	Tree	C	6	3.8

16.	<i>Mimosa pudica</i>	Shrub	B, C	2	1.3
17.	<i>Morinda lucida</i>	Tree	C	12	7.5
18.	<i>Moringa oleifera</i>	Tree	C	6	3.8
19.	<i>Nerium oleander</i>	Shrub	A	3	1.9
20.	<i>Newbouldia leavis</i>	Tree	B, C	14	8.7
21.	<i>Platyclusus orientalis</i>	Tree	A	2	1.3
22.	<i>Psidium guajava</i>	Tree	C	2	1.3
23.	<i>Ravenala madagascariensis</i>	Tree	B	1	0.5
24.	<i>Roystonea regia</i>	Tree	A, B, C	13	8.2
25.	<i>Securinega virosa</i>	Shrub	C	12	7.5
26.	<i>Senna alata</i>	Shrub	C	2	1.3
27.	<i>Terminalia catappa</i>	Tree	C	6	3.8
28.	<i>Vernonia amygdalina</i>	Tree	C	2	1.3
Total				159	100.00

Table 4.14: List of Species Encountered in Project area frequency and relative abundance

Number of species encountered	Frequency	Abundance (%)
<i>Eleusine indicasp</i>	3	2.6
<i>Eulophia speciosasp</i>	6	5.1
<i>Ficus exasperata sp</i>	1	0.9
<i>Ficus sursp</i>	2	1.7
<i>Icacina trichantha sp</i>	3	2.6
<i>Ipomoea involucrate sp</i>	3	2.6
<i>Ludwigia erectasp</i>	4	3.4
<i>Lygodium microphyllum sp</i>	8	6.8
<i>Macaranga spinosa sp</i>	3	2.6

<i>Mimosa pudicasp</i>	9	7.7
<i>Mollugo nudicaulissp</i>	2	1.7
<i>Morinda lucidasp</i>	4	3.4
<i>Myrianthus arboreussp</i>	5	4.3
<i>Nephrolepis bisserata sp</i>	4	3.4
<i>Newbouldia laevisp</i>	3	2.6
<i>Palisota hirsuta sp</i>	7	6.0
<i>Panicum maximum sp</i>	5	4.3
<i>Paullinia pinnata sp</i>	2	1.7
<i>Pleioceras barteri sp</i>	2	1.7
<i>Raphia viniferasp</i>	3	2.6
<i>Rauvolfia vomitoria sp</i>	3	2.6
<i>Securinega virosa sp</i>	2	1.7
<i>Senna occidentalis sp</i>	3	2.6
<i>Sida acutasp</i>	4	3.4
<i>Smilax anceps sp</i>	3	2.6
<i>Solanum turoumsp</i>	3	2.6
<i>Sterculia tragacantha sp</i>	2	1.7
<i>Tetracera alnifolia sp</i>	2	1.7
<i>Tridax procumbens sp</i>	2	1.7
<i>Triumfetta sp.</i>	2	1.7
<i>Vernonia cinereasp</i>	3	2.6
<i>Myrianthus arboreussp</i>	3	2.6
<i>Psidium guajavasp</i>	4	3.4
<i>Cochorus sp</i>	2	1.7

4.9 FAUNA

Fauna is the name given to collective animal life that lives or was once found in a certain area. The occurrence of fauna species is highly variable and dependent on the complex relationship between an animal's behavioral adaptations and its

environment. Animals constitute an important component of the tropical rainforest ecosystem. They play an active role in the balance of the ecosystem through transfer of food energy and are important sources of biodiversity conservation and provision of protein in the diet of rural communities. The data recorded that evidence exists with regards to the presence of wildlife species such as some snakes and various rodent species. Also, small commensal rodents such as *Rattus sp.* and *Aroicanthes niloticus* are seen to exist in the area.

Field surveys were conducted to determine the types of fauna species present in the project area. The wildlife study cuts across the entire ecosystem. Methodologies of sample collection and identification include;

- Visual observations
- Oral discussion with natives of the study area.
- Tree beating, shaking, purpose mark, feathers, shells, sounds, foot prints, information on the available species and relative abundance was obtained through oral interviews and discussions with indigenes. According to the local residents contacted and information obtained during the site visitation, four different categories of vertebrate animals are associated with the study sites. These are reptiles, mammals, rodents and birds. All of these were frequently encountered by the respondents except turkey, domestic pigeon and the common blackbird.

Table 4.15: List of some wild animals sighted and enumerated by the local farmers near the project site

Animal Species				Frequency*	IUCN Status
1.	Vertebrates sighted and reported by the respondents				
	A.	Reptiles			
	i.	Black-necked spitting cobra	<i>Naja nigricollis</i>	Very frequent	Least concern
	ii.	Green grass snake	<i>Opheodrys vernalis</i>	Very frequent	Least concern
	iii.	Alligators (Ornate monitor)	<i>Varanus ornatus</i>	Frequent	Vulnerable
	iv.	Agama lizard	<i>Agama lionotus</i>	Very frequent	Least concern
	B.	Mammals			
	i.	Bate's pygmy antelopes	<i>Neotragus bates</i>	Frequent	Near threatened
	ii.	Silver fox	<i>Vulpes vulpes</i>	Frequent	Least concern
	iii.	Tantalus monkey	<i>Chlorocebus tantalus</i>	Very frequent	Least concern
		Animal Species		Frequency	IUCN Status
				*	
	iv.	Baboon	<i>Papio spp.</i>	Frequent	Least concern
	v.	Domestic sheep	<i>Ovis aries</i>	Very frequent	NA
	vi.	Domestic dog	<i>Canis lupus familiaris</i>	Frequent	NA
	C.	Rodents			
	i.	African grass cutter (Greater cane rat)	<i>Thryonomys swinderianus</i>	Frequent	Least concern

	ii.	Rabbits (Cape hare)	<i>Lepus capensis</i>	Very frequent	Conservation dependent
	iii.	Green bush squirrels	<i>Paraxerus poensis</i>	Very frequent	Least concern
	iv.	Brown rat (eku emo)	<i>Rattus norvegicus</i>	Very frequent	Least concern
	v.	African giant pouched rat (okete)	<i>Cricetomys gambianus</i>	Very frequent	Least concern
	D. Birds				
	i.	Long-tailed cormorant	<i>Phalacrocorax africanus</i>	Very frequent	Least concern
	ii.	Turkey	<i>Meleagris gallopavo</i>	Not frequent	Least concern
	iii.	Mourning dove	<i>Zenaidamacrourea</i>	Very frequent	Least concern
	iv.	Domestic fowl	<i>Garllusgarllus</i>	Very frequent	NA
	v.	Domestic pigeon	<i>Columbia livia domestica</i>	Not frequent	Least concern
	vi.	Common blackbird	<i>Turdus merula</i>	Not frequent	Least concern
	vii.	House sparrow	<i>Passer domesticus</i>	Frequent	Least concern
2.	Invertebrates observed during data collection				
	A. Insects				
	i.	Subterranean termites	<i>Reticulitermes flavipes</i>	NA	Least concern
	ii.	Dragon fly	Anisopterans		Near threatened
	iii.	Butterflies	Dipterans		Near threatened
	B.	Millipedes and centipedes: flatbacked millipede	<i>Harpaphe haydeniana</i>	NA	Least concern

	C.	Earthworms	<i>Lumbricusterrestris</i>	NA	Not evaluated
	D.	Garden snails	<i>Helixpomatia</i>	NA	Least concern

NA: Not Applicable

4.10 LAND TENURE SYSTEM AND LAND USE

This section presents the current land use in the study area and focuses on the identification of the land use characteristics of the area. The study combines ground trotting and observations involving residents who are familiar with the project area. Land tenure is an important part of social, political and economic structures. It is multi-dimensional, bringing into play social, technical, economic, institutional, legal and political aspects that are often ignored but must be taken into account. In simple terms, land tenure systems determine who can use what resources for how long, and under what conditions. Land use is defined as the arrangements, activities and inputs people undertake in a certain land cover type to produce, change or maintain it. This definition establishes a direct link between land cover and the actions of people in their environment (Di Gregorio & Jansen, 2005). Land use surveys provide spatially defined information for land management, usually in the framework of rural development planning and decision making. The land use classes in the project area in their order of dominance are Industrial/Commercial and Residential.

Residential: About 80% of the land within 3km radius of the project site may be considered to be urban settlements. The settlement and housing patterns and demographic features of all communities are characteristic of urban settlements with relatively high number of inhabitants.

Commercial/Industrial: The proposed project area is characterized by high level of industrial and relatively high commercial activities; constituting approximately 10% of the total land use in the area. Notable areas in close proximity to the project site are;

Religious Places: Religious places have always been part of residential facilities in the land use structure. It constitutes about 5% on which the area is to be situated. Few Mosques and churches were found in different parts of the area where people gather for religious purposes.

According to the Land Use Act all lands in the state is vested in the Governor of the State but the Decree categorically stated that the land is to be held in trust for the citizens and the means of enforcing such rights are provided in sections 39 and 41. The principle of alienability was generally recognized and so was the concept of private ownership of land. The State Government, by virtue of the Land Use Act, may acquire a land for the overriding interest of the public.



Plate 4.11: Showing a section of the proposed project site

Transportation

There are fairly good road networks in Aseese; The major means of transportation is by car. Majority of the people own private cars; some individuals use public transport especially those coming into the community for business transaction. People using private cars are put at 30% while 70% of people take public transport system.

Access to the project area is adorned with good city road networks consisting of interconnected paved carriageways designed to carry buses, cars, articulate vehicles and accommodate pedestrian traffic. The road systems also have monitoring systems used to manage traffic such as intersection controls with traffic lights and Road Information Panels and Speed breakers

4.11 SOCIO-ECONOMIC STUDY

The socio-economic, cultural and health profiles of the proposed project area are discussed under various sections. The information covers both the results from analysis of questionnaires administered as well as secondary sources (Online Journals, Focused Group Discussion, Key Information Interviews etc.) of information about the project area. The basic human activities were assessed and addressed, while an attempt was made to establish the potential impacts in these perspectives, and suggestions made on feasible mitigations where necessary. The communities Maba, Aseese, Ibafo were identified and they gave the study unparalleled support during the field survey.

This section presents the human environmental aspects, consisting of the socio-economic existing conditions of the project. Socio-economic information forms a fundamental part of most integrated impact assessment (IA) studies. As an integral part of EIA, information of interests includes those socio-economic receptors which are sensitive to perturbation or impact from planned project's activities. These receptors are considered fundamental to the survival and quality of life of the people who live close to the proposed facility or cohabit within the project environments. The detailed scope for the socio-economic component of the project required an extensive gathering of socio-economic data covering the following on the project area:

- Population characteristics of project community;
- Economy and livelihood/occupational characteristics;
- Community development/infrastructures;
- Socio-cultural institutions and;
- Community institutional consultations and land use system.

The Socio-economic terms of reference also include the identification of associated/potential socio-economic impacts of the operations at the facility, determination of the impacts (impact prediction), evaluation and interpretation and proffering appropriate mitigation measures for the identified effects.

4.11.1 Study Approach/Data Acquisition

Socioeconomic data was obtained using multiple methods, namely:

- i. Review of available literature;
- ii. Field data acquisition;
- iii. Community consultation
- iv. Application of professional knowledge and experience.

The consulting team embarked on the field study of the project site environment.

4.11.2 Questionnaire Administration and Response

A total of a hundred and forty five (145) questionnaires were administered within 3km radius of the project area predominated by residential and commercial buildings and One hundred and Thirty (130) were recovered while Fifteen (15) were rumped, torn or not returned. More than 50% of the population is likely to fall below the age bracket of target respondents' age (18 and above).

4.11.3 Sample Size Determination

Sample size is important for economic reasons: An undersized study can be a waste of resources for not having the capability to produce useful results, while an oversized one uses more resources than are necessary. In an experiment involving human or animal subjects, sample size is a pivotal issue for ethical reasons. An undersized experiment exposes the subjects to potentially harmful treatments without advancing knowledge. In an oversized experiment, an unnecessary number of subjects are exposed to a potentially harmful treatment, or are denied a potentially beneficial one. In deciding the sample size for this study, the following steps were taken:

- Population Size: Experimental and observational units was selected from the appropriate population and randomized correctly with sampling procedures

followed carefully. The study has an adequate size, relative to the goals of the study. It was “big enough” to such magnitude as to be of scientific and statistical significance and not “too big,” to effect little scientific importance

- Determination of the desired precision of results. This is the measure of closeness between replicate results of analysis with which the sample predicts the true values to be obtained in the population. The difference between the sample and the real population is called the sampling error.
- Confidence Level Determination: This is expressed as a percentage and represents how often the true percentage of the population that would respond, lies within the confidence interval. For response collation, a 90% confidence level was used.

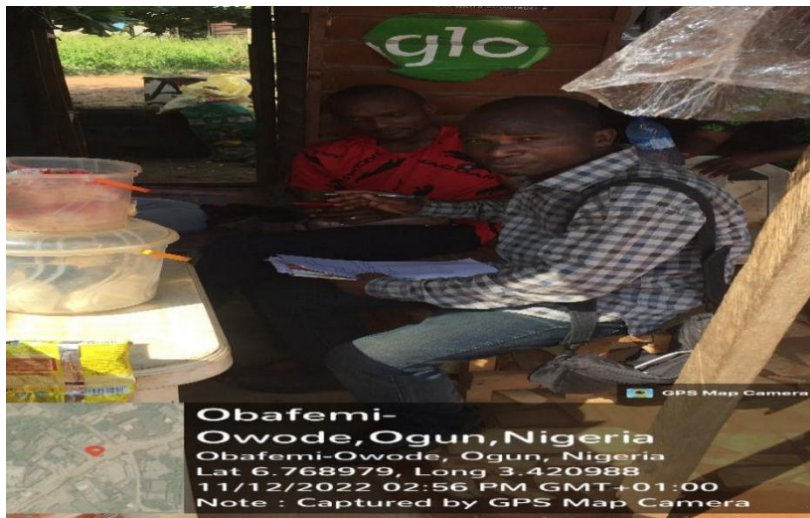


Plate 4.12: Questionnaire Administration on Randomly Selected Respondents

Informal Interview

This was carried out to compliment the data and information gathered from other sources other than formal interview method. Emphasis during the interview session focused mainly on established impacts, which included their disposition.

On-the Spot-Assessment

It combined with the other survey methods to achieve a comprehensive coverage of data acquisition. This was effective where the survey team met hostile members of communities and over-zealous stakeholders. Formal town hall meeting was held in the community coupled with several informal and cluster discussions.

Other strategies adopted in the study included Focus Group Discussions, interviews, and on-the spot assessment and reference to secondary information sources such as government gazette, internet Google services, National Bureau of Statistics (NBS, 2012) and National Population Commission (NPC, 2014).

Consultations

In line with the Federal Ministry of Environment EIA Process Manual, consultations form integral part of all EIA reports and hence the present consultation initiative which is intended to carry along all the stakeholders in this project. The consultation process for the EIA was undertaken at an early stage to help develop a scope of issues to be addressed and to identify the significant issues relating to the project activities and also to capture and address issues and concerns of the stakeholders.

Objectives of Consultation

The main objectives for carrying out consultation with the identified stakeholders for the project are as follows:

- Sustaining consultation with stakeholders via people's parliament with explanation on key issues associated with the project and their effects on the people.
- Maintaining effective communication between Believers Loveworld and project affected communities.
- Assuring full commitment to the implementation of mutually acceptable and sustainable community development projects.
- Facilitating communications and understanding between the various stakeholders and the project proponent.
- Gaining support and buy-in from all relevant stakeholders
- Complying with mandatory statutory requirements.
- Identifying key issues relevant to the project which are likely to cause impact
- Avoiding conflict with the primary stakeholders by addressing issues promptly

- Ensuring that any apprehension and disenchantment about the project with respect to environmental impacts are given the required attention by sensitizing, and mobilizing the project community to express their concerns.
- Considering effective participation of the project community in maintaining and sustaining the beneficial impact of the project.

Identification and Involvement of Key Stakeholders

The primary stakeholders include:

- The people living in Aseese and Ibafo where the project is located
- The Local Government Area of the project area; Obafemi Owode Local Government Area of Ogun State

The regulators are also stakeholders in the project and they include:

- Federal Ministry of Environment (FMEnv),
- Ogun State Ministry of Environment (OGMOE)

The regulators were informed of the project through letters as well as visit to their offices and direct discussions. Discussions were also held with the local authorities, community leaders and this shall be maintained to ensure that all issues of local concerns are adequately addressed.

Believers Loveworld recognizes the importance of consultation in the process of data acquisition and has therefore initiated and maintained consultation with appropriate stakeholders identified for the study. Their views were sought, which included chiefs, elders, community leaders, youth organizations, traditional leaders and council workers. The various regulatory bodies are still being consulted on the project. The modus operandi was to hold consultations with each of the above groups.



Plate 4.13: Pictorial Evidence of Stakeholders consultation

Future Consultations

Consultation shall be continuous and all areas of concern identified during the lifespan of the project shall be addressed appropriately.

Community Perceptions and Expectations

The perceptions of stakeholders in Aseese and Ibafo are adjudged, positive and negative effects and mitigation measures outlined; community needs were also made known.

They are of the opinion that positively Believers Loveworld operations would provide in the long run occasional contract employment for community youths, boom on commercial activities and will encourage resourcefulness of the people. As there are no foreseeable negative operations in Believers Loveworld activities beside loss of the space being occupied by the crusade ground, displacement of species habitat and interference on natural environment, hence suggested needs are: -

- Skill acquisition.
- Youth employment.
- Police Post.
- Grant soft loans to private school operators to upgrade their facilities for good learning environment.
- Scholarship for indigent student and provision of educational institutions
- Installation of electrical facilities in the community
- Asphalt tarring of community road
- Improved security system
- Seasonal/periodic gift to community during festive period.

4.11.4 Historical Background and Social Structure

Ogun State enjoys a relatively homogenous ethnicity with the inhabiting ethnic groups of Egbas, Ijebus, Yewas, Aworis, Eguns and a host of other settlers and non-Yorubas such as Igbo, Hausa and people from Southern Benue, amongst others. Ogun State indigenes belong to the Yoruba ethnic group, comprising mainly the Egba, the

Yewa, the Awori, the Egun, the Ijebu and the Remo. This social structure reflects in Abeokuta South Local Government, which is populated largely by people of Remo ancestry, a subset of the Yorubas and the original inhabitants of the area. However, other Yoruba speaking groups and ethnic groups such as Igbo and Hausa settlers also live in the area. It has a large population of non-indigenes and migrants from other parts of the country who settled in the area by virtue of high presence of industrial facilities, economic potential and proximity to Lagos State.

The language mostly spoken by the indigenes are Yoruba of the Remo dialect. It is believed that a common heritage exists among the various ethnic groups hence the prevalence of customary solidarity among them. The similarities in language, music, values, art, styles, literature, family life, religion, ritual, food, naming, public life, and material culture is evidence of the historical fact that Nigerians in general have pursued common social, cultural, political, and economic relationships. The people of this area have four distinct cultural characteristics that affect and direct their behavioral patterns. These include the following; Pre-occupation with the supernatural; concern for good morals; Rebellion against injustice and Belief in a strong family system. These four characteristics influence their music and dance.

Traditional Governance and Socio-cultural Practices

The traditional system of government and socio-cultural practices/pattern of social organization found in Aseese Community is characterized by having a Baale as the head of settlement and being supported by the Baale-in-council drawn from family heads, the CDC, the youth and women organization in maintaining orderliness, peace, unity, religious tolerance, inter-family interaction and security in the study area. The Baale is totally responsible for administrative decisions taken in the community. Baale-in-Council membership is attained by age, 50 years at least and it is an all-male council. Its role is advisory. The women group has an executive committee headed by a woman leader. All adult female members, whether born or married into the town are eligible members of the women's group.

Membership of the youth group is open to adult members of both sexes between ages of 18 and 40 years. It comprises of tenure elected president and executive committee members drawn from amongst the youth group. The women's and youth groups report to the CDC. The roles of these organs of society are clearly defined and there were no indications of role conflicts. They help in information dissemination, social mobilization, maintaining law and order, managing conflict situations among their members, and they also provide the average indigenous resident a sense of belonging. While a group like the CDC is set up purely to perform local administrative and developmental roles, the socio-cultural groups thereby ensure the preservation of their cultural heritage and also actively participate in improving the welfare conditions of their members. Generally, socio-cultural groups are important in community administration and conflict management. There exist in Aseese community occupational guilds, social clubs and religious units which maintain an important role in commerce, social control, and vocational education in the village. There are no scared or archaeological sites within the community or around the location of the project.

Religious Practices

The preservation of festivals in a community is the most important aspect of a people's culture. There is freedom of worship in the community. The Eid el-Malud, Ed el-Fitri and Eid el-Kabir are Muslim festivals observed in the community, while Easter and Christmas are main Christian celebration. There are various Christian denominations with places of worship in the village (Plate 4.11) as there is also for the Muslims. Some of the Christian denominations include Redeemed Christian Church of God, Assemblies of God Church, Deeper Life Bible Church, Christ Freedom Evangelical Ministry and White-garment Churches of CAC, Apostolic and C&S, among others. The main traditional festival is celebrated around December in Aseese. Their ancient religious practices and culture is found in periodic/yearly festivals dedicated to certain types of masquerades. The major festivals include those of the Igbo Igunnu, Igbo Oshun, Oju Alele, Igbo Oro and Igbo Ologboni including Youth carnival in December.

Ethnic Composition

The Yoruba are the predominant ethnic group resident in Aseese Community. They account for about 80% of the population. Other ethnic nationalities found in the study area included Ibibio, Igbo, Igbira, Igala, Idoma, Hausa, Edo, Delta and Togolese/Beninese which accounted for the remaining 20% population. These non-natives comprise of traders, factory and commercial workers. All these people reside and pursue their various livelihood activities in the community.

Education and Literacy Level

Ogun State has a total of nine registered universities, the highest in any state in Nigeria. It has five private universities (which were amongst the first private universities in the country). The state has the following tertiary institutions; the Federal University of Agriculture, Abeokuta (FUNAAB), Federal College of Education (FCE), Osiele (both at Odeda Local Government Area), Tai Solarin University of Education (TASUED), (formerly known as Ogun State College of Education, Ijagun, Ijebu-Ode, Federal Polytechnic, Ilaro, Moshood Abiola Polytechnic (MAPOLY) - formerly known as Ogun State Polytechnic, Ojere, Abeokuta and Olabisi Onabanjo University, Ago Iwoye (formerly known as Ogun State University), Redeemers University, Bell University.

The study area has quite a number of private primaries and secondary schools. It also has prominent universities in the area of influence which includes the Mountain Top University, Ibafo and the Redeemers University, Mowe.



Plate 4.14: Some schools in the study area

Demographics Characteristics

The total population of Nigeria in 2010 was estimated to be 158.4 million, with a population growth rate of three percent per year (World Bank, 2010). Approximately 51 percent of the national population is male, against 49 percent female. In 2009, Nigeria reported an average life expectancy at birth of 51 years, which was broken down into a life expectancy of 50 years for men and 52 years for women (World Bank, 2010). In 2007, the WHO reported that 70.8 percent of the population was living below the poverty line of less than USD1 per day (WHO, 2010). The population of Ogun state, based on the 2006 Population Census, is 3,751,140 Ogun State consists of sixteen (20) Local Government Areas

Table 4.16: Population Figures of the Local Government Areas (LGAs) of Ogun State

Local Government Area	Population
Ifo	539,170
Ado-Odo/Ota	527,242
Ijebu North	280,520
Shagamu	255,885
Abeokuta South	250,295
Obafemi-Owode	235,071 (Project area)
Egbado North	183,844
Egbado South	168,336
Ijebu Ode	157,161
Ipokia	150,387
Odogbolu	125,657
Ikenne	119,117
Odeda	109,522
Imeko Afon	82,952
Ogun Waterside	74,222
Ijebu North East	68,800
Remo North	59,752

Ewekoro	55,093
Abeokuta North	198,793
Ijebu North East	68,800
TOTAL	255,885

Source : National Population Commission (1991-2006)

The proposed project is sited at Aseese community in Obafemi - Owode LGA of Ogun State. Aseese community, the study area is a nodal community and situated along Lagos Ibadan expressway at the northern boundary of the metropolis and Lagos state. Obafemi - Owode Local Government, the LGA in which the proposed project site is situated has a total surface area of 1,600km² with total population of 235,071 people in 2006 and projected to be increase to 399800 by 2022.118574 representing approximately 50.4% and 116497 representing approximately 49.6% of the population are male and female respectively.

Population Structure and Distribution of Respondents

Male respondents across the communities within the spatial boundary constitute 35% of the total number of people interviewed while 65% of the respondents were female.

Table 4.17: Respondents Distribution by Sex at the project area

Respondents	Number	Percentage %
Male	46	35%
Female	84	65%
Total	130	100

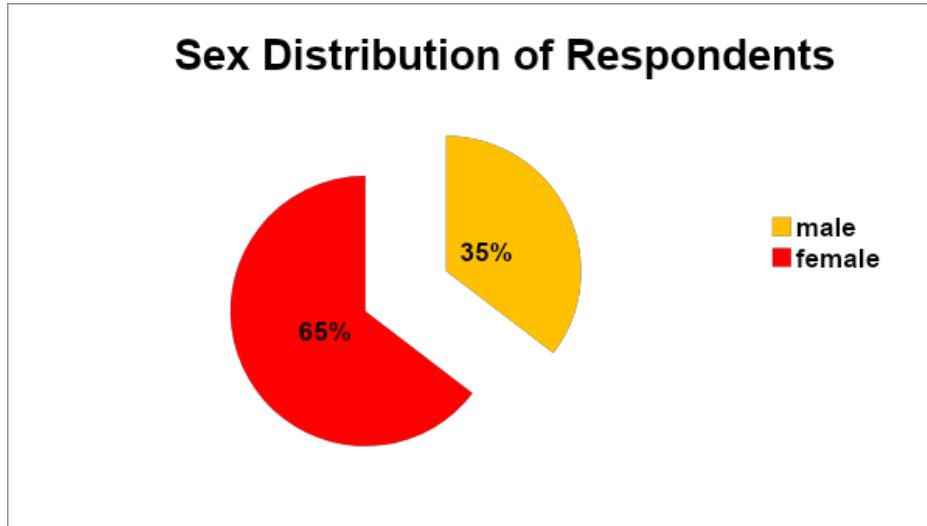


Figure 4.14: Sex distribution of respondents

Age Distribution

The study shows that the majority of the respondents have attained full adulthood with age bracket of 40 to 60years representing approximately 68% of the total number (130) of the respondents. The remaining 32% Of the respondents are youths within the age range 20 – 39years.

Table 4.18: Age Distribution of Respondents

Respondents	20-39	40-59	>60
Female	30	27	29
Male	12	23	9

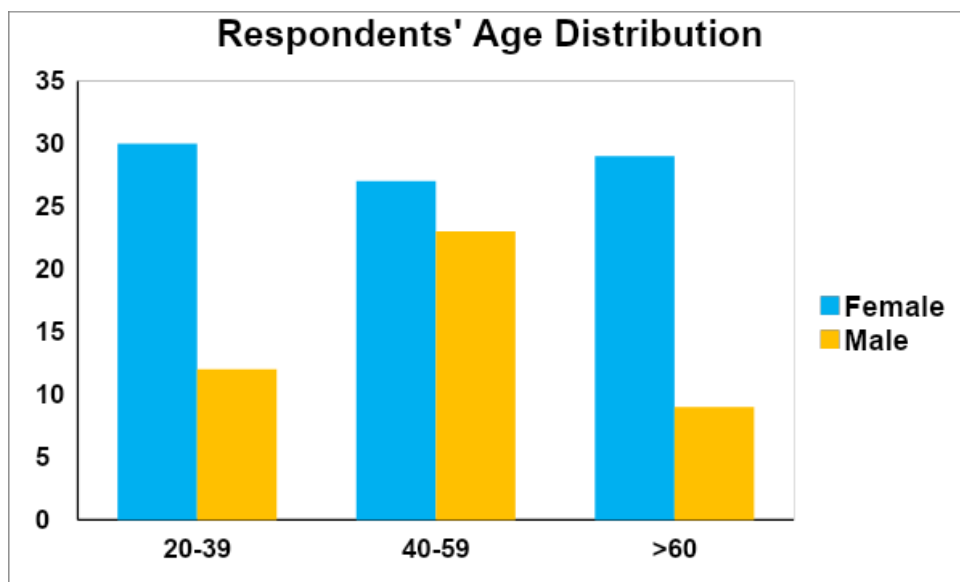


Figure 4.15: Age Distribution of Respondents

Marital Status

For this study, married respondents are classified as those who are in stable unions irrespective of the degree of recognition under extant marriage law in Nigeria. Respondents were asked if they had ever been married or lived with a man, currently married, living with a man, widowed, divorced or separated. Of the total respondents, 53% were married, 20% were single while 17% of the respondents were divorced and 10% were separated or widowed.

Resident Status and Length of Residence

All the respondents claimed to be resident or working in the project area all year round. The collated data indicates that most of the respondents have stayed in the study area for between 6-10years (48%). Some 21% of the respondents had stayed in the area for more than 10years while 31% had lived in the area for 3-5 years. From this information, it is assumed that out-migration is minimal. Also from the qualitative data gathered, including responses from community stakeholders and residents, majority of the residents are native to the project area.

Table 4.19: Resident Status and length of residence around the project site

Years	Number	Percentage %
6-10 years	63	48
3-5 years	40	31
>10 years	27	21
Total	130	100

Occupation of Respondents

Occupation of population in the proposed project area is dominated by entrepreneurs (mostly traders) and employees in different companies around the project area constituting 25% and 55% respectively. Student population pursuing first degree and other post-secondary education was 15% while 5% claimed to be civil servants at various local and state government establishments of the respondents interviewed in the area.

Table 4.20: Household income of respondents

Income Levels	Number	Percentage %
< N10, 000	22	17
N10, 000 -N99,000	40	31
>100000	55	42
>250,000	13	10
Total	130	100

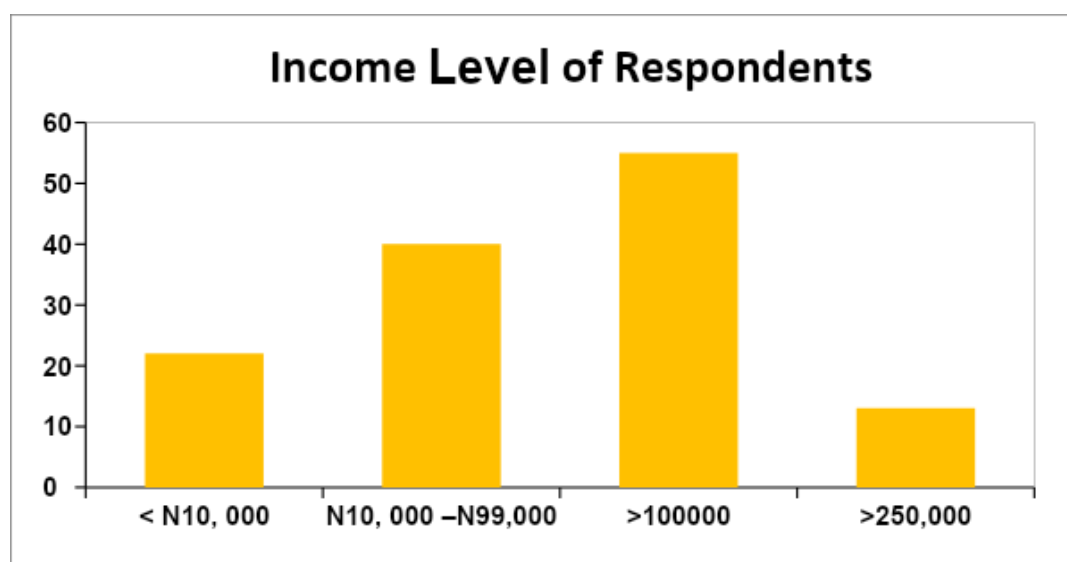


Figure 4.16: Income levels of respondents

INFRASTRUCTURE

Source of Lighting and Fuel

Quality of life measures the amount and distribution of socio-economic variables such as electricity, potable water, access road, means of transportation, educational. The residents of the project area depend on national grid supply and use of privately owned power generating sets. Most of the respondents (21.5%) claimed to depend solely on national grid while 68.8% depend on both national grid and generator sets while 9.7% depend on only generator sets.

Water Supply

The project area and neighboring community make use of boreholes as their main source of water supply. They mostly depend on boreholes and wells as sources of water for domestic purposes and few use water vendors.

Waste Disposal and Sanitation

Solid waste in the State is generated from domestic and commercial activities. The volume of waste generated from each of these sources varies from one location to another depending on the population and commercial activities in the area.

The Ogun State Waste Management Authority (OGWAMA) in collaboration with Private Investors (PSP) is responsible for solid waste disposal within the State. Licensed operators are responsible for the collection and evacuation of solid waste from the communities to the final approved dumpsite. The respondents were asked about their waste disposal methods. 96.8% of the respondents use OGWAMA accredited vendors, while 3.2% dispose their wastes through Private cart pushers.

HEALTH ASSESSMENT

Health Status Assessment & Common Ailments

The respondents were interviewed about their health status, majority of the respondents claimed to be in good health conditions.

From responses of the people interviewed across the communities, Government hospital is the preferred option in terms of seeking medical assistance for ailments. Most of the respondents (75.3%) claimed to prefer visiting government hospitals and healthcare clinics for treatment and medical consultation for major health challenges. 16.1% of the respondents self-medicate with orthodox medicine for treatment, while 1.6% usually resort to self-medication by purchasing traditional medicine.

The prevalent symptom survey revealed that malaria is top on the list with 68% response, headache (57%), fever (64%), anxiety (31%), cough (40%), eye problems (36%), hypertension (21%), infertility, fear, pneumonia, low sperm count, and miscarriages. Subsequently the identified symptoms below could be due to other ailments, the commonest being malaria which is endemic in Nigeria at large.

Unkempt environment and crevices in mud housing Open could have contributed as breeding sites/home for mosquitoes, crawling ant and reptiles. Malaria patients can also show signs of headache, fever and vomiting. This is also true for typhoid fever. It is also worthy of note that there is high incidence of malaria associated with headache and fever which has been attributed to the start of wet season as a result of increase in vector carrying parasites and conducive bush environment. Cough and asthma are associated with the system organ of breathing. These could be due to some irritation from inhalation of irritant which can cause infections (such as pneumonia) which also give rise to fever.

Table 4.21: Prevalent Reported Symptoms

Symptoms	Frequency	%
Headache	54	57
Fever	61	64
Skin irritation	2	2
Malaria/Typhoid	65	68
Diarrhea	11	12
Dysentery	7	7
Vomiting	5	5
Cough	38	40
Whooping cough	-	-
Tuberculosis	5	5
Asthma	15	16
Hypertension	20	21
Congestive Cardiac failure	3	3
Pneumonia	9	9
Fits	2	2
Respiratory Problem	13	14
Palpitation	2	2
Fear	23	24

Anxiety (Worry) ;8	29	31
Heartburn (Indigestion)	9	9
Suicide	-	-
Insomnia (Sleeplessness)	7	7
Anorexia	1	1
Leukemia	-	-
Low sperm count	9	9
Infertility	12	13
Miscarriages	1	1
Congenital malformation	-	-
Breast cancer		
Brain cancer (Tumor)		
Alzheimer		
Autism	1	1
Eye problem	34	36
Hearing problem	2	2
Symptom Change	Frequency	%
Respondent who claimed symptoms were worse	31	33

Infectious and Parasitic Disease Spread

The environment is susceptible to incubating and sustaining diseases carrying vectors. From on-the-spot assessment, it is adduced that malaria carrying parasitic vectors, cloning of ailments such as tuberculosis, trypanosomiasis (sleeping sickness), asthma and gastrointestinal disorder could be prevalent.

Transportation System

Commercial and private vehicles, both in different types such as buses, cars, SUVs and vans were observed to make use of the road by conveying passengers to their different destinations within and outside the State. Motorcycles were also used by the inhabitants of the area as their means of transportation for private purposes.

CHAPTER FIVE
ASSOCIATED AND POTENTIAL
ENVIRONMENTAL IMPACTS

CHAPTER FIVE

ASSOCIATED AND POTENTIAL ENVIRONMENTAL IMPACTS

5.1 INTRODUCTION

This chapter contains the scoping summary, detailed impact identification, quantification, analysis and discussion of the positive/beneficial, neutral and negative/adverse environmental and social health impact assessment. The approach was a multidisciplinary one involving various experts who assessed the baseline environmental and socio - economic and public health status and also aligned them with the various phases and sub phases of construction of the proposed Multipurpose Crusade Ground at Aseese Community, Ibafo, Obafemi Owode LGA, Ogun state. Information from relevant FMEnv guidelines, literature review, stakeholder engagement and hindsight from the wealth of experience of the various experts and laboratory analysis were used in evolving an exhaustive impact assessment and proffering appropriate mitigation measures. This section is initiated with a checklist of environmental indicators/resources and project activities.

The proposed project would impact air/atmosphere, soil, ground water, human socio-economy and health status (i.e., the biophysical and human socio-economic and health environment) in both the host community and its environs to varying degrees. In this chapter, the environment and project interactions are examined quantitatively to arrive at specific impact ratings.

5.2 Identification of Potential Environmental Issues

On the basis of the preliminary scoping evaluation, the developmental activities associated with the proposed project (pre-construction, construction, operation and decommissioning/abandonment) are anticipated to be capable of causing potential significant effects on the following environmental issues:

Environmental Issues

- ✓ Climate and Meteorological Studies
- ✓ Air Quality Studies

- ✓ Noise assessment
- ✓ Cultural Heritage and Archaeology
- ✓ Traffic and Transportation Studies
- ✓ Ecological Assessment
- ✓ Groundwater Quality Assessment
- ✓ Soil Quality Studies
- ✓ Geology and Geotechnical Studies
- ✓ Socio-Economic Impact Assessment Including gender development and poverty alleviation
- ✓ Health Impact Assessment
- ✓ Operational Safety and Security Assessment
- ✓ Waste Management Assessment

All the identified environmental components are then subjected to expert evaluation and scoping based on available information on the project area and existing land use pattern, in order to establish the necessity for inclusion or exclusion in the EIA study (Table5.1).

5.3 IMPACT IDENTIFICATION AND EVALUATION

The following basic steps were adopted for identification and evaluation of impacts in adherence to general guidelines:

- Impact identification;
- Impact qualification;
- Impact rating; and
- Impact description

5.3.1 *Impact Identification*

The aim of impact identification is to account for the entire cumulative associated bio-physical, social and health impacts making sure that both significant and insignificant impacts are accounted for. The impacts were determined based on the interaction between project activities and environmental sensitivities.

Table5.1: Components of the Environment and Impact Indicators

Environmental Components	Indicators
Soil/Land-use	Coastline Erosion, fishing, bearing capacity.
Ecology	Distribution, diversity & abundance terrestrial and aquatic flora/fauna
Climate	Temperature, humidity, wind speed, rainfall.
Air Quality	Particulates, NO _x , SO _x , CO, CO ₂ , VOCs
Noise/Vibration	Hearing loss, disturbance, communication impairment, tremor, impact on fishes and other aquatic organisms
Hydrology/Hydrogeology	Discharge, drainage, sedimentation, erosion, groundwater level quality.
Socio-economics	Properties, Population, Income, settlement, transportation, occupation, migration patterns, urbanization, health, security, safety.

5.3.2 *Impact Qualification*

Four criteria used to qualify the identified impacts of the project were:

- Positive or negative
- Short-term or long-term
- Reversible or irreversible
- Direct or indirect

Negative impacts are those that adversely affect the biophysical, health, and social environments, while positive impacts are those which enhance the quality of the environment. For this study, short term means a period of time less than three months while any period greater than three months is considered long term. Reversible/irreversible referred to whether the environment can either revert to previous conditions or remain permanent when the activity causing the impact is terminated. Direct impacts are primary impacts which occur as a result of a specific

project activity, while indirect impacts refer to secondary effects – the consequence of a primary impact.

5.3.3 *Impact Rating*

This stage involves evaluation of the impact to determine whether or not it is significant. The quantification scale of 0, 1, 3 and 5 was used. The ratings adapted from The International Organization for Standardization ISO 14001- Environmental Management System Approach are as described below. The criteria and weighing scale used in evaluating significance are:

- Legal/regulatory requirements (L)
- Risk factor (R)
- Frequency of occurrence of impact (F)
- Importance of impact on an affected environmental component (I),
- Public perception/interest (P)

5.3.3.1 *Legal/Regulatory Requirements (L)*

This asks the question ‘is there a legal/regulatory requirement or a permit required?’

The scoring is as follows:

0= There is no legal/regulatory requirement

3= There is legal/regulatory requirement

5= There is a legal/regulatory requirement and permit required

The legal/regulatory requirements were identified based on national laws/guidelines/standards relating to the project activity.

5.3.3.2 *Risk (R)*

This uses a matrix based on the interaction of the probability of occurrence of the impact (Table 5.3) against consequences (Table 5.4). The matrix (Figure 5.1) is referred to as the Risk Assessment Matrix (RAM). Five probability categories were interacted against four groups of consequences. The resultant outcomes were given scores with colour-coding. High-risk categories are red; intermediate risks, yellow and low risk, green as follows:

1=Low risk (green)

3=Intermediate risk (yellow)

5=High risk (red)

Table 5.2: Probability of Occurrence

Probability Category	Definition
A	Possibility of Repeated Incidents
B	Possibility of Isolated Incidents
C	Possibility of Occurring Sometime
D	Not Likely to Occur
E	Practically Impossible

Table 5.3: Impact – severity rating for risk assessment matrix (RAM)

Severity	Potential Impact	Definition	Duration
0	Zero effect or No risk	No environmental damage. No change in the environment. No financial consequences	
1	Slight effect or very low risk	Local environmental damage within the perimeter and within systems. Negligible financial consequences	Short term
2	Minor effect low risk	Contamination, damage sufficiently large to reach the environment single occurrence limit of statutory or prescribed criteria. No permanent effect on the environment	Short term
3	Localized/moderate effect/risk	Limited loss of discharges of known toxicity. Repeated exceeding of statutory	Long term

		or prescribed limits. Affecting the neighbourhood	
4	Major effect or High risk	Severe environmental damage. The church is required to take extensive measures to restore the contaminated environment to its original state. Prolonged exceeding of statutory or prescribed limits	Short term
5	Massive effect or very high risk	Persistent severe environmental damage or severe nuisance extending over a large area. In terms of commercial or recreational use or nature conservancy, a major economic loss for the church. Consistently exceeding statutory or prescribed limits by wide margins.	Long term

Source: Risk Assessment Matrix March 1996. Health, Safety and Environment.

5.3.3.3 Frequency of Impact (F)

Frequency of impact refers to the number of occurrences of impact. The frequency of impact was determined using impacts historical records of occurrence and consultation with experts and local communities. The criteria for rating the frequency of impacts are outlined in Table 5.4.

Table 5.4: Frequency Rating and Criteria

Frequency	Rating	Criteria
Low	1	Rare, not likely to happen within project lifespan
Medium	3	Likely to happen \geq 5 years
High	5	Very likely to happen throughout the project lifespan

5.3.3.4 Importance of Affected Environmental Component and Impact (I)

The importance of the affected environmental components was determined through consultation and consensus of opinions. This was also further facilitated by information on experiences on the impacts of already existing facilities in the proposed project area. The rating of the importance of impacts is summarized in Table 5.5.

Table 5.5: Importance Criteria

Importance	Rating	Criteria
Low	1	<ul style="list-style-type: none"> • Imperceptible outcome • Insignificant alteration in value, function or service of impacted resource • Within compliance, no controls required
Medium	3	<ul style="list-style-type: none"> • Negative outcome • Measurable reduction or disruption in value, function or service of impacted resource • Potential for non-compliance
High	5	<ul style="list-style-type: none"> • Highly undesirable outcome (e.g., impairment of endangered species and protected habitat) • Detrimental, extended animal behavioral change (breeding, spawning, molting) • Major reduction or disruption in value, function or service of impacted valued ecosystem resource • Impact during environmentally sensitive period • Continuous non-compliance with existing statutes

5.3.3.5 Public Perception (P)

The consensus of opinions among the project stakeholders were used to determine the public perception on the associated impacts and the criteria applied are summarized in Table 5.6. The combination of the five impact rating weights forms the basis for

judging the level of significance of each impact. A matrix displaying the combination based on the ISO 14001 tool is shown in table 5.7

Table 5.6: Public Perception Criteria

Public Perception	Rating	Criteria
Low	1	<ul style="list-style-type: none"> No risk to human health, acute and/or chronic No possibility of life endangerment for residents, associated communities Minor reduction in social, cultural, economic values Unlikely adverse perception among population
Medium	3	<ul style="list-style-type: none"> Limited incremental risk to human health, acute and/or chronic Unlikely life endangerment for residents, communities Some reduction in social, cultural, economic value Possibility of adverse perception among population. Potential for non-compliance
High	5	<ul style="list-style-type: none"> Elevated incremental risk to human health, acute and/or chronic Possibility of life endangerment for residents, abutting communities Major reduction in social, cultural, economic value Continuous non-compliance with statute Any major public concern among population in study area

Table 5.7: Impact Value and Rating Colour Code

Impact value	Cut off values	Impact Rating
L+R+F+I+P	<8	Low
L+R+F+I+P	≥8 but <15	Medium
L+R+F+I+P	≥15	High

F + I	>6	
P	= 5	
Positive		Positive

The final ratings of the identified impacts are presented in Tables 5.8 - 5.10. In this study, medium and high significant negative impacts were judged to require mitigation, and all positive impacts required enhancement.

5.4.SUMMARY OF IMPACT SIGNIFICANCE RANKING

The Impact Assessment of the proposed project (interaction of different Phases and Project activities/Environmental Aspects) resulted in Forty - Five (45) impacts with different impact significance ratings including Beneficial, Low, Medium and High. The summary of impact significance rating as summarized in Table 5.11 shows that 13.3% of the identified impacts were beneficial, 17.8% low impacts, while 42.2% and 26.7% had medium and high impacts respectively.

Table 5.8: Potential and Associated Impacts of proposed crusade ground multipurpose (residential and commercial) project at Aseese community, Ibafo, Obafemi - Owode Local Government of Ogun State.

Construction Phase

Project Activity	Description of Impact	Impact Qualification							Impact Quantification					F + I	Impact Rating	
		P	N	I	S	L	R	I	L	R	F	I	P			Total
Labour Requirement	Increased demand on infrastructure	√	√		√	√			0	1	1	1	1	4	2	L
	Increase in sexually transmitted disease	√	√		√	√			0	1	1	1	1	4	2	L
	Increase in social vices		√	√		√	√		0	1	1	1	1	4	2	L
	Increased business and employment	√		√		√	√		-	-	-	-	-	-	-	P
	Influx of migrant workers		√	√		√	√		0	1	1	1	1	4	2	L
Site clearing and preparation	Impairment of air quality	√	√		√	√			3	3	5	3	3	17	8	H
	Solid waste generation	√	√			√	√		0	1	1	1	1	4	2	L
	Noise and vibration nuisance		√	√		√	√		3	1	3	1	1	9	4	M
	Loss of Biodiversity		√	√			√	√		3	5	4	3	2	17	7

Project Activity	Description of Impact	Impact Qualification						Impact Quantification						F + I	Impact Rating		
		P o s i t i v e	N e g a t i v e	D i r e c t	I n d i r e c t	S h o r t t e r m	L o n g t e r m	R e v e r s i b l e	I r r e v e r s i b l e	L	R	F	I			P	T o t a l
	Increased opportunity for employment	√		√		√		√		-	-	-	-	-	-	-	P
Civil works	Impairment of air quality		√	√		√		√		3	5	5	3	3	19	8	H
	Noise and vibration nuisance		√	√		√		√		3	3	5	3	3	17	8	H
	Solid and Liquid waste generation		√	√			√	√		3	1	3	1	1	9	4	M
	Increased opportunity for business and employment	√		√		√		√		-	-	-	-	-	-	-	P
Equipment Installations	Welding- Exposure to heat and Electricity		√	√		√		√		0	3	5	3	5	16	8	H
	Noise and vibration nuisance		√	√		√		√		3	3	3	3	1	13	6	M

Table 5.9: Potential and Associated Impacts of proposed crusade ground multipurpose (residential and commercial) project , Obafemi - Owode, Ogun State- Operation Phase

Project Activity	Description of Impact	Impact Qualification							Impact Quantification					Total	F + I	Impact Rating	
		P	N	I	S	R	R	I	L	R	F	I	P				
RELIGIOUS AND SOCIAL ACTIVITIES.	Impairment of air quality	√	√			√	√		3	1	2	1	1	8	3	M	
	Noise and vibration	√	√		√		√		5	1	3	1	3	13	4	M	
	Solid waste generation	√	√			√	√		5	1	3	1	1	11	4	M	
	Liquid waste generation	√	√			√	√		3	1	1	1	1	7	2	L	
	Impacts to Livelihoods and Socioeconomics - job opportunities, growth of ancillary businesses, provision of infrastructure facilities through the application of CSR	√		√			√	√		-	-	-	-	-	-	-	P
	Impact on infrastructure	√	√			√	√		5	1	3	1	3	13	4	M	
ENERGY SUPPLY	Air Emissions (CO ₂ , NO ₂)	√	√			√	√		3	1	3	1	3	11	4	M	
	Noise and vibration	√	√			√	√		3	3	3	3	3	15	6	H	
	Increased opportunity for business and employment	√		√			√	√		-	-	-	-	-	-	P	
MAINTENANCE	Spent Oil generation/ Oil spill	√	√			√	√		3	1	3	1	1	9	4	M	
	Groundwater and surface water contamination	√	√			√	√		3	1	1	1	1	7	2	L	
	Oil spill	√			√	√	√		3	1	3	1	1	9	4	M	
	Impairment of air quality	√	√		√		√		5	1	3	1	3	13	4	M	

Project Activity	Description of Impact	Impact Qualification							Impact Quantification						Total	F + I	Impact Rating
		P	N	I	S	L	R	R	L	R	F	I	P				
TRANSPORTATION AND LOGISTICS	Increased traffic and strain on road network	√	√			√	√		3	3	5	1	3	15	6	H	
	Increase Suspended Particulate Matter	√	√			√	√		3	1	3	1	1	9	4	M	
	Road traffic accidents	√	√			√	√		3	3	3	1	3	13	4	M	
	Increased opportunity for Employment Opportunities	√		√													P

Table 5.10: Potential and Associated Impacts of proposed crusade ground multipurpose (residential and commercial) project, Aseese, Obafemi - Owode, Ogun State- Decommissioning Phase)

Project Activity	Description of Impact	Impact Qualification							Impact Quantification					F +I	I m p a c t R a t i n g		
		P o s i t i v e	N e g a t i v e	D i r e c t	I n d i r e c t	S h o r t t e r m	L o n g t e r m	R e v e r s i b l e	I r r e v e r s i b l e	L	R	F	I			P	T o t a l
Demolition, Evacuation and site clean-up	Acidification of water		√	√			√	√		0	1	3	1	1	6	4	L
	Blockage of drainage pattern		√	√			√	√		5	3	3	3	1	15	6	H
	Blockage of roads/motorways		√	√		√		√		3	1	3	5	5	17	8	H
	Contamination of surface and groundwater		√	√		√		√		3	1	3	3	1	11	6	M
	Employment Opportunities		√	√		√		√		3	1	3	3	1	11	6	M
	Exposure to excessive heat and light		√	√		√		√		3	1	3	3	1	11	6	M
	Impairment of air quality		√	√		√		√		3	3	3	3	3	15	6	H
	Interference with road transportation		√	√		√		√		3	1	3	1	3	11	4	M

Project Activity	Description of Impact	Impact Qualification							Impact Quantification					F +I	I m p a c t R a t i n g		
		P o s i t i v e	N e g a t i v e	D i r e c t	I n d i r e c t	S h o r t t e r m	L o n g t e r m	R e v e r s i b l e	I r r e v e r s i b l e	L	R	F	I			P	T o t a l
	Legal issues		√	√		√		√		3	1	3	1	3	11	4	M
	Loss of employment/ income		√	√		√		√		0	3	5	5	5	18	10	H
	Noise and vibration nuisance		√	√		√		√		3	1	3	3	1	11	6	M
	Road traffic accidents		√	√			√	√		0	3	5	5	5	18	10	H

Table 5.11: Summary of Impact Significance Ranking

Project Phase	Project Activity/Environmental Impact	Number of Identified Impacts	Impact Significance Ranking			
			Beneficial	Low	Medium	High
Construction	Labour Requirement	5	1	4	0	0
	Site clearing and preparation	5	1	1	1	2
	Civil works	4	1	0	1	2
	Equipment Installations	2	0	0	1	1
Operation Phase	Church Activities	6	1	1	4	0
	Energy Supply	3	1	0	1	1
	Maintenance	4		1	3	0
	Transportation and Logistics	4	1	0	2	1
Decommissioning Phase	Demolition and evacuation, and site clean-up	12	0	1	6	5
Total		45	6	8	19	12
Percent Significance			13.3%	17.8%	42.2%	26.7%

5.5 Impact Discussion

This section presents more detailed discussions on the environmental aspects as well as the associated and potential impacts of the activities of proposed crusade ground multipurpose (residential and commercial) project, Obafemi - Owode, Ogun State. These impacts have been assessed (characterized and evaluated) above and assigned respective significant levels. The discussions presented in this section are intended to provide insight into the nature and magnitude as well as duration of identified impacts of the various project activities. It is worthy to note that for socio-economic benefits and security considerations, the project is encouraged to go on and efforts is therefore geared towards ensuring a thorough assessment and also in ensuring that it leaves as low a negative trail as possible.

5.5.1 *Adverse Environmental Effects*

5.5.1.1 *Adverse Impacts of Gaseous and Fugitive Dust Emissions on Air Quality*

Mobilization of personnel, materials and equipment to site and site clearing activities, geotechnical surveys, route preparation, disposal of debris, excavation and operational activities which includes conveyance of people and goods will have an impact on the air quality especially Total Suspended Particulates (TSP) in the study area. Movement of heavy-duty vehicles into the area to help in conveying construction materials, generating sets, construction cabins, earth etc. into the project area would result in impairment of the local air quality. Together with particulates, there are chances of excessive discharge of exhaust which is often laden with CO or CO₂ due to age of most construction and service trucks. While CO is a hematotoxic gas with the potential for carboxyl haemoglobin which impairs O₂ transfer from the lungs to the bloods, CO₂ is a potent greenhouse gas.

Site clearance and excavation, coupled with influx of construction earth into the project site and also conveyance of people and goods would contribute to reduction in air quality by way of fugitive dusts emission from debris. Bulldozers also have the potential for raising dusts into the air. These together with emissions from the exhaust

would contribute to impairment of air quality during this phase. When the construction has ended, such trucks would be brought in again in order to remove excess unused earth, cuttings, blocks, cabins, concrete Mixers and other construction equipment from the site. Potential increase in traffic flow during the operational phase due to the influx of vehicles carrying construction materials will also have an influence on the local air quality conditions as a result of incremental discharge of noxious gases especially CO, CO₂, NO₂, NO, SO₂, from vehicular exhaust.

Petroleum hydrocarbon (VOCs) inhalation from leaks from outdated cars and trucks will pose an environmental factor. During the abandonment/decommissioning phase when the project has reached its full cycle and a decision to demolish has been arrived at, the potential for air pollution also exists. Demolition of structures with bulldozers would lead to fugitive dust emissions due to tanks and debris. Such heavy-duty vehicles like bulldozers, pail loaders and debris removal trucks are often old and poorly serviced, therefore are likely to impact local air quality with their exhaust during such actions.

Overall, the project phases have high impacts on the air quality and mitigation measures would therefore need to be put in place to minimize the levels of emissions and the potential negative health effects.

5.5.1.2 Adverse Impacts of Noise and Vibration on the Environment and Health

Starting from the pre-construction phase when heavy duty vehicles are being mobilized to site, noise levels might be noticeably increased. The vehicles on their own generate noise by the workings of their engines. This would also be increased when they jump in and out of existing pot holes on some sections of the road resulting in some level of disturbances.

The construction phase of the project is expected to have significant effects on noise and vibration levels in the project area. The use of heavy machineries during construction as well as welding equipment are likely to have an impact on noise level and vibration in the project area with the potential to cause sleep disturbance to

aquatic organisms affecting their circadian rhythm as well as their behavioural and other developmental processes. Once the project has become operational, the sources of noise would include vehicular traffic, singing and drumming instrument, public address system, social activities etc.

During demolition when the abandonment/decommissioning phase has been triggered, noise levels is expected to likely be highest because of sounds made by bulldozers, pay loaders, trucks, drilling and cutting equipment. At this phase, the tendency to act carelessly on the part of the workers exists and this further enhances the possibility of increased noise with significant impact.

5.5.1.3 Adverse impacts of the project on Ground and surface Water

During construction phase, ground water would be abstracted to supply the required amount of water for the construction process. Although the stock of the aquifer in the area is not common knowledge, it is obvious that increase utilization/ harnessing would have low impact on the available stock volume given that the construction is a short-term activity, there is also the high tendency of seepage of calcium salts in cement used during this phase into the groundwater, hence increasing the hardness of the water. Seepage of materials into the surface water may impact negatively on aquatic ecosystem. Thus, there will be minimal disruption on the hydrology of the area. During decommissioning phase as well, the tendency of spillage from moving trucks and the dismantled tank are likely to affect groundwater and surface water quality.

5.5.1.4 Adverse impacts of the project on Biodiversity

During construction phase, the site will be cleared displacing fauna and flora resident on the project site. Vegetation clearance around project site, will bring about and disruption of the community of organisms and put pressure on the already stressed biodiversity of the State. During operational phase the influx of vehicles and people into the site will increase conflict between humans and animals resident within the project site. The Noise from musical equipment and light from the camp ground will affect the circadian rhythm of animals within the site.

5.5.1.5 Livelihoods and Socio-Economic Impacts (Including gender development and poverty alleviation)

The proposed crusade ground construction will bring about significant (positive and negative) effects on the socio-economic characteristics of the area. Some of the negative/adverse socio-economic issues that will arise from the activities of the facility are the effects upon the locality with regards to specific indicators such as influx of people into the community, increase in property value and pressure in the area due to influx of other service vendors/facilities.

From the site clearance, through construction, operational and decommissioning stage there is the potential for many positive impacts. However, a few things can go wrong. If affected people are not paid certain monies as compensation for livelihood disruptions confrontations and violence may ensue. This may pose a stumbling block to the smooth actualization of the project. Influx of migrant workers and vendors from other areas into the area could spark conflict especially if the youths and business people in the host community feel left out in employment and service contracts during the construction phase.

Migrant workers who arrive at the site to work might disrupt social values of the host community by bringing in diverse forms of negative and alien cultures. This is particularly possible because there would be interactions with the host community members which might result in long lasting impacts. Migrant workers involved in vices such as trade and use of illicit drugs would be a threat to the social organization because youths might be easily influenced to take up such bad habits. However, given that such migrant workers are likely to come from neighbouring communities with similar values and cultures the risk of such negative occurrence has been defined as negligible.

5.5.2 Beneficial Effects

Creation of Employment and Business opportunities

The project will create employment and business opportunities for various professionals/consultants who will be involved in the different stages of the project.

They will include: project managers, engineers, architects, building economists, land surveyors, environmentalists, economists, urban planners among others. These professionals may be employed directly in the project or by consultants whose services will be procured.

Generation of Income and Source for Government Revenue

Income generated from adjoining services undertaken within the crusade ground will provide income which will be taxed and generate revenue for the state. In addition, fees levied for the submission of plans to the local authorities and state agencies for approval and application for services will generate revenue that is used to meet the various governmental goals and objectives.

Additionally, in order to operationalize the project financial resources will have to be mobilized and these will be injected into the economy. These resources will be used for the services involved in the design and planning of the project and also acquiring the raw materials of the project.

5.5.3 Cumulative Impact Discussion

The assessment of cumulative impacts of the projects on various Valued Environmental and Social Components (VEC) as compared to respective receptors, historical patterns and envisaged future developments in the area indicated a minor to moderate impacts if expected mitigation measures are put in place. However, there exist a couple of moderate to major effects of significance in the area which can be associated with the projects cumulative effects in the area.

Air Quality

The pre-existing air quality of the area cannot be considered as pristine due to high level of development, and working activities already going on. Increased traffic during construction and operation is expected to cause increase in the emission of polluting gases. Dust generation during construction stage is also an environmental concern. These would result in a local impact with potential for long range transport via diffusion. The envisaged use of generating sets by the businesses which it would

attract is expected to increase the air pollution status of the area in the future. Thus, the cumulative effects on the air quality in the area are assigned negative but moderate.

Noise

The various activities in the construction activities and post-construction are expected to negatively impact the environment in terms of the envisaged increase in ambient noise levels. The project is rural with low moderate noise level, noise from traffic along the Lagos - Ibadan expressway and commercial activities along the expressway the major source of noise level within the area. However, the camp ground will increase to a significant extent the noise level within the area alongside expected localization of vendors and increased business activities that will accompany the establishment of this project, is expected to generate noise at higher levels than the current level. This cumulative effect of the project on noise levels is considered to be negative but moderate.

Ground and surface Water

Given the high ground water table in the area, there is the risk of pollution of ground water sources by spills from construction vehicles and machine parts. The cumulative assessment of impacts of activities in the area is considered moderate and negative to ground water because the current lack of coordination and diffuse pollution mitigation measures across the area implies that there are likely various sources of ground water pollution in the area. The activities of the facility in the State would only add to the existing levels. The management shall ensure provision of adequate containment strategies against surface and underground pollution.

Biodiversity

Vegetation clearance within and around project site including disruption of the ecosystem shall put pressure on the already stressed biodiversity of Ogun State. Thus, multipurpose crusade ground project and future developments would result in a

change in the already existing status of biodiversity in the area. The cumulative impact is therefore considered minor and negative.

Local Population

The project would improve household income, create more business opportunities and enhance job security. The envisaged businesses which would be set up close to the facility may also contribute to the social problems by pushing cost of home rentals beyond the reach of many in the area. New comers and workers from distant places would interact with locals with the risk of cross disease transfer, resulting in epidemiological challenges on the local scale which has a slim chance of escalating because the new comers are not expected to come by the locations. Existing national/state-wide disease management programs have the capacity to absorb such changes. There exist a number of positive impacts for the local population of which employment and training opportunities as well as opportunities for fledgling service and sales-oriented businesses are primary. Thus, a major positive impact is envisaged with respect to opportunities for locals.

Global Climate Change

The contribution of the project and the envisaged development which are to come in the area are classified as negative and major. Throughout the phases of the projects, it is expected that there will be emission of vehicular exhaust containing CO₂ from trucks and other construction vehicles. The facility would attract new businesses to localize in the area, emitting CO₂. This implies that there would be an overall CO₂ trail which contributes to the global greenhouse gas (GHG) burden.

CHAPTER SIX
MITIGATION MEASURES

CHAPTER SIX

MITIGATION MEASURES

6.1 Introduction

Mitigation measures are means to prevent, reduce or control adverse environmental effects of a project, and include restitution for any damage to the environment caused by those effects through replacement, restoration, compensation or any other means. Mitigation measures are a critical part of the EIA process, as these actions aim to prevent adverse impacts from the planned project on the environment and people, ensuring that unavoidable impacts are maintained within acceptable levels.

This Chapter presents the environmental mitigation and management measures considered for the proposed ultra modern crusade ground project at Aseese community, Ogun State As described in the previous chapter (chapter 5), the EIA team used a methodology for impact evaluation that assessed the consequence and likelihood of each event to determine an overall significance rating of *high*, *medium* and *low*. These impact categories are used to determine the required level of mitigation. A “low” category indicates a potential impact that is at an acceptable level assuming that standard operating procedures and best practices will be applied. A “medium” category is a potential impact that requires further mitigation measures in order to bring the potential impact down to an acceptable level. Finally, a “high” category represents a major or moderate consequence or probable likelihood and requires either an alternative approach or design, or a mitigation measure that will minimize the potential impact. Mitigation measures are proposed in this chapter for each of the medium or high levels impact identified in Chapter 5.

6.2 Mitigation Approach

The mitigation requirements for each of the impacts of the project were determined using a comprehensive risk assessment matrix (Fig. 6.1). The frequency, severity, sensitivity scale, longevity, legal/Permit requirement and communication/complaints were factors taken into consideration during these assessments. The measures for mitigation were proffered to prevent, eliminate or

reduce the impact of this project to a level considered as low as reasonably practicable (ALARP).

To do this, the primary objectives were:

- ✓ **Prevention** – ensuring that significant and adverse potential impacts and risks do not occur.
- ✓ **Reduction** – ensuring that the effects or consequences of those significant associated and potential impacts that cannot be prevented are reduced to as low as reasonably practicable. Reasonable practicability was determined in reference to best industry practice and to economic, environmental, technical, health and safety considerations.
- ✓ **Control** – ensuring that residual associated impacts are reduced to a level as low as reasonably practicable.

The following were considered;

Subsequently, the specific mitigation measures satisfying the mitigation requirement were established putting the following into consideration:

Available resources and competencies;

On-site conditions; and

Public concerns and technology.

The proposed mitigation measures shall be Specific, Measurable, Achievable, Realistic, and Time-based (SMART). Mitigation measures proposed shall include:

- ✓ Recommendations on feasible and cost-effective measures to prevent or reduce significant negative impacts to acceptable levels;
- ✓ Suggestion of strategies to enhance beneficial impacts of the project;
- ✓ Determination of the non - mitigable impacts (residual);
- ✓ Evaluation of the effectiveness of any mitigation measures identified; and
- ✓ Provision of a comprehensive and detailed plan covering mitigation of impacts.

The mitigation plan shall include the following:

- a) Strategies to manage all environmental, social and health issues to levels as low as reasonably practicable (ALARP);
- b) Strategies to establish communication and trust of the stakeholders; and

c) Action Plan for implementing appropriate mitigation strategies in a tabular format to address:

- ✓ Impacts
- ✓ Prevention
- ✓ Reduction
- ✓ Enhancement

The classification of the mitigation requirements (formal control, informal control, physical control, training and avoidance) is presented below.

Formal control

This involves the application of documented policy, process or procedure in mitigating the impacts of the project activities.

Informal Control

This involves the application of sound judgment and best practice in mitigating the impacts of project activities.

Physical control

This involves the application of physical processes or instruments (pegs, flags, sign post etc), not necessarily requiring any special technology, in order to mitigate the impacts of a project.

Avoidance

This involves the modification of plans, designs or schedules in order to prevent the occurrence of an impact or impacts.

Training

This involves personnel awareness in specific / specialized areas.

Impact Significance ↑	Major	Formal Control	Physical Control	Avoidance
	Moderate	Training	Formal Control	Physical Control
	Minor	Informal Control	Training	Formal Control
		Minor	Moderate	Major
		Likelihood of Occurrence →		

Figure 6.1: Matrix for Determination of Mitigation Measure

6.3 Mitigation Measures Approach

Cost-effective measures that are environmentally, socially and technically acceptable to manage and mitigate the identified project impacts have been defined, developed and highlighted in this chapter. These very important procedures will ensure that adverse environmental impacts of the proposed project are properly managed.

In developing these measures, the first consideration was on measures that are aimed at preventing or reducing identified negative impacts that may occur through the design and management of this project. This is in line with the 'hierarchy of mitigation measures (avoidance, minimization and compensation), which establishes a structure to guide project development and application of measures to mitigate impacts on environmental and social values as well as their associated components. As a result, preference has been given to prevention of negative impacts and minimization to an acceptable level and appropriate compensation were only recommended where avoidance is impracticable.

6.4 Mitigation Measures for Noise and Vibration Impact

The potential and associated impacts of noise and vibration from the proposed project cut across the project phases (pre-construction, construction operational and decommissioning). Therefore, the mitigation measures are phase-specific and are as presented in the subsections below.

Pre-Construction and construction Phases

Noise impacts during mobilization and construction activities are generally related to sources such as vehicles used for movement of workforce and materials, worker's conversations, construction equipment in relation to proximity to the noise receptors. The following are examples of mitigation measures that shall be implemented to further minimize noise and vibration impacts from the project site during construction.

- Use of old, poorly maintained vehicles for movement of construction crew and materials shall be dissuaded. Vehicles to be used for this purpose shall either be new or well-maintained old ones.
- Vehicles and equipment shall be turned off when not in use for a prolonged period of inactive time.
- Construction equipment shall, on a regular basis, be checked for worn or chipped gear teeth, worn bearings, poor lubrication, imbalance in rotating parts, obstruction in airways, damaged silencers etc. as may be applicable. All identified anomalies or defects shall be corrected without delay.
- Alternative construction techniques that are less noisy shall be considered.
- Use of ear plugs by workers who are exposed to noise level up to 90dB(A) over a prolonged period of time should be enforced as a protective measure against noise impact.
- Workers should be encouraged to communicate in an orderly manner to minimize noise impacts.

Operation and Maintenance

Most of the mitigation measures are to be adopted during design and installation phases to eliminate or reduce potential noise sources of the operation phase. The mitigation measures recommended are as follows:

- The generator shall be installed with soundproof to minimize sound output to the neighbourhood and maintained at all times.
- Common power generating set shall be applicable instead of multiplication of generators
- Preference will be given for renewable energy
- Auditoriums and worship centers will be sound proofed to combat high level which will be produced during activities.
- The indiscriminate use of vehicle horns will be prohibited within the city

Decommissioning Phase

The project proponent shall replicate all applicable measures recommended for the construction phase.

6.5 Mitigation Measures for Impact on Air Quality

The proposed measures to eliminate or reduce impact on air quality in the area are phase-specific, and they are as presented below.

Construction

The most effective method of minimizing air pollution is to control dust and other air pollutants at source before they are airborne. The project proponent and or contractors handling the project shall:

- Minimize movement of vehicles as much as possible. This may be achieved by using large-sized vehicles, which are capable of moving more materials to project site compared to small or medium-sized vehicles, which require more trips to move the same quantity of materials to the site.
- Ensure that engines and exhaust systems of equipment and vehicles used for construction are properly maintained to make certain emissions do not exceed statutory emission limits.

- Ensure that vehicles, equipment and internal combustion plant are not left carelessly, running unnecessarily. They shall be switched off if not in use for a prolonged period of time.
- Ensure that fine construction materials such as sand and cement that are likely to generate dust on transit have proper covering during haulage to prevent wind impact and dust generation.
- Ensure that construction materials that are likely to generate dust if blown by wind are stored and covered in an enclosure or bonded area.
- Adopt water-suppression methods to minimise dust generation on site. Water may be sprinkled where necessary as dust suppressant to minimize airborne dust excavation, compacting etc.
- Embark on air quality monitoring during the construction phase to ensure that they do not constitute nuisance or exceed recommended limits.
- Site shall be barricaded with gauze wire to limit encroachment of animals into the site, thereby reducing clashes between animals and site workers.
- A construction site health and safety policy shall be drafted and enforced throughout the construction alongside the use of appropriate personal protective equipment.
- A designated green area shall be included in the design of the project.

Operation and Maintenance

The operation phase has potential adverse impacts on air quality. The following mitigation measures shall be implemented:

- Vehicles used for conveyance of people and commodity will be well-serviced and properly maintained to ensure emissions do not exceed regulatory limits. Also the use of batteries or electricity for motorised equipment instead of diesel to reduce carbon footprint shall be adopted.
- Air conditioning systems and dust extractors shall be provided within enclosed spaces such as auditoriums to allow proper ventilation
- Embark on air quality and noise level monitoring during the operational phase quarterly to ensure that they do not exceed statutory limits.

- Generating sets used within the city shall be serviced regularly and equipped with high exhaust pipes and soundproofs.
- A waste management plan shall be developed and enforced within the facility.
- Regular stakeholder meetings with leaders of the community shall be held to maintain cordially relationship with the host community.
- Bund walls shall be designed around generator areas to contain oil spills. Oil spill kits shall also be provided within the facility to manage accidental spills.

Decommissioning

The contractors handling the decommissioning of the facility shall:

- Minimize movement of vehicles as much as possible. This may be achieved by using large-sized vehicles, which are capable of hauling more materials from site compared to small or medium-sized vehicles, which require more trips to move the same quantity of materials from the closed facility.
- Ensure that engines and exhaust systems of equipment and vehicles used for decommissioning exercise are properly maintained to make sure certain emissions do not exceed statutory emission limits.
- Use of old, poorly maintained equipment for demolition, excavation and haulage of debris shall be discouraged. Vehicles to be used for this purpose shall either be new or well serviced old ones.
- Vehicles and equipment shall be turned off when not in use for a prolonged period of *idling* time.
- Waste management would be ensured (reuse, reduce and recycle).

6.6 Mitigation Measures for Impact on Ground and surface water resource

The recommended mitigation measures would have potential impacts on the proposed project ground and surface water resource in the area as presented in the subsections below.

Construction phase

- During construction, over-abstraction of groundwater resource in the project area should be avoided. Only the required volume of water for use shall be

drawn to conserve groundwater resource. And the borehole will be metered for proper inventory of water usage

- The proponent shall identify sustainable yields of groundwater, and abstraction shall be controlled to guarantee moderate withdrawal, which does not exceed the sustainable yield of the aquifer.
- As much as possible, accidental spill of hazardous materials, which may percolate and contaminate ground and surface water, should be prevented.
- Waste generated onsite shall be properly discarded in waste bins and disposed of using approved waste managers.
- Avoidance of indiscriminate waste disposal into water bodies
- Spill prevention and adequate containment
- Integrated waste management system that encourages waste recovery, reuse and recycling

Operation and Maintenance

- Soil contamination during routine maintenance activities, which may also lead to contamination of groundwater, should be avoided.
- Regularly check for and fix leaks in water taps, hose connections and other plumbing installations.
- Water quality monitoring shall be done to ensure the parameters are within the statutory limits for use.
- Bundwall shall be erected around oil and fuel storage containers.
- Installation of wastewater and sewage treatment plant
- Adequate drainage system
- Aquatic environment conservation

Decommissioning Phase

- As much as possible, accidental spill of hazardous materials like spent oil, which may percolate and contaminate groundwater, should be prevented during decommissioning activities.

- Waste generated onsite shall be properly discarded in waste bins and disposed of using approved waste managers. The contractors, using accredited waste managers, shall dispose of excess excavated materials in approved areas to minimize leaching of hazardous materials.

6.7 Mitigation Measures for Impact on Transport and Traffic

The mitigation measures presented below are recommended to minimize potential impacts of the proposed project on traffic and transportation in the area as presented in the subsections below.

Construction

A wide range of temporary traffic management measures shall be employed, as appropriate, to facilitate the construction works and mitigate the potential impacts on traffic situation in this area. These measures will include:

- Transportation plan, particularly for oversized or overweight project components, would be developed. The plan should consider component sizes, weights, and special handling requirements.
- Limit construction vehicle traffic on public roadways to off-peak commuting times to minimize impacts on local commuters.
- Instruct and require all personnel and contractors to adhere to speed limits to ensure safe and efficient traffic flow.

Operation and Maintenance

- Distribution / movement of materials and people shall be properly regulated and synchronized to off-peak traffic period to avoid heavy traffic situation in the area.
- Safe speed limit shall be maintained by drivers conveying people within the city.
- The management shall put proper traffic management in place
- Speed governor shall be installed on trucks including health education of drivers

- Rehabilitation of community road that serves as alternative route to the site. Synergy should be effected with the host community on traffic management and security.

Decommissioning

- All the traffic management procedures recommended for the construction phase shall be adopted, where applicable, during project decommissioning and site restoration.

6.8 Mitigation Measures for Impacts on Social Infrastructures

The mitigation measures to minimize the possible impacts of the project activities on the proposed social infrastructure address the operation and construction phases in particular.

Construction

- Proposed crusade ground multipurpose (residential and commercial) project, Aseese community, Ogun State, shall engage a significant number of local people for semi-skilled and unskilled labour to minimize number of immigrant workers in the project area.

Operation and Maintenance

- The operation phase, as earlier stated, may have little or negligible impact on the social amenities in the area. However, non-resident skilled workers shall be encouraged to get accommodation in areas other than the project location to minimize potential pressure on facilities.

Decommissioning

- All the measures recommended for construction phase shall be implemented during decommissioning phase.

6.9 Mitigations for Impact on Workers Health and Safety

The proposed crusade ground multipurpose (residential and commercial) project at Aseese community, Ogun State, shall implement the following mitigation measures during the construction, operation and decommissioning phases:

Construction

- The proposed crusade ground multipurpose project at Aseese community, Ogun State, shall ensure a safe and healthy work environment is provided for the workforce, and this shall include placement of visible signages, provision and enforcement of use of appropriate personal protective equipment.
- Ensure that no minor is engaged as a worker on or off-site. According to the applicable laws in Nigeria, a minor is a person who is less than 18 years old.
- There shall be in place procedures, which strongly discourages all forms of discrimination against any group of people within the workforce.
- Workers' welfare and fundamental rights shall be protected at all times.
- There shall be in place well-stocked first aid box, Medical Emergency Response plan which is easily accessible for workers in the event of any illness or injury before seeking medical attention.
- Use of alcohol, hard drugs and other substances capable of causing harms to the user and co-workers shall be forbidden on project site.
- Health trainings and awareness shall be regularly held within the facility.

Operation and Maintenance

Workers may get injured while manually handling freight due to heavy lifting, awkward postures, long periods doing the same movements. Inappropriate use of plant and equipment are the most common cause of injuries.

The proposed crusade ground multipurpose (residential and commercial) project at Aseese community, Ogun State, shall:

- Ensure that workplace layout at the camp ground is in such a way that people are restricted from the out of bound area.
- Provide enough space to operate mobile plant, such as trolleys.
- Design parking spaces to accept vehicles of varying dimensions, and provide easy access and exit.
- Only well trained, certified personnel shall be allowed to carry out installations, repairs and maintenance of electrical equipment and licensed drivers to operate vehicles.

- To prevent electric shock and electrocution, energized cables shall be deactivated and properly grounded before carrying out repairs and maintenance of electrical installations and equipment.
- Visitors, contractors and workers of the camp shall carry out their tasks only when properly protected using personal protective devices.
- There shall be fall prevention and Safety programme (such as training in climbing techniques) in place for personnel working at elevations.
- Workers' welfare and fundamental rights shall be protected at all times
- Use of alcohol, hard drugs and other substances capable of causing harm to the user and co-workers shall be forbidden at work place.
- There shall be in place procedures, which strongly discourages all forms of discrimination against any group of people within the workforce.

Decommissioning Phase

- Believers Loveworld Ministry, Aseese., shall ensure a safe and healthy work environment is provided for the workforce, and this shall include installation of warning signs, provision and enforcement of use of appropriate personal protective equipment.
- Ensure that no minor is engaged as a worker on or off-site. According to the applicable laws in Nigeria, a minor is a person who is less than 18 years old.
- There shall be in place well-stocked first aid boxes, which is easily accessible for workers in the event of any illness or injury before seeking medical attention.
- Use of alcohol, hard drugs and other substances capable of causing harm to the user and co-workers shall be forbidden on site.
- All electrical equipment and installations shall be completely disconnected from energy sources and electrical installations capable of discharging residual current shall be carefully handled during removal of facilities.

6.10 Mitigation Measures and Management of Hazardous Substances

- An appropriate spill prevention, containment, and clean up contingency plan for hydrocarbon products (e.g. fuel, oil, hydraulic fluid, etc.), and other

hazardous substances shall be put in place prior to commencement of construction activities and operation phase of the project.

- All machinery and equipment for site use shall be in good repair and free of excess oil and grease. Fuelling and maintenance of equipment shall be properly done to avoid accidental spill. On-site washing of oil-contaminated parts of equipment and vehicles would be discouraged.
- On-site storage of hazardous materials shall be avoided, or minimised. Hazardous materials stored on the construction site would be stored in a secure area of sufficient containment capacity.
- Effective spill containment kits and bund walls shall be provided on-site if hazardous materials are to be stored on the construction site. Unplanned spills shall be contained and cleaned up immediately.
- In addition, storage and handling of materials shall be undertaken in accordance with the instructions on Material Safety Data Sheet (MSDS) of the chemicals.

6.11 Enhancing Positive Impacts of Proposed Project

Potential beneficial impacts of the proposed project identified in the area are the creation of employment opportunities for local residents, increase in industrialization and economic activities of the area. The management of The proposed crusade ground multipurpose (residential and commercial) project at Aseese community, Ogun State shall be committed to sustainability of the project through sound decision making, staff welfare, production and storage of products and engagement of more local workers and less of expatriates.

Table 6.1: Summary of Project Activities, Impact Ratings, Mitigation Measures and Residual Impacts

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
Noise Level	<i>Phase:</i> <i>Pre-construction and Construction</i>	High	<p>proposed crusade ground multipurpose (residential and commercial) project shall ensure</p> <ul style="list-style-type: none"> • Vehicles that are certified with efficient engine performance following regular servicing and maintenance shall be engaged. • Noise impacts shall be reduced by installing appropriate noise mufflers. • Contractors shall be required to ensure that engines and generators are in good working order and well maintained, and that all have original noise suppression equipment (e.g. mufflers) intact. • Equipment and general construction activities that produce noise shall be 	Moderate

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
			<p>limited to regular working hours</p> <ul style="list-style-type: none"> Contractors shall be required to implement best driving practices when approaching and leaving the project site to minimize noise emissions. Construction equipment shall be shut down when not in use for extended periods of time. <p>-</p>	
	<i>Phase: Operation and Maintenance</i>	Moderate	<p>Most of the mitigation measures are to be adopted during design and installation phases to eliminate or reduce existing noise sources of the operation phase. The mitigation measures recommended are as follows:</p> <ul style="list-style-type: none"> The generator shall be installed with soundproof to minimize sound output to the neighborhood. 	Low

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
			<ul style="list-style-type: none"> • The generator(s) and operations equipment to be installed for use shall be well serviced and maintained at all times • Centralization of power generation source • The indiscriminate honking of car horns shall be prohibited within the crusade ground 	
	<i>Phase: Decommissioning</i>	High	The project proponent shall repeat all applicable measures recommended for the construction phase	Moderate
Air Quality	<i>Phase: Construction</i>	High	proposed crusade ground multipurpose (residential and commercial) project shall ensure	Moderate

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
			<ul style="list-style-type: none">• that large trucks are used for movement of materials to reduce the number of journeys required• Equipment and vehicles shall be turned off when not in use.• Management shall ensure that contractors operate only modern and well-maintained equipment and machinery for construction activities. Vehicles with efficient engine performance and minimal air pollution shall be engaged for the project.• Movement of vehicles shall be restricted during periods, likely to generate high level of suspended particulate matters such as dust.	

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
			<ul style="list-style-type: none"> • Dust control measures during construction shall include i) proper location of material stockpiles, especially sand and soil downwind from the residential and other establishments; ii) wetting of the stockpile and working area; iii) providing wind breaks for stockpiles; iii) use of covered trucks for transportation of materials that release dust emission. • Adopt water-suppression methods to minimize dust generation on site. Water may be sprinkled where necessary as dust suppressant to minimize airborne dust during earthmoving activities, prior to clearing, before excavating, 	

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
			<p>backfilling, compacting, or grading, and during blasting. Applying water to exposed soils can be time intensive, and if done to excess, could result in excess runoffs from the site or vehicles tracking mud onto public roads. Therefore, well trained personnel shall be assigned this duty.</p> <ul style="list-style-type: none"> ● Train workers to handle construction materials and debris during construction well to reduce fugitive emissions. ● Ensure that soil is kept moist while loading into dump trucks, and soil loads shall be kept below the freeboard of the truck to minimize drop heights. 	

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
			<ul style="list-style-type: none"> Embark on air quality monitoring during the construction phase to ensure that they do not constitute nuisance or exceed recommended limits. 	
	<i>Phase: Decommissioning</i>	High	proposed crusade ground multipurpose (residential and commercial) project shall apply all the applicable measures recommended for construction activities	Moderate
Ground and surface water resource	<i>Phase: Construction</i>	Moderate	<p>proposed crusade ground project shall ensure</p> <ul style="list-style-type: none"> Spills from engines at the construction site shall be properly cleaned or excavated to prevent seepages into groundwater or pollution of water course through runoffs from contaminated soil. 	Low

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
			<ul style="list-style-type: none"> Contractors shall employ adequate slope protection techniques to minimise or prevent soil erosion. 	
	<i>Phase: Operation</i>	High	<ul style="list-style-type: none"> Groundwater resource shall be carefully managed, such that water abstraction for production process and cleaning use is regulated. Only the required volume of water for use shall be drawn to conserve groundwater resource Regularly check for and fix leaks in water taps, hose connections and other plumbing installations. Water quality monitoring shall be done to ensure the parameters are within the statutory limits for use. 	Moderate

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
			<ul style="list-style-type: none"> ● Adequate containment strategies against accidental spill ● Bundwall around fuel and oil storage tanks ● Indiscriminate discharges of oil shall be prevented ● Conservation of aquatic ecosystem ● Adequate landscaping ● Effective waste management 	
	<i>Phase: Decommissioning</i>	Moderate	<p>project management shall ensure</p> <ul style="list-style-type: none"> ● Spills from engines at the construction site shall be properly cleaned or excavated to prevent seepages into groundwater or pollution of water course through runoffs from contaminated soil. 	Low

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
			<ul style="list-style-type: none"> Contractors shall employ adequate slope protection techniques to minimise or prevent soil erosion. 	
Traffic and Transportation	<i>Phase: Construction</i>	High	<p>proposed crusade ground multipurpose (residential and commercial) project shall</p> <ul style="list-style-type: none"> Construction contractors shall have in place and implement a practicable traffic management plan. All drivers engaged shall be licensed and given proper orientation on best transport safety practices to prevent traffic obstruction and accidents. Movement of project-related trucks and vehicles shall be properly timed to avoid interference with transportation system in the area. 	Moderate

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
	<i>Phase: Operation</i>	High	<ul style="list-style-type: none"> ● Distribution / movement of goods to and from the facility shall be properly regulated and synchronized to off-peak traffic period to avoid compounding the usual heavy traffic situation in the area. ● Safe speed limit shall be maintained by drivers conveying materials or products to and from the factory. ● Truck Parks and Car parks use shall be in place with waiting times regulated. ● A traffic management plan shall be developed for the facility. ● Road signs and speed limits shall be clearly provided around the project site. ● Installation of traffic lay by ● Employment of traffic officers ● Effective traffic planning 	Moderate

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
		High	<ul style="list-style-type: none"> Rehabilitation and reconstruction of community road serving as the alternative route to the camp Health education of drivers and other workers 	Moderate
	<i>Phase: Decommissioning</i>		<ul style="list-style-type: none"> All the traffic management procedures recommended for the construction phase shall be adopted, where applicable, during project decommissioning and site restoration. 	
Workers' Health, Safety and Security	<i>Phase: Construction</i>	Moderate	<p>proposed crusade ground multipurpose (residential and commercial) project shall</p> <ul style="list-style-type: none"> Require all contractors to implement a Safety, Health and Environment (SHE) plan which shall outline procedures for avoiding health and safety incidents and for emergency medical treatment. 	Low

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
			<p>This shall be achieved by making it a component of contractual agreement.</p> <ul style="list-style-type: none">• Daily toolbox talks prior to commencement of construction activities shall be implemented.• Contractors shall wear suitable Personal Protective Equipment (PPE) including hard hats, high-visibility vests, safety boots and gloves, nose masks etc.• Management shall ensure that standard operating procedures for equipment installation are strictly followed.• project management shall ensure that safety awareness and compliance is strictly followed by all personnel.	

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
			<ul style="list-style-type: none"> All electrical installation shall be performed by certified personnel and supervised by an accredited person. Certification for such work shall include theoretical as well as practical education and experience. The proposed project site is a residential/commercial location and unlikely to be strayed into by children. However, the site shall be properly barricaded; warning and caution signs shall also be mounted in visible sections of the facility to prevent intruders and notify people of precautions to be exercised. 	
	<i>Phase: Operation</i>	Moderate	proposed crusade ground multipurpose (residential and commercial) project shall:	Low

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
			<ul style="list-style-type: none">• Ensure that workplace layout at the facility is in such a way that people are restricted from the loading/unloading area.• Provide enough space to operate mobile plant, such as trolleys.• Design loading area to accept vehicles of varying dimensions, and provide easy access and exit.• Ensure vehicles can be loaded and unloaded as close as possible to where the freight is located.• Only well trained, certified personnel shall be allowed to carry out installations, repairs and maintenance of electrical equipment.	

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
			<ul style="list-style-type: none">• Access to facility and operation sections shall be restricted. During receiving dispatch, loading and unloading of containers, caution must be maintained to ensure that goods do not fall off from elevations. Workers should be restricted from moving near motorized equipment during operations.• To prevent electric shock and electrocution, energized cables shall be deactivated and properly grounded before carrying out repairs and maintenance of electrical installations and equipment.• Workers shall carry out their tasks only when properly protected using personal protective devices	

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
			<ul style="list-style-type: none"> • There shall be fall prevention and Safety programme (such as training in climbing techniques and use of safety harness) in place for personnel working at elevations. Permit to work for sensitive tasks like work at height, hot surfaces, confined space etc. • Workers' welfare and fundamental rights shall be protected at all times • Use of alcohol, hard drugs and other substances capable of causing harm to the user and co-workers shall be forbidden at work place by instilling company policies on such acts • There shall be in place procedures, which strongly discourages all forms of 	

Impact Receptors	Project Phase & Activities	Unmitigated Impact Rating	Mitigation Measures	Residual Impact Rating
			discrimination against any group of people within the workforce.	
	Phase: Decommissioning	Moderate	<p>proposed crusade ground multipurpose (residential and commercial) project shall ensure:</p> <ul style="list-style-type: none"> • All electrical equipment and installations shall be completely disconnected from energy sources. • All electrical installations capable of discharging residual current shall be carefully handled during removal of project facilities • Other measures recommended for implementation during the construction phase shall be taken where applicable. 	Low

CHAPTER SEVEN
ENVIRONMENTAL
MANAGEMENT PLAN

CHAPTER SEVEN

ENVIRONMENTAL MANAGEMENT PLAN

7.1 INTRODUCTION

This chapter presents the Environmental Management Plan (EMP) for the proposed Global Multipurpose Crusade Ground project by Believers Loveworld AKA Christ Embassy. The EMP is a central link that stipulates the guidelines, strategies and procedures for managing the significant, possible, potential and associated environmental impacts of the project. It is also a standalone tool that provides assurance that the proposed mitigation measures are effectively implemented and project activities are appropriately monitored.

The Environmental Impact Assessment (EIA) having identified the key environmental and socio-economic aspects, potential impacts, targets and objectives and mitigation measures associated with the project will serve as a basis for the EMP. For each potentially high or moderate impact, the EMP identifies and describes the linkage between applicable regulatory requirements and other commitments, the relevant mitigation measures, the monitoring approach and schedule. ;

The potential impacts of development projects are multidimensional. That is, impacts can be environmental, economic, health or social. Thus, international best practices include development, adoption and implementation of an Environmental Management Plan to mitigate potential risks associated with development projects.

International Finance Corporation (IFC) Performance Standard highlights the import of managing environmental and social performance of a development project throughout its lifecycle. Residual impact after implementation of mitigation measures will persist, which may be insignificant, minor or moderate. As a result, the Environment Management Plan presented here is aimed at effective management of potential and residual impacts of the project through allocation of responsibilities for implementation during different phases of the proposed project.

7.2 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The long-term objectives of the environmental management programme are to:

- Incorporate environmental management into project design and operating procedures;
- Address concerns and issues raised in the EIA's stakeholder consultation process and those that will likely continue to arise during the Project's lifetime.
- Achieve, enhance and demonstrate sound environmental performance built around the principle of continuous improvement;
- Integrate environment fully into the business;
- Rationalize and streamline environmental activities to add value in efficiency and effectiveness;
- Encourage and achieve the highest performance and response from individual employees and contractors;
- Provide the standards for overall planning, operation, audit and review, and
- Enable management to establish environmental priorities applicable throughout the organization;
- Comply and adhere to all applicable laws, regulations, standards and guidelines for the protection of the environment within and around the project area
- Adopt best practicable waste management for all types of waste (liquid, gaseous and solid) with objective on prevention, minimization, recycling, treatment or disposal of wastes
- Train and bring awareness to employees and contractors with regards to environmental obligations and compliance.
- Increase efficiency through minimum consumption and conservation of energy deplete-able resources

7.3 ENVIRONMENTAL MONITORING PROGRAMME

Environmental monitoring programme serves as key part of the operational activities, and it is likely to generate the necessary information for environmental management and information dissemination. It is expected that monitoring of key environmental

parameters will be conducted during the key phases of the project: design, location, construction and operation. This plan will play a fundamental role in ensuring that the trends for specific parameters are tracked and it will provide information on compliance with regulations, set guidelines or desirable operational limits; and form the basis for corrective actions and modification of project activities if necessary. The intensity of sampling will depend on the time and location of the activities and results derived from monitoring data.

Environmental Monitoring Programme serves as an integral part of the operational activities and it is expected to generate the requisite information for environmental management and environmental information dissemination. The environmental monitoring for the facility shall be carried out to ensure that the mitigation processes put in place have adequately taken care of the predicted impacts. This will necessitate establishing programme to address the following:

- Alteration to the biological, chemical and physical characteristics of the recipient environment.
- Social and health issues.
- Alterations in the interactions between project activities and environmental sensitivities, and interactions between the sensitivities.
- Determination of long term and residual effect.
- Identification of project specific cumulative environmental effects.
- The frequency and duration of monitoring will depend on the sensitivity of the environmental variable to the impact indicator and magnitude and severity of the impact.

The aim of the monitoring is to establish proper monitoring criteria to verify the predicted impact of the project, and to ensure that any unforeseen impacts are detected, and the mitigation measure are adjusted where needed at an early stage. The monitoring will keep relevant records to ensure compliance with exhaustive

environmental procedures recommended. The monitoring plan will ensure that mitigating measures and impacts of the project during construction and operation phases are implemented

Table 7.1: Environmental Management Plan: Preconstruction/Construction Phase

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/Frequency	Responsible Party
Air Quality and Noise					
SPM from dust, noise, vibration and emissions from construction equipment.	Movement of equipment, materials and workforce to site and emissions from vehicles and construction equipment	Properly serviced vehicles and equipment shall be deployed for use during the mobilization and construction phases. The equipment shall be modified (such as integration of mufflers or sound-proof materials) to ensure the noise generated from the equipment is bearable. Vehicles and equipment shall be turned off when not in use	Visual observation, site inspection and monitoring of dust during construction works Sampling and measurement	Monthly throughout the construction phase	To be implemented by Contractors and Subcontractors monitored by Project Manager of Believers Loveworld

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
		<p>for a prolonged period of inactive time.</p> <p>Ensure all Construction equipment shall, on a regular basis, be checked for worn or chipped gear teeth, worn bearings, poor lubrication, imbalance in rotating parts, obstruction in airways, damaged silencers etc. as may be applicable. All identified anomalies or defects shall be corrected without delay.</p>	<p>of ambient noise and air quality parameters such as SPM, CO, NO_x, SO_x, CH₄/LEL, H₂S</p>	<p>Weekly and throughout</p>	<p>Believers Loveworld contractors and Project Manager</p>

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
		<p>Noisy construction activities shall be, as much as practicable, synchronized and restricted to the least noise-sensitive period of the day in the area (usually between 8am and 6pm). Alternative construction techniques that are less noisy shall be considered.</p> <p>Use of ear plugs by workers who are exposed to noise level up to 85 dB(A) over a prolonged period of time should be enforced as a</p>	<p>Enforce use of necessary PPEs</p>	<p>construction phase</p> <p>Daily throughout the construction phase</p>	<p>Believers Loveworld contractors and Project Manager</p>

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
		<p>personal protective measure against noise impact.</p> <p>Minimise movement of vehicles as much as possible.</p> <p>Ensure that engines and exhaust systems of equipment and vehicles used for construction are properly maintained to ensure certain emissions do not exceed statutory emission limits.</p> <p>Ensure that fine construction materials such as sand and</p>	<p>Daily for every trip</p>	<p>Daily</p>	<p>Believers Loveworld contractors and Project Manager</p> <p>Believers Loveworld contractors and Project Manager</p>

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
		<p>cement that are likely to generate dust on transit have proper covering during haulage to prevent wind impact and dust generation.</p> <p>Ensure that construction materials that are likely to generate dust if blown by wind are stored and covered in an enclosure or bunded area.</p> <p>Adopt water-suppression methods to minimise dust generation on site. Water may be sprinkled where necessary</p>	<p>During excavation or activities likely to emit particulate mater</p>	<p>As often as the contractor deems fit</p>	<p>Believers Loveworld contractors and Project Manager</p> <p>Believers Loveworld contractors and Project Manager</p> <p>Environmental Consultant</p>

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
		as dust suppressant to minimize airborne dust excavation, compacting etc.			
Groundwater Quality and Quantity					
Depletion and contamination of ground and surface water resources	Over-abstraction, Contamination and Spill off	Ensure during construction, over-abstraction of groundwater resource in the project area is avoided. Accidental spills of hazardous substances shall be prevented during routine maintenance activities.	Groundwater quality assessment and monitoring of specific yield	Occasionally during construction period	To be implemented by Contractors. Monitored by Project Manager. Regulated by Federal Ministry of Environment, Ogun state Ministry of Water Resources and Rural Development Area and OGEPA.

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
		<p>Entire facility is concreted to avoid contamination.</p> <p>The proponent shall identify sustainable yields of groundwater, and abstraction shall be controlled to guarantee moderate withdrawal, which does not exceed the sustainable yield of the aquifer</p> <p>Protection of surface water against abuse through indiscriminate disposal of refuse.</p>			

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
		Effective integrated waste management system should be implemented.			
Soil Quality					
Soil contamination, degradation and disturbance, soil compaction, increased soil erosivity potential	Site clearing and preparation, earthworks, accidental spill of hazardous chemicals during fueling, movement,	Hazardous materials such as lube oil shall be carefully stored and handled to avoid accidental spill and soil contamination. Construction debris during excavation shall be used to carted away to approved disposal site.	Visual inspection of storage area and construction machineries Construction workers are expected to be	Weekly	Construction contractor, Project Manager

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
	operation and servicing of construction equipment and vehicles. Accidental spill of materials at storage site	Low impact excavation shall be implemented. Provide spill containment kits on site Instill good housekeeping on site including proper waste management Conservation of top soil removed during excavation for reuse and landscaping	trained on spill response procedures.		
Solid waste generation	Domestic waste generated by construction	Believers Loveworld shall follow correlated guidelines on waste management	Visual monitoring and aesthetics of site	Daily	Contractors and Project Manager OGWAMA Accredited waste manager

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
	workers waste from construction activities	<p>Believers Loveworld shall ensure cleaning of the site in compliance with relevant national guidelines, involving the removal of the waste, etc.</p> <p>Installation of central solid waste storage site</p> <p>Believers Loveworld shall ensure proper waste handling and disposal methods and provide adequate waste bins on site.</p>	Regular disposal as at when due by OGWAMA accredited vendor		HSE Manager/Officers

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
		<p>Ensure proper housekeeping at waste dump area.</p> <p>Waste segregation will be practiced with waste generated.</p> <p>Waste segregation at source, waste reduction, reuse, recovery, repair and recycling</p>			
Socio-economic and Health					
Change in local demographic profile and pressure on social infrastructure	Construction activities	<p>As much as possible, skilled, semi-skilled and unskilled labour shall be sourced from the host communities</p> <p>Resolution mechanism shall be established to resolve conflicts</p>	Feedbacks from residents of the host communities	Throughout the construction period and after	To be implemented by Contractors and monitored by Believers Loveworld

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
<p>due to presence of migrant workers</p> <p>Transmission of STIs and impacts on family structure</p> <p>Extra pressure on existing facilities in the community</p>		<p>that may arise due to the presence of non-resident workers or project-related issues.</p> <p>Construction workers shall be sensitized on responsible sexual behaviours such as abstinence from unsafe sex or use of preventive latex (condom)</p>		demobilization	

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
Community Health, Safety and Security	Movement of trucks and construction equipment, Risk of accidents,	There shall be adequate and visible hazard/safety signages at and around the construction site such as access restriction and traffic hazards Other recommended mitigation measures, which are aimed at preventing or minimizing potential adverse health impacts of the project and its related activities (such as	Visual observation of compliance to safety measures and documentation of near misses, incidents and accidents for corrective measures,	Daily	To be implemented by Contractors and monitored by Believers Loveworld Project Manager

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
		emissions and possible spread of STIs), shall be implemented. Implement Security Policy and plans in place			
Traffic Increased vehicular traffic, obstruction in the flow of traffic, and possibility of accident	Movement of materials to site, mobilization of workers to and from site, general construction activities	Traffic management plan shall be developed and implemented by the Contractor For safety of pedestrians and road users in the area, all project vehicles and trucks shall comply with the existing speed limit (10 to 20km/hr. especially along the adjoining routes to the project site)	Monitoring of road traffic control measures to ensure compliance Investigation of complaints from	Daily	To be implemented by Contractors and monitored by Believers Loveworld Project Manager

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
		<p>There shall be presence of flagman at the entrance and exit of the project site in order to control vehicles and truck movement.</p> <p>Other transport safety practices, traffic warning signs and mitigation measures as contained in chapter 6 of the EIA report shall be employed to prevent traffic accident.</p> <p>Specific waiting time shall be in place to regulate trucks within the project area</p>	<p>residents or authority on non-compliance with speed limit or unnecessary obstruction of traffic flow.</p> <p>Corrective actions shall be taken afterwards to forestall future occurrence.</p>		

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
Occupational Health and Safety					
Injuries or death and impacts on general well-being of workers	Hazards at construction site due to use of vehicles, heavy machineries, fall from elevation, electric shock or electrocution	Believers Loveworld shall install safety signs, provide and enforce use of appropriate personal protective equipments (PPEs) Believers Loveworld shall ensure that no minor is engaged as a worker on or off-site. Permit to work systems for sensitive tasks on project site shall be adopted	Monitoring of compliance to safety measures	Daily	To be implemented by Contractor and monitored by Loveworld Project Manager

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
		<p>Risk assessment for every task and job hazard analysis will be adopted</p> <p>No one shall be coerced into any form of labour or activities regarding the proposed project.</p> <p>There shall be in place procedures, which strongly discourages all forms of discrimination against any group of people within the workforce.</p>			

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
		<p>Workers' welfare and fundamental rights shall be protected at all times.</p> <p>There shall be in place well-stocked first aid box with well trained first aiders, Medical Emergency Response plan which is easily accessible for workers in the event of any illness or injury before seeking medical attention.</p> <p>Maintain retainership with established hospitals and have standby ambulance for emergencies.</p>			

Potential Impacts	Sources of Impacts	Mitigation Measures	Indicator	Timing/ Frequency	Responsible Party
		Use of alcohol, hard drugs and other substances capable of causing harms to the user and co-workers shall be forbidden on project site.			

Table 7.2: Environmental Management Plan: Operation/Maintenance Phase

Potential Impacts	Sources of Impacts	Mitigation Measures	Monitoring	Timing/ Frequency	Responsibility
Air Quality and Noise					
Noise and noxious air pollutants from car, trucks, vehicles and generators (when there's public power outage)	Emission from motorized machines, equipment and generator	Noise impacts and air pollutants shall be reduced by using well-serviced equipment, properly maintained generators and ensuring regular servicing.	Evaluation of noise level using noise meter at noise-sensitive locations. Air quality parameters such as NO _x , CO, etc shall be evaluated at sensitive locations.	Every 3 month throughout the facility life cycle	Believers Loveworld Environmental consultant; to be monitored by FMEnv, NESREA and OGEPA
Ground and surface water Quality and Quantity					

Potential Impacts	Sources of Impacts	Mitigation Measures	Monitoring	Timing/ Frequency	Responsibility
Possible contamination of groundwater due to accidental spills during maintenance activities; Over-abstraction of groundwater resource leading to decline in water table.	Water used in cleaning, spent oil discharged during servicing of machines and equipment	<p>Accidental spills of hazardous substances shall be prevented during routine maintenance activities.</p> <p>In the event of spill, containment (using spill kits and equipment) of the substance shall be promptly done and contaminated soil shall be evacuated and disposed of.</p> <p>Abstraction of water for use at the estate shall be</p>	Groundwater quality assessment	Every year throughout the estate lifecycle	Believers Loveworld Environmental consultant; to be monitored by FMEnv, NESREA & Ogun State Ministry of Environment and OGEPA

Potential Impacts	Sources of Impacts	Mitigation Measures	Monitoring	Timing/ Frequency	Responsibility
		<p>done in a responsible and controlled manner.</p> <p>Ensure regular trainings on hazardous substance handling and storage</p>			
Solid waste generation	Domestic waste generated by employees and waste from maintenance activities	Believers Loveworld shall ensure good house-keeping, regular clean-up and disposal in compliance with relevant national	Visual monitoring and aesthetics of site	Daily, Regularly	Project Manager through OGWAMA accredited waste management contractors

Potential Impacts	Sources of Impacts	Mitigation Measures	Monitoring	Timing/ Frequency	Responsibility
		<p>guidelines, involving waste removal.</p> <p>Believers Loveworld shall ensure proper waste handling and disposal methods.</p> <p>Waste segregation at source, waste recovery, repair, reduction, reuse and recycling</p> <p>Availability of central waste depot and sanitary dustbins at all sections of the camp.</p> <p>Waste segregation at</p>			

Potential Impacts	Sources of Impacts	Mitigation Measures	Monitoring	Timing/ Frequency	Responsibility
		source and recycling is essential.			

Table 7.3: Environmental Management Plan: Decommissioning Phase

Potential Impact	Mitigation Measures	Monitoring			
		Parameter	Recommendation	Frequency	Responsibility
Noise level and dust generation	All mobile and stationary internal combustion engines to be used for demolition and removals shall be properly maintained. Dust suppression through the use of water shall be adopted when the need arises	Noise level and air quality	Use of noise meter and air quality monitors within and around the demolition site	Daily throughout the decommissioning phase	Contractors and Believers Loveworld Project Manager

Potential Impact	Mitigation Measures	Monitoring			
		Parameter	Recommendation	Frequency	Responsibility
Solid waste generation	<p>The OGWAMA guidelines on waste management shall be followed in disposal of debris and waste</p> <p>Clean-up in compliance with relevant guidelines shall be ensured.</p>	Visual Assessment, General Aesthetics,	Proper waste handling, storage, treatment, and disposal	Routinely, Daily (till end of decommissioning exercise)	Contractors and Believers Loveworld Project Manager

Potential Impact	Mitigation Measures	Monitoring			
		Parameter	Recommendation	Frequency	Responsibility
Injury/fatalities in workforce /communities	<p>Work site shall be cordoned off to protect the general public from hazards</p> <p>Use of PPE by workers shall be ensured / enforced</p> <p>Warning signs shall be placed visibly in strategic locations</p> <p>Emergency response procedures shall be adopted</p>	Avoid injuries on workers	Ensure only skilled workers are engaged during the decommissioning phase of a site	Always	Contractors and Believers Loveworld Project Manager

7.3.1 Roles and Responsibility

Believers Loveworld will develop programs and designated duties to internal personnel, while acknowledging the role and efforts of external agents such as regulatory agencies and environmental consultants in achieving their objectives. Project Maintenance and Management team would be constituted to implement and evaluate the performance of set objectives.

EMP during construction phase:

The construction phase impacts would be mainly due to civil works such as site preparation, leveling, foundation works, excavation and earth removing, transportation of construction materials and machineries, installation of machineries etc. These activities will involve movement of a substantial quantity of soil and debris.

The construction phase impacts are temporary and localized phenomena except the permanent change in local landscape. However, it is essential to consider the probable impacts of construction phase and suggest efficient procedural and structural measures to address the adverse impacts on the environment.

Air Quality Emission:

Dust will be the main pollutant affecting the ambient air quality during construction phase along with vehicular exhaust during transportation of required materials. There will also be intermittent emissions from the operations of construction machineries. Though the emissions are not expected to contribute significantly to the ambient air quality, some generic measures to reduce fugitive and gaseous pollutants will have to be under taken.

Such measures typically include the followings:

- For suppression of dust during excavation and transportation, stock piling, land levelling activities, water should be sprinkled.

- The storage and handling of soil, sub-soil, top-soil and materials shall be carefully managed to minimize the risk of wind-blown material and dust e.g.by the use of cover sheets like tarpaulin sheets.
- Vehicles delivering dusty construction materials to the site or removing spoil shall be enclosed and covered to prevent escape of dust.

Water Use:

During the construction phase the water will be utilized for civil work and drinking water for laborers. As the laborers will be recruited from nearby local area, there will not be any need of labour camps. The source of water supply will be from ground water. Following measures shall be implemented to reduce the impacts on quantity and quality of water:

- Optimum use of water will be done through water meter for fresh water consumption for construction phase
- Laborers will be provided with adequate water supply for drinking purpose and sanitation facilities.

Land Use:

As the proposed Crusade Ground Multipurpose (residential and commercial)project is to be developed on a land already acquired by Believers Loveworld A.K.A Christ Embassy, Aseese community, Ogun State on outright purchase, there will be no conflict for land use pattern for the proposed site. As soon as the construction is over, the surplus earth will be utilized to fill up low lying areas. The surfaces will be reinstated. Construction activities will be timed to avoid monsoons (a situation whereby rain lasts for several months without interruption)

Noise level:

Noise will be generated during construction work due to intermittent operations of construction machineries as well as vehicular movements (mostly material transport)

having insignificant impact for short duration. Following measures will be under taken to improve the noise environment and/ or to reduce the impact:

- On-site workers working with high-noise generating equipment shall adopt use of noise protection devices like ear muffs.
- Construction equipment or machineries with sound level higher than 85.0dB(A) will be fixed with noise attenuator or silencer.
- High noise prone activities shall be restricted to possibly during night, particularly (10.00 pm to 6.00 am) in order to have minimum disturbance.

EMP during Operation/Maintenance Phase:

It goes without saying that the operational phase of any project causes the long-term and cumulative impacts on the various components of the environment. In order to distinctly identify and suggest appropriate mitigation measure(s) while fixing the responsibility for action, an attempt has been made to present such details in a tabular form for easy reference.

Air Quality Emissions:

- No vehicle or equipment shall emit visible black smoke from its exhaust system other than during ignition, vehicle engines shall not be left running when not in use.
- The internal route will be asphalted or concreted to bring dust level to the lowest minimum.
- Centralized power generating set shall be used
- Renewable energy should be explored for cleaner energy
- Avoidance of waste burning at the holy site

Water Use

- Domestic liquid waste (urinary and kitchen) will be channeled into sedimentation tank where it will be evacuated as at when due.
- Storm water from within the facility will be directed to drains in the facility that link with public drains.
- Leakages in water pipes will be urgently attended to for prevention of wastage.
- Sewage treatment plant shall be installed
- Wastewater treatment plant shall be provided
- Rainwater harvesting system is recommended

Noise Levels:

- Enclosures and barriers will be provided to machineries (generator) producing high noise levels.
- There will be periodical noise level measurements for verifying compliance with relevant laws.
- Mufflers or noise attenuators will be fixed on generators with high noise level generation.
- Also regular servicing of generators to prevent engine rattles will be encouraged within the estate.

7.3.2 Communication

A communication and consultation programme would be maintained in the estate. A community and stakeholder consultation plan will be developed and delivered for maintenance activities of the project. The consultation plans will build on the outcomes of development application process that are intended to minimize impacts of the development on the host community. Formal procedure for communicating with the regulatory authorities will be maintained and a well-organized structure that authorizes

all occupants to carry out their environmental responsibilities without jeopardizing their efficiency in other production activities required of them.

7.3.3 Environmental and Social Management Plan

The management shall ensure a continuous impact assessment of the proposed project in form of Environmental Monitoring Reporting (EMR), quality control and assurance of services provided. The proponent shall establish and maintain an approved generally accepted methodology to identify the environmental and social aspects of the project activities which carry potential impacts on the environment.

7.3.4 Records/Documentation

Believers Loveworld shall control HSE documentation including management plans; associated procedures; and checklists, forms and reports, through a formal procedure. All records shall be kept on site and will be backed up at several offsite locations (including secure cloud storage facilities as may be required). Records shall be kept in both hard copy and soft copy formats. All records shall be archived for future purpose. The contractor and subcontractors shall be required to develop a system for maintaining and controlling their own HSE documentation and describe these systems in their respective HSE plans.

At proposed crusade ground multipurpose (residential and commercial) project , the following records would be kept by Project Manager;

- Internal and public complaints;
- Training records;
- Activities information;
- Inspection and maintenance records;
- Incident reports;
- Emergency preparedness and response procedures;

Emergency Preparedness and Response

Contingency Plan

The proposed crusade ground multipurpose (residential and commercial) project shall be equipped with:

- An internal communication/alarm system capable of providing immediate emergency Instructions to all occupants as well as guests.
- Telephones capable of summoning emergency assistance from local police and fire service department.
- Routinely serviced fire extinguishers and fire alarms.
- First aid box with trained in-house first aider in place.
- Muster point (Emergency assembly point) within the facility's premises.
- Fire exit.

All the above equipment is maintained regularly, and tested periodically to ensure steady effectiveness.

Emergency Procedures

The following procedures shall be implemented in the event of an emergency:

a) Fire:

- Raise alarm.
- Contact the emergency coordinator through telephone.
- Use suitable available fire-fighting device.
- Close the doors and windows if outbreak is in a room.
- Move to emergency assembly point through the emergency exits and take roll call.
- The supervisors shall call the most senior cadre qualified personnel on phone, notifying him of the fire and the location and contact the State Fire Service and Police Command immediately.

- Release trained fire fighters to combat the emergency
- Instruct everybody not to panic.

b) Accidents/ Incidents:

- Give first aid if appropriate.
- Contact the nearest available emergency lines
- Carry out root cause analysis and put corrective action in place to forestall future occurrences

c) Electric Shocks:

- Switch off control.
- Trace trailing wires and other related problems (by qualified electrician)

Do's and Don'ts for Material Handling, Fire Prevention, and Housekeeping:

✓ Material Handling

Do's	Don'ts
<ul style="list-style-type: none"> ● Use proper lifting tool and tackle having adequate capacity. ● Only authorized persons should operate material handling equipment. ● Assess weight of the material, distance to be carried and hazards etc. before lifting the load. ● Wear Personal Protective Equipments while handling of material. 	<ul style="list-style-type: none"> ● Do not hold the load with tip of the fingers; grasp the load firmly with palm. ● Do not allow male and female adult to lift a load manually higher than 55kgs and 30kgs respectively. ● Avoid using defective or faulty tool. ● Do not load the equipment above its safe working load. ● Movement of people underneath lifted load should be outrightly prohibited.

<ul style="list-style-type: none"> • Wherever possible, mechanized material handling shall be adopted. • While lifting a load physically, keep the load as near as possible to the body with feet properly placed for body balance. • Bend knees, keep back straight, keep the load closed to the body and lift the load. 	<ul style="list-style-type: none"> • Do not use the equipment for the purpose other than its design intention.
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✓ Fire Prevention

Do's	Don'ts
<ul style="list-style-type: none"> • Follow "NO SMOKING" sign. • Fire Hose used for any other purpose should be permanently marked and taken out of fire hydrant system. • Take permission before breaking or removal of fire barrier and ensure subsequent relocation. • Attend any abnormality/ deficiency with fire protection system promptly. • Check periodically the operability of stationed fire fighting system. 	<ul style="list-style-type: none"> • Do not misuse fire-fighting equipment other than purpose. • Do not destroy the inspection tag provided with the fire equipment. • Do not obstruct accessibility to the muster point or fire related equipment. • Do not over tighten fire hydrant valves. • Do not leave flammable material like acetone, kerosene etc, used as cleaning agent at the workarea.

✓ House Keeping

Do's	Don'ts
<ul style="list-style-type: none"> ● Assign places for everything and maintain things at assigned places. ● Clean the area after completion of work. ● Ensure adequate illumination and ventilation for the job. ● Drop paper, plastic, glass and metal scraps in separate bins kept for this purpose. ● Arrest all types of spills such as water, oil, air/gas, steam etc. and clean up the area immediately. ● Ensure exits are indicated/painted for use during emergency. 	<ul style="list-style-type: none"> ● Do not eat, drink or smoke in the area of work. ● Do not allow dustbin to overflow. ● Do not generate extra waste. ● Do not disturb the safety equipment from assigned location. ● Do not block emergency switches and on/off switches of the equipment by storing of materials in front of work. ● Do not leave a spillage unattended.

CHAPTER EIGHT
REMEDICATION PLAN AFTER
DECOMMISSIONING

CHAPTER EIGHT

REMEDIATION PLAN AFTER DECOMMISSIONING

8.1 INTRODUCTION

Every project is usually designed with an expected period of time: long/short through which it spans. However, no matter how long the designed project stays, it will eventually come to close in future within the confinement of the life expectancy of the project. The proposed estate project is expected to be operated for about 30-50years before it could be brought to close.

Generally, life span of a project can be compared with the initial expected life span by virtue of good maintenance culture and proactive planning consciously put in place at the inception of the project. The longevity of any development project is primarily dependent on a number of factors, which include but not limited to;

- Availability of products
- Profitability of the project
- Usefulness and acceptability of the project
- Sustainability of the project and manpower.

8.2 PURPOSE OF ENVIRONMENTAL DECOMMISSIONING REPORT

The nature of a project's maintenance activities and waste management system employed for the wastes generated during the project's maintenance may result in contamination of the environmental media within and around the project. Decommissioning is however the strategic approach to deactivating a project from service in an environmental-friendly manner.

8.3 REASONS FOR DECOMMISSIONING A FACILITY

- Availability of modern facilities with lesser running expenses and state of the art design;
- In the case of facility development life cycle, a project may lose funding and be terminated which instigates decommissioning and
- Economic consideration with increasing pressure of urban encroachment on industrial lands may result in the closure of industrial facilities and the selling of the land for re use.
- War or famine
- Legal dispute

8.4 DESCRIPTION OF DECOMMISSIONING ACTIVITIES & METHOD

When decommissioning a site, the process of closing, dismantling, and remediation of contamination, reclamation, evaluation and decision-making is in consideration to human health and safety, potential (negative) effects on the environment and ensuring compliance with all environmental stated laws and regulations. At the expiration of the lifespan of the project when a decision to embark on decommissioning has been arrived at, the proponent shall seek permission from the Federal Ministry of Environment, National Environmental Standard Regulations Enforcement Agency (NESREA), Ogun State Environmental Protection Agency (OGEPA) and other relevant Federal agencies to begin demolition of the project and restoration of the environment. In principle efforts would be focused at removing all existing structures and features introduced due to the tank installation and restoring it to pre- construction scenario.

A general approach will be to commence detailed planning of decommissioning and abandonment activities about five years in advance. This should ensure a safe, environmental - friendly, and efficient decommissioning/abandonment programme. Discussed below are the end processes of the offshore decommissioning activities;

Refurbishment and re-use

As much as practicable, building and equipments will be refurbished and re-used. This method is generally better than demolition because the environmental costs of energy, water and materials are less.

Scrapping

During demolition, equipments made out of steel e.g., cables and onshore equipments shall be treated and scrapped in order to enable specified contractors recycle and re-use such materials.

Offsite Waste disposal

Waste which cannot be recycled or re-used will be sent to approve treatment and disposal sites for proper disposal. Only OGWAMA accredited waste vendors and approved technologies shall be engaged and monitored to ensure that all regulations concerning waste disposal at registered sites are followed.

Remediation and re-vegetation

Vegetation in the plant areas will be restored based on the results of assessments and studies conducted prior to a final restoration plan. This plan will be based on restoring structure and functionality to the baseline environment which will take into account risk, value and socioeconomic and community concerns. Groundwater monitoring will be carried out to detect any contamination. In the case of contaminated groundwater, on-site treatment or extraction will be done.

Before decommissioning, Believers Loveworld will develop a plan that will establish:

- Facilities to be decommissioned and removed
- List of equipment/machineries to be deactivated
- Environmental aspects of the decommissioning activity

- Methods for project re-use, recycling, disposal, or removal
- Proper consultation with all stakeholders (communities, other land users and regulators)
- Efforts to mitigate negative environmental, socioeconomic and health impacts
- Programmes for restoring the environment in accordance with national and international best-practices and regulatory requirements

The content of the plan will take into consideration the extent of the decommissioning (temporary or permanent, partial or complete shutdown), plans for future use of the site, and the condition of the site and environment at the time of decommissioning. A detailed post operational study of the impact of the project on the environment will be conducted to determine appropriate restoration and remedial measures.

8.5 STAKEHOLDERS CONSULTATION FOR DECOMMISSIONING

The project decommissioning plan will include consultation with various stakeholders including employees from various departments within the estate, communities, nearby facilities, regulators and experts. The decommissioning team will include competent personnel from within the project area as well as the regulatory authorities (FMEnv, NESREA, and OGEPA) and personnel from nearby facilities.

8.6 SHUT-DOWN OPERATIONS

As the project approaches the end of its economic viability, plans will be put in place to shut down activities. These will include a review and rationalization of operations and personnel with a possible gradual shut down of some facilities. The decommissioning of the plan will be planned for a significant period before the cessation of activity. This will allow for a carefully planned redeployment and, where necessary, relocation and compensation of personnel as appropriate.

8.7 DECOMMISSIONING OF PROJECT

At the end of the project's utility, all features will be decommissioned. Believers Loveworld Health Safety and Environmental Management Systems will be implemented to assure safety of personnel and the public during decommissioning as well as minimize negative environmental impacts. Particular attention will be paid to the following:

8.7.1 Protection from Air Pollutant Emissions and Noise

As part of the decommissioning procedure for the proposed crusade ground multipurpose (residential and commercial) project, attention will be paid to the air quality of the immediate environment.

Decommissioning contractors will be required to comply with noise impact abatement measures and acoustic mufflers shall be installed on large equipment to reduce noise levels as much as practicable. Workers will also be provided with ear protective devices such as ear muffs/ ear plugs for protection against exposure to noise.

8.7.2 Waste Handling

Waste will be segregated according to the risks they pose and the treatment and handling required. This segregation also improves the chances of recycling. OGWAMA accredited waste vendor and trained workers will handle and dispose of waste in a environmental friendly manner.

8.7.3 Re-use/Recycling of Equipment

All project components that can be re-used or recycled will be identified and quantified. Alternatively, Vehicles and other facilities will be scrapped and/or moved to other locations. Cleared locations will be re-vegetated using fast growing native species. Contaminated soils attributable to project activities will be remediated and restored.

8.8 REPORTING

As required by both national (FMEnv & NESREA) and state (OGEPA) regulations, a post decommissioning report will be prepared and submitted to the Nigerian regulatory bodies mentioned. The report will provide the following details:

- Overview of decommissioned facilities
- Details of methods used for decommissioning
- Nature of decommissioning (partial or whole)
- Record of consultation meetings
- Details of recyclable/reusable materials/facility components
- Decontaminated facilities
- Decommissioning Schedule
- State of the surrounding environment
- Waste Management Plan
- Plans for restoration/remediation where necessary.

CHAPTER NINE

CONCLUSION

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CONCLUSION

9.1 CONCLUSION

It is recommended that Believers Loveworld A.K.A Christ Embassy shall ensure that the proposed Multipurpose crusade ground project is developed and operated in an environmentally sustainable manner, in compliance with National and International Standards by properly managing the processes/activities that may bring about disturbances to the environment through the implementation of the recommended mitigation measures and the EMP. Continuous monitoring of environmental and social performance of the Project shall also be maintained, including periodic consultation with the relevant stakeholders.

9.2 RECOMMENDATION

The EIA of the proposed multi-dimensional crusade ground project has been undertaken in accordance with the EIA Act CAP E12 LFN2004 as well as extant laws in Nigeria and relevant international guidelines. The study involved a number of key steps including: desktop review, scoping, stakeholder engagement, field data gathering, and laboratory analysis of field samples, potential impact identification and evaluation, development of mitigation measures and environmental management plan, and reporting.

The essence of the EIA process is aimed at ensuring informed decision-making and environmental accountability, and to assist in achieving environmentally sound operation throughout the Project life cycle. Consistent with the regulatory standards, the assessment of the environmental status and the socio-economic aspects of the proposed Project area of influence have been carefully carried out using universally accepted methodology.

Evaluation of associated and potential impacts of the Project identified both positive and negative interactions with the receiving biophysical and socioeconomic environment.

- The positive impacts associated with the Project include, amongst others:
- Direct employment opportunities
- Acquisition of new skills
- Revenue generation to Government through taxes
- Improved standard of living in the Project area

There are no human uses of the Project site that will be permanently displaced and no relocation of community residents is required. There are no culturally significant sites or heritage resources within the Project area that would be negatively impacted.

The potential negative effects identified were mostly of minor to moderate significance. The significance levels of the identified negative impacts can generally be reduced by implementing the recommended mitigation measures.

Based on the nature and extent of the proposed Project and the findings of the EIA, it is believed that the potential negative impacts associated with the proposed Project can be mitigated to as low as practicable. Also, an Environmental Management Plan (EMP) has been established to assess the efficiency and effectiveness of the recommended mitigation measures and ensure long-term monitoring of the Project.

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QUESTIONNAIRE

Social impact assessment questionnaire for Environmental Impact Assessment of Lebruni Agro Limited

Personal Information

- 1 Respondent's number -----
- 2 Sex:
- 3 Age:
- 4 Tribe:
- 5 Language spoken:
- 6 Occupation
- 7 Type of settlement:
- 8 Name of Community:
- 9 Local Government Area:
- 10 State:
- (A) Economic scenario

- 11 What are the occupations of the people in this community (see below). Also indicate the gender and age groups mainly involved in each occupation.

S/N	Activity	Gender* M/F	Age group** C/Y/A/E
1	Crop farming (list common crops)		
2	Trading		
3	Livestock rearing (list the common ones)		
4	Fishing		
5	Hunting		
6	Logging		
7	Processing (garri, local, local gin, fufu, etc.		
8	Handicraft (pottery, weaving, tailoring)		
9	Collection of forest products (fruits, vegetables, firewood etc		

10	Artisanship (carpentry, bricklayer, etc)		
11	Civil service/teaching		
12	Company workers		
13	Other specific		

*M = Male, F=Female, **C=Children, Y=Youth, E=Elderly, A=Adult

12. What are the predominant occupation?
13. What types of crops do you cultivate?
14. What types of animals are being killed by the hunter?
15. What types of trading do you engage in?
16. What is your estimated monthly income (i) N less than 10,000.00 (ii) 10,000.00 to 20,000.00 (iii) 20,001.00 to 30,000.00 (iv) 30,001.00 to 40,001.00 (v) 40,001 to 50,000.00 (vi) Above 50,000.00
17. What is the nature of the access road?
18. What type of transportation system do you have?
19. Do you have marked? (i) Yes (ii) No. If yes mention their names and the days of function.
20. Do you have banks? (i) Yes (ii) No. If yes mention their names.
21. Do you have electricity? (i) Yes (ii) No. If yes what is the source?
22. What recreation facilities do you have in your community?
23. From which of the following is your sources of water supply? (i) Rain water () (ii) Steam/River () (iii) Pipe borne water () (iv) Borehole () (v) Well (vi) Others, specify
24. How is water from each of these sources treated before use?

25. How is solid waste disposed off? (i) Burning () (ii) Dumping () (iii) Throwing into running/stagnant water (iv) Others, specify
26. How is human waste disposed off? (i) in the bush () (ii) Pal system () (iii) Pit toilet () (iv) water system () (v) Defecation into water channels () (i) Others, specify

(D) HEALTH

27. Do you have medical facilities? (i) Yes () (ii) No ()
28. Do you have qualified doctors, nurses and other health personnel? (i) Yes () (ii) No ()
29. How serious are medical cases handled?
30. Prevalent diseases.
31. Peculiar diseases.

(E) CULTURE AND RELIGION

32. What religious organizations are present in your community? (i) Christianity () (ii) Islam () (iii) Traditional religion (iv) Oriental ()
33. Do you have shrines and deities in your community? (i) Yes () (ii) No ()

(F) SOCIAL ENVIRONMENT

34. Briefly describe the structure of authority in your community.
35. What type of land tenure system do you have in your community?

(G) STANDING OF LIVING

36. What categories of people are more common in your community?

(i) Landlords () (ii) Tenants ()

(H) EDUCATION

37. Do you have primary schools here? (i) Yes () (ii) No ()

38. Do you have secondary school here? (i) Yes () (ii) No ()

39. Do you have higher institution? (i) Yes () (ii) No ()

ENVIRONMENTAL PROBLEMS

40. List the main environmental problems in this community (e.g. deforestation, erosion, oil spillage, gas flaring, flooding fire outbreak, etc).

S/N	Environmental problems	causes
1		
3		
4		
5		
6		

41. How seriously do these problems affect your income generating activities?

(i) Little effect () (ii) Serious effect () (iii) Has lead use to stop some activities ()

42. Has the government or any other organization embarked on the activity to help reduce environmental problems in your community? (i) Yes () (ii) No ()

43. If yes, what type of development programmes; which organization; and what have been the impact?

PROJECT IMPACT

44. How do you think the project will benefit this community during the operational phase?

Item	Very Minimal	Minimal	Great	Don't know
Job opportunities				
Occupational change				
Improved better communication				
Improved social life				
Increase income				
Improvement of living standards				

45. How do you think the project will adversely affect this community during the operational phase?

Item	Very Minimal	Minimal	Great	Don't know
Ground water contamination				
Surface water contamination				
Increase in noise level				
Pollution of drinking water				
Land vibration				
Land pollution				
Loss of wild life species				
Occupational change				

Thank you for your cooperation and God bless.

DATA SHEET FOR ECOLOGICAL PARAMETERS

(A) What are the plants species encountered in the project area?

1. Herbs

S/N	Common Name	Scientific Name
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

2. Shrubs

S/N	Common Name	Scientific Name
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

2. Liana

S/N	Common Name	Scientific Name
1		
2		

3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

3. Vines

S/N	Common Name	Scientific Name
1		
2		
3		
4		
5		

6		
7		
8		

4. Trees

S/N	Common Name	Scientific Name
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

(B) Economic crops/plant species present in the area and in the communities farms and garden

S/N	Common Name	Scientific Name	Conservation Status/ Abundance
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			

18			
19			
20			

(C) Fauna found in the project sites

PHYLUM	Class: Species
Annelida	Oligochaeta:
Arthropoda	Arachnida:
	Diplopoda (millipedes):
	Trichoptera:
	Coleoptera:
	Diptera:

	Orthoptera:
	Homoptera:
	Isopteran (termites):
	Lepidoptera (butterflies):
	Hymenoptera:
	Crustacea:
Mollusca	Gastropoda:
	Bivalvia:

(D) Terrestrial fauna and wildlife present in the project area.

Animal group and common name	Species	Common name and description
Earthworm		
Woodlice		
Ant		
Beetles		
Moths		
Cricket		
Flies		
Dragon fly		
Grasshoppers		

Mantid		
Stick insect		
Collembolan		
Snails		
Wildlife		
Amphibians		
Frog		
Toads		
Reptiles		
Pisces		
Birds		

Mammals		