APP-00167
ENVIRONMENTAL MANAGEMENT PLAN

EXISTING BUKALO SERVICE CENTRE FUEL RETAIL FACILITY

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PROJECT DETAILS

TEAM MEMBERS

NAME	POSITION	COMPANY
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C. Ailonga	Environmental Specialist	Matrix Consulting Services

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REPORT STATUS:	**FINAL**

GLOSSARY OF TERMS

Environment - This means the surroundings within which humans exist and that are made up of;

a) the land, water and atmosphere of the earth;

b) micro-organisms, plant and animal life;

c) any part or combination of a) and b) and the interrelationships among and between them; and

d) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well being.

Environmental Manager (EM) - For the purposes of this document, the 'EM' refers to the individual appointed by the employer to be the "employer's representative" and to act as an on-site implementing agent and has the responsibility to ensure that the Client's responsibilities are executed in compliance with the relevant legislations.

Contractor - For the purposes of this document, the term 'Contractor' refers to the main contractor(s) appointed to undertake the construction of the project, or portion of the construction of the project. The Contractor(s) are required to adhere to the EMP and are responsible for ensuring that all Sub-Contractors, suppliers and staff appointed by them also adhere to the conditions of the EMP.

Proponent (or Developer) – The client (an individual or group), whom is responsible for the planning, funding and development of the project.

Environmental Consultant – The individual or company responsible for the development of the EMP. The Environmental Consultant can also fulfill a role in the monitoring and auditing of the implementation of the EMP. For the purposes of this document, the term 'Environmental Consultant' refers to *Matrix Consulting Services*.

Environmental Control Officer (ECO) – For the purposes of this document, the 'ECO' refers to the individual appointed by the Developer to oversee the implementation of the EMP on site by the various Contractors. The ECO is to be qualified in the environmental sciences, understand the detailed environmental issues associated with the development, and is to be well versed in the contents of the EMP and its associated reports. The ECO will be the liaison person between the Environmental Site Officers (ESOs, refer below) of the contracting teams, and the Developer (refer above).

Environmental Site Officer (ESO) - For the purposes of this document, the ESO is an individual appointed by the Contractor to represent the contracting team, and is to be responsible for ensuring the day-to-day implementation of the EMP on the site by the team in question. The ESO should be qualified in the environmental sciences (not imperative however), informed of the contents of the Environmental Management Programme (EMP) relevant to the activities of the construction team in question, and is to understand the basic environmental issues associated with the development. The ESO is to report to the ECO (refer above) with regards to any environmental issues.

Hazard - Anything that has the potential to cause damage to life, property and/or the environment. The hazard of a particular material or installation is constant; that is, it would present the same hazard wherever it was present.

Potentially Hazardous Substance - is a substance which, in the reasonable opinion of the ECO, EM, ESO and Engineers can have a deleterious effect on the environment.

Environmental Management Plan (EMP) - A working document on environmental and socio-economic mitigation measures, which must be implemented by several responsible parties during all the phases of the proposed project.

Interested and Affected Party (I&AP) - any person, group of persons or organization interested in or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.

Significant Impact - means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

Reasonable - means, unless the context indicates otherwise, reasonable in the opinion of the ECO after he has consulted with a person, not an employee of the Client, suitably experienced in "environmental management plans".

Solid waste - means all solid waste, including construction debris, chemical waste, excess cement/ concrete, wrapping materials, timber, tins and cans, drums, wire, nails, domestic waste, dead vegetation, asphalt products, etc.

Contaminated water - means water contaminated by the Contractor's activities containing cements, concrete, lime, paint products, thinners, turpentine, chemicals, fuels, oils washing detergents, etc.

Project site (or location) - means any area within the boundaries of the Site where construction is taking place.

Contractor's camp or construction camp - Means the area designated for all the Contractor's temporary offices, storage areas, plant parking areas, staff welfare facilities etc.

1. INTRODUCTION

1.1. Background

Bukalo Service Centre has commissioned an Environmental Management Plan (EMP) for the existing fuel retail facility, in Bukalo. The EMP aims at prescribing a methodology for managing, rehabilitation and monitoring of potential negative environmental impacts and to maximise positive impacts.

This Environmental Management Program aims to:

1. Provide the necessary protection of potentially sensitive areas and
2. Provide environmental responsibility and a management framework, within which all future construction and operation will occur.
3. Ensure that all construction activities are conducted in an environmentally acceptable and safe manner.

Various impacts are identified and mitigation and management measures designed and proposed for these impacts. These mitigation measures have been organized and co-ordinate into the Environmental Management Program, which will remain in force during the implementation of the project and will be a subject of regular audits and updates.

The objectives of the Environmental Management Program describe the implementation of the project proposal in its three phases namely:

1. Phase 1 – Operational
2. Phase 2 – Possible Decommissioning,

The Environmental Management Program will guide the operation and maintenance phases of the proposed project. It is a dynamic guideline document that will be updated regularly as the project proceeds, once approval has been granted. The mitigation and management measures described in the Environmental Management Plan will be incorporated into the contract agreements with the contractors to ensure their environmental compliance.

Matrix Consulting Services, an independent environmental consultant, was appointed by Bukalo Service Centre to compile and submit an EMP for the operation of the Bukalo Service Centre Fuel Retail Facility.

1.2. Project Location

The Bukalo Service Centre Fuel Retail Facility is located on Erf 572, (17.726114°S; 24.527527°E), at the corner of B8 and D3510 road, in the Bukalo Village Council Townlands, Zambezi Region. See Figure 1.

Bukalo Service Centre is located in an area dominated by business. The Consultant does not expect that the development will directly affect any nearby land and/or property in any manner during the continued operation of the development. Indirect impacts may however occur through potential ground or surface water pollution and the interaction thereof.

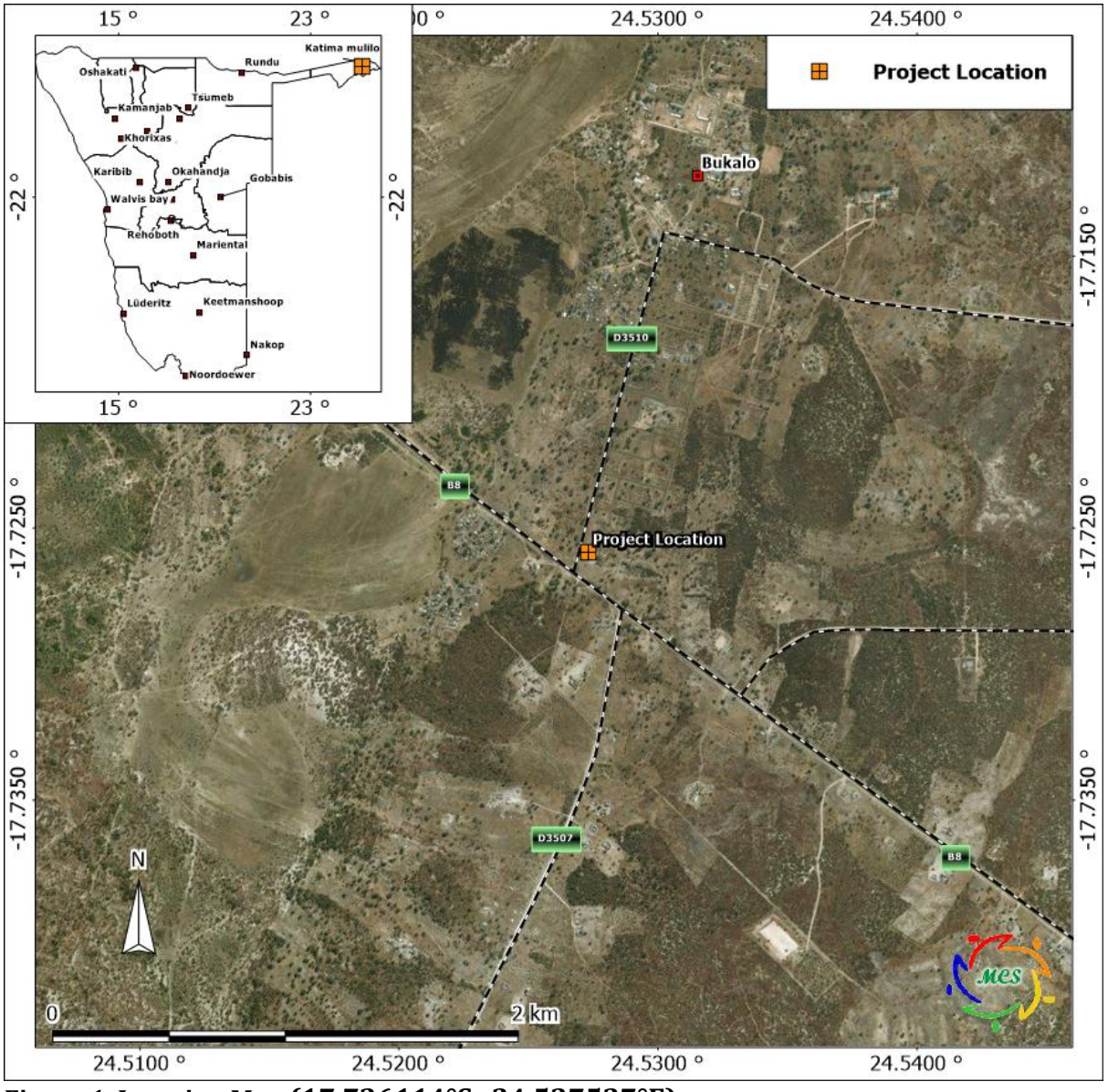

Figure 1. Location Map (17.726114°S , 24.527527°E)

1.3. Purpose of this Document

The Environmental Management Plan (**EMP**) provides management options to ensure impacts of the proposed development are minimised. An EMP is an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the possible maintenance, operation and decommissioning of a project are prevented, and the positive benefits of the projects are enhanced.

The objectives of the EMP are:

- ✓ to include all components of the development;
- ✓ to prescribe the best practicable control methods to lessen the environmental impacts associated with the construction of the development;
- ✓ to monitor and audit the performance of personnel in applying such controls; and
- ✓ to ensure that appropriate environmental training is provided to responsible construction personnel.

The EMP acts as a stand-alone document, which can be used during the various phases of the development. The document serves as a guiding tool for the contractors and workforce on their roles and responsibilities concerning environmental management at the site, and also provides an environmental monitoring framework for all project phases of the development.

2. LEGAL REQUIREMENTS

The Namibian Constitution has a section on principles of state policy. These principles cannot be enforced by the courts in the same way as other sections of the Constitution. But they are intended to guide the Government in making laws which can be enforced.

The constitution clearly indicates that the state shall actively promote and maintain the welfare of the people by adopting policies aimed at management of ecosystems, essential ecological processes and biological diversity of Namibia for the benefit of all Namibians, both present and future.

The following legislations are relevant to this development:

I. The Namibian Constitution

The Namibian Constitution has a section on principles of state policy. These principles cannot be enforced by the courts in the same way as other sections of the Constitution. But they are intended to guide the Government in making laws which can be enforced.

The Constitution clearly indicates that the state shall actively promote and maintain the welfare of the people by adopting policies aimed at management of ecosystems, essential ecological processes and biological diversity of Namibia for the benefit of all Namibians, both present and future.

II. Environmental Management Act No.7 of 2007

This Act provides a list of projects requiring an Environmental assessment. It aims to promote the sustainable management of the environment and the use of natural resources and to provide for a process of assessment and control of activities which may have significant effects on the environment; and to provide for incidental matters.

The Act defines the term "*environment*" as an interconnected system of natural and human-made elements such as land, water and air; all living organisms and matter arising from nature, cultural, historical, artistic, economic and social heritage and values.

The Environmental Management Act has three main purposes:

(a) to make sure that people consider the impact of activities on the environment carefully and in good time

(b) to make sure that all interested or affected people have a chance to participate in environmental assessments

(c) to make sure that the findings of environmental assessments are considered before any decisions are made about activities which might affect the environment

Line Ministry: Ministry of Environment and Tourism

III. The Water Act (Act No 54 of 1956)

The Water Act No. 54 of 1956 as amended, aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users.

The Act broadly controls the use and conservation of water for domestic, agricultural, urban and industrial purposes; to control, in certain respects, the use of sea water; to control certain activities on or in water in certain areas; and to control activities which may alter the natural occurrence of certain types of atmospheric precipitation.

IV. Water Resources Management Act of Namibia (2004) *(Guideline only)*

This act repealed the existing South African Water Act No.54 of 1956 which was used by Namibia. This Act ensures that Namibia's water resources are managed, developed, protected, conserved and used in ways which are consistent with fundamental principles depicted in section 3 of this Act. Part IX regulates the control and protection of groundwater resources. Part XI, titled Water Pollution Control, regulates discharge of effluent by permit.

Line Ministry: Ministry of Agriculture, Water Affairs and Forestry

V. Environmental Assessment Policy of Namibia (1995)

Environmental Assessments (EA's) seek to ensure that the environmental consequences of development projects and policies are considered, understood and incorporated into the planning process, and that the term ENVIRONMENT (in the context of IEM and EA's) is broadly interpreted to include biophysical, social, economic, cultural, historical and political components.

All listed policies, programmes and projects, whether initiated by the government or private sector, should be subjected to the established EA procedures.

Apart from the requirements of the Environmental Assessment Policy, the following sustainability principles needs to be taken into consideration, particularly to achieve proper waste management and pollution control:

- ✓ **Cradle to Grave Responsibility**

This principle provides that those who manufacture potentially harmful products should be liable for their safe production, use and disposal and that those who initiate potentially polluting activities should be liable for their commissioning, operation and decommissioning.

- ✓ **Precautionary Principle**

There are numerous versions of the precautionary principle. At its simplest it provides that if there is any doubt about the effects of a potentially polluting activity, a cautious approach should be adopted.

- ✓ **The Polluter Pays Principle**

A person who generates waste or causes pollution should, in theory, pay the full costs of its treatment or of the harm, which it causes to the environment.

- ✓ **Public Participation and Access to Information**

In the context of environmental management, citizens should have access to information and the right to participate in decisions making.

Line Ministry: Ministry of Environment and Tourism

VI. Petroleum Products and Energy Act of Namibia (Act No. 13 of 1990)

The Act makes provision for impact assessment for the existing fuel retail facility and petroleum products known to have detrimental effects on the environment.

VII. Draft Pollution Control and Waste Management Bill *(Guideline only)*

The operations of the Bukalo Service Centre fuel retail facility at Bukalo, only applies to Parts 2, 7 and 8 of the Bill.

Part 2 stipulates that no person shall discharge or cause to be discharged any pollutant to the air from a process except under and in accordance with the provisions of an air pollution licence issued under section 23. It further provides for procedures to be followed in licence application, fees to be paid and required terms of conditions for air pollution licences.

Part 7 states that any person who sells, stores, transports or uses any hazardous substances or products containing hazardous substances shall notify the competent authority, in accordance with sub-section (2), of the presence and quantity of those substances.

Part 8 calls for emergency preparedness by the person handling hazardous substances, through emergency response plans.

VIII. Atmospheric Pollution Prevention Ordinance of Namibia No. 11 of 1976

The Ordinance prohibits anyone from carrying on a scheduled process without a registration certificate in a controlled area. A certificate must be issued if it can be demonstrated that the best practical means are being adopted for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process. Best practice would be to notify the line Ministry about emissions but it is not a legal requirement.

Line Ministry: Ministry of Health and Social Services

IX. Hazardous Substances Ordinance No. 14 of 1974

The Ordinance applies to the manufacture, sale, use, disposal and dumping of hazardous substances, as well as their import and export and is administered by the Minister of Health and Social Welfare. Its primary purpose is to prevent hazardous substances from causing injury, ill-health or the death of human beings.

Line Ministry: Ministry of Health and Social Services

- ***International Conventions and Regulations***

Article 144 of the Namibian Constitution states that "the general rules of public international law and international agreements binding upon Namibia form part of the law of Namibia." This means that all the international agreements that Namibia signed become part of the law of our country. These laws and/or agreements are:

- ✓ Convention on Biological Diversity, 1992;
- ✓ United Nations Framework Convention on Climate Change, 1992;
- ✓ Kyoto Protocol on the Framework Convention on Climate Change, 1998;
- ✓ Stockholm Convention of Persistent Organic Pollutants, 2001.

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3. INSTALLATIONS AND RELATED ACTIVITIES

3.1. Existing UST and Pump Specifications

The site has been operational for over fourteen years. The aboveground infrastructure consists of a canopy covering the forecourt area, with Two (2) multi-product dispensing points with associated pump islands.

The underground infrastructure at the site consists of Two (2) UST's (underground storage tanks), namely;

- 1 x Tank – 23 m^3 unleaded petrol (ULP),
- 1 x Tank – 23 m^3 diesel UST (500ppm),

Conveniently located in the townlands of Bukalo , at the corner of B8 and D3510 road, the Service Station offers a convenience store. See the photo below for the site layout.

Photo 1. The existing Bukalo Service Centre .

The Bukalo Service Centre EMP will cater for the following 2 phases:

Operational activities on the site will include:

1. Fuel retailing to motorists.
2. Maintenance and repairs of the buildings and associated infrastructure.

Possible decommissioning activities will include:

1. Removal of associated buildings, pavements, fuel installations and other infrastructure.
2. Quantification of hydrocarbon pollution and its disposal or bioremediation.
3. Post closure environmental monitoring.

4. PROVISION OF MUNICIPAL SERVICES

4.1. Electricity Supply

The site sources its electricity supply from the Bukalo Village Council.

4.2. Potable Water Supply

The Bukalo Village Council provides water supply to the existing Bukalo Service Centre at present, and will continue to do so for the development.

4.3. Sewage

The site is currently connected to the main sewage network of the Bukalo Village Council. The existing fuel retail facility is expected to pose minimal stress to the existing system as no major ablution or toilet facilities are planned.

4.4. Waste Removal

Waste removal at the site is currently the responsibility of the Bukalo Village Council. The waste disposal site, and the various satellite waste disposal sites in Bukalo are being used by the municipality to dispose off different waste types. However, no hazardous waste disposal site exist in Bukalo, all hazardous waste must be disposed at the nearest hazardous waste disposal site.

5. RECEIVING ENVIRONMENT

This section lists the most important environmental characteristics of the project area and provides a statement on the potential environmental impacts.

5.1. Climate

The landscape is classified as being in the Central Western Plains.

Classification of climate:	Extremely arid area
Average rainfall:	Rainfall in the area is averaged to be less than 50mm per year.
Variation in rainfall:	Variation in rainfall is averaged to be more than 100% per year.
Average evaporation:	Evaporation in the area is averaged to be between 2600-2800 mm per year.
Precipitation:	The highest summer rains are experienced in April.
Water Deficit:	Water deficit in the area is averaged to be between 1701-1900mm per year.
Temperatures:	Temperatures in the area are averaged to be between 17-18°C per year.

5.2. Topography and Drainage

The site is relatively flat with a gentle slope south-west ward. The landscape is classified as being in the Kalahari Sandveld, an area of paleo dunes and pans. The site is located within the catchment of the Kalongwe River, a perennial river, draining in an southererly direction towards Lake Liambezi. The Kavango River is situated approximately 1.2km northwest of the site.

In general, local drainage in the area is well developed and takes place towards the Kalongwe River. Proper drainage systems (e.g. erection of culverts) should be developed at the site to control the flow of surface water to avoid flooding. Storm water management systems should form part of the engineering designs.

5.3. Geology and Hydrogeology

The area has generally a relatively thick natural soil cover. Surface geology consists of formations of the Kalahari Sequence, which have a thickness of up to 30m in the area. The Kalahari Sequence generally the following six lithological classifications are recognized: Duricrusts, Kalahari sand, Alluvium and lacustrine deposits, Sandstone, Marl, Basal conglomerate and Gravel.

Coarse pebbly gravels are known to occur within the upper 30m in the area between Katima Mulilo and Ngoma, but probably represent fluvial, paleo-Zambezi deposits of Pleistocene age.

Surficial Kalahari sand covers almost the entire land surface here. These lithologies comprise fine-medium-coarse grained, sub angular-rounded glassy quartz sand, off-white in colour and typically clay-free in the upper 5m. These aeolian sands represent reworked Kalahari sediments. Though red sands occur, much of the surface sand in the area is leached of any iron staining. The transition from the so-called Kalahari sand to the older, underlying sandstone is often not clear, but seems to be gradational.

Below the truly surficial horizon, similar sands are found, but often with varying clay content that may reach significant (>10%) proportions. These sands may contain a small percentage of coarse glassy material, up to 4mm in diameter, which is mostly angular to sub-angular. Within these sands, thin gravel horizons, usually <0,5m thick, are not uncommon. These gravels are comprised of well-rounded, mainly chalcedonic grains and may represent transported amygdales of decomposed Karoo lavas.

Groundwater flow would be mostly through primary porosity but flow along fractures, faults and other geological structures present within the formations might take place where consolidated layers are present.

According to the DWA database, as well as the MCS in-house database, subsurface water in the area is utilized with approximately 15 known boreholes present in a 2km radius (See Figure 2). Water levels are generally near the surface, close to the river and become deeper as one moves away from the river towards the southeast. Considering the water level above sea level, it becomes evident that groundwater flow takes place from the river, into a southeasterly direction. This can be expected, as the river is a source of groundwater recharge. This can however be reversed during the rainy season when the area receives rain. Water quality in the area is general very good.

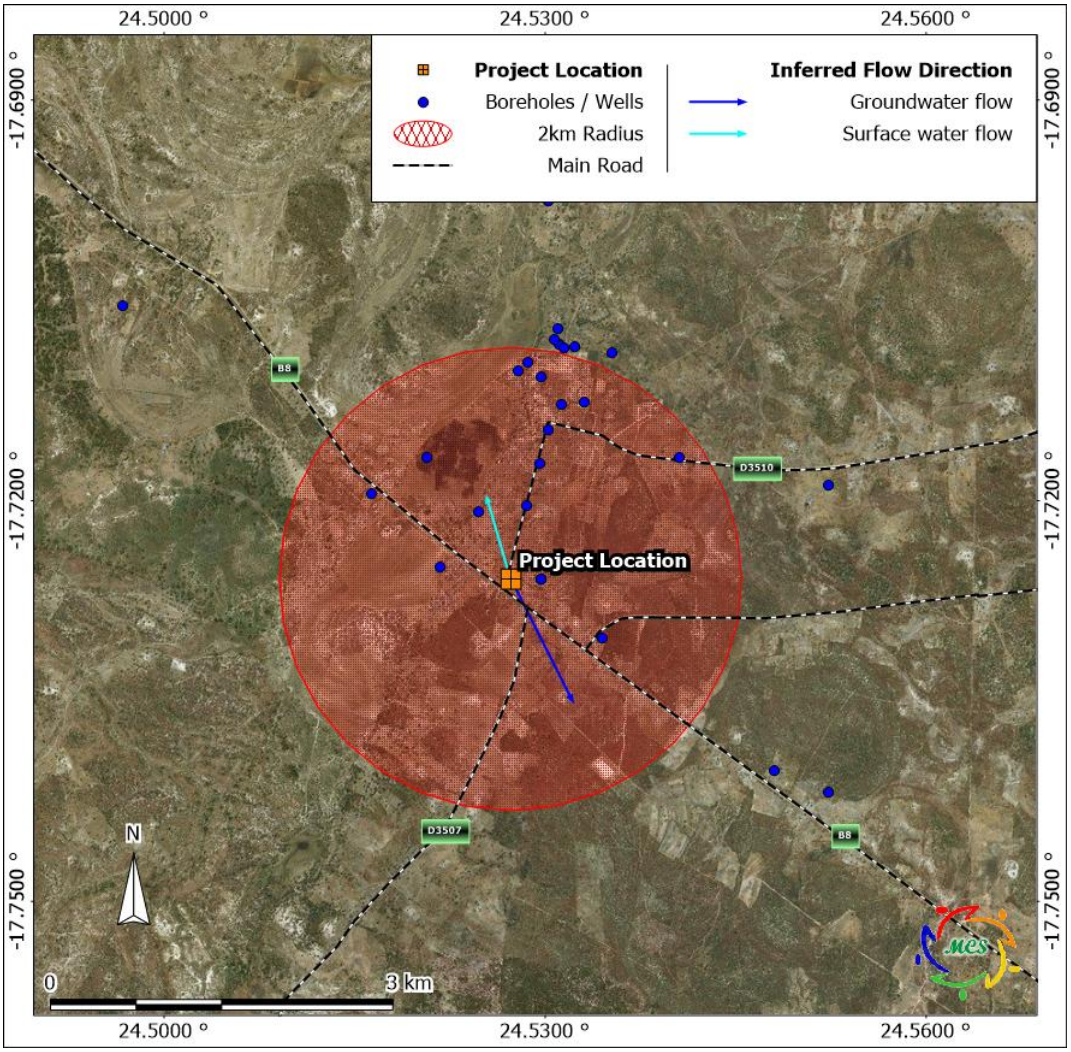

Figure 2. Hydrogeological Map

6. ENVIRONMENTAL MANAGEMENT STRUCTURES

The Contractor and / or its agents will be responsible for environmental management on site during the operational period. For the purpose of this report,

- the *Project Personnel* refers to the employees, staff and suppliers responsible for the *operations activities* of Bukalo Service Centre.
- the *Contractor* (and its sub-contractors) refers to construction personnel responsible for the *site upgrade activities* and/or *maintenance activities* at the project site.

In addition surrounding residents, tenants or land owners must be notified in advance of any potentially disturbing activities.

An independent environmental consultant will need to act as the ECO and conduct inspections of the operational activities and EMP implementation. After each inspection, the ECO will produce a monitoring report that will be submitted to the

environmental manager (and Ministry of Environment and Tourism (Department of Environmental Affairs) if required). Relevant sections of the minutes of site meetings will be attached to the monitoring report.

Roles, responsibility and authority shall be defined, documented and communicated in order to facilitate effective environmental management through implementation of the EMP. Management shall provide resources essential to the implementation and control of the EMP including: human resources, technology, and financial resources.

6.1. Responsibility Matrix

The responsibility matrix table below will be completed upon contract award.

Table 1. Responsibility Matrix

Function	Responsibility
Environmental Manager (EM)	▪ Overall management of project and EMP implementation. ▪ Oversees site works, liaison with Contractor, ESO and ECO.
Environmental Control Officer (ECO)	▪ Implementation of EMP and liaison between Vivo Energy Namibia Ltd, Department of Environmental Affairs (MET), Bukalo, Contractor and Landowners/stakeholders
Environmental Site Officer (ESO)	▪ Interaction with ECO, landowners and labourers. Must understand the EMP
Contractor	▪ Implementation and compliance with recommendations and conditions of the EMP, Appoints dedicated person (ESO) to work with ECO

The general roles and responsibilities of various parties during all phases of the project are outlined below.

6.2. Roles of the Environmental Manager (EM)

The EM (proponent's representative) will act as the proponent's on-site implementing agent and has the responsibility to ensure that the Client's responsibilities are executed in compliance with the relevant legislations. Any on-site decisions regarding environmental management are ultimately the responsibility of the EM. The on-site EM shall assist the ECO where necessary and will have the following responsibilities in terms of the implementation of this EMP:

- ✓ Be fully knowledgeable with the contents of the Operational EMP;
- ✓ Review and authorise updates to the EMP.
- ✓ Ensure resource allocation for implementation of the EMP requirements.

- ✓ Ensure that environmental requirements are integrated into project plans, work method statements, tender and contract documents.
- ✓ Ensure necessary support to the ESO for implementation of the EMP.
- ✓ Undertake environmental system reviews, site inspections, audits and other verification activities to assure that the EMP implementation is at an optimal level.
- ✓ Participate in environmental performance verification activities to verify the level of compliance with the EMP in delivering the legal and environmental obligations.
- ✓ Assess the efficacy of the EMP and identify possible areas of improvement or amendment required within the EMP.
- ✓ Participate in incident investigations (as required).
- ✓ Initiate external audits (as required).

6.3. Roles of the Environmental Control officer (ECO)

The ECO for the site is an independent environmental consultant appointed by Bukalo Service Centre to monitor and review the on-site environmental management and implementation of this EMP on the site.

The duties of the ECO:

- ✓ Ensure that all operational or possible decommissioning activities on site are undertaken in accordance with the EMP;
- ✓ Undertake compliance audits against the EMP and conditions of the Environmental Authorisation.
- ✓ Provide support and advice to the project team, contractor and all subcontractors in the implementation of environmental management procedures and corrective actions.
- ✓ Report significant incidents internally and externally as required by law and the conditions of authorisation.
- ✓ Ensure that monitoring programs, which assess the performance of the EMP, are implemented.
- ✓ Assist in the investigation of incidents and non-conformances and confirm in conjunction with the ESO that corrective and preventive action is taken and is effective.
- ✓ Assess the efficacy of the EMP and identify possible areas of improvement or amendment required within the EMP.
- ✓ Facilitate the amendment of the EMP in conjunction with the Environmental Manager (as required).

- ✓ Provide environmental training for key project personnel (in communication with Environmental Manager).
- ✓ Prepare audit reports (and submit reports to the relevant authority as required).

6.4. Roles of the Environmental Site Officer (ESO)

The ESO is expected to administer and control all environmental matters relating to the project. The ESO will conduct the following:

- ✓ Ensure implementation of the EMP.
- ✓ Ensure that the latest EMP documents are filed and readily accessible as required.
- ✓ Ensure communication of EMP requirements to relevant project, contractor and sub-contractor personnel as required for EMP implementation.
- ✓ Monitor compliance of EMP implementation and compliance of all contractors and sub-contractors.
- ✓ Facilitate environmental induction of all project staff and either deliver or coordinate delivery of all such training that would be required for the effective implementation of the EMP. This includes identifying additional project training requirements and implementing the training programme.
- ✓ Maintain training records for all project personnel including contractors.
- ✓ Maintain environmental incidents and stakeholder complaints register.
- ✓ Undertake environmental system reviews, site inspections, audits and other verification activities to assure that the EMP implementation is at an optimal level.
- ✓ Report significant incidents internally and externally as required by law and the conditions of authorisation.
- ✓ Investigate incidents and recommend corrective and preventative actions.
- ✓ Provide support and advice to the contractor and all sub-contractors in the implementation of environmental management procedures and corrective actions.

- ✓ Ensure that monitoring programs, which assess the performance of the EMP, are implemented.

- ✓ Ensure maintenance of site document control requirements.

- ✓ Assess the efficacy of the EMP and identify possible areas of improvement or amendment required within the EMP.

6.5. Roles of the Contractors in all phases

The ECO, will be responsible for monitoring compliance with the Environmental Management Plan, and liaising with the EM. The contractors shall ensure that all construction staff, sub-contractors, suppliers, etc. are familiar with, understand and adhere to the EMP during maintenance. Failure by any employee of the Contractor, Sub-contractor, Suppliers etc. to show adequate consideration to the environmental aspects of this contract shall be considered sufficient cause for the ECO to instruct the EM to have the employee removed from the site. The EM will also order the removal of equipment from the site that is causing continual environmental damage (e.g. leaking oil and diesel). Such measures will not replace any legal proceedings the Client may institute against the Contractor.

The EM shall order the contractor to suspend part or all of the works if the contractor and/or any sub-contractor, suppliers, etc., fail to comply with both the EMP and the construction procedures supplied by the Contractor. The suspension will be enforced until such time as the offending procedure or equipment is corrected and/or if required remedial measures are put in place. No extension of time will be granted for such delays and all costs will be borne by the Contractor

By virtue of the environmental obligations delegated to the Contractor through the Contract Document, all staff (including subcontractors and staff), suppliers, and service providers appointed for the project would be responsible for:

- ✓ Ensuring adherence by providing adequate staff and provisions to meet the requirements of the EMP;
- ✓ Ensuring that Method Statements are submitted to the Environmental Manager for approval before any work is undertaken, and monitor compliance with the EMP and approved Environmental Method Statements;
- ✓ Ensuring that any instructions issued by the ECO and/or EM are adhered to;

- ✓ Ensuring the representation of a report at each site meeting, documenting all incidents that have occurred during the period before the site meeting;
- ✓ Undertake daily, weekly and monthly inspections of the work area(s);
- ✓ Ensuring that a register of all the transgressions issued by the ECO is kept in the site office;
- ✓ Ensuring that a register of all public complaints is maintained; and
- ✓ Ensure that all employees, including those of sub-contractors receive training before the commencement of work so that they can constructively contribute towards the success full implementation of the environmental requirements of the EMP.
- ✓ Report and record any environmental incidents caused by the Contractor or due to the Contractor's activities;
- ✓ obtain required corrective action within specified time frames and close out of environmental incidents;
- ✓ Provide periodic checklists to the EM and ECO.

The Contractor will nominate an Environmental Site Officer (ESO) who will be responsible for ensuring that the requirements of the EMP and the associated documents are complied with on the construction site on behalf of the Contractor. The ESO shall:

- ✓ Identify areas of non-compliance and recommend measures to rectify them in consultation with the Project Manager, the EM and the ECO as required;
- ✓ Ensure that environmental problems are remedied timeously and to the satisfaction of the Project Manager, the EM and the ECO as required;
- ✓ Set up activity based method statements prior to the start of relevant construction activities and submit these to the Project Manager, the EM and the ECO as required;
- ✓ Perform ongoing environmental awareness training of the Contractor's site personnel.

7. IMPLEMENTATION AND MONITORING

7.1. Possible Decommission/Maintenance Phase Procedures

7.1.1. Environmental Awareness Training

Bukalo Service Centre have the responsibility to ensure that all persons involved in the project are aware of, and are familiar with, the environmental requirements for the project. All project personnel, including

contractors and sub-contractors are required to receive training of a type and level of detail that is appropriate for the environmental aspects of their work. Training shall be held during normal working hours, at a suitable venue. All attendees shall remain for the duration of the training and, on completion, sign an attendance register that clearly indicates participants' names. A copy of the register shall be handed to the ECO. As a minimum, all personnel are required to complete the training requirements stipulated in Table 1 below.

Table 2. Environmental Training Requirements

<table>
<tr><th colspan="3">Training and Induction Requirements</th></tr>
<tr><th colspan="2">Training Requirement</th><th>Frequency</th></tr>
<tr><td colspan="2">Site Induction - the purpose of the induction is to ensure that, as a minimum, all on-site personnel understand the EMP in terms of:</td><td rowspan="11">Operational Phase: prior to commencement of work by staff and / or contractors.</td></tr>
<tr><td></td><td>Key issues relating to the project.</td></tr>
<tr><td></td><td>Relevant conditions of the Environmental Authorisation.</td></tr>
<tr><td></td><td>Location and protection of environmentally sensitive areas (if any).</td></tr>
<tr><td></td><td>Waste management and minimisation.</td></tr>
<tr><td></td><td>Minimising potential impacts to air, noise and water quality.</td></tr>
<tr><td></td><td>Surface and groundwater contamination.</td></tr>
<tr><td></td><td>Spill control measures.</td></tr>
<tr><td></td><td>Environmental Emergency Plan.</td></tr>
<tr><td></td><td>Incident reporting procedures.</td></tr>
<tr><td></td><td>Roles and responsibility relating to environmental management.</td></tr>
<tr><td colspan="2">Pre-Start Meeting – Pre-start meetings should be undertaken prior to commencement of a new activity in order to discuss the planned work and operational aspects of the tasks. Health, safety and environmental issues and controls should be discussed and understood.</td><td>Maintenance/Possible Decommission Phase: As required.</td></tr>
</table>

All senior and supervisory staff members shall familiarise themselves with the full contents of the EMP. They shall know and understand the specifications of the EMP and be able to assist other staff members in matters relating to the EMP.

7.1.2. Method Statements

The EMP provides the overall project strategy for management of environmental issues; however, a Construction Method Statement (CMS) will address environmental management issues at a site level. The CMS provides an environmental manual for use by management and construction staff involved in the works. It addresses the environmental issues that are specific to an activity and/or site. CMS's should be produced for all major construction activities, and will typically provide detailed descriptions of items including, but not necessarily limited to:

- ✓ Nature, timing and location of activities;
- ✓ Procedural requirements and steps;
- ✓ Management responsibilities;
- ✓ Material and equipment requirements;
- ✓ Transportation of equipment to and from site;
- ✓ Develop methods for moving equipment/material while on site;
- ✓ How and where material will be stored;
- ✓ Emergency response approaches, particularly related to spill containment and clean-up;
- ✓ Response to compliance/non-conformance with the requirements of the EMP; and

Any other information deemed necessary by the EM/ECO.

The contractor shall not commence the activity until the Method Statement has been approved and shall, except in the case of emergency activities, allow a period of two weeks for approval of the Method Statement by the ECO and EM. Such approval shall not unreasonably be withheld.

The ECO and EM may require changes to a Method Statement if the proposal does not comply with the specification or if, in the reasonable opinion of the ECO and EM, the proposal may result in, or carries a greater than reasonable risk of, damage to the environment in excess of that permitted specifications.

Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel. The contractor shall carry out works in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the contract.

Based on the specifications in this EMP, the following Method Statements are required as a minimum (but not limited to these):

- ✓ Site clearing;
- ✓ Site layout and establishment;
- ✓ Hazardous substances;
- ✓ Cement and concrete batching (for each operation)
- ✓ Traffic accommodation;
- ✓ Solid waste control system;
- ✓ Wastewater control system;
- ✓ Erosion remediation and stabilization (for both operations);
- ✓ Fire control and emergency procedures.

7.2. Site Establishment during Maintenance

7.2.1. Demarcation of the Site

The 'site' here refers to all areas required for construction purposes. Prior to any construction on site the approved building site shall be demarcated for the development as per the approved SDP.

The site will be properly demarcated and or temporarily fenced off as agreed with the ECO.

The EM in co-operation with the ECO will be responsible for the demarcation of the outer perimeter of the construction site. The method of demarcation of the outer perimeter of the construction site. The method of demarcating the boundaries shall be determined by the contractor and agreed to by the EM prior to any work being undertaken. The contractor shall maintain the demarcation line and ensure that materials used for construction on the site do not blow on or move outside the site and environs, or pose a threat to people. The boundaries of the site shall be demarcated prior to any work commencing on the site. The site boundary demarcation fence shall be removed when all construction work is completed.

The contractor shall ensure that all his plant, labour and materials remain within the boundaries of the site, unless otherwise agreed in writing with EM. Failure to do so may result in the EM requiring the contractor to fence the boundaries of the site with wire mesh at his own expense to the

satisfaction of the EM and the municipality. It will be the responsibility of the contractor to decide on an appropriate system of protective fencing for the site.

The contractor shall be responsible to ensure that building materials such as sand is not blown away and take the necessary precautions to prevent sand from being blown by the wind.

7.2.2. Movement of Construction Personnel and Equipment

The contractor shall ensure that all construction personnel and equipment remain within the demarcated construction site at all times. Where construction personnel and/or equipment wish to move outside the boundaries of the site other than normal access to the road for loading and access purposes, the contractor shall obtain written permission from the EM.

7.2.3. Location of Construction Camps

Construction camps include workshops, temporary stockpile sites, fuel installations, other storage and work areas, required by the contractor, sub-contractors and suppliers. All construction camps will be positioned in a demarcated areas approved by the ECO.

7.2.4. Ablution Facilities

The contractor shall provide the necessary ablution facilities for all site personnel. The sitting of toilets shall be agreed with the EM. The contractor shall supply an adequate number of chemical or other suitable and approved toilets throughout the site where construction personnel will be operating. The toilets shall be secured to prevent them from blowing over, and the doors shall be provided with an external closing mechanism to prevent toilet paper from being blown out. Toilets shall be cleaned and serviced regularly.

The contractor shall ensure that any chemicals and/or waste from the toilets is not spilled on the ground at any time. Should there be spillage of chemicals and/or waste, the EM shall require the contractor to place the toilets on solid base or containment structures with sumps. The contractor will be required to provide a suitable and approved and to remove accumulations of chemicals and waste from the site and dispose of it at an appropriate waste disposal site or sewage plant base at his own expense.

7.2.5. Living Areas

The accommodation of construction staff (if necessary) shall be agreed with the ECO and EM. One campsite within the existing campsite, may be allocated for construction workers subject to strict control.

7.2.6. Eating Areas

The contractor shall, in agreement with the EM, designate specific areas for eating and shall provide adequate refuse bins at all places. The refuse bins shall be cleaned on a daily basis.

7.2.7. Provision of Water

The contractor shall be responsible for providing construction, drinking and washing water for his staff. Construction water shall be obtained from locations as agreed with the ECO and EM.

7.3. Material Handling and Storage

7.3.1. Refuelling of Equipment

Unless allowed by the Project Specification, fuel shall not be stored on site but shall be transported to the site as and when required.

Where reasonably practical, plant shall be refuelled at a designated re-fuelling area or at the workshop as applicable. If it is not reasonably practical then the surface under the temporary refuelling area shall be protected against pollution to the reasonable satisfaction of the ECO/EM prior to any refuelling activities. The contractor shall ensure that there is always a supply of absorbent material (not saw dust) readily available to absorb/breakdown and where possible is designed to encapsulate minor hydrocarbon spillage. The quantity of such material shall be able to handle a minimum of 200litre of hydrocarbon liquid spill. This material must be approved by the ECO/EM prior to any refuelling or maintenance activities.

A Method Statement must be provided detailing how these liquids will be stored, handled and disposed of. The Bukalo's Fire Department must be informed and consulted for fire regulations.

7.3.2. Lubricant Storage

No bulk storage of lubricant will be permitted on site. Small containers required by the contractor for daily use have to be either sealed or have tightly fitted caps. All containers must be closed unless in use. Decanting of lubricants must be carried out in a specific area that has been previously identified and suitably protected. The floor of any storage of decanting area shall be impervious (such as concrete) to lubricants and kept clean at all times. The floor shall slope towards a central sump, all liquids collected in

the sump shall be disposed of as hazardous waste, at the nearest hazardous waste disposal site.

Lubricants shall be stored under cover in a no smoking area. All lubricant impregnated cotton waste and rags shall be promptly disposed of and handled as hazardous waste.

7.3.3. Petroleum, Chemical, Harmful and Hazardous Materials

The contractor shall comply with all relevant national and local legislation with regard to storage, transport, use and disposal of petroleum, chemical, harmful and hazardous substances and materials. The contractor shall obtain the advice of the manufacturer with regard to the safe handling of such substances and materials.

The contractor shall provide the EM with a list of all petroleum, chemical, harmful and hazardous substances and materials on site, together with storage, handling and disposal procedures for these materials.

The contractor shall ensure that information on all petroleum, chemical, harmful and hazardous substances are available to all personnel on site. The contractor shall furthermore be responsible for the training and education of all personnel on site who will be handling the material about its proper use, handling and disposal. A dangerous material datasheet should be available on site.

The contractor shall submit method statements detailing the substances / materials to be used, together with the storage, handling and disposal procedures of the materials.

7.4. Solid Waste Management

The Contractor shall institute a waste control and removal system for the site that is acceptable to the ECO. The Contractor shall not dispose of any waste and/or construction debris by burning, or by burying. All waste shall be disposed of off site at an approved landfill site. Consultation with the Bukalo's Solid Waste Management Division should be conducted in this regard. The Contractor shall supply the ECO with a certificate of disposal.

The Contractor shall supply waste bins/skips where construction personnel are working. The bins shall be secured in such a manner as to prevent their contents blowing out. The Contractor shall ensure that all personnel immediately deposit all waste in the waste bins for removal by the Contractor. Waste shall be properly contained in a scavenger, water and wind-proof containers until disposed of at an approved landfill. Bins shall be emptied and waste removed at least once a week from the site. The bins shall not be used for any purposes other than waste collection.

Petroleum, chemical, harmful and hazardous waste throughout the site shall be stored in enclosed, bunded areas, the location of which shall be determined on site in conjunction with the ECO. The bunded areas shall be clearly marked. Such waste shall be disposed of off site at the nearest hazardous waste disposal site.

7.5. Cement and Concrete Operations

The contractor is advised that cement and concrete are regarded as materials that are potentially damaging to the natural environment on account of the very high pH of the material, and the chemicals contained therein. The contractor shall ensure that all operations that involve the use of cement and concrete are carefully controlled.

The contractor shall submit a construction procedure for mixing of concrete for approval by the ECO/EM prior to commencing any such work. Concrete mixing shall only take place in agreed specific areas on site. Concrete shall not be mixed directly on the ground below the 1:100 floodline.

Water and slurry from concrete mixing operations shall be contained to prevent pollution of the ground surrounding the mixing points. Old cement bags shall be placed in wind and spill proof containers as soon as they are empty. The contractor shall not allow closed, open or empty bags to lie around the site.

Where exposed aggregate finishes are specified the contractor shall collect all cement-laden water and store it in conservancy tanks for disposal off site at an approved disposal site.

All visible remains of excess concrete shall be physically removed immediately and disposed of as waste. Washing the visible signs into the ground is not acceptable. All excess aggregate shall also be removed.

All excess concrete shall be removed from site on completion of concrete works and disposed of. Washing of the excess into the ground is not allowed. Should it be necessary to clean concrete tankers/trucks on site, a method statement has to be approved by the ECO prior to such activity. No cement or concrete laden water will be permitted to be drained directly into any watercourse.

7.6. Surfacing Materials

Over spray of bitumen products outside of the road surface and onto roadside vegetation shall be prevented using a method approved by the EM. All areas to be surfaced with any bitumen products must be demarcated and no overspray will be permitted. When heating bitumen products, the contractor shall take cognizance of appropriate fire control measures.

Stone chip / excess gravel shall not be left on the road/ paved area verges. This shall be swept and/or raked into piles and removed to an area approved by the EM. Water quality from runoff from any fresh bitumen surfaces shall be monitored by the EM and remedial actions taken where necessary. All excess aggregate shall also be removed.

7.7. Lighting Management

The Contractor shall ensure that any lighting installed on the site for his activities does not interfere with road traffic, or cause an avoidable nuisance to the surrounding properties, or other users of the area. Lighting installed shall, as far as practically possible, be energy efficient. Lighting utilized on site shall be turned off when not in use.

7.8. Waste Water Treatment

7.8.1. Discharge of Construction Water

Construction water in this report, refers to all water affected by construction activities. The Contractor shall construct and operate the necessary collection facilities to prevent pollution. The Contractor shall dispose of collected waste water in a manner agreed with the ECO.

The Contractor may discharge “clean” water overland and allow this water to filter into the ground. However, he shall ensure that he does not cause erosion as a result of any overland discharge. No water shall be allowed to drain onto neighbouring properties or directly into any nearby streams or rivers.

No washing of plant, equipment, concreting equipment etc. shall be permitted on site unless approved by the ECO based on a method statement which deals specifically with the issue of potential pollution of the streams, rivers or stormwater systems.
Should it be necessary to dispose of contaminated water into the municipal sewer or storm water system, written permission is required from the relevant Bukalo.

A Method Statement is required from the Contractor detailing the management of contaminated water. The Contractor shall notify the ECO/EM immediately of any pollution incidents on Site.

7.8.2. Prevention of Soil, Surface-and Groundwater Pollution

The Contractor shall take all reasonable precautions to prevent the pollution of the ground and/or surface water resources on and adjacent to the site as a result of his activities. Such pollution could result from the release, accidental or otherwise, of chemicals, oils, fuels, sewage and waste products, etc. Water pollution can be reduced through the establishment of rules and regulations set by the ECO on water usage which will guide workers and visitors during operation and construction. The relevant drainage patterns are addressed in Section 3, and the potential risk to each determined.

The Contractor shall obtain oil absorbent pads, booms and spill kits, or similar designed products or materials to soak up oil, petrol and diesel. These materials shall be readily available for use wherever construction equipment is working. This should also be available at work stations where fuel and lubricants is being offloaded, stored, equipment is filled and serviced. The Contractor shall ensure that he is familiar with the correct use and disposal of any materials designed to soak up petroleum products. Environmental friendly methods will be used during construction e.g.

- ✓ cement batching on boards, no wash water allowed to run off,
- ✓ paint washing in containers to be removed to licensed site,
- ✓ use of environmental friendly paints with low toxicity,
- ✓ use sand filters for paint brush washing and contain cement bags,
- ✓ waste water from paints with potential high environmental impact must be disposed of in accordance with an agreed method with the ECO.

The Contractor shall ensure that no oil, petrol, diesel, etc. is discharged onto the ground. Pumps and other machinery requiring oil, diesel, etc. that are to remain in one position for longer than two days shall be placed on drip trays or other similar suitable containment structures. These containment

structures shall be watertight and shall be emptied regularly and the contaminated water disposed off-site at a facility capable of handling such waste liquid. Drip trays shall be cleaned before any possible rain events that may result in the drip trays overflowing, and before long week ends and holidays.

The Contractor shall remove all oil, petrol, diesel-soaked soil immediately and shall dispose of it as hazardous waste.

7.9. Site Clean Up and Rehabilitation

7.9.1. Site Clean Up

The Contractor shall ensure that all waste, temporary structures, equipment, materials and facilities used for construction activities are removed upon completion of the project. The Contractor shall clear and clean the construction site to the satisfaction of the ECO upon completion of the project.

7.9.2. Rehabilitation

The proponent will undertake all rehabilitation of areas disturbed as a result of activities on site. Especially areas outside the designated project area. Expenses incurred in rehabilitating these areas shall be for the Contractor's account. The estimated cost of rehabilitation will be provided to the Contractor prior to the rehabilitation work commencing.

Due to the urban setting of the project location, very little vegetation is present in the area. However, if deemed necessary, revegetation of disturbed construction areas shall take place as soon as possible after construction work is completed.

7.10. Emergency Procedures

7.10.1. Fire

The Contractor shall take all the necessary precautions to ensure that fires are not started as a result of activities on site. The Contractor shall report all fires immediately to the municipality and EM.

The Contractor shall be liable for any expenses incurred by any organizations called to assist with fighting fires and for any costs relating to the rehabilitation of burnt areas and/or property, and/or persons should the fire be caused by activities on the site. No open fires for heating or cooking shall be permitted on site.

The Contractor is advised that sparks generated during operations involving welding, cutting of metal or gas cutting can cause fires. Every

possible precaution shall therefore be taken when working with this equipment near potential sources of combustion. Such precautions include having a suitable, tested and approved fire extinguisher immediately available at the site of any such activities and the use of welding curtains.
The Contractor shall be responsible for providing the necessary basic fire-fighting equipment. All equipment shall be maintained in good operating order.

The Contractor shall supply all site offices, workshop areas, materials, stores and any other areas identified by the EM with suitable tested and approved fire fighting equipment. The Contractor shall appoint members of his staff as the fire officer and fire-fighting team. The contractor will train the fire officer and the fire-fighting team. All expenses incurred shall be for the Contractor's account.

The following measures will be followed to reduce the intensity of fires during operational and possible maintenance/decommissioning phase :
Inform workers to perform activities carefully (e.g. some machines create sparks)

- ✓ Restrict smoking to designated areas,
- ✓ Provide fire extinguishers,
- ✓ Restrict fires to designated areas,
- ✓ Emergency response plan related to fuel storage,
- ✓ Emergency fire plan for visitors and staff.

7.10.2. Accidents on Site

The Contractor shall comply with the Occupational Health and Safety Regulations, Local Building Regulations (Bukalo) and any other national, regional or local regulations with regard to safety on site. The Contractor shall ensure that contact details of the local medical services are available to the relevant construction personnel prior to commencing work.

7.10.3. Petroleum, Chemical, Harmful and Hazardous Materials

The Contractor shall ensure that he is familiar with the requirements for the safe storage, handling and disposal of petroleum, chemical, harmful and hazardous materials.

The Contractor shall be responsible for establishing an emergency procedure for dealing with spills of release of these substances. He shall also ensure that the relevant construction personnel are familiar with these emergency procedures.

The Contractor shall submit his emergency procedure to the EM prior to bringing on site any such substances. All spills or accidents involving such

materials are to be recorded. The clean up of spills and any damage caused by the spill shall be for the Contractor's account.

7.10.4. Adverse Weather Conditions

The Contractor shall ensure that any sumps/settling ponds etc. are emptied when necessary and in terms of the agreed method statement. Special care will be taken during rainy periods to prevent their contents from overflowing. The Contractor shall set up a procedure for rapidly emptying any collection points should they be in danger of overflowing.

The Contractor may consider collection points to prevent their filling with rainwater. The measures to be implemented to prevent contamination from wastewater and or polluted storm water shall be addressed in a method statement. The Contractor shall also ensure that rainwater does not run off areas containing pollutants and thus result in a pollution threat. Stockpiles of the fine material such as sand, topsoil material, cement, etc. must also be protected from rain runoff and wind.

The Contractor shall ensure that a procedure is established for dealing with potentially polluted rainwater.

7.10.5. Emergency Advisory Procedures

The Contractor shall ensure that there is an emergency advisory procedure on site before commencing any operations that may cause damage to the environment. The Contractor shall also ensure that site staffs are familiar with all emergency procedures to be followed.

The Contractor shall ensure that lists of all emergency telephone numbers/contact people are kept up to date, and that all numbers and names are posted at relevant locations at all times.

7.11. Compliance Monitoring

7.11.1. Procedures

The Contractor shall comply with the environmental specifications and requirements on an ongoing basis and any failure on his part to do so will entitle the EM to impose a penalty. In the event of non-compliance the following recommended process shall be followed:

- ✓ The EM shall issue a notice of non-compliance to the Contractor, stating the nature and magnitude of the contravention. A copy shall be provided to the ECO.
- ✓ The Contractor shall act to correct the non-conformance within 24 hours of receipt of the notice, or within a period that may be specified within the notice.

- ✓ The Contractor shall provide the EM with a written statement describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions. A copy shall be provided to the ECO.
- ✓ In the case of the Contractor failing to remedy the situation within the predetermined time frame, the EM shall impose a monetary penalty based on the conditions of contract.
- ✓ In the case of non-compliance giving rise to physical environmental damage or destruction, the EM shall be entitled to undertake or to cause to be undertaken such remedial works as may be required to make good such damage and to recover from the Contractor the full costs incurred in doing so.
- ✓ In the event of a dispute, difference of opinion, etc. between any parties in regard to or arising out of interpretation of the conditions of the EMP, disagreement regarding the implementation or method of implementation of conditions of the EMP, etc. any party shall be entitled to require that the issue be referred to specialists for determination.
- ✓ The EM shall at all times have the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remediation measures.

Any non-compliance by the contractor under instructions of the applicant will be regarded as non-compliance by the applicant and the contractor will not be held liable for such action.

7.11.2. Offences and Penalties

Any avoidable non-compliance with the conditions of the EMP shall be considered sufficient ground for the imposition of a penalty. Possible offences, which should result in the issuing of a contractual penalty, include, but are not limited to:

- ✓ Unauthorized entrance into no-go areas e.g. river outside designated construction site;
- ✓ Unauthorized damage to natural vegetation;
- ✓ Unauthorized camp establishment (including stockpiling, storage, etc.);
- ✓ Hydrocarbons / hazardous material: negligent spills / leaks and insufficient storage;
- ✓ Ablution facilities: non-use, insufficient facilities, insufficient maintenance;
- ✓ Late method statements or failure to submit method statements;
- ✓ Insufficient solid waste management (including clean-up of litter, unauthorized dumping etc.);
- ✓ Erosion due to negligence / non-performance;
- ✓ Excessive cement / concrete spillage / contamination;

- ✓ Insufficient fire control and unauthorized fires;
- ✓ Preventable damage to water courses or pollution of water bodies; and
- ✓ Non-induction of staff.

7.11.3. Environmental Monitoring

Periodic inspections will be performed by the ECO. These will consist of formal reviews of conformance against policies and procedures stated in this document. Inspections will occur on a monthly basis (or as required). Supervisors in all work areas will conduct performance and compliance reviews, using the EMP as guideline to ensure compliance.

7.11.4. EMP Administration

Copies of this EMP shall be kept at the site office and should be distributed to all senior staff members, including those of the contractors.

7.11.5. EMP Amendments

The EMP amendments can only be made with the approval of the EM and ECO, and if required ultimately the Office of the Environmental Commissioner. Amendments to the EMP should be liaised to all employees and contractors.

7.11.6. Non-Compliance

Problems may occur in carrying out mitigation measures or monitoring procedures that could result in non-compliance of the EMP. The responsible personnel should encourage staff to comply with the EMP, and address acts of non-compliance and penalties.

The ESO is responsible for reporting non-conformance with the EMP, to the ECO. The ESO, in consultation with the ECO must, thereafter, undertake the following activities:

- ✓ Investigate and identify the cause of non-conformance.
- ✓ Report matters of non-conformance to Bukalo Village Council (depending on the severity of the incident).
- ✓ Implement suitable corrective action as well as prevent recurrence of the incident.
- ✓ Assign responsibility for corrective and preventative action.
- ✓ Any corrective action taken to eliminate the causes of non-conformance shall be appropriate to the magnitude of the problems and commensurate with the environmental impact encountered.

7.11.7. Environmental Register

An environmental register should be kept on site in which incidents related to actual impacts are recorded. This will include information related to incidents as spillages, dust generation and complaints from adjacent neighbours. It should also contain information relating to actions taken. Any party on site may complete the register, however, it is envisaged that the EM, ESO and the contractor(s) will be the main contributors, and who will also be the main parties involved in suggesting mitigation measures.

7.11.8. Site Management

Areas outside the designated working zone shall be considered "no go" areas. The offloading zones must be clearly demarcated when offloading goods to enhance safety around the project location.

7.11.9. Access Routes and Work Sites

Vehicular movement, construction trucks and earthmoving equipment will access the site from the D3509. No new tracks/roads shall be established and only existing roads may be used. Work sites shall be clearly demarcated and road signs erected were needed. The general public should not have unauthorised/uncontrolled access to the work sites during both maintenance and possible decommission phase.

Vehicle access will be limited to a single entrance (where necessary) to facilitate control. The entrance will be manned during the operation hours, but will be locked during non-operational hours to prevent unauthorised entry.

A notice board, in two languages or more, must be erected at the entrance and must state the most pertinent site health and safety issues, the operator/responsible person and emergency telephone numbers. Suitable signs must also be erected on the approach roads and on-site, to direct drivers and to control speed.

Furthermore, on-going controls, such as fencing and policing, must be implemented.

7.11.10. Staff Management

The Contractor must ensure that their employees have suitable personal protective equipment and properly trained in fire fighting and first aid. Training records must be kept for future references.

8. ENVIRONMENTAL MANAGEMENT MEASURES FOR MAINTENANCE AND POSSIBLE PHASE

This section will look at the potential environmental impacts, which may arise during the maintenance/possible decommissioning phase of the existing Bukalo Service Centre Fuel Retail Facility (*i.e.* short and long-term impacts).

8.1. Maintenance/Possible Decommission Phase: Construction Vehicles and Equipment

Table 3. Transport of Construction Material

Maintenance/Possible Decommissioning phase	
Management Aspect	Transport of Construction Material
Proposed Mitigation Measures	▪ Secure all loads to prevent spillage during transportation. ▪ Park delivery vehicles on impermeable surfaces for delivery of materials. If this is impractical, drip trays are to be used if there are any chances of fuel or oil spills from delivery vehicles. ▪ Ensure haul vehicles transporting fine materials have suitable covers e.g. tarpaulins if there is any chance of dust being created during transport. ▪ Optimise load sizes during transport of construction materials to avoid spillages.
Proposed Monitoring	Regular visual inspections by EM and ESO.
Performance Indicators	Number and size of spills or leakages, visible contaminants from trucks, trucks are adequately equipped with proper covers and equipment.
Responsible Party	Contractor

Table 4. Control of Speed

Maintenance/Possible Decommissioning phase	
Management Aspect	Speed Control
Proposed Mitigation Measures	▪ Implement and enforce strict speed control measures for all vehicles and machinery operating on site or frequenting the site. ▪ Inform drivers of construction vehicles of relevant speed limits and implement speed control mechanisms where possible.
Proposed Monitoring	Regular visual inspection by EM and ESO .
Performance Indicators	Number of complaints, Drivers sign awareness register
Responsible Party	ESO/Contractor

Table 5. Spillages and Leakages

Maintenance/Possible Decommissioning phase	
Management Aspect	Spills and Leaks
Proposed Mitigation Measures	▪ Prevent spillages of any chemicals and petroleum products (i.e. oils, lubricants, petrol and diesel). Use drip trays, linings or concrete floors when evidence of leaks are observed on vehicles or equipment. ▪ No major servicing and maintenance of vehicles and/or equipment should be conducted at the site. ▪ All fuelling, storage and chemical handling should be conducted on surfaces provided for this purpose. Drip trays, linings or concrete floors must be used when removing oil from machinery. ▪ Spillage control procedures must be in place according to relevant SANS standards or better. Waste water collection systems should be connected to these systems. ▪ Proper environmental awareness and remedial response training of operators must be conducted on a regular basis.
Proposed Monitoring	Monthly EMP compliance and audit by ECO, Regular visual inspections by EM, daily and weekly inspections by ESO, records of remediation.
Performance Indicators	Number and size of spills or leakages; visible contaminants from trucks and equipment; evidence that leaking equipment decommissioned; evidence of soil and water contamination.
Responsible Party	Contractor

Table 6. Traffic

Maintenance/Possible Decommissioning phase	
Management Aspect	Traffic
Proposed Mitigation Measures	▪ Install and maintain official traffic signalling (where necessary) on local roads / intersections surrounding the project location during the construction phase in conjunction with local traffic authorities. ▪ Confine heavy vehicles to primary roads as far as possible, and avoid roads not designated for heavy cargo loads.
Proposed Monitoring	Regular visual inspections by EM and ESO.
Performance Indicators	Adequate traffic signage; evidence of traffic congestion
Responsible Party	ESO/Contractor

Table 7. Emissions from vehicles and machinery

Maintenance/Possible Decommissioning phase	
Management Aspect	Emissions
Proposed Mitigation Measures	▪ Ensure all vehicle, plant and equipment are in good condition. ▪ Encourage reduction of engine idling
Proposed Monitoring	Regular visual inspections of air quality at site by EM and ESO; and of vehicle exhaust emissions.
Performance Indicators	Vehicle exhaust emissions; Evidence of vehicles idling long.
Responsible Party	ESO/Contractor

Table 8. No Go Areas

Maintenance/Possible Decommissioning phase	
Management Aspect	No Go Areas
Proposed Mitigation Measures	▪ Confine all vehicles and equipment to designated access roads and parking areas. Prevent use of vehicles in ''no go areas'. ▪ Limit movement of construction vehicles and machinery to the defined network of road accesses.
Proposed Monitoring	Regular visual inspections by EM and ESO.
Performance Indicators	Number of disturbances outside designated area; Evidence of disturbances to vegetation or property outside designated area.
Responsible Party	ESO/Contractor

Table 9. Noise Pollution

Maintenance/Possible Decommissioning phase	
Management Aspect	Noise Pollution
Proposed Mitigation Measures	▪ Ensure the use of construction vehicles and equipment that emit reduced noise levels. ▪ Ensure proper maintenance is conducted on vehicles to ensure the reduction of noise emission.
Proposed Monitoring	Regular visual inspections by EM and ESO.
Performance Indicators	Evidence of no excessive noise.
Responsible Party	ESO/Contractor

8.2. Maintenance/Possible Decommission Phase: Waste Management

Table 10. Storage of Waste

Maintenance/Possible Decommissioning phase	
Management Aspect	Waste Storage
Proposed Mitigation Measures	▪ Ensure that sufficient weather- and vermin- proof bins / containers are present on site for the disposal of solid waste. Waste and litter generated during this phase must be placed in these disposal bins. ▪ When possible, materials used or generated by construction shall be sorted for recycling or scrap purposes. Ensure waste is segregated, classified and labelled at source ▪ No unauthorised entry into the waste storage areas.
Proposed Monitoring	Regular visual inspections by EM and ESO.
Performance Indicators	Evidence of littering, evidence of adequate waste disposal containers; amount of recyclable material; number of incidents of unauthorised entry.
Responsible Party	ESO/Contractor

Table 11. Disposal of Waste.

Maintenance/Possible Decommissioning phase	
Management Aspect	Waste Disposal
Proposed Mitigation Measures	▪ No disposal of /or burying of waste on site should be conducted. ▪ No waste should be burned on site. ▪ Empty bins weekly or more regularly (when required).
Proposed Monitoring	Weekly inspections by EM and ESO. Audit Record/Receipts for waste disposal.
Performance Indicators	Note evidence of littering / waste disposal on site; number of incidents of waste burning on site; disposal certificates on record; method statement.
Responsible Party	ESO/Contractor

Table 12. Disposal of Hazardous Waste

Maintenance/Possible Decommissioning phase	
Management Aspect	Disposal of Hazardous Waste
Proposed Mitigation Measures	▪ Separate hazardous wastes from general waste, clearly marked, and stored in appropriate containers. ▪ Solid and liquid hazardous waste shall be stored in separate containers. ▪ The hazardous waste storage is to be clearly marked to indicate the presence of hazardous substances, and the protocols associated with handling of such hazardous wastes shall be known by all relevant staff members. ▪ Ensure that all contaminated soils; and waste oils, lubricants and grease from containment systems should be disposed of at the Kupferberg hazardous waste disposal facility. ▪ Awareness of the hazardous nature of various types of waste should be enforced.
Proposed Monitoring	Visual inspection by EM and ESO; Note evidence of Record/Receipts for hazardous waste disposal.
Performance Indicators	Record of disposal certificates; various hazardous waste types (e.g. waste oils, lubricants etc) are accounted for in the disposal certificate.
Responsible Party	ESO/Contractor

8.3. Maintenance/Possible Decommission Phase: Waste Water Management

Table 13. Contamination of Surface Water

Maintenance/Possible Decommissioning phase	
Management Aspect	Contamination of Surface Water
Proposed Mitigation Measures	▪ Contamination of surface water might occur through oil leakages, hydrocarbon fuel, lubricants and grease from the earthmoving (heavy-duty) vehicles and equipment during the construction phase. ▪ Spillage control procedures must be in place according to relevant SANS standards or better. ▪ Prevent discharge of any pollutants, such as cements, concrete, lime, chemicals, and hydrocarbons into water courses. ▪ Direct run-off from areas with high risk of accidental releases of oil or hazardous materials (e.g. fuelling or fuel transfer locations, truck washing bays, concrete swills etc.) into containment basins or conservancy tanks and dispose of contaminated water at an approved site. ▪ Prevent illegal washing out of containers in water courses. ▪ Conditions of any reticulation systems (i.e. fuel, sewage, water etc) both existing and new will have to be checked regularly and repaired (if necessary) to prevent leakages. ▪ Proper environmental awareness and remedial response training of operators must be conducted on a regular basis.
Proposed Monitoring	Regular visual inspection by EM and ESO.
Performance Indicators	Note evidence of surface contamination; Record of contaminated water in water courses; unauthorised activity in water courses.
Responsible Party	ESO/Contractor

Table 14. Leachate

Maintenance/Possible Decommissioning phase	
Management Aspect	Leachate
Proposed Mitigation Measures	▪ Collect samples from identified monitoring points bi-annually and preserve and analyse accordingly.
Proposed Monitoring	Monthly sampling by EM and ECO.
Performance Indicators	Record of sample data.
Responsible Party	ESO/Contractor

8.4. Maintenance/Possible Decommission Phase: Dust Management

Table 15. Minimise Dust

Maintenance/Possible Decommissioning phase	
Management Aspect	Minimise Dust
Proposed Mitigation Measures	▪ Ensure measures are in place to minimise dust generated by construction activities, to the satisfaction of the EM and ECO. ▪ Avoid excavation, handling and transport of materials which may generate dust under high wind conditions or when a visible dust plume is present. ▪ Locate stockpiles of construction materials in sheltered areas where they are not exposed to erosive effects of the wind. ▪ Use appropriate dust suppression measures when dust generation is unavoidable, e.g. dampening with water, particularly during prolonged periods of dry weather. Such measures may include the use of temporary stabilizing measures (e.g. chemical soil binders, chipping etc). ▪ Sweep roads at the site entrance and exit points regularly, to prevent the spread of mud by construction vehicles, which would later result in dust. ▪ Control dust on site roads through wet suppression.
Proposed Monitoring	Regular visual inspection by EM and ESO. Monitoring dust levels during Construction Phase when dust levels are expected to peak to determine whether on-going dust management is required.
Performance Indicators	Record of complaints about dust; visible dust plumes, visible wind erosion.
Responsible Party	ESO/Contractor

Table 16. Monitoring

Maintenance/Possible Decommissioning phase	
Management Aspect	Monitoring
Proposed Mitigation Measures	▪ Monitoring dust levels during this phase when dust levels are expected to peak to determine whether on-going dust management is required.
Proposed Monitoring	Regular monitoring by EM and ESO.
Performance Indicators	Record of monitoring data.
Responsible Party	ESO/Contractor

8.5. Maintenance/Possible Decommission Phase: Noise Management

Table 17. Construction Equipment

Maintenance/Possible Decommissioning phase	
Management Aspect	Construction Equipment
Proposed Mitigation Measures	▪ Maintain construction equipment and vehicles in good working order to prevent unnecessary noise. Where noise levels are unacceptable, the EM and ECO may recommend that noise reduction devices/mufflers be installed on particularly noisy equipment. ▪ Ensure proper design and maintenance of silencers on diesel-powered equipment.
Proposed Monitoring	Regular inspections by EM and ESO.
Performance Indicators	Record of noise complaints.
Responsible Party	ESO/Contractor

Table 18. Blasting

Maintenance/Possible Decommissioning phase	
Management Aspect	Blasting
Proposed Mitigation Measures	▪ No unregulated blasting is permitted on site.
Proposed Monitoring	Regularly monitor complaints and concerns of noise.
Performance Indicators	Record of noise complaints.
Responsible Party	ESO/Contractor

Table 19. General

Maintenance/Possible Decommissioning phase	
Management Aspect	General
Proposed Mitigation Measures	▪ Comply with the Noise Regulations in terms of the Environmental Management Act (No 27 of 2007)
Proposed Monitoring	Regularly monitor complaints and concerns of noise.
Performance Indicators	Record of noise complaints.
Responsible Party	ESO/Contractor

8.6. Maintenance/Possible Decommission Phase: Fire Management

Table 20. Fire-fighting Equipment

Maintenance/Possible Decommissioning phase	
Management Aspect	Fire-fighting Equipment
Proposed Mitigation Measures	▪ Ensure that sufficient fire-fighting equipment is available on site, to the satisfaction of the EM and the local Fire Services. Fire fighting equipment is to be suitably maintained. ▪ Ensure that all personnel on site are aware of the location of fire fighting equipment on the site and how the equipment is operated. Provide appropriate signage and relevant emergency contact details on site. ▪ Provide adequate fire-fighting equipment at fuel storage and dispensing areas.
Proposed Monitoring	Record of attendance register for training sessions; Monthly visual inspections and approvals by EM and ESO.
Performance Indicators	Certification letter from local fire services; Record of awareness registry of fire fighting equipment; Adequate and appropriate signage in place; Fire-fighting equipment in place.
Responsible Party	ESO/Contractor

Table 21. Illegal Fires

Maintenance/Possible Decommissioning phase	
Management Aspect	Illegal Fires
Proposed Mitigation Measures	▪ No fires are permitted on site except in areas designated by the EM. Locate such designated areas as far as possible from vegetated areas, flammable material stores and any other high fire risk areas.
Proposed Monitoring	Regular visual inspections and approvals by EM.
Performance Indicators	Record of number of uncontrolled fires.
Responsible Party	ESO/Contractor

Table 22. Smoking

Maintenance/Possible Decommissioning phase	
Management Aspect	Smoking
Proposed Mitigation Measures	▪ Establish designated smoking area(s) on site. Smoking shall not be permitted in those areas that pose a fire hazard, such as fuel storage areas and areas where vegetation is such that a fire may spread rapidly e.g. open dry grass.
Proposed Monitoring	Regular visual inspections and approvals by EM and ESO.
Performance Indicators	Record of smoking in outside designated areas.
Responsible Party	ESO/Contractor

Table 23. Risk

Maintenance/Possible Decommissioning phase	
Management Aspect	Risk
Proposed Mitigation Measures	▪ Develop fire safety measures to protect the site against fires originating from outside the site.
Proposed Monitoring	Regularly reviewed and approved by ESO, EM and ECO.
Performance Indicators	Record available fire safety measures.
Responsible Party	ESO/Contractor

8.7. Maintenance/Possible Decommission Phase: Construction Site Camp and Boundaries

Table 24. Construction Camp

Maintenance/Possible Decommissioning phase	
Management Aspect	Construction Camp
Proposed Mitigation Measures	▪ Establish suitably fenced construction camp at the start of the contract, which will allow for site offices, vehicle, equipment, material and waste storage areas to be consolidated as much as possible. ▪ Locate the construction camp within a disturbed area within the site boundaries or within areas otherwise approved by the EM.
Proposed Monitoring	Visual inspections and approvals by the EM and ESO.
Performance Indicators	Number of disturbances outside designated construction area; Appropriate construction camp.
Responsible Party	ESO/Contractor

Table 25. Site Boundaries

Maintenance/Possible Decommissioning phase	
Management Aspect	Site Boundaries
Proposed Mitigation Measures	▪ Demarcate the construction site boundaries upon site establishment. Limit all construction and related activities, including material and waste storage within the construction site boundaries or within areas otherwise approved by the EM. ▪ Designate certain areas beyond the boundary of the site as "No Go" areas for all personnel on site. No vehicles, machinery, materials or people shall be permitted in the "No Go" areas at any time without the express permission of the EM. Designate all environmentally sensitive areas as "No Go" Areas. ▪ Ensure the site fencing is in working order. ▪ Inform construction personnel that the unauthorised entrance or encroaching on neighbouring properties is strictly prohibited.
Proposed Monitoring	Weekly visual inspections and approvals by EM and ESO.
Performance Indicators	Record number of disturbances outside designated construction area; Evidence that site boundary is well demarcated and fencing is in good condition.
Responsible Party	ESO/Contractor

Table 26. Laydown Areas

Maintenance/Possible Decommissioning phase	
Management Aspect	Laydown Areas
Proposed Mitigation Measures	▪ Contractor to use the designated lay down areas during construction, thus minimising disturbance.
Proposed Monitoring	Regular visual inspections and approvals by the EM and ESO.
Performance Indicators	Number of disturbances outside designated area.
Responsible Party	ESO/Contractor

Table 27. Maintenance Area

Maintenance/Possible Decommissioning phase	
Management Aspect	Maintenance Area
Proposed Mitigation Measures	▪ Designate an area on site for the servicing of equipment and vehicles with an impermeable lining to contain any spillage during services, and to prevent soil contamination. **On-site maintenance of equipment should only be considered (and approved), under extreme conditions.** ▪ Surface run-off from this area must be treated as contaminated water, and must be directed to a conservancy tank or containment basin for suitable disposal.
Proposed Monitoring	Visual inspections and approvals by EM and ESO.
Performance Indicators	Evidence of spills.
Responsible Party	ESO/Contractor

Table 28. Break/Canteen Areas

Maintenance/Possible Decommissioning phase	
Management Aspect	Break/Canteen Areas
Proposed Mitigation Measures	▪ Designate areas for personnel to eat during breaks within the site boundary.
Proposed Monitoring	Regular or weekly inspections by EM and ESO.
Performance Indicators	Evidence of designated areas in place; Number of incidences of personnel not using designated areas.
Responsible Party	ESO/Contractor

Table 29. Ablution Facilities

Maintenance/Possible Decommissioning phase	
Management Aspect	Ablution Facilities
Proposed Mitigation Measures	▪ Provide suitable toilet facilities which are covered, closed, ventilated and should offer hand-washing facilities. One (1) toilet per 20 workers should be provided. ▪ Toilets should be located within a radius of 50m for construction staff in areas of concentrated construction activities and within a radius of 200m elsewhere on site. If workers are not making use of the toilet facilities due to distance from work areas, additional toilets will need to be provided. ▪ Secure all temporary / portable toilets to the ground to the satisfaction of the EM to prevent them toppling due to wind or any other cause. ▪ Maintain toilets in a hygienic state and remove waste to a licensed disposal facility. ▪ Ensure that no spillages occur when the toilets are cleaned or emptied. ▪ Prohibit urination on site, other than at designated facilities.
Proposed Monitoring	Regular visual inspections and approvals by EM and ESO.
Performance Indicators	Sufficient ratio of toilets; Number of incidents of personnel not using facilities; State of toilets; Evidence of overflow, leakages or spillages; Records of waste disposal.
Responsible Party	EM, ESO and Contractor

8.8. Maintenance/Possible Decommission Phase: Safety and Security

Table 30. Signage

Maintenance/Possible Decommissioning phase	
Management Aspect	Signage
Proposed Mitigation Measures	▪ Display telephone numbers of emergency services, including the local fire fighting service, in the Contractor's office and at the entrance to the site. Contact the emergency services in the area in the case of an emergency. ▪ Provide suitable emergency and safety signage on site (manufactured of durable, weatherproof material) displayed at prominent and conspicuous places along the fences and entry gates. Demarcate any areas which may pose a safety risk (including hazardous substances, deep excavations etc). These notices must be worded in the official languages applicable to the area.
Proposed Monitoring	Regular visual inspections and approvals by EM and ESO.
Performance Indicators	Evidence of signage in place.
Responsible Party	ESO/Contractor

Table 31. Personal Protective Equipment (PPE)

Maintenance/Possible Decommissioning phase	
Management Aspect	Personal Protective Equipment
Proposed Mitigation Measures	▪ Enforce the use of appropriate Personal Protective Equipment (PPE) at all times.
Proposed Monitoring	Regular daily inspections ESO, and weekly inspections by EM.
Performance Indicators	Evidence of personnel using construction machinery or equipment possessing appropriate PPE.
Responsible Party	ESO/Contractor

Table 32. Illegal Access

Maintenance/Possible Decommissioning phase	
Management Aspect	Illegal Access
Proposed Mitigation Measures	▪ Prevent illegal access to the site by implementing appropriate security measures. These security measures must not pose a threat to surrounding communities.
Proposed Monitoring	Visual inspections and approvals by EM and ESO.
Performance Indicators	Evidence of appropriate measures in place.
Responsible Party	ESO/Contractor

8.9. Maintenance/Possible Decommission Phase: Site Clearing

Table 33. Topsoil Cover

Maintenance/Possible Decommissioning phase	
Management Aspect	Topsoil Cover (if any)
Proposed Mitigation Measures	▪ Remove topsoil and stockpile on site prior to excavation. Ensure stockpiles are located within the boundary of the site and are protected from erosion.
Proposed Monitoring	Visual inspections and approvals by EM and ESO.
Performance Indicators	Evidence of proper stockpiling and management.
Responsible Party	ESO/Contractor

Table 34. Erosion

Maintenance/Possible Decommissioning phase	
Management Aspect	Erosion
Proposed Mitigation Measures	▪ Stabilise cleared areas as soon as possible to prevent and control surface erosion. The method of stabilization shall be determined in consultation with the EM.
Proposed Monitoring	Visual inspections and approvals by EM and ESO.
Performance Indicators	Evidence of surface erosion.
Responsible Party	ESO/Contractor

Table 35. Vegetation Clearing

Maintenance/Possible Decommissioning phase	
Management Aspect	Vegetation Clearing (if any)
Proposed Mitigation Measures	▪ Avoid clearing of vegetation until such time as soil stripping is required and exposed surfaces shall be stabilized as soon as is practically possible. ▪ Limit clearing of vegetation to those areas within the footprint of construction, minimise open areas and reduce the frequency of disturbance.
Proposed Monitoring	Visual inspections and approvals by EM and ESO.
Performance Indicators	Evidence of surface erosion; Number of disturbances outside designated.
Responsible Party	ESO/Contractor

Table 36. Batching

Maintenance/Possible Decommissioning phase	
Management Aspect	Batching
Proposed Mitigation Measures	▪ Ensure small scale cement batching (if required) occurs within the project footprint.
Proposed Monitoring	Regular daily inspections by ESO, and weekly inspections by EM.
Performance Indicators	Records of batching outside designated area.
Responsible Party	ESO/Contractor

Table 37. Cleaning

Maintenance/Possible Decommissioning phase	
Management Aspect	Cleaning
Proposed Mitigation Measures	▪ Clean cement truck delivery chutes at a designated area on the site, if it is essential that they are cleaned before leaving the site. The area designated for cleaning of delivery chutes is to be agreed on with the EM and is to be suitably contained to prevent contamination of soil, and to allow for the containment of contaminated water.
Proposed Monitoring	Visual inspections and approvals by EM and ESO.
Performance Indicators	Evidence of cleaning outside designated areas.
Responsible Party	ESO/Contractor

Table 38. Contaminated Water

Maintenance/Possible Decommissioning phase	
Management Aspect	Contaminated Water
Proposed Mitigation Measures	▪ Contain contaminated water from batching operations and allow sediments to settle before being disposed of as waste water.
Proposed Monitoring	Regular daily inspections by ESO, and weekly inspections by EM.
Performance Indicators	Evidence of contamination of soil and water.
Responsible Party	ESO/Contractor

Table 39. Cement Bags

Maintenance/Possible Decommissioning phase	
Management Aspect	Cement Bags
Proposed Mitigation Measures	▪ Place cement bags in bins and dispose of bags as waste to a licensed waste disposal facility.
Proposed Monitoring	Regular inspections by ESO.
Performance Indicators	Evidence of waste on site.
Responsible Party	ESO/Contractor

Table 40. Asphalt/Bitumen

Maintenance/Possible Decommissioning phase	
Management Aspect	Asphalt/Bitumen
Proposed Mitigation Measures	▪ Prevent over spray of bitumen products outside of the road surface.
Proposed Monitoring	Visual inspections and approvals by ESO and EM.
Performance Indicators	Evidence of waste on site.
Responsible Party	ESO/Contractor

Table 41. Gravel/Pavers

Maintenance/Possible Decommissioning phase	
Management Aspect	Gravel/Pavers
Proposed Mitigation Measures	▪ Sweep / rake / stack excess stone chip / gravel / pavers into piles and dispose at a licensed waste disposal facility.
Proposed Monitoring	Regular daily inspections by ESO, and weekly inspections by EM.
Performance Indicators	Evidence of waste on site.
Responsible Party	ESO/Contractor

Table 42. Local Labour

Maintenance/Possible Decommissioning phase	
Management Aspect	Local Labour
Proposed Mitigation Measures	▪ Give priority to the local population with employment opportunities, provided applicants have the necessary skills. ▪ Advertise employment opportunities adequately, so as not to limit application opportunities. ▪ Implement a transparent process of contracting staff, following pre-established and accepted criteria.
Proposed Monitoring	Internal audit by Vivo Energy Namibia Ltd.
Performance Indicators	Tender document requirements for local labour; Records of advertisements; Targets for local labour.
Responsible Party	Bukalo Service Centre , EM and Contractor

8.10. Maintenance/Possible Decommission Phase: Heritage Resources

Table 43. Heritage Resources

Maintenance/Possible Decommissioning phase	
Management Aspect	Heritage Resources
Proposed Mitigation Measures	▪ Report all exposed heritage remains to the National Heritage Council of Namibia (NHC). Heritage remains uncovered must not be disturbed until approval has been obtained from NHC. ▪ Ensure that all Contractors and Sub-contractors are made aware of the potential existence of heritage resources, and instructed on the correct procedure for preserving the integrity thereof.
Proposed Monitoring	Regularly record and document findings (if any); Visual inspections of findings; Record of heritage resources awareness programme or session.
Performance Indicators	Records of correspondence, and appointment of archaeologist; Evidence that awareness session(s) is conducted.
Responsible Party	EM, ESO and Contractor

8.11. Maintenance/Possible Decommission Phase: Site Rehabilitation

Table 44. Exposed Areas

Maintenance/Possible Decommissioning phase	
Management Aspect	Exposed Areas
Proposed Mitigation Measures	▪ Reshape and stabilize all exposed areas and areas damaged by construction vehicles and personnel as soon as possible to prevent and control dust and erosion. ▪ Restrict traffic and general movement over stabilised areas.
Proposed Monitoring	Final approval of site closure by EM and ECO.
Performance Indicators	Evidence of erosion.
Responsible Party	ESO/Contractor

Table 45. Construction Equipment/Materials

Maintenance/Possible Decommissioning phase	
Management Aspect	Construction Equipment/Materials
Proposed Mitigation Measures	▪ Remove all vehicles, equipment, waste and surplus materials, including site offices and other facilities for workers, from the site.
Proposed Monitoring	Visual inspections and approvals by EM and ECO.
Performance Indicators	Completion of identified actions in site closure.
Responsible Party	ESO/Contractor

Table 46. Spillages

Maintenance/Possible Decommissioning phase	
Management Aspect	Spillages
Proposed Mitigation Measures	▪ Clean up and remove any spills and contaminated soil on site.
Proposed Monitoring	Visual inspections and approvals by EM and ECO.
Performance Indicators	Completion of identified actions in site closure.
Responsible Party	ESO/Contractor

Table 47. Checklist

Maintenance/Possible Decommissioning phase	
Management Aspect	Checklist
Proposed Mitigation Measures	▪ Ensure the EM and ECO are satisfied with the site and that all actions identified in the site closure checklist have been completed.
Proposed Monitoring	Visual inspections and approvals by EM and ECO.
Performance Indicators	Completion of identified actions in site closure.
Responsible Party	ESO/Contractor

9. ENVIRONMENTAL MANAGEMENT MEASURES FOR OPERATIONAL PHASE

This section will look at the potential environmental impacts, which may arise during the operational phase of the Bukalo Service Centre Fuel retail facility (*i.e.* short and long-term impacts).

9.1. Operational Phase: General

Table 48. Documentations of Administration

Operational phase	
Management Aspect	Documentations of Administration
Proposed Mitigation Measures	▪ Maintain records and attendance registers of environmental awareness training courses on site. ▪ Ensure a Complaints Register is available on-site and is up-to-date. ▪ Maintain environmental authorisations/permits/licences on site. ▪ Take photographs of any areas of concern for record purposes e.g. before and after photos of non- compliance and corrective action. ▪ Revise the EMP should any environmental issues crop up during the Operational Phase. Submit the revised EMP to DEA and DWA for review.
Proposed Monitoring	Weekly inspections; Internal audit.
Performance Indicators	Record of complaints and action; Records of licence and permits; Evidence and records of updated EMPs (when necessary).
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 49. Operational Plan

Operational phase	
Management Aspect	Operations
Proposed Mitigation Measures	▪ Comply with the procedures set out in the Operations Plan.
Proposed Monitoring	Internal audit.
Performance Indicators	Performance report.
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 50. Environmental Audit Reports

Operational phase	
Management Aspect	Environmental Audit Reports
Proposed Mitigation Measures	▪ Conduct internal environmental compliance regularly (preferably once a year) when operations begin. ▪ Specify the performance and conformity of the project with all the conditions of authorisation and all the commitments made by the proponent in this EMP. ▪ Submit the audit reports to the relevant authorities (when required).
Proposed Monitoring	Internal audit.
Performance Indicators	Evidence and records of internal auditing.
Responsible Party	EM/ BUKALO SERVICE CENTRE

9.2. Operational Phase: Hazardous Substances Management

Table 51. Disposal of Hazardous Substances

Operational phase	
Management Aspect	Disposal of Hazardous Substances
Proposed Mitigation Measures	▪ All hazardous waste should be safely contained, transported and disposed of at the nearest **hazardous waste disposal site**.
Proposed Monitoring	Regular visual inspection; Internal audit; Weekly inspections; Audit of records/labelling.
Performance Indicators	Record of hazardous material received.
Responsible Party	EM/ BUKALO SERVICE CENTRE

9.3. Operational Phase: Vehicles and Equipment

Table 52. Speed Management

Operational phase	
Management Aspect	Speed Management
Proposed Mitigation Measures	▪ Notify drivers of vehicles of relevant speed limits within the project location and put into practice speed control methods (where feasible).
Proposed Monitoring	Regular visual inspection.
Performance Indicators	Records of number of complaints.
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 53. Spillages and Leakages

Operational phase	
Management Aspect	Spillages and Leakages
Proposed Mitigation Measures	▪ Ensure compliance to the maintenance and service plans. ▪ Ensure that transportation vehicles are equipped with sufficient equipment and material to contain and remediate any accidental spills; and to remove any contaminated soil or water. ▪ Ensure that any petroleum products, such as grease, waste oils and lubricants are contained in containment structures (e.g. plastic liners, drip trays etc.). These structures are to be used during all servicing or refuelling equipment. ▪ Vehicle and equipment should be serviced and maintained regularly. All leaks should be properly contained and repaired immediately. ▪ Leaking equipment should be removed from the work area to a designated containment area, which should be equipped with a waste water collection system. ▪ Equipment and materials to deal with spill cleanup must be readily available on site and staff must be trained as to how to use the equipment and briefed about reporting procedures.
Proposed Monitoring	Regular weekly visual inspection; Records of remediation.
Performance Indicators	Records of vehicle maintenance; Record visible contaminants from trucks and equipment.
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 54. Transport of Materials

Operational phase	
Management Aspect	Transport of Materials
Proposed Mitigation Measures	▪ Make sure all loads are secure to prevent spillage during transportation of material. ▪ All operational surfaces at the project location must be installed with spill containment areas. ▪ All vehicles should be parked on designated containment areas. Drip trays must to be used if there is any chance of fuel or oil spills from vehicles.
Proposed Monitoring	Regular visual inspection.
Performance Indicators	Records of number of spills and incidences.
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 55. No Go Areas

Operational phase	
Management Aspect	No Go Areas
Proposed Mitigation Measures	▪ No movement of persons outside designated footprint is allowed. ▪ Confine all operational vehicles to designated access roads and parking areas. Prevent use of vehicles in "No Go" Areas.
Proposed Monitoring	Regular visual inspection.
Performance Indicators	Number of disturbances outside designated area
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 56. Noise Pollution

Construction/Decommissioning phase	
Management Aspect	Noise Pollution
Proposed Mitigation Measures	▪ Ensure the use operational vehicles, equipment and machines that emit reduced noise levels, compatible with the most recent environmental standards. ▪ Ensure proper maintenance are conducted on vehicles to ensure the reduction of noise emission. ▪ Where necessary, workers should be equipped with ear protection equipment. ▪ Daily operational activities should be limited to 07H00 - 19H00 (where feasible).
Proposed Monitoring	Regular visual inspections.
Performance Indicators	Evidence of no excessive noise.
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 57. Emissions from vehicles and machinery

Construction/Decommissioning phase	
Management Aspect	Emissions
Proposed Mitigation Measures	▪ Air quality around the site could be impacted by exhaust fumes from operational trucks and vehicles accessing the project site. ▪ Ensure all vehicle, plant and equipment are in good condition. ▪ Promote the reduction of engine idling at the project site.
Proposed Monitoring	Regular visual inspections of air quality at site; and of vehicle exhaust emissions.
Performance Indicators	Evidence of vehicles idling too long.
Responsible Party	EM/ BUKALO SERVICE CENTRE

9.4. Operational Phase: Waste Management

Table 58. General Operations

Operational phase	
Management Aspect	General Operations
Proposed Mitigation Measures	↓ Ensure transport vehicles are suitable to transport the class and type of waste generated during the operations of the fuel retail facility. ↓ No illegal waste dumping outside designated project footprint; or burning of waste on site.
Proposed Monitoring	Regular visual inspection.
Performance Indicators	Evidence of no waste dumped or burned on site; Suitable vehicles for transportation of waste.
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 59. Large Scrap Materials

Operational phase	
Management Aspect	Large Scrap Materials
Proposed Mitigation Measures	↓ No scrap metal should be stored at the project premises.
Proposed Monitoring	Regular inspection of large scrap waste material on site.
Performance Indicators	Records and evidence of scrap material project site.
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 60. Green Waste

Operational phase	
Management Aspect	Green Waste
Proposed Mitigation Measures	↓ Ensure that all green waste is securely stored in suitable containment containers on site, in order to prevent any potential scavengers. The waste should be securely transported and disposed off at a suitable Compost Facility.
Proposed Monitoring	Regular visual inspections.
Performance Indicators	Evidence of minimal green waste placed in general waster bins.
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 61. Hazardous Waste

Operational phase	
Management Aspect	Hazardous Waste
Proposed Mitigation Measures	▪ Hazardous waste should be properly stored, transported and disposal at any hazardous waste disposal site. ▪ Awareness of the hazardous nature of various types of waste should be enforced.
Proposed Monitoring	Regular visual inspection at waste at site; Record/Receipts for hazardous waste disposed.
Performance Indicators	Record of disposal certificates; Evidence of hazardous waste at project site
Responsible Party	EM/ BUKALO SERVICE CENTRE

9.5. Operational Phase: Waste Water Management

Table 62. Stormwater Management

Operational phase	
Management Aspect	Stormwater Management
Proposed Mitigation Measures	▪ Ensure all stormwater drains or channels are clear of litter or obstructing material. Remove all excess sedimentation, rubble and any other waste material present in the waterway and dispose of in a suitable manner to ensure proper drainage runoff. ▪ Ensure that stormwater management systems are regularly maintained and tested, and are in good working order.
Proposed Monitoring	Regular visual inspections of storm water channels; Visual monitoring of stormwater pooling or overflowing into water courses; Internal audit.
Performance Indicators	Evidence of no storm water pooling or overflowing into water courses; Evidence of no leakages or pollution from stormwater ways.
Responsible Party	EM/ BUKALO SERVICE CENTRE

9.6. Operational Phase: Air Quality Management

Table 63. Minimise Dust

Operational phase	
Management Aspect	Minimise Dust
Proposed Mitigation Measures	▪ Acquire all reasonable measures to minimise dust generated by operational activities. ▪ Avoid handling and transporting of materials which may generate dust under high wind conditions or when a visible dust plume is present. ▪ Establish stockpiles of materials in secluded areas where they are not exposed to the erosive effects of the wind. ▪ Appropriate dust suppression measures should be deployed when dust generation is unavoidable, e.g. dampening with water (wet suppression.), particularly during prolonged periods of dry weather. ▪ Sweep roads at site entrance and exit points regularly, to prevent the spread of mud by vehicles, which would later result in dust.
Proposed Monitoring	Regular visual inspections by EM.
Performance Indicators	Records of number of dust complaints; Visible dust plumes; Visible wind erosion.
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 64. Air Quality Management

Operational phase	
Management Aspect	Air Quality Management
Proposed Mitigation Measures	▪ Retain the objection mechanism to capture public perceptions and complaints with regard to air quality impacts, track investigation actions and introduce corrective measures for continuous improvement.
Proposed Monitoring	Regular visual inspection; Internal audit.
Performance Indicators	Records of grievance procedure.
Responsible Party	EM/ BUKALO SERVICE CENTRE

9.7. Operational Phase: Fire Management

Table 65. Control of Fires

Operational phase	
Management Aspect	Control of Fires
Proposed Mitigation Measures	▪ Avoid smoking in areas that are close to fire hazard areas and environments, such as fuel storage areas and areas of dry vegetation. ▪ Ensure that sufficient fire-fighting equipment is available on site. Fire fighting equipment is to be suitably maintained. ▪ Supply appropriate signage and relevant emergency contact details on site and displayed outside the main administration building. ▪ Do not allow informal cooking or warming fires on the site. ▪ Appoint a fire officer who shall be responsible for co-coordinating emergency response in the event of a fire according to the Emergency Response Plan. ▪ Staff to be sufficiently trained in the operation of fire-fighting equipment. ▪ Establish and maintain designated smoking areas.
Proposed Monitoring	Regular visual inspections; Designated smoking areas; Records of fire fighting training and awareness.
Performance Indicators	No evidence of fires on site; Certification from local fire services; Appointment of fire officer(s); Number of uncontrolled fires.
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 66. Risk

Operational phase	
Management Aspect	Risk
Proposed Mitigation Measures	▪ Conform to fire safety measures to protect the project development against fires originating from outside the site.
Proposed Monitoring	Internal audit
Performance Indicators	Fire safety measures
Responsible Party	EM/ BUKALO SERVICE CENTRE

9.8. Operational Phase: Noise Management

Table 67. Noise

Operational phase	
Management Aspect	Operational Equipment
Proposed Mitigation Measures	▪ Utilise stringent vehicle and equipment noise specifications. ▪ Comply with the Service Plan. ▪ Perform appropriate and timeous maintenance of equipment and vehicles. ▪ Ensure proper design and maintenance of silencers on diesel-powered equipment. ▪ Maintain the grievance mechanism to capture public perceptions and complaints with regard to noise impacts, track investigation actions and introduce corrective measures for continuous improvement.
Proposed Monitoring	Regular visual inspections; Suitable maintenance schedules; Internal audit.
Performance Indicators	Record of noise complaints; Evidence of no excessive noise; Records of grievance procedure.
Responsible Party	EM/ BUKALO SERVICE CENTRE

9.9. Operational Phase: Visual/Aesthetics Management

Table 68. Buildings

Operational phase	
Management Aspect	Buildings
Proposed Mitigation Measures	▪ Plant additional vegetative screening in and around the project location.
Proposed Monitoring	Regular visual inspections.
Performance Indicators	Evidence of trees planted around in and around the fuel retail facility.
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 69. Litter

Operational phase	
Management Aspect	Litter
Proposed Mitigation Measures	▪ Implement measures to manage litter from the site. These measures should include the following: (a) Cover waste timeously i.e. daily and immediately after disposal when wind speeds exceed 20km/h; (b) Dispose of waste in areas of the site that are sheltered from the wind when high wind speed conditions prevail; and (c) Erect physical barriers such as fences to prevent windblown litter from leaving the immediate confines of the working (disposal) area or plant trees around the site to act as wind breakers. ▪ Regularly clear windblown litter that gathers along fencing or beyond. ▪ Employ people from the local community to collect litter, in and around the project site, should windblown litter become a problem.
Proposed Monitoring	Regular visual inspections.
Performance Indicators	Evidence of no litter in and around the site.
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 70. Dust

Operational phase	
Management Aspect	Dust
Proposed Mitigation Measures	▪ Implement dust suppression/control measures, if conditions are windy.
Proposed Monitoring	Regular visual inspections.
Performance Indicators	Records of number of dust complaints; Visible dust plumes.
Responsible Party	EM/ BUKALO SERVICE CENTRE

9.10. Operational Phase: Environmental and Health Awareness

Table 71. Environmental Awareness

Operational phase	
Management Aspect	Environmental Awareness
Proposed Mitigation Measures	▪ Ensure that all site personnel and all sub-contractors are aware of their environmental obligations on site, through an environmental awareness training programme. ▪ Provide information posters at strategic points on site for site personnel. Posters should include emergency contact details, emergency procedures, and a simple list of key environmental requirements or "do's" and "don'ts".
Proposed Monitoring	Regular visual inspections.
Performance Indicators	Occurrence of training sessions; Evidence of signage in place.
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 72. Health Awareness

Operational phase	
Management Aspect	Health Awareness
Proposed Mitigation Measures	▪ Implement an awareness program and continuous information actions on health issues with lectures, posters and informal information sessions for all workers employed. ▪ Ensure employees are familiar with and adhere to the Health, Security and Safety Plan.
Proposed Monitoring	Attendance register; Internal audit.
Performance Indicators	Records of attendance; Evidence of suitable signage in place; Number of awareness sessions conducted.
Responsible Party	EM/ BUKALO SERVICE CENTRE

9.11. Operational Phase: Safety and Security

Table 73. Signage

Operational phase	
Management Aspect	Signage
Proposed Mitigation Measures	▪ Display telephone numbers of emergency services, including the local fire fighting service, in the administration office and at the entrance to the site. Contact the emergency services in the area in the case of an emergency. ▪ Provide suitable emergency and safety signage on site (manufactured of durable, weatherproof material) displayed at prominent and conspicuous places along the fences and entry gates. Demarcate any areas which may pose a safety risk (including hazardous substances, deep excavations etc). These notices must be worded in the official languages applicable to the area.
Proposed Monitoring	Regular visual inspection.
Performance Indicators	Evidence of suitable signage in place; Number of awareness sessions conducted.
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 74. Personal Protective Equipment (PPE)

Operational phase	
Management Aspect	Personal Protective Equipment (where required)
Proposed Mitigation Measures	▪ Enforce the use of appropriate Personal Protective Equipment (PPE) at all times.
Proposed Monitoring	Regular weekly inspections.
Performance Indicators	All workers working with heavy operational machinery, vehicles and equipment to have PPEs all the time during work.
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 75. Illegal Access

Operational phase	
Management Aspect	Illegal Access
Proposed Mitigation Measures	▪ Prevent illegal access to the site by implementing appropriate security measures. These security measures must not pose a threat to surrounding communities. ▪ Ensure that recyclable goods are separated out prior to disposal reducing the temptation for handpicking of these goods which can be exchanged for cash.
Proposed Monitoring	Regular visual inspection.
Performance Indicators	Evidence of no illegal access.
Responsible Party	EM/ BUKALO SERVICE CENTRE

Table 76. Emergencies

Operational phase	
Management Aspect	Emergencies
Proposed Mitigation Measures	▪ Comply with the Emergency Response Plan. ▪ Install Emergency Control System.
Proposed Monitoring	Internal auditing.
Performance Indicators	Evidence that correct procedures are followed; Evidence of adequate emergency systems in place; Records of emergency responses.
Responsible Party	EM/ BUKALO SERVICE CENTRE

9.12. Operational Phase: Rehabilitation

Table 77. Progressive Rehabilitation

Operational phase	
Management Aspect	Progressive Rehabilitation
Proposed Mitigation Measures	▪ Comply with the Rehabilitation Plan and the Stability Management Plan. ▪ Begin immediately rehabilitation of any disturbed area due to operational activities.
Proposed Monitoring	Regular visual inspection; Internal auditing.
Performance Indicators	Evidence of rehabilitation and closure report; Records of number of complaints.
Responsible Party	EM/ BUKALO SERVICE CENTRE

10. CONCLUSIONS

All known environmental and social risks can be minimised and managed through implementing preventative measures and sound management systems.

If the above-mentioned management recommendations are properly implemented, it is anticipated that most of the adverse impacts on the environment can be mitigated. It is important that Bukalo Service Centre through its environmental structures continuously monitor and audit all activities during the operational phase of the fuel retail facility, to ensure that the EMP is fully implemented and complied with. This EMP caters for all project phases, but will need to be reviewed during all phases of project, especially when revisions are made to the project development plans.

The Environmental Management Plan should be used as an on-site tool during all phases of the proposed project. Parties responsible for contravention of the EMP should be held responsible for any rehabilitation that may need to be undertaken. It is the Proponent's responsibility to initiate the update of the EMP at all times, especially when environmental conditions changes or when an upgrade is required.

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