APP-005960

OPERATIONS OF THE SMALL STOCK ABATTOIR OF FARMERS MEAT MARKET, MARIENTAL

UPDATED ENVIRONMENTAL MANAGEMENT PLAN

Prepared by:

Prepared for:

June 2025

Project:	**OPERATIONS OF THE SMALL STOCK ABATTOIR OF FARMERS MEAT MARKET, MARIENTAL: UPDATED ENVIRONMENTAL MANAGEMENT PLAN**	
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Report Approval	 **André Faul** Environmental Assessment Practitioner	

I _____ acting as a representative of Farmers Meat Market Mariental Abattoir (Pty) Ltd , hereby confirm that the project description contained in this report is a true reflection of the information which the Proponent provided to Geo Pollution Technologies. All material information in the possession of the proponent that reasonably has or may have the potential of influencing any decision or the objectivity of this assessment is fairly represented in this report and the report is hereby approved.

Signed at Mariental on the 23rd day of June 2025.

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LIST OF ABBREVIATIONS

BOD	Biodegradable Oxygen Demand
COD	Chemical Oxygen Demand
DWA	Department of Water Affairs
ECC	Environmental clearance certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act No 7 of 2007
EMP	Environmental Management Plan
EMS	Environmental Management System
GDP	Gross Domestic Product
GPT	Geo Pollution Technologies
HIV	Human Immunodeficiency Virus
HSEQ	A Health, Safety, Environment and Quality Policy
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
kV	Kilovolt
kW	Kilowatt
m	Metre
m^3	Cubic metre
MEFT	Ministry of Environment, Forestry and Tourism
MSDS	Material Safety Data Sheet
MWth	Megawatt Thermal
NO_x	Nitrogen Oxides
O_2	Oxygen
PM	Particulate Matter
PPE	Personal Protective Equipment
SANS	South African National Standards
STI	Sexually Transmitted Infections
SO_2	Sulfur Dioxide
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization
SS	Suspended Solids

GLOSSARY OF TERMS

Biochemical Oxygen Demand - Measurement of oxygen utilised by microorganisms during oxidation of organic material contained in wastewater.

Chemical Oxygen Demand - Measurement of the amount of chemically oxidisable organic matter, viz the amount of oxygen required to convert all organic carbon constituents to CO_2 and H_2O.

Competent Authority - means a body or person empowered under the local authorities act or Environmental Management Act to enforce the rule of law.

Construction - means the building, erection or modification of a facility, structure or infrastructure that is necessary for the undertaking of an activity, including the modification, alteration, upgrading or decommissioning of such facility, structure or infrastructure.

Cumulative Impacts - in relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Effluent - Liquid waste originating from domestic, industrial, agricultural or mining activities that has been treated in a wastewater treatment facility and released into the environment in a dam, an evaporation pond, an aquifer, a river, the sea or onto the surface of the ground.

Biological Effluent Ponds- System of dams that are designed to receive and treat wastewater, utilising mainly natural resources, e.g. solar energy, algae and a variety of microorganisms, to physically and biologically decompose and / or remove solids, organic matter, nutrients and reduce pathogens.

Environment - As defined in the Environmental Assessment Policy and Environmental Management Act - "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, palaeontological or social values".

Environmental Clearance Certificate (ECC) - certificate (and its associated conditions) issued in terms of the environmental management act, authorising a listed activity to be undertaken.

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

Environmental Management System (EMS) - An Environment Management System, or EMS, is a comprehensive approach to managing environmental issues, integrating environment-oriented thinking into every aspect of business management. An EMS ensures environmental considerations are a priority, along with other concerns such as costs, product quality, investments, PR productivity and strategic planning. An EMS generally makes a positive impact on a company's bottom line. It increases efficiency and focuses on customer needs and marketplace conditions, improving both the company's financial and environmental performance. By using an EMS to convert environmental problems into commercial opportunities, companies usually become more competitive.

Groundwater - Water - (a) occurring naturally below the surface of the ground; or

(b) pumped, diverted or released into a cavity for storage underground.

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.

Landfill area – For purposes of this document the landfill refers to an area where slaughterhouse waste is buried.

Mitigate - The implementation of practical measures to reduce adverse impacts.

Proponent (Applicant) - Any person who has submitted or intends to submit an application for an authorisation, as legislated by the Environmental Management Act no. 7 of 2007, to undertake an activity or activities identified as a listed activity or listed activities; or in any other notice published by the Minister or Ministry of Environment, Forestry and Tourism.

Slaughterhouse Waste – inedible parts of animals derived from the slaughtering process inclusive of intestinal contents, trimmings, pieces of flesh or fat falling to the floor, pieces of skin, etc.

1 INTRODUCTION

Geo Pollution Technologies (Pty) Ltd was appointed by Farmers Meat Market Mariental Abattoir (Pty) Ltd (the Proponent), to apply for the renewal of their existing environmental clearance certificate (ECC-APP3426), for the continued operations of the Farmers Meat abattoir at Mariental in the Hardap Region. The abattoir is located on Portion 6 of Farm Keikanachab Ost (Farm No. 90), about 6 km north of Mariental (Figure 2-1). It specialises in the slaughtering and export of lamb to international markets. Local markets are however also supplied and their products include sheep, goats and springbok. The abattoir operates in accordance with various laws and regulations in force in Namibia and requires an ECC in terms of the Environmental Management Act (Act No. 7 of 2007) (EMA). In addition, to export to international markets, the abattoir also adheres to stringent requirements of, for example, the European Union.

To renew their existing ECC, this environmental management plan (EMP) was updated and will be submitted to the Ministry of Environment, Forestry and Tourism for approval. Construction and operations of a new diesel consumer fuel installation, used to secure a reliable fuel supply for operational processes, is included in the updated EMP. It should be noted that the new consumer fuel installation is subject to the final investment decision, based on operational needs.

The livestock and game for the abattoir are sourced from Namibian farms. The facility is also equipped to partially portion or debone carcasses, for export markets. At maximum operational capacity, the abattoir can slaughter up to 1,200 small stock or small game animals per day.

The EMP is a tool used to take pro-active action by addressing potential problems before they occur. This limits potential future corrective measures that may need to be implemented and allows for application of mitigation measures for unavoidable impacts. This document should be used as an on-site reference document during all phases (planning, construction (care and maintenance), operations and decommissioning) of the abattoir. All monitoring and records kept should be included in bi-annual reports to ensure compliance with the EMP and the conditions of an ECC. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken. The Proponent's workplace safety policy, environmental policy, quality / food safety policy and any other relevant policies should be used in conjunction with the EMP. Relevant regulations and guidelines must be adhered to and monitored regularly as outlined in the EMP.

2 SCOPE

The scope of the EMP is to:

- Provide a brief overview of all components and related operations of the abattoir.
- Summarise the legal and regulatory framework within which the abattoir operates.
- Provide a brief overview of the environment, i.e. the physical, biological, social and economic conditions, potentially impacted by the abattoir and related operations.
- Identify a range of management actions which could mitigate the potential adverse impacts to acceptable levels.
- Provide sufficient information to the relevant competent authorities and the MEFT to make informed decisions regarding the operations of the abattoir.

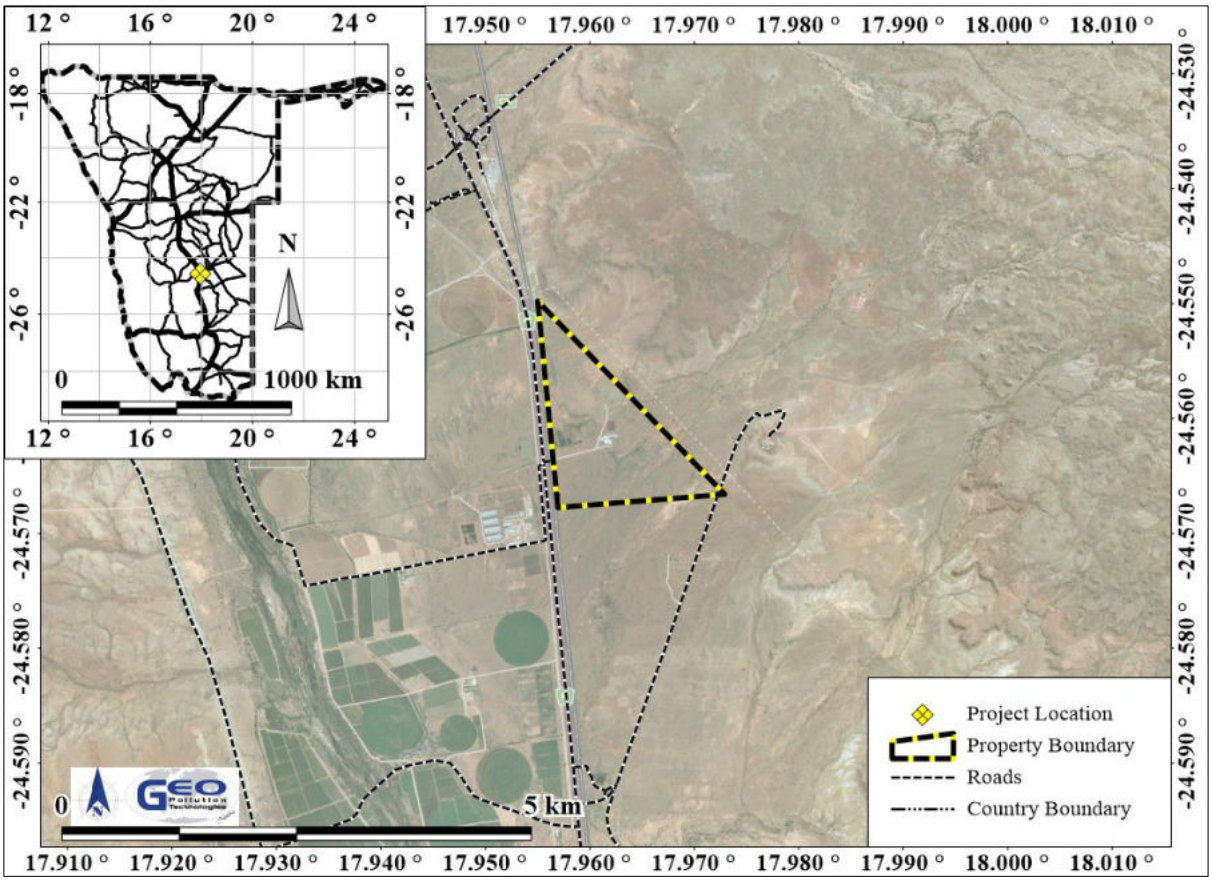

Figure 2-1 Project location

3 PROJECT DESCRIPTION

The Farmers Meat Market abattoir specialises in the slaughtering of small stock and small game, specifically sheep, goat and springbok for local and export markets. At maximum operational capacity, the abattoir can slaughter up to 1,200 small stock or small game animals per day.

The entire facility is divided into a “green line” and “red line” area. The green line area is operational areas where strict cleanliness must be maintained to prevent contamination of meat products, while the red line is operational areas where entrails, offal and wastes are handled in order to keep it separate from the green line. During slaughtering events, employees are not permitted to move between green line and red line areas without proper controls in place. Each area has its own ablution facilities for workers.

The following sections provide a brief overview of the main operational activities at the facility.

3.1 SMALL STOCK AND GAME DELIVERY

Trucks or smaller vehicles delivering live sheep or springbok carcasses arrive at a dedicated gate where security inspects their permits, before allowing them to enter. Sheep are offloaded and kept in pens with concrete floors and a roof structure for shade. They are provided with water, but feed is only supplied if delays prevent slaughtering from starting and being completed within 24 hours.

Springbok are culled on the farms from which they are sourced and transported to the abattoir in refrigerated trucks. The springbok carcasses are offloaded directly into cold rooms where they are temporarily stored prior to processing.

All empty trucks must go through a compulsory washing and sanitation process before they are allowed to depart from the premises. Washing is performed with water, soda ash and chlorine based cleaning agents at a dedicated wash bay.

Photo 3-1 Security controlled stock delivery gate

Photo 3-2 Vehicle washing area

3.2 SLAUGHTERING AND PROCESSING

When slaughtering commences, the sheep are led into a walkway leading to the slaughter room inside the main building. The sheep are stunned with an electrical pulse that ensures temporary unconsciousness. They are then hanged upside down on an overhead rail from where they are slaughtered according to Halaal methods. The carcass moves automatically along the processing line, passing various workers who each perform specific slaughtering tasks until the sheep is fully skinned and eviscerated. The sheep carcass and offal are inspected by veterinarians. If it passes inspection, the carcasses are weighed and graded and then placed in chiller rooms. The entrails, offal and skins passes into the red line area for further processing. If any sheep are found to be unfit for human consumption by the veterinarian, they are removed from the processing line for examination and subsequent disposal.

Carcasses may be prepared in four ways:

- Dispatched as whole carcasses, unpackaged (typically for local markets),
- Dispatched as whole carcasses, but in a vacuum sealed bag and packaged into a carton (typically for export markets),
- Portioned with bone, vacuum sealed and packaged into a carton (typically for export markets).
- Portioned, deboned, vacuum sealed and packaged into a carton (typically for export markets).

Sheep earmarked for whole carcass dispatch are hung in chillers, and upon the arrival of a refrigerated truck, they are weighed and loaded through the whole carcass dispatch door. Sheep packaged as whole carcasses are cut and folded to fit in a vacuum bag. They are then vacuum sealed and placed into cartons. For deboning, the sheep carcasses are processed with electric meat saws and with knifes by workers skilled in deboning techniques. Deboned meat is placed in vacuum bags, sealed and boxed. All vacuumed and boxed meat pass through a metal detector to ensure no foreign metal objects are present. They are then placed in freezers for at least 48 hours before being collected by refrigerated trucks.

Springbok carcasses undergo the same processes from skinning to processing and packaging as the sheep.

Photo 3-3 Slaughtering line

Photo 3-4 Slaughtering station

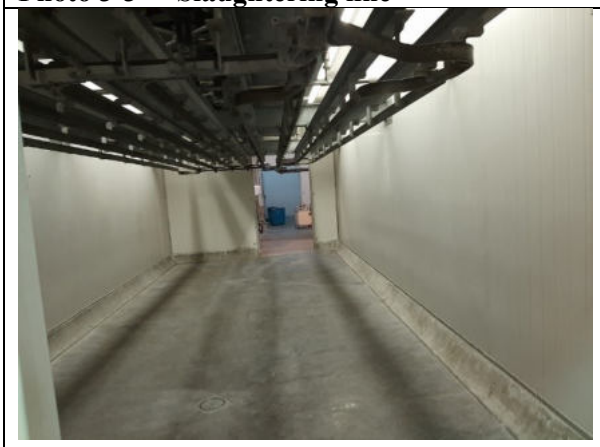

Photo 3-5 Chiller room

Photo 3-6 Portioning and deboning area

Photo 3-7 Vacuum packing and metal screening area

Photo 3-8 Freezer room

Photo 3-9 Offal handling area

Photo 3-10 Dispatch area

3.3 BY-PRODUCT HANDLING

The main by-products are entrails, offal, bones from the deboning process, horns and skins. All entrails and offal undergo basic cleaning in the red line area and are then boxed and placed into freezers from where they are dispatched to clients. All skins are salted and the skins, bones and horns are sold to local clients.

3.4 EXISTING INFRASTRUCTURE

All required infrastructure has previously been established on site and no additional major infrastructure will be established. The main infrastructure components are depicted in Table 3-1 and Figure 3-1.

Table 3-1 Main abattoir infrastructure components

Infrastructure	Description
Covered holding pen	Holds 1,500 – 1,600 small livestock units
Slaughter house	Capacity to slaughter 1,200 small livestock units per day. Including the slaughter floor, deboning section, offal handing area
Cold storage	Chillers can accommodate approximately 2,420 slaughtered lambs Various blast freezers with different capacities for boxed meat (green line) and offal (red line)
Refrigeration system	Compressors, ammonia tanks, evaporative cooling towers
Solar geysers	Roof mounted
Boiler and stack	Two boilers and one stack with 3 m stack height
Aboveground diesel storage tank	8 m^3 steel tank inside bund wall. This tank may, in future, be decommissioned and a new 23 m^3 tank installed at a new consumer fuel installation.
Photovoltaic plant	407 kW
Power line and transformer	33 kV line and related transformer to the main building
Administrative and other buildings	Including offices, ablutions, kitchens, workshops, stores, etc.
Chemical store	Mostly cleaning materials
Air washer	System to pass air through water to remove impurities and humidify the air in order to provide clean, high quality air to operational areas.
Biological Effluent ponds	System of nine ponds (volume not known) Additional three ponds as back-up for instances of high waste water volumes
Septic tanks	Three
Landfill area	Area earmarked for the burying of slaughterhouse waste and burning of general waste
Water supply line	NamWater supply line for potable water
Water reservoir	Back-up water supply. Water is chlorinated before used in the facility.
Wash bay	Can accommodate a single truck at a time

The holding pen is covered and fitted with water troughs providing shelter to all livestock received. It has a cement floor for easy cleaning of manure. Located next to the holding pen, in a secure building, are the various slaughter and processing components of the abattoir, including the main cold storage facility which uses ammonia as coolant. The coolant is stored in an ammonia tank and circulated throughout the facility by compressors, supplying the various evaporators located in cold rooms, freezers, and other operational areas. After heat exchange take place, the warm coolant is cooled down in three evaporative towers.

Hot water required for cleaning the various components of the abattoir is obtained from a boiler located in a boiler room. A second boiler is present for back-up purposes in case the main boiler fails. Diesel for the boiler operations is currently stored in an 8 m^3 aboveground tank in a concrete bund area. The diesel tank is owned by a third-party diesel supplier, who is responsible for ensuring all legal compliance related to the tank. The Proponent ensures correct operational procedures are followed and that spill control measures are implemented. All water is supplied by NamWater, with a backup reservoir located on site. Water is disinfected through chlorination before use. Electricity is supplied by the Mariental municipality through a 33 kV power line and a transformer, and is supplemented by a 407 kW grid tied photovoltaic plant.

Wastewater generated from cleaning of the facility is channelled into a series of nine biological effluent ponds while all sewage is sent to three septic tanks on site. Slaughterhouse waste and condemned material are buried onsite in a landfill area.

Additional infrastructure on the premises includes a small chemical room primarily used for storing cleaning agents, as well as a maintenance store/workshop for equipment repairs. The site also comprises various offices, a kitchen, ablution facilities, and a gate security room. The entire property is fenced with a stock fence while the abattoir and associated buildings and the main infrastructure component is fenced with a security fence.

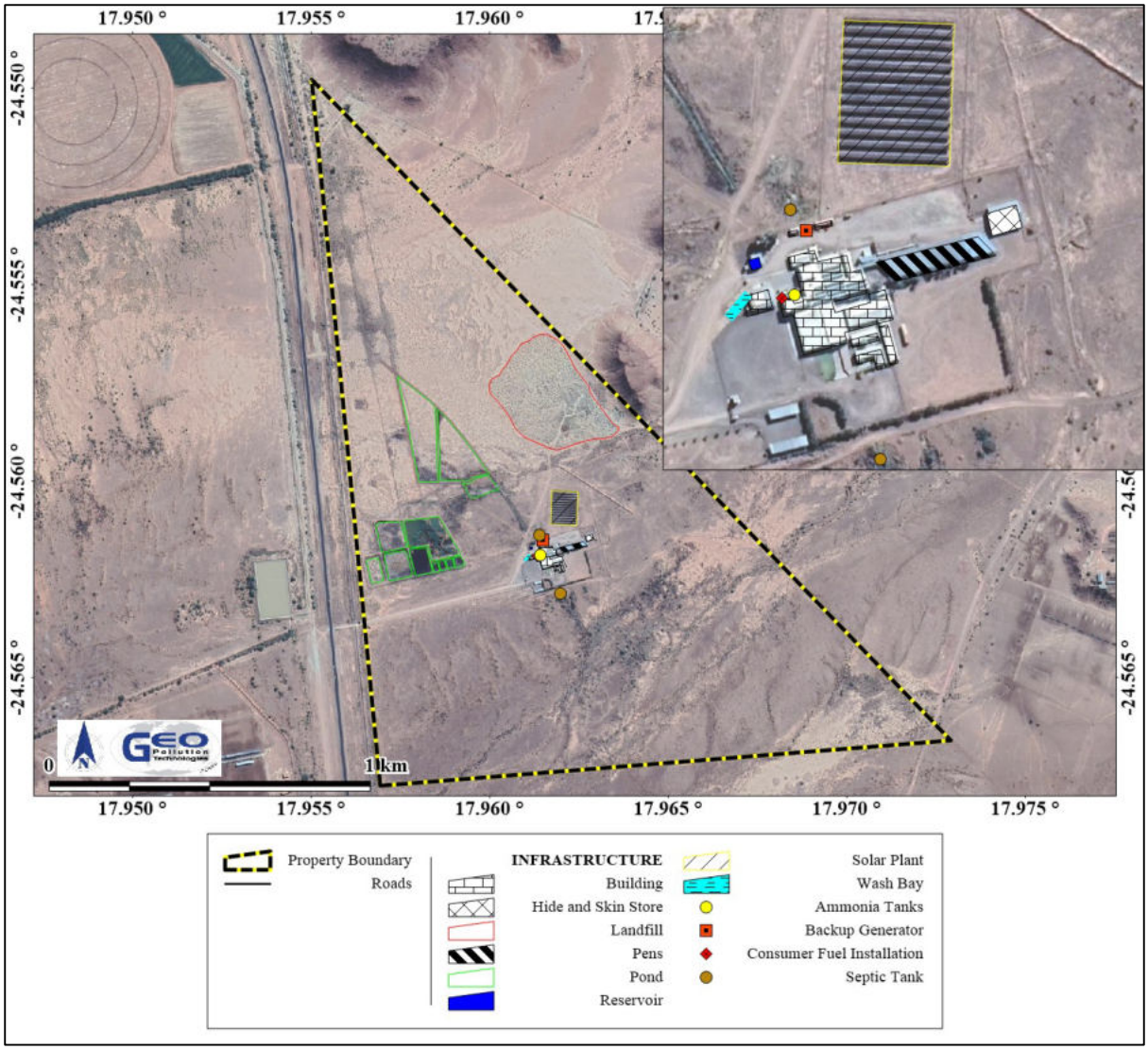

Figure 3-1 Infrastructure components

Photo 3-11 Existing diesel tank

Photo 3-12 Water storage

Photo 3-13 Solar plant

Photo 3-14 Ablution facilities

3.5 PLANNED INFRASTRUCTURE

The Proponent plans to add an additional consumer fuel installation on site. It will be an aboveground, steel diesel tank of 23 m^3 and will be installed in a concrete bund area with a sumo with underflow arrangement to release rain water and remove floating spilled hydrocarbons. See Figure 3-2.

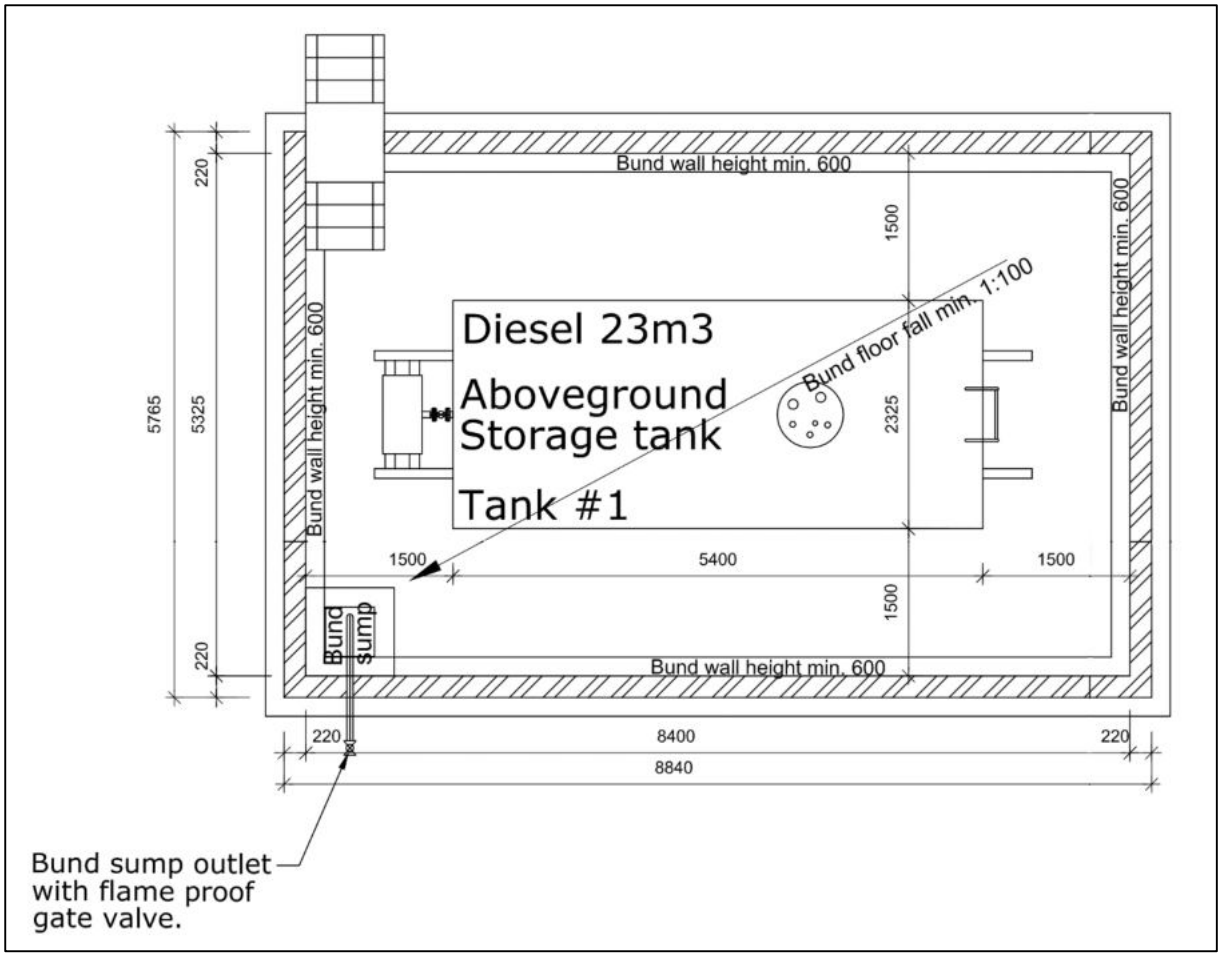

Figure 3-2 New consumer fuel installation layout

3.6 WASTE GENERATION

The abattoir as a whole has various waste streams. Major waste streams are indicated in Table 3-2.

Table 3-2 Main waste streams and disposal methods

Type	Category	Origin	Disposal
Livestock droppings (faeces)	Solid	Holding pens and truck washing area	Landfill
Urine	Liquid	Mixed with wash water from holding pens and truck washing area	Biological effluent ponds
Blood	Liquid	Mixed with wash water from slaughtering area	Biological effluent ponds
Slaughterhouse waste	Solid and liquid	Slaughtering area	Solids separated from liquid. Liquids disposed in biological effluent ponds, solids disposed at landfill area
Condemned material	Solid (biological)	Slaughtering, processing and cold storage area	Landfill
Wash water	Liquid	All washing and cleaning water from pens, slaughtering areas, truck washing area, etc.	Biological effluent ponds
Domestic sewage	Liquid and solid	Ablutions, kitchens	Septic tanks
Domestic and office waste	Liquid and solid	Offices, kitchens, etc.	Municipal waste disposal site
Exhaust gases	Gas	Boilers	Released in air
Hazardous waste	Solid, liquid or gas	Expired or contaminated cleaning chemicals or fuels, lubricants, pest control traps, microbiology culture plates, etc.	Returned to supplier or disposed at a hazardous waste disposal facility

All industrial waste water that is disposed of in the biological effluent ponds, as indicated in Table 3-2, first collect in a sump through three inlets. One of the inlets first passes through a liquid-solids separator, where liquid (primarily water from intestinal contents and other slaughtering waste) is pressed out. The liquid flows into the sump, while the separated solids are deposited into a skip for disposal. In the sump, remaining solids are allowed to settle before the wastewater flows, under gravity, through a pipe to the biological effluent ponds.

The biological effluent ponds consist of nine ponds connected in series. When wastewater volumes exceed the capacity of the pipeline from the collection sump to the ponds, a pump is started manually to pump the excess wastewater from the sump to a separate series of three ponds. The sump is periodically cleaned to remove all collected solids for disposal.

The landfill area is an area earmarked mainly for disposal of livestock droppings (on surface) and burial of slaughterhouse waste and condemned material. In the landfill, small diameter pits of five to six meters deep are excavated using a back actor. Slaughterhouse waste is disposed of in the pit which, when full, is covered with the soil removed for the digging of the pit. The next pit is then dug for the next slaughtering event. After sufficient time, when the contents of the pits in an area have adequately decomposed, that area are re-used. Garden waste is also burnt in the pits and covered with soil.

Photo 3-15 Effluent sump

Photo 3-16 Effluent pond

Photo 3-17 A section of the landfill area

Photo 3-18 Septic tank area

3.7 GENERAL

Basic microbial testing is performed on site. Swabs are routinely taken from products, surfaces and workers hands, and applied to agar gel in petri dishes. The agar plates are prepared in Windhoek and sent to the abattoir in sterile conditions. Once inoculated, the plates are placed in an incubator to promote bacterial growth, if present, thereby allowing detection of any bacterial contamination. Since traceability of all carcasses is ensured through a computerised recording system, any contaminated products can be easily identified and traced for removal from the market.

Site security controls access to the site at two access gates, one for stock and game delivery vehicles and one for access to the offices and for trucks collecting products.

General day to day administrative tasks continue, including cleaning of the premises, waste disposal, maintenance, and garden care. A kitchen prepares food for workers and a small onsite laundry washes clothing used by slaughtering and meat handling personnel.

No personnel reside on the site and all personnel are transported to and from the site by the Proponent.

4 ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS

4.1 NAMIBIAN LEGISLATION

To protect the environment and achieve sustainable development, all projects, plans, programmes and policies deemed to have adverse impacts on the environment require an ECC, as per the Namibian legislation. The legislation and standards provided in Table 4-1 to Table 4-3 govern the environmental assessment process in Namibia and/or are relevant to the abattoir. Note that various Namibian acts and ordinances have their origins from pre-independence South African

legislation, made applicable to the then "South West Africa". The Namibian legislative process is slow to repeal and replace many of these laws and they technically remain in place, albeit mostly without accompanying regulations. Where newer acts lacks detailed or adequate regulations and guidelines, Namibia reverts to international law and often use South African regulations and South African National Standards (SANS) as guidelines for development and execution of projects. The Petroleum Products and Energy Act, for example, specifically prescribes SANS standards for fuel installations, while the Namibian meat industry uses the South African Meat Safety Act (2000) as guideline where Namibia lacks its own legislation.

Table 4-1 Namibian law applicable to the abattoir

Law	Key Aspects
The Namibian Constitution	♦ Promotes the welfare of people. ♦ Incorporates a high level of environmental protection. ♦ Incorporates international agreements as part of Namibian law.
Environmental Management Act Act No. 7 of 2007, Government Notice No. 232 of 2007	♦ Defines the environment. ♦ Promotes sustainable management of the environment and the use of natural resources. ♦ Provides a process of assessment and control of activities with possible significant effects on the environment.
Environmental Management Act Regulations Government Notice No. 28-30 of 2012	♦ Commencement of the Environmental Management Act. ♦ Lists activities that requires an environmental clearance certificate. ♦ Provides environmental impact assessment regulations.
Abattoir Industry Act 54 of 1976 Act No. 54 of 1976, Government Notice No. 620 of 1976	♦ Makes provision for control on matters related to construction and operations of abattoirs.
Livestock and Livestock Products Act Act No.12 of 1981, Government Notice No. 99 of 1981	♦ Originally named the Meat Industry Act 12 of 1981. ♦ The Livestock and Livestock Products Amendment Act 15 of 2023 (GG 8182) amended and renamed the Act. ♦ Establishes the livestock and livestock products board. ♦ Provides for control over the grading, sale, import and export of livestock, meat and meat products, and the levies on these items.
Abattoirs Restriction Proclamation 8 of 1944	♦ Places restrictions on the types of animals which can be slaughtered in abattoirs. ♦ Prohibits slaughtering of animals other than stock without consent. ♦ Makes no provision for regulations.
Cold Storage Works and Abattoirs Proclamation 50 of 1921	♦ Places limits on the construction and operation of cold storage works used for the export of meat. ♦ No regulations known of.
Animal Health Act Act No. 1 of 2011, Government Notice 46 of 2011	♦ Provide for the prevention, detection and control of animal disease and the maintenance and improvement of animal health.

Law	Key Aspects
Animals Protection Act Act No. 71 of 1962, Government Gazette Extraordinaire of 22nd June 1962	♦ Consolidates and amends the laws relating to the prevention of cruelty to animals.
Agricultural Produce Export Ordinance 13 of 1928	♦ Regulates the export of agricultural produce and meat. ♦ No regulations known of.
General Health Regulations Government Notice 121 of 1969	♦ Lays down minimum requirements and standards for, among others, butcheries and abattoirs. ♦ Requires the registration of abattoirs.
Prevention of Undesirable Residue in Meat Act Act No.21 of 1991, Government Notice No. 322 of 1991	♦ Regulates the slaughtering of animals and the marketing of meat and meat products.
Water Resources Management Act Act No. 11 of 2013	♦ Provide for management, protection, development, use and conservation of water resources. ♦ Prevention of water pollution and assignment of liability. ♦ Requires permitting of wastewater treatment facilities and discharge. ♦ Prescribes standards for potable water and effluent. ♦ Prescribes parameters that wastewater treatment facilities must adhere to.
Local Authorities Act Act No. 23 of 1992, Government Notice No. 116 of 1992	♦ Define the powers, duties and functions of local authority councils.
Public and Environmental Health Act Act No. 1 of 2015, Government Notice No. 86 of 2015	♦ Provides a framework for a structured more uniform public and environmental health system, and for incidental matters. ♦ Deals with Integrated Waste Management including waste collection disposal and recycling; waste generation and storage; and sanitation.
Petroleum Products and Energy Act Act No. 13 of 1990, Government Notice No. 45 of 1990	♦ Regulates petroleum industry. ♦ Makes provision for impact assessment. ♦ Petroleum Products Regulations (Government Notice No. 155 of 2000).
Labour Act Act No. 11 of 2007, Government Notice No. 236 of 2007	♦ Provides for Labour Law and the protection and safety of employees. ♦ Labour Act, 1992: Regulations relating to the health and safety of employees at work (Government Notice No. 156 of 1997).
Namibian Food Safety Policy of 2014	♦ Aims to protect consumer health while facilitating trade in food. ♦ Policy ensures that control standards are established and adhered to as regards food production safety, food product hygiene, animal health and welfare, plant health and preventing the risk of contamination from external substances. ♦ Lays down conditions for regulations on appropriate labelling for these foodstuffs and food products.

Law	Key Aspects
Atmospheric Pollution Prevention Ordinance Ordinance No. 11 of 1976	♦ Governs the control of noxious or offensive gases ♦ Prohibits scheduled process without a registration certificate in a controlled area. ♦ Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process.
Hazardous Substances Ordinance Ordinance No. 14 of 1974	♦ Applies to the manufacture, sale, use, disposal and dumping of hazardous substances as well as their import and export. ♦ Aims to prevent hazardous substances from causing injury, ill-health or the death of human beings.
Pollution Control and Waste Management Bill	♦ The bill aims to prevent and regulate the discharge of pollutants to air, water, and land. It further aims to promote the establishment of a system of waste management and enable Namibia to meet its international obligations. Only unrecyclable and unusable materials will be disposed of at a designated disposal site.

Table 4-2 Guiding documents, directives and standards

Law	Key Aspects
Meat Safety Act of 2000 of South Africa	♦ Provides guidance for the local meat industry where Namibia lacks its own regulations in respect of promotion of meat safety and the safety of animal products; standards, regulations on the importation and exportation of meat.
Red Meat Regulations (2004) of the Meat Safety Act (2000) of South Africa	♦ Where lacking in Namibia, provides guidelines on registrations, hygiene, treatment of animals, inspections, marks and marking, condemned material, and export and import regulations related to red meat and abattoirs.
Farm Assured Namibian Meat (FAN Meat) Scheme Standards for Export Abattoirs	♦ Provides standards for: design and maintenance of facility and equipment; sanitation; personnel hygiene and training; pest control; water quality; waste and effluent control; animal welfare, humane treatment of animals and slaughter process; meat inspection; traceability requirements; carcass classification; ante-mortem inspection; hazard analysis critical control points (HACCP) system; and marketing and the use of the FAN meat logo.
European Union Directives	♦ Food safety and hygiene: Regulation (EC) No 178/2002, 852,2004, 853/2004, 854/2004. ♦ Microbiological criteria. Regulation (EC) No 2073/2005. ♦ Animal Welfare: Regulation (EC) No 1099/2010. ♦ Residues: Commission Decision 96/23/EC. ♦ Animal by-products: Regulation (EC) No 142/2011. ♦ Official Controls: Regulation (EC) No 854/2004, 882/2004.
SANS 893-1&2:2018	♦ Standards for risk assessment and the control of *Legionella* spp. (bacteria) in water sources.

Law	Key Aspects
South African National Standards (SANS) 10089 & 10131	♦ The Petroleum Products and Energy Act prescribes SANS standards for the construction, operations and demolition of petroleum facilities. ♦ SANS 10089-3:2010 is specifically aimed at storage and distribution of petroleum products at fuel retail facilities and consumer installations. ♦ SANS 10131: 2004 Deals with above-ground storage tanks for petroleum products. ♦ Provide requirements for spill control infrastructure.
South African National Standards (SANS) 10147	♦ Provides standards for the installation and operations of refrigeration plants (with reference to using ammonia as coolant).

Table 4-3 Relevant multilateral environmental agreements for Namibia and the abattoir

Agreement	Key Aspects
Stockholm Declaration on the Human Environment, Stockholm 1972.	♦ Recognizes the need for a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment.
1985 Vienna Convention for the Protection of the Ozone Layer	♦ Aims to protect human health and the environment against adverse effects from modification of the Ozone Layer are considered. ♦ Adopted to regulate levels of greenhouse gas concentration in the atmosphere.
United Nations Framework Convention on Climate Change (UNFCCC)	♦ The Convention recognises that developing countries should be accorded appropriate assistance to enable them to fulfil the terms of the Convention.
Convention on Biological Diversity, Rio de Janeiro, 1992	♦ Under article 14 of The Convention, EIAs must be conducted for projects that may negatively affect biological diversity.

Listed activities which require an ECC application (Government Regulation No 29 of 2012) related to this project include the following:

Section 1 of Government Notice No. 29 of 2012: Energy Generation, Transmission and Storage Activities

- 1(a). The construction of facilities for the generation of electricity: The abattoir has an existing 407 kW photovoltaic plant. The plant is small enough to warrant exemption from requiring an ECC, however it is included here for purpose of management measures.

Section 2 of Government Notice No. 29 of 2012: Waste Management, Treatment, Handling and Disposal Activities

- 2.1. The construction of facilities for waste sites, treatment of waste and disposal of waste:
  - Operations require that industrial effluent (mainly wash water and the organic products it contains like blood) be treated and disposed of onsite via a system of treatment ponds.
  - Three septic tanks systems accommodate all sewerage.
  - Slaughterhouse waste are collected in skips or bins and taken to an onsite landfill where it is buried.

Section 9 of Government Notice No. 29 of 2012: Hazardous Substance Treatment, Handling and Storage

- 9.1 "The manufacturing, storage, handling or processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974." Fuel, ammonia and various chemicals are stored on site.
- 9.2 "Any process or activity which requires a permit, licence or other form of authorisation, or the modification of or changes to existing facilities for any process or activity which requires an amendment of an existing permit, licence or authorisation or which requires a new permit, licence or authorisation in terms of a law governing the generation or release of emissions, pollution, effluent or waste." The Proponent stores fuel for own use in an above ground tank.
- "Construction of filling stations or any other facility for the underground and aboveground storage of dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin" Diesel, for own use, is stored in an aboveground tank on site.

4.2 ADDITIONAL POLICIES AND STANDARDS

Guidelines related to septic tanks and pond systems are implemented by the Department of Water Affairs, Ministry of Agriculture, Water and Land Reform (DWA 2008). These are:

Department of Water Affairs and Forestry, Code of Practice: Volume 1, Septic tank Systems.

Department of Water Affairs and Forestry, Code of Practice volume 2 Pond Systems General Guidelines.

These should be considered in the operation of the abattoir.

Of importance related to the placement of septic tanks are:

- Not be closer than 2 m and 5 m from buildings and boundaries respectively. In areas where municipal by-laws apply, these must be taken into full consideration.
- Be located downhill from wells or springs.
- Never be closer than 500 to 800 m from any water resource or water supply - larger distances are preferred where possible. If closer, a proper environmental impact assessment (EIA) study to motivate this must be produced by a reputable consultant in this field.
- Not be considered for swampy areas, nor in areas subjected to flooding.
- Be located where there is a large area available with good soil penetration, serving as disposal field.

Among others, of importance related to Industrial Wastewater Pond Systems (code of practice: volume 2 pond systems general guidelines) are:

- "For design and evaluation purposes each industrial plant must therefore be treated as unique and a full assessment of each effluent stream of its COD and especially BOD must be undertaken."
- "Whereas pond systems mainly remove biodegradable organic material (reduce COD and BOD), they do not achieve good ammonia-nitrogen removal rates and cannot be used for biological N and P removal. Also, the soluble BOD of the final effluent will be low, but total SS and total BOD will be high, which is attributed mainly to algae. Thus, the final effluent from a pond system cannot achieve the required final water standards required for final effluent discharge". DWA does not allow any final effluent from a pond system to be discharged into the environment or to be disposed of into a river. Instead it should be contained in evaporation ponds.
- "The pond system must be completely fenced in to prevent people and animals entering the area and ample notices must be provided to warn and keep people out of this area. As a minimum, a "jackal proof" fence at least 1.8 m high with double-gate to allow access for trucks must be provided. The gate must be kept properly locked. No animals or people are allowed to swim in any of the ponds."

For safe disposal of sludge, the waste sludge shall not:

- "Contaminate any drinking water supply;
- Give rise indirectly to a public-health hazard by being accessible to insects, rodents or other possible animals, which later may come into contact with food or drinking water;
- Give rise directly to a public-health hazard by being accessible to children;
- Violate laws or regulations governing water pollution or sewage disposal;
- Pollute or contaminate the waters of any bathing beach, shellfish-breeding ground or stream used for public or domestic water supply purpose, or for recreational purpose.
- Give rise to nuisance due to odour or unsightly appearance."

4.3 INTERNATIONAL GUIDELINES

The Namibian legislature lacks specific, enforceable air quality parameters[1] for operations such as boilers. In general air quality standards aim to protect human life as well as ecosystems. In light of the lack of enforceable standards, projects may revert to the World Bank and International Finance Corporation's (IFC) Environmental, Health, and Safety guidelines (known as the EHS guidelines). These guidelines are technical reference documents which may be considered by specific industries. The use of these guidelines are hinged on the condition that the guidelines be adapted to site specific variables, considering the sensitivity of the environment and project factors as indicated in the environmental assessment.

For the purposes of this project, reference is made to the "General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality".

The boiler system used to heat the water may be classified as a "Small Combustion Facility". These are systems which are designed to deliver electrical or mechanical power, steam, heat, or any combination of these, regardless of the fuel type, with a total, rated heat input capacity of between three (3) Megawatt thermal (MWth) and 50 MWth. The emissions guidelines in Table 4-4 (as adapted from the guidelines) are applicable to small combustion process installations operating more than 500 hours per year, and those with an annual capacity utilisation of more than 30 percent (IFC, 2007).

Table 4-4 Small combustion facilities emissions guidelines (3 MWth – 50 MWth) – (in mg/Nm^3 or as indicated) as adapted from the EHS Guidelines (IFC, 2007)

Combustion Technology / Fuel	Particulate Matter (PM)	Sulfur Dioxide (SO_2)	Nitrogen Oxides (NOx)	Dry Gas, Excess O_2 Content (%)
Boiler				
Gas	N/A	N/A	320	3
Liquid	50 or up to 150 if justified by environmental assessment	2,000	460	3
Solid	50 or up to 150 if justified by environmental assessment	2,000	650	6
Notes: -N/A - no emissions guideline; Higher performance levels than these in the Table should be applicable to facilities located in urban / industrial areas with degraded airsheds or close to ecologically sensitive areas where more stringent emissions controls may be needed.; MWth is heat input on high heat value basis; Solid fuels include biomass; Nm^3 is at one atmosphere pressure, 0°C.; MWth category is to apply to the entire facility consisting of multiple units that are reasonably considered to be emitted from a common stack except for NOx and PM limits for turbines and boilers.				

[1] Ambient standards provide the maximum allowable level of a pollutant in the receiving environment whereas emission standards set the maximum amount of pollutant that may be released

5 PERMITTING REQUIREMENTS

The Environmental Management Act defines the *environment* as: "*land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values*". Based on this, the following permits related to the environment are required for the operations of the abattoir.

Table 5-1 Permitting and authorisations

Act	Regulations	Type
Environmental Management Act 7 of 2007	List of activities that may not be undertaken without environmental clearance certificate: Environmental Management Act (Government Notice 29 of 2012)	An **ECC** is required for various aspects related to the abattoir. The listed activities with applicability are provided in section 4.
Livestock and Livestock Products Act 12 of 1981	Notice of Prohibition: Meat Industry Act, 1981 [Livestock and Livestock Products Act] (Government Notice 91 of 2006)	All abattoir operators must **register** as a producer with the Livestock and Livestock Products Board of Namibia.
Labour Act 11 of 2007	No person shall operate a factory which is not registered under these regulations [Labour Act, 1992: Regulations Relating to the Health and Safety of Employees at Work]. (Government Notice 156 of 1997)	An abattoir is per definition of the Labour Act a factory which must be **registered** in terms of the Act.
Water Resources Management Act 11 of 2013	Water Resources Management Regulations (Government Notice No. 269 of 2023)	Application for **licence** to discharge effluent or construct or operate a wastewater treatment facility or waste disposal site. **Registration** of all new and existing boreholes.
Petroleum Products and Energy Act 13 of 1990	Petroleum Products Regulations: Petroleum Products Act of 1990 (Government Notice No. 155 of 2000).	Issuing of consumer fuel installation **certificate.**

6 ENVIRONMENTAL MANAGEMENT PLAN

The purpose of this section is to list the most pertinent environmental impacts that are expected from the planning, operational, construction (upgrades, maintenance, etc.) and potential decommissioning activities of the abattoir.

6.1 OBJECTIVES OF THE EMP

The EMP provides management options to ensure impacts of the abattoir are minimised. The objectives of the EMP are:

- to include all components of planning, construction activities (upgrades, maintenance, etc.) and operations of the abattoir;
- to prescribe the best practicable control methods to lessen the environmental impacts associated with the abattoir;
- to monitor and audit the performance of operational personnel in applying such controls; and
- to ensure that appropriate environmental training is provided to responsible operational personnel.

6.2 IMPLEMENTATION OF THE EMP

Section 6.4 and section 6.5 outline the management of the environmental elements that may be affected by the different activities. Impacts addressed and mitigation measures proposed are seen as minimum requirements which have to be elaborated on. Delegation of prevention and mitigation measures as well as reporting activities should be determined by the Proponent and included in the EMP. The EMP is a living document that must be prepared in detail, and regularly updated, by the Proponent as the project progress and evolve.

The EMP and ECC must be communicated to the abattoir managers. A copy of the ECC and EMP should be kept on site. All monitoring results must be reported on as indicated. Reporting is important for any future renewals of the ECC and must be submitted to the MEFT. Renewal of ECC will require six monthly reports based on the monitoring prescribed in this EMP.

Various potential and definite impacts will emanate from the planning, operations, construction (care and maintenance) and decommissioning phases. The majority of these impacts can be mitigated or prevented. The prevention and mitigation measures are listed below.

6.3 MANAGEMENT AND IMPLEMENTATION OF THE EMP

Successful implementation of an environmental management plan is hinged on appointing key responsibilities and tasks to identified personnel. Members of staff may be assigned more than one position and carry the responsibility of more than one office. Therefore, for example, the environmental co-ordinator may also be the health and safety officer and / or community liaison officer. Key personnel as referred to in the documentation are as follows:

- General Manager
- Financial Manager
- Procurement Manager
- Maintenance manager
- Environmental Coordinator
- Financial Manager
- Human Resource Manager
- Community Liaison Officer (CLO)
- Health & Safety Officer

Note that each business or project has its own management structure tasked with the management and implementation of an EMP. The above positions may thus be replaced with the related equivalent. However, the Proponent will be required to develop and maintain their own organogram, indicated who will be responsible for which aspects. The organogram should be reviewed and updated regularly and should align with safety and emergency plans as well.

Table 6-1 provides a list of actions which have been assigned to specific personnel as per the related EMP. The table should be completed with the relevant responsible parties by the Proponent.

Table 6-1 Specific identified actions and related responsible party

Responsible Party	Action Intervals	Action	Appointed Person
General Manager	Ongoing	♦ Accountable and responsible for compliance and approval of any action plans.	
Financial Manager	Once-off	♦ Ensure budgetary allowance and/or insurance for any environmental incidents/damage (e.g. pollution clean-up due to fuel spills) or rehabilitation where infrastructure is removed.	
	Ongoing	♦ Financial provisions for employee development (training): ♦ Examples: o Educational and wellness programs (communicable diseases, alcohol and drug abuse, financial advice, etc.). o Fire protection and prevention training. o Health and safety plan / first aid training. o Communication strategy.	
Procurement Manager	Ongoing	♦ Ensure contractors' awareness and compliance to the Proponent's requirements for contractors on site and to applicable sections of this EMP.	
Maintenance Manager	Ongoing	♦ Draft necessary maintenance programs and information on utilities (location, capacity, etc.)	
Compliance Manager	Ongoing	♦ Drafting and maintenance of permitting, registration and licensing register, etc.	
Human Resources Manger	Ongoing	♦ Keep labour related documentation. ♦ Employment contracts. ♦ Local labour requirement. ♦ Unskilled labour requirement. ♦ Logging of work hours. ♦ Identification card. ♦ Provide references to employees.	
Health and Safety Officer	Once-off	♦ Compile a health and safety plan.	
	Ongoing	♦ Health and safety incidents register and related actions. ♦ Health and safety committee meetings. ♦ Legal appointments. ♦ Safety training e.g. toolbox talks.	
Community Liaison Officer	As required	♦ Record communication to community members (of incidents of importance such as environmental incidents). ♦ Record consultation with the local and regional authorities. ♦ Record and respond to complaints from community members.	
Environmental Coordinator	Once-off	♦ Develop an environmental mitigation strategy / plan. ♦ Develop a disciplinary policy for non-compliance.	

	Bi-annual report	♦ Record keeping of site inspections. ♦ Record keeping of rehabilitation where required (dated photos of rehabilitated areas)	
	As required	♦ Environmental training of relevant staff on various aspects of environmental management (compliance to, and implementation, of the EMP) to be covered. Proof in the form of attendance registers kept on file.	
	Ongoing	♦ Recording of environmental performance and management. ♦ Recording of environmental incidents. Proof in the form of incidents register and communication to be kept on file.	

Section 6.5 outlines the management of the environmental elements that may be affected by different activities or incidents at the abattoir. Each impact is provided as a standalone impact for easy reference and distribution to relevant contractors and employees. Impacts are however not always completely independent of each and overlaps between two or more impacts are common. Furthermore, impacts addressed and mitigation measures proposed are seen as minimum requirements which can be elaborated on by the Proponent as the execution of the project progress and evolve. As such, the EMP is a living document that must be prepared in detail, and regularly updated, by the Proponent and/or its consultants.

Currently, all ECCs list a bi-annual monitoring frequency as one of the conditions. Should this change, the frequency of monitoring report submission should match that as prescribed.

Since the preventative and mitigation measures for various impacts are generally the same, regardless of whether it is for the construction, maintenance, operational or decommissioning phases, these phases will be dealt with simultaneously to prevent duplication.

6.4 MANAGEMENT OF IMPACTS: PLANNING PHASE

The following section provides management measures for the planning activities related to the abattoir operations and maintenance. During the phases of planning for operations, construction (care and maintenance) and decommissioning of the abattoir, it is the responsibility of the Proponent to ensure they are and remain compliant with all legal requirements. The Proponent must also ensure that all required management measures are in place prior to and during all phases, to ensure potential impacts and risks are minimised. The following actions are recommended for the planning phase and should continue during various other phases of the project:

- Ensure that all the necessary permits from the various ministries, local authorities and any other bodies that govern abattoirs, meat processing and related activities are in place and remains valid. These include effluent disposal permits from the Ministry of Agriculture, Fisheries, Water and Land Reform, consumer installation certificate from the Ministry of Environment, Forestry and Tourism, etc. Maintain a register of such permits, their requirements/conditions, and their renewals.
- Ensure a contractor management program is in place and that it includes the EMP.
- Employees to adhere to relevant sections of the EMP, as applicable to their scope of work and general operations.
- Make provisions to have a health, safety and environmental coordinator, or similar, to oversee implementation of the EMP, occupational health and safety, as well as general environmental related compliance at the site.
- Corporate communication processes to be followed in the event of complaints from public entities.
- Have emergency response plans, equipment and personnel on site, as applicable, to deal with all potential emergencies.
- Develop and adopt a waste management plan inclusive of a waste minimisation strategy for all aspects of the abattoir operations.
- Ensure availability of sufficient funds or insurance spill clean-up or pollution remediation if ever required.
- Establish and / or maintain a reporting system to report on aspects of construction activities, operations and decommissioning as outlined in the EMP.
- Submit bi-annual reports to the MEFT to allow for environmental clearance certificate renewal after three years. This is a requirement by MEFT.
- Update the EMP and apply for renewal of the environmental clearance certificate as per the conditions of the ECC.

6.5 MANAGEMENT OF IMPACTS

The following sub sections provide management measures for both the operational phase and the construction activities (maintenance and minor upgrades) related to the abattoir.

6.5.1 Employment

Continuous operations and maintenance of the abattoir require a permanent employee base and periodic appointment of contractors. Both can include skilled and unskilled employees to perform various tasks. Employment increases individual and societal economic resilience through, not only the payment of wages, but also contributions to social security and fringe benefits.

Desired Outcome: Remuneration of temporary and permanent employees and contractors as per the Labour Act. Continued contributions to social security.

Actions

Enhancement:

- The Proponent must employ local Namibians from the area where possible.
- Develop and maintain a contractor management program, inclusive of compliance reviews of service level agreements etc.

Responsible Body:

- Proponent

6.5.2 Skills, Technology and Development

Development of people and technology are key to the economic development of Namibia. During abattoir operations, training is provided to the workforce to be able to conduct certain tasks according to the required standards. Skills are periodically transferred to an unskilled workforce for general tasks. Employees enhance their work experience and capabilities while some individuals may be identified for promotion and additional skills development and training. New technologies are at times introduced and a portion of the workforce trained on its implementation and/or operations.

Desired Outcome: To see an increase in skills of local Namibians, as well as development and technology advancements in the meat processing industry and local community.

Actions

Enhancement:

- As far as is practically possible, employees and contractors must first be sourced at local level and if not locally available, regional or national options should be considered.
- Employees should have access to relevant skills development and improvement programs based on identified needs.
- Inform employees about parameters and requirements for references upon employment.
- Ensure that all employees who receive formal training receive training certificates or managerial references where informal training is provided.
- Appoint reputable contractors who prioritise employee development and upliftment.

Responsible Body:

- Proponent

6.5.4 Economic Resilience

The operations of the abattoir changed the way revenue is generated and paid to the national treasury. The export of meat contributes to the national gross domestic product, towards a positive trade balance and the economic resilience of Namibia.

Desired Outcome: Contribution to the national treasury and payment of fees and taxes in accordance with the laws of Namibia.

Actions

Enhancement:

- Adhere to the relevant Namibian legislation pertaining to the payment of salaries, taxes, fees, etc.
- Prioritise and set targets for local procurement.

Responsible Body:

- Proponent

6.5.5 Demographic Profile and Community Health

The abattoir is well established with a permanent employee base which sees little fluctuation in numbers. No significant expansion in operations is foreseen for the near future and the number of employees will thus mostly remain the same. Social ills, such as alcoholism and drug abuse (trade and use of illegal substances), and the spread of communicable diseases and sexually transmitted infections (STIs) may occur, especially as a result of workers' disposable income. Greater economic prosperity, as linked to the successful operations, may lead to a change in the demographic profile of the local community. Change may result from an influx of job seekers over time and further densification of the informal settlement of Mariental. Community structures may change with an increase in population while the economic profile will be adjusted as the employment structure of the area is changed. An increase in people in the area may potentially increase the risk of criminal and socially deviant behaviour such as vandalism. More people in the area will exert additional pressure on governmental services, particularly essential services such as health care. Medical assistance, emergency services and the policing of the community may become strained.

Desired Outcome: To prevent the occurrence of social ills and prevent the spread of communicable diseases and STIs.

Actions

- Maintain a comprehensive employee wellness program, ensuring that relevant support are provided to employees in line with the needs of the employees at a particular site.
- Appointment of reputable contractors where applicable.
- Disciplinary steps, within the legal parameters of Namibia, to be taken for socially deviant behaviour during working hours, should be clearly stipulated in employment contracts.

Mitigation:

- Take disciplinary action against employees not adhering to contractual agreements with regard to socially deviant behaviour (e.g. alcohol or drug abuse during working hours).

Responsible Body:

- Proponent

6.5.6 Employee Health and Safety

Daily operational, maintenance and construction activities are reliant on human labour. Such activities have varying degrees of health risks. Examples include hypothermia related to cold temperatures in cold rooms and freezers, exposure to hazardous chemicals with inherent health hazards, such as fuel, disinfectants, ammonia, pesticides, etc. Exposure can include dermal or eye contact, inhalation or ingestion.

Potentially harmful *Legionella* bacteria may proliferate in the hot water tanks and heaters, plumbing systems, water-based air washers and water storage tanks. *Legionella* bacteria which, if it becomes airborne in small droplets through for example the ventilation system or through wash water spray, can be inhaled. This may lead to Legionnaires' disease or Pontiac fever in exposed individuals.

The wastewater treatment ponds pose a danger of people becoming ill from exposure to pathogens prevalent in the water. This may be employees working at the ponds or people illegally accessing the ponds.

Employees may unknowingly infect each other with an infectious disease/illness. This has the potential to spread among workers who are in close contact with each other.

Food and canteen hygiene is important to prevent employees from getting food poisoning. Certain employees may have severe allergies to certain foodstuffs.

Diseased or contaminated meat can lead to health impacts in the end-consumers.

The continued slaughtering process may further pose risks to some employee's psychological and behavioural patterns including coping mechanisms.

Various operational and maintenance/construction activities have inherent safety risks. Activities such as the operation of slaughtering equipment (knifes, saws, steel hooks, etc), cold rooms, vehicles and machinery, as well as handling of hazardous chemicals, pose risks to employees. Accidental release of ammonia form the refrigeration system can pose safety risks. Ammonia is corrosive and can cause freeze burns. In addition the majority of the facility's operational areas have numerous risks associated with sharp instruments and slippery surfaces.

The site is located within a peri-urban area and occurrences of wild animals, including venomous species of snakes and scorpions are possible. Encounters with these wild animals, may pose risks to staff

Desired Outcome: To prevent health impacts among employees and the end-consumers.

Actions

Prevention:

- All health standards specified in the Labour Act should be complied with.
- All industry specific health procedures and regulations applicable to the abattoir should be in place and adhered to, this should include a food handler's medical survey programme.
- Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool, which includes:
    - A medical surveillance program.
    - A hygiene and ergonomic survey for the site.
    - A functioning first aid room.
    - Operational, safe work, first aid and medical procedures.
    - Permit to work system for dangerous work.
    - Job hazard analysis and standard operating procedures where required.
    - Emergency response plans and drills.
    - Lockout tagout protection when servicing or maintaining potentially dangerous equipment.

  - Housekeeping programmes.
  - MSDS's and signage requirements (PPE, flammable etc.).
- Develop a risk specific safety management plan inclusive of emergency equipment that must be present on site, emergency response drills, training and awareness, contact details of all emergency services, etc.
- Compile a thorough microbiological hazard assessment, with applicable monitoring plan, specifically related to the landfill and biological effluent ponds.
- A *Legionella* specific risk assessment and management plan should be compiled which includes identifying, inspection and analysis of any water sources potentially containing *Legionella* spp.
- Selected staff should be trained in first aid and first aid kits must be readily available together with the contact numbers for emergency ambulance and professional medical services.
- All relevant staff should receive adequate training on hygiene in the working environment
- The abattoir must have emergency plans to deal with diseased animals that may be found among livestock delivered and kept in pens prior to slaughtering. This includes the design and planning for isolation pens and mass disposal areas.
- Staff must be regularly trained in procedures pertaining to containment of disease outbreaks and destruction and disposal of diseased animals.
- Ensure that all relevant employees receive adequate training on the health hazards associated with chemicals and fuel as well as safe handling techniques. Employees must also be trained in the use and understanding of the respective chemicals' material safety data sheets (MSDS).
- Maintain an MSDS file for all chemicals kept and used on site and ensure that summaries of the most important aspects of each is available (and visible) at each chemical's storage area.
- Encourage staff to immediately report any signs/symptoms of illness. Managers to determine whether such staff should go off duty to prevent infection of other staff and whether medical treatment will be required.
- Maintain a robust meat safety program with clearly defined hazard control points and ensure the cold chain is maintained.
- Regularly clean and disinfect areas with a high probability of bacterial or virus contamination such as the slaughtering area, bathrooms, canteen, etc.
- Promote good hygiene and regular hand washing among staff and especially those directly involved with slaughtering and handling of meat.
- Ensure caterers are aware of any personnel with severe food allergies and that food prepared for personnel with food allergies are segregated from any allergy causing foods.
- Clearly label dangerous and restricted areas as well as dangerous equipment and products. These include the slaughtering area, ammonia compressor room, boilers, the chemical store, fuel storage area. Clearly indicate compulsory personal protective equipment (PPE) requirements for specific areas.
- The biological effluent ponds should be fenced with warning signs prohibiting entry by unauthorised persons.
- Provide all relevant employees with required and adequate PPE.
- Identify trip hazards and remove where possible. Where such structures form part of the required operational infrastructure, they should be painted in bright or distinguishable colours.
- Develop and maintain an infrastructure, machinery and tools register for the abattoir inclusive of a maintenance and inspection schedule, this should include driven machinery, fuel storage, chemical storage, etc.
- Ensure legal appointments, of appropriately qualified and trained personnel, are in place for all necessary maintenance and specialised operational activities.
- Ammonia has a strong smell and leaks are typically quickly detected by smell only. However, leak detectors should be considered since personnel will not always be present in the compressor rooms.

- Staff should be educated / trained on human wildlife conflict management and not to confront wild animals or other potentially venomous / dangerous animals that may be encountered on site.

Mitigation:

- Seek medical attention for all serious health related incidents.
- Implement mental awareness programs specifically related to the continued slaughtering process' risks to employees' psychological and behavioural patterns including coping mechanisms.
- Ensure that all incidents are reported, recorded, managed and investigated in line with the Proponent's specific procedures related to incident management. Take corrective actions where required, including disciplinary action where negligence is suspected.

Responsible Body:

- Proponent

6.5.7 Security

Security risks will be related to unauthorized entry onto the premises with the possibility of theft.

Desired Outcome: To prevent security incidents and theft.

Actions

Prevention:

- Security procedures and proper security measures must be in place to protect workers and prevent unauthorised entry.
- Lock away or store all equipment and goods on site in a manner suitable to discourage criminal activities (e.g. theft).
- Advise personnel to lock away valuables and not to leave valuable items unattended.
- Contractors on site must wear identifiable nametags so that staff can recognise them as being permitted to be on site.

Mitigation:

- In line with the Labour Act and any other relevant legislation and internal policies and procedures, take disciplinary action against staff who are guilty of theft.
- If the need arise, improve security measures to prevent entrance of potentially deviant people onto the premises.

Responsible Body:

- Proponent
- Contractors

6.5.8 Fire

Failing electrical infrastructure, maintenance and construction activities, incorrect chemical storage, boiler operations, kitchen operations, etc. all can result in accidental fires. Vehicles can also ignite dry vegetation if sufficient heat (e.g. exhaust pipes) or sparks are produced when such vehicles for example access the solid waste disposal area, do earth works or are used to clear vegetation at the photovoltaic plant. Such a fire can cause veld fires spreading to neighbouring properties when dry vegetation is abundant.

Ammonia, if present in low volumes in air becomes flammable, and a fire and explosion risk is present where ammonia forms a 15% to 28% mixture with air. Typically experienced in boiling liquid expanding vapour fires/explosions.

Desired Outcome: To prevent property damage, veld fires, possible injury and impacts caused by uncontrolled fires.

Actions

Prevention:

- Prepare a holistic fire protection, prevention and response plan. This plan must include evacuation plans and signage, an emergency response plan and a firefighting plan.
- Personnel training (safe operational procedures, firefighting, fire prevention and responsible housekeeping practices).
- Maintain firefighting equipment at approved intervals and keep a maintenance register.
- Ensure good housekeeping to reduce fire risks associated with accumulated waste materials, dry vegetation, etc.
- No open fires to be allowed on site (e.g. for cooking) except at designated areas and with the necessary approval from management.
- No fires may be ignited with the intent to clear vegetation or burn waste on site without managements consent. If planned burns are contemplated, all measures to prevent the spread of fire into the veld and nearby farms must be in place including firefighting equipment and personnel. No slaughterhouse or hazardous waste should be burned on site.
- Ensure the relevant authorities are notified if the power line servitude must be maintained and vegetation removed to prevent elevated fire risks.
- Ensure all fuel and chemicals, including ammonia, are stored and handled according to MSDS and SANS instructions.
- The compressor room must have an emergency response plan specific to ammonia related fire risks if leaks or accidental release of ammonia occur. This could include explosive proof lighting, extractor fans, PPE and water hoses with water diffusing nozzles. Water absorbs ammonia vapour if sprayed by a fine mist or droplets of water. Refer to MSDS and SANS 10147.
- See section 6.5.9 for ammonia leak detection.
- Have an electrical maintenance / service and inspection plan in place, this should include; regular inspections on high and low voltage reticulation systems; annual infrared scans on all main distribution boards and electrical equipment; annual Earth leakage tests, transformer management plan and legal appointments of responsible, qualified personnel.

Mitigation:

- Implement the fire response plan in the event of a fire and notify neighbours in case of potential spreading of a fire to nearby farms.
- Quick response time by trained staff will limit the spread and impact of fire.

Responsible Body:

- Proponent
- Contractors

6.5.9 Air Quality – Odour, Gas Emissions and Dust

The abattoir will include the operations of an evaporation pond system and septic tanks. Methane, hydrogen sulphide and mercaptans are the primary foul smelling emissions from abattoir effluent treatment plants, abattoir solid (biological) waste storage and disposal facilities, and domestic septic tanks. Apart from being foul smelling and a nuisance, some gases such as methane are also major contributors to the greenhouse effect and global warming.

If the biological effluent ponds malfunction or if solid wastes are not disposed of properly, odours may be produced in significant volumes to become a nuisance. While no immediate neighbours are present, the wind can cause such odours to reach receptors some distance away. Effluent treatment pond failure is likely due to the very high organic load together with detergents and disinfecting chemicals disposed with the effluent.

The small stock holding pens can cause bad odours (e.g. ammonia) if urine and faeces are not regularly removed / cleaned. Ammonia can also be harmful to animals in the holding pens.

Ammonia may also be accidentally released from the refrigeration system and is corrosive and an irritant and can cause significantly reduced air quality in the immediate vicinity of the leak or if contained inside a closed building.

Dust may be generated should any construction take place or during the excavation and or maintenance of the disposal pits.

The boiler is the principal emitter of air pollutants and of key concern are the "exhaust" gases: nitrous oxides, sulphurous oxides, hydrocarbons, carbon monoxide, carbon dioxide, and particulate matter, which are all considered to be significant sources of air pollution. Gases emitted from the boiler contribute to the greenhouse effect. The volume associated with these releases during the operational phase are insignificant, however may have a cumulative effect on the airshed. Mariental is associated with a lower relief due to the Fish River. The valley accommodates air inversions especially during the winter months, when cooler air is trapped, accumulating pollution. However, the site is located outside the Mariental urban centre (with related, elevated greenhouse gas emissions) and will contribute negligible amounts of pollution to the airshed.

Although diesel is not as volatile, limited fuel vapours may still be released into the air during refilling of the bulk diesel storage tank. Prolonged exposure may have carcinogenic effects.

Desired Outcome: To prevent any nuisance and reduce emissions.

Actions

Prevention:

- Good housekeeping is essential not only to stop odours from developing, but also to ensure hygienic conditions.
- The boiler must use clean fuels free of heavy metals and toxic wastes.
- The boiler stack should be high enough to prevent ground level concentrations of pollutants from reaching undesirable levels (refer to International Finance Corporation / World Bank: General Environmental, Health, and Safety Guidelines: Environmental Air Emissions and Ambient Air Quality for additional guidelines)
- Adopt strategies to reduce odours from the animal holding pens. These can include:
  - Scraping and removing the manure for disposal, then washing down using low volume high pressure water spray as soon as possible after sheep leaves the pen.
  - If sheep remain in the pens for longer periods, manure should be collected and disposed of daily.
- Obtain expert input in the best practice (and rehabilitation or re-design) of biological effluent ponds to ensure their optimum functioning. During commissioning, odours produced by anaerobic waste treatment ponds can potentially be reduced by aspects such as:

- Allowing some fat and manure solids to pass to the pond to establish a crust of 100 mm thick on the surface of the anaerobic ponds (first ponds).
- Layering of reeds on the surface of the anaerobic pond.
- Using the minimum amount of chemicals necessary for cleaning purposes to reduce the volume of chemicals entering the ponds as well as investigating biodegradable chemical alternatives.
- An appropriate starter culture or enzyme can be used to establish pond equilibrium (also in the event of a pond treatment failure).

- All slaughterhouse waste should be buried under at least 60 cm deep soil to prevent odours from escaping or exposure of the waste by animals, wind or storm water. The addition of ammonium sulphate or lime to slaughterhouse waste should be contemplated to speed up decay.
- The skin drying area should be well ventilated.
- Ammonia has a strong smell and leaks are typically quickly detected by smell only. However, leak detectors should be considered since personnel will not always be present.

Mitigation:

- Compressor rooms and ammonia storage rooms, if not well ventilated, must have extractors in case of leaks or accidental ammonia releases.
- Dust suppression to be conducted if required during earthworks (e.g. digging pits at landfill, maintaining biological effluent ponds, etc.)

Responsible Body:

- Proponent
- Contractors

6.5.10 Noise

The multifaceted operations of an abattoir involve various systems and machines which will generate noise of various intensity. These include compressors, pressure washers, electrical saws, etc. Maintenance and construction activities may cause temporary elevated noise levels. Noise impacts will be limited to workers and visitors present on site as no other receptors (neighbours) are present near the facility.

Desired Outcome: To prevent any nuisance and hearing loss due to loud noise.

Actions

Prevention:

- For various components of the abattoir and surroundings, adhere to the applicable prescribed noise levels as contained in:
  - *Labour Act, 1992: Regulations relating to the health and safety of employees at work*
  - *European Union noise standards for export abattoirs.*
  - *World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999).* [Applicable where new receptors establish on neighbouring properties.]
- All machinery and vehicles must be regularly serviced and lubricated where applicable to ensure minimal noise production.
- Where relevant, install mechanical equipment on mounts designed to isolate structure-borne vibration and noise.
- All ventilation and extractor fans should be noise efficient or fitted with silencers, and all ducts could be lined with sound-absorbent material, if required.

Mitigation:

- Follow recommendations from occupational hygiene survey regarding occupational exposures and mitigation which may include noise barriers such as screens around noisy equipment and operations and hearing protectors as standard PPE for workers in situations with elevated noise levels.

Responsible Body:

- Proponent
- Contractors

6.5.11 Liquid Waste – Industrial Waste Water

Industrial waste water to be managed on site consists of wash water from the slaughtering, processing and cold storage areas, water from the skins treatment and drying area, wash water from the holding pens and truck washing area, blood, excrement, cleaning chemicals, and slaughterhouse wastes.

Waste water containing solids is screened to separate solids from water and/or solids are allowed to settle out of suspension in the sump. Due to the blood and biological contents of the waste water, it has a very high organic load with a high BOD / COD. The waste water is disposed of in on-site biological effluent ponds while solids are disposed of in a land fill as indicated in section 6.5.13. In terms of the *Department of Water Affairs and Forestry, Code of Practice volume 2 Pond Systems General Guidelines*, no effluent from a pond system may be released into the environment. It states: *"Generally, open ponds cannot produce a final effluent complying with the currently applicable Namibian standards for effluent discharge, viz the General Standard of Act No. 24 of 2004* [also applicable to the Water Resources Management Act, 2013]. *Therefore, final effluent produced by a pond system will not be allowed for discharge into the environment. However, this effluent would be suitable for limited reuse, provided maturation ponds and proper disinfection is included. Limited reuse would typically include gardening, lawns, sports fields and certain agricultural produce. Where new ponds are constructed and the final effluent is not reused for irrigation, they should be of sufficient size (area) to ensure that all water is evaporated. Since water is a scarce commodity in Namibia, reuse thereof is strongly encouraged. A reuse permit obtainable from the Department of Water Affairs is required for this purpose."*

Desired Outcome: To reduce the amount of industrial waste water produced, and to adequately contain and treat waste water to prevent pollution of the environment and to prevent health hazards associated with the effluent treatment facilities. Treated water released into the environment must comply with effluent disposal permit conditions and specifically Namibian standards for effluent discharge, as per the Water Resources Management Act of 2004.

Actions

Prevention:

- Develop and implement an effluent management plan, this should include waste water reduction initiatives and regular inspection and maintenance of wastewater reticulation and treatment infrastructure.
- Biological effluent ponds to be managed as per the *Department of Water Affairs and Forestry, Code of Practice volume 2 Pond Systems General Guidelines.* Obtain expert input in the best practice (and rehabilitation or re-design) of biological effluent ponds to ensure their optimum functioning and adherence to *Code of Practice volume 2*.
- Regular monitoring, sampling and analysis of the oxidation ponds to ensure adequate treatment as per *Code of Practice volume 2* and effluent discharge permit conditions.
- No effluent may be released (accidentally or purposefully) from any of the ponds, but should instead be allowed to evaporate from the final evaporation ponds, unless the final effluent first pass through additional treatment processes to ensure quality complies with Department of Water Affairs' prescribed standards. The beneficial use of wastewater could then be considered (e.g. irrigation use).
- The ponds should be fenced as per *Code of Practice volume 2.*
- All foreign material must be collected and prevented from entering the wastewater stream.
- Regular monitoring and periodic cleaning of ponds to ensure depth and capacity remain adequate (employment of management measures to reduce sedimentation, etc.).

Mitigation:

- To reduce effluent volumes the following should be considered:
  - Operators should be trained in water conservation and water usage monitoring.
  - Use high pressure low volume water hoses to minimise the amount of water required for cleaning operational areas.

- Water used for general washing must be pressurized.
- Cold water must be used to clean surfaces soiled with blood (except periodic deep cleaning at the end of the day) as the use of hot water causes congealing of the blood, making cleaning more difficult, thus resulting in unnecessary wastage of water.
- All hoses must be fitted with self-closing nozzles to prevent wastage when not in use. Where the hoses are frequently used, pistol grips must be used.
- All hoses, fittings and connections must be leak free and replaced if leaks are detected.
- Slaughterhouse waste and manure in the pens can be dry swept and removed prior to the areas being washed.

- To reduce the organic load of industrial wastewater beneficial use of blood can be investigated. This will not only improve the conditions in the biological effluent ponds, but may also create additional economic spinoffs.
- Biodegradable cleaning materials should be investigated to limit impacts on the biological effluent ponds and the environment.

Responsible Body:

- Proponent
- Contractors

6.5.12 Liquid Waste – Sewage Effluent

Sewage originates from ablution facilities and kitchens. It is disposed of in two septic tanks.

Desired Outcome: To reduce the amount of sewage produced, and to adequately contain and treat sewage to prevent pollution of the environment and to prevent health hazards associated with the septic tanks

Actions

Prevention:

- The septic tanks should be designed and operated according to the general guidelines set forth in the *Department of Water Affairs and Forestry, Code of Practice: Volume 1, Septic tank Systems* including wastewater discharge permit conditions.
- Ensure all ablution facilities are connected to the septic tanks to prevent groundwater contamination.
- No foreign objects, hazardous chemicals, fuels or excessive amounts of cooking grease may enter the sewage system.
- Switch to bio-degradable, septic tank friendly cleaning chemicals where available.
- When septic tanks are full, the liquid can be pumped into the effluent pond system or alternatively be collected and disposed of at the municipal sewage treatment facility. No effluent may be disposed of directly into the environment.
- Should the septic tanks be decommissioned, all waste should be removed from the tank and disposed of at a registered sewage treatment facility prior to decommissioning. The septic tanks should then be backfilled to prevent collapse and animals or people falling into them.

Mitigation:

- Promote and implement water saving strategies including water saving devices in ablution facilities in order to reduce the volume of sewage produced.

Responsible Body:

- Proponent
- Contractors

6.5.13 Solid Waste Production

Solid waste can be faeces from the holding pens, slaughterhouse wastes or it can be waste originating from kitchens, offices, workshops, etc. Maintenance waste can include discarded or obsolete equipment. Some wastes can be dangerous / hazardous such as diseased animal carcasses, obsolete or expired chemicals, contaminated fuels or chemicals, etc.

Desired Outcome: To reduce the amount of waste produced, and prevent pollution and littering.

Actions

Prevention:

- Develop and implement a waste management program, this should include waste reduction and recycling initiatives and regular inspection and maintenance of waste storage and disposal areas.
- All employees should be educated on proper waste handling and disposal and importantly on the segregation of waste according to the different waste streams and their appropriate disposal locations.
- Ensure adequate temporary waste storage facilities are available that prevents waste being blown away by wind and prevent scavenging (human and non-human) of waste.
- Composting of manure should be done in pits or bunkers instead of stacks and heaps and according to best practise for abattoir compost waste.
- Slaughterhouse waste and condemned material resulting from the slaughtering process should be disposed of at the landfill area at a safe depth.
- General waste can be burnt on site.
- No hazardous or potentially toxic materials may be burnt or discarded at the landfill, but must be disposed of at a hazardous waste disposal facility.
- Slaughterhouse waste that are buried must be covered by at least 60 cm of clean soil and not less than 100 m from the abattoir, providing such material may not be harmful to the hygiene of the abattoir.
- No unauthorised people should be allowed access to the landfill area.
- All hazardous materials, including chemical container disposal, should be conducted as per their MSDS instructions.
- Should any buildings or structures be decommissioned, all waste and infrastructure should be disposed of at a pre-approved landfill site.
- See the material safety data sheets available from suppliers for disposal of contaminated products and empty containers. All hazardous waste chemicals containers requiring a triple rinse system for disposal purposes, should have the rinse water collected in a separate system and not disposed of into the oxidation ponds unless approved as per a chemical and biological assessment of the ponds and related interaction with the hazardous chemicals.

Mitigation:

- Waste should be disposed of regularly.
- Liaise with the local authority regarding waste and handling of hazardous waste.
- Investigate alternative techniques for disposal of slaughterhouse wastes such as composting by anaerobic digestion in windrows, alkaline hydrolysis, etc., with adequate destruction of all pathogens to enable beneficial use as for example fertilizers. This will not only reduce the environmental impact, but may also have positive economic spinoffs.

Responsible Body:

- Proponent
- Contractors

6.5.14 Ecosystem and Biodiversity

The facility was established many years ago and no major infrastructure additions are planned in the near future. Operational areas around the abattoir are devoid of vegetation however the inherent nature of the biological effluent ponds is that of a man-made wetland which provides a suitable habitat for various species of plants and animals, notably birds. The risk of contamination of the site and surrounding remains if the ponds' embankments are damaged and effluent drains into the surrounding environment or if the ponds' efficiency is low and effluent is not decomposed sufficiently.

The landfill areas has been used extensively in the past. As such the vegetation structure has changed significantly and *Prosopis* trees proliferate in these disturbed areas. No protected trees were observed to be present in the area. Condemned material disposed in the landfill pose risks of transferring pathogens to wild animals scavenging on exposed waste.

Soil contamination due to hazardous substance or fuel spillages may present risks to ecosystems.

Infrastructure components such as the power line and transformers present areas for bird nesting sites. The power line and photovoltaic plant also presents a hazard to some birds while flying.

Diseased wild animals may enter the holding pens and infect livestock to be slaughtered, especially if they are kept in the pens for longer periods due to unforeseen circumstances.

Desired Outcome: To avoid impacts on the ecological environment.

Actions

Prevention:

- Educate all contracted and permanent employees on the value of biodiversity.
- Disciplinary actions to be taken against all employees failing to comply with contractual conditions related to poaching and the environment.
- Fencing of areas such as the oxidation ponds and disposal pit to prevent scavenging by animals. Regular inspection and maintenance of all fences.
- All fuel and chemical storage to be conducted as per relevant SANS or MSDS instructions to prevent ecological damage.
- Birds should be deterred from nesting on infrastructure.
- Regular monitoring of the power line and photovoltaic plant for bird strikes and nesting. For the power line the relevant authority needs to be informed of such events while the Proponent should implement deterrent measures for the photovoltaic plant.
- Removal of trees, especially protected species and large trees, must be avoided and is subject to permitting from the Directorate of Forestry.

Mitigation:

- Mitigation measures related to waste handling and the prevention of groundwater, surface water and soil contamination should limit ecosystem and biodiversity impacts.
- All alien invasive *Prosopis* must be eradicated from the premises.

Responsible Body:

- Proponent

6.5.15 Soil structure disturbance and / or contamination

Various activities have already occurred on site which have significantly impacted the soil structure. These include the establishment of the infrastructure (foundation and compaction of surrounds), solar photovoltaic plant, oxidation ponds, holding pens and during the operations of the landfill area. Operations will see continued movement of heavy motor vehicles across the site and around the operations, resulting in compaction or disturbance of the topsoil. Compaction of topsoil can increase runoff potential while soil disturbance can result in excessive dust during windy conditions.

Excavations required for the continued burying of solid waste material will continue soil structure compromise as excavated soil (which includes layers of topsoil and subsoil) are mixed over material to be buried. The chemical and biological nature of the waste has the potential to further change the composition of the soil and this can be accelerated during rainfall events. Decomposition of the waste in the landfill may lead to a nutrient overload, a form of soil contamination / pollution.

Contamination of soil may further occur as a result of leaking effluent pipelines, vehicles leaking fuel, oil or hydraulic fluids and the spillages or incorrect disposal of chemicals.

Anthropogenic activities and modification of topography, by the Proponent and by neighbours, influence surface flow and may result in erosion, especially where vegetation is disturbed.

Desired Outcome: To prevent soil contamination, soil structure disturbance and erosion

Actions

Prevention:

- Proper training of employees and of operators of machinery and vehicles must be conducted on a regular basis (fuel and chemical handling, spill detection, spill control).
- All machinery and vehicles should be properly maintained to be in a good working condition during operations.
- Employ drip trays and spill kits when servicing / repairs of equipment are needed.
- Standard operating procedures should be developed and implemented for the use of hazardous materials.
- All harmful chemicals should be stored according to relevant MSDS requirements and a register maintained of all stored chemicals and their volumes.
- Fuel storage and handling according to SANS standards including storing fuel in a closed, bunded area and the use of drip trays or spill proof surfaces where fuel is handled. The bunded area should only be drained after rain events, once it is assured no fuel is present, or after any fuel present is removed (oil / water separator).
- No off-road driving should be allowed.
- Regular inspection of effluent pipelines for leaks and damage.
- Investigate the flood risk posed by changes in topography and devise a flood management strategy to protect infrastructure and people, prevent erosion and prevent water from carrying pollutants (effluent and slaughterhouse waste) away from the site.

Mitigation:

- Spill clean-up means must be readily available on site as per the relevant MSDS for all chemicals and fuels and spills should be cleaned immediately.
- Any fuel spillage of more than 200 litres must be reported to the Ministry of Mines and Energy. Keep proof of submission.
- The fuel storage bund area must be cleaned if any fuel products are present and this waste must be disposed of at a suitably classified hazardous waste disposal facility.
- Repair leaking pipelines immediately once a leak is detected.

- Any erosion gullies should be documented and repaired together with preventative measures implemented.
- Any berm erosion should be repaired as soon as possible and documented together with preventative measures implemented.
- Any erosion of effluent pond embankments or related structures should be repaired immediately and documented together with preventative measures implemented.

Responsible Body:

- Proponent
- Contractors

6.5.16 Groundwater and Surface Water

Groundwater is not utilised in the area and is expected to be slightly saline. Contamination of groundwater can occur should untreated or partially treated effluent (sewage and industrial), decomposing biological waste (buried), chemicals or fuels from the abattoir seep into the soil and ultimately the groundwater.

Surface runoff from the site drains to the Fish River, downstream of the Hardap Dam. Water in the river here mainly originates from the Hardap Irrigation Scheme and as such is highly degraded as a result of extensive use of fertilizers and pesticides. It does however support some aquatic life. The Fish River will get contaminated if potential pollutants wash into drainage lines and ultimately the Fish River during high rainfall events. Contamination of the river will decrease the dissolved oxygen content of water and may impact aquatic life. In addition, macronutrients such as nitrogen and phosphorus may cause eutrophication which further reduces the dissolved oxygen levels. Chemical compounds from surfactants and detergents will also impact aquatic life while some pathogens may also be present in the effluent. While water from the Fish River in the Hardap Irrigation Scheme area is not utilised, the pollutants may travel downstream to areas where water is utilised for stock watering and even as potable source.

Fuel supply is handled by a third party supplier, but the facility is operated by the Proponent. The Proponent is thus responsible for daily checks and for emergency procedures to be executed in case of a leak / spill since the supplier will not always be present on site.

Desired Outcome: To prevent the contamination of surface and groundwater.

Actions

Prevention:

- All biological effluent ponds to be managed as per the *Department of Water Affairs and Forestry, Code of Practice volume 2 Pond Systems General Guidelines.* Obtain expert input in the best practice (and rehabilitation or re-design) of biological effluent ponds to ensure their optimum functioning and adherence to *Code of Practice volume 2*.
- The septic tank should be designed and operated according to the general guidelines set forth in the *Department of Water Affairs and Forestry, Code of Practice: Volume 1, Septic tank Systems*.
- Embankments of oxidation ponds must be regularly inspected and maintained to ensure their integrity is maintained and that they do not become eroded due to overflowing, rain, animal activity and vegetation growth.
- Continual cleaning and monitoring of ponds to ensure depth and capacity remain adequate. Remove sludge when build-up is approximately half the total volume of the dam. Liaise with the municipality for the disposal of sludge.
- See the material safety data sheets available from suppliers for disposal of contaminated products and empty containers. All hazardous waste chemicals containers, requiring a triple rinse system for disposal purposes, should have the rinse water collected in a separate system and not disposed of into the oxidation ponds unless approved as per a chemical and biological assessment of the ponds and related interaction with the hazardous chemicals.
- Proper training of employees and of operators of machinery and vehicles must be conducted on a regular basis (fuel and chemical handling, spill detection, spill control).
- All machinery and vehicles should be properly maintained to be in a good working condition during operations.
- Employ drip trays and spill kits when servicing / repairs of equipment are needed.
- Standard operating procedures should be developed and implemented for the use of hazardous materials.
- All hazardous chemical should be stored in a sufficiently bunded area and a register maintained of all such chemicals and their volumes.

- Fuel storage and handling according to SANS standards including storing fuel in a closed bunded area and the use of drip trays or spill proof surfaces where fuel is handled. The bunded area should only be drained after rain events once it is assured no fuel is present or after any fuel present is removed (oil / water separator).

Mitigation:

- Spill clean-up means must be readily available on site as per the relevant MSDS for all chemicals and fuels.
- Any fuel spillage of more than 200 litres must be reported to the Ministry of Mines and Energy.
- The fuel storage bund area must be cleaned if any fuel products are present and this waste must be disposed of at a suitably classified hazardous waste disposal facility.
- Any incident related to the contamination from the oxidation ponds, should be communicated to downstream community and relevant authorities.
- Groundwater monitoring and corrective action if water quality deteriorates.

Responsible Body:

- Proponent
- Contractors

6.5.17 Water Supply

Water usage is minimal between slaughtering events but relatively large volumes are required during slaughtering. Water use is however not expected to impact on any nearby users, but water saving remains paramount in a dry country like Namibia. Interruptions in freshwater supply to the abattoir will negatively impact operations of the abattoir. Poor quality water may have health impacts.

Desired Outcome: To utilise water sustainably and ensure an adequate supply of water remains available to the abattoir.

Actions

Prevention:

- The abattoir must have suitable water storage on site to ensure a sufficient volume of water for animal watering and cleaning purposes are available in the eventuality that a water supply interruption occurs during a slaughtering event. Slaughtering of animals only to commence when proven water supply is available.
- The water must be clean, potable and free of suspended material and substances which could put health at risk.

Mitigation:

- Develop and implement a water management programme, which includes water use reduction measures, monitoring of water utilised and consumption volumes and regular inspections and maintenance of the water reticulation system.
- Periodic testing of water from the onsite water reservoir to determine quality and microbial proliferation problems.
- Should the water storage tank be contaminated, sterilisation, flushing and cleaning of the tank should be performed as appropriate.

Responsible Body:

- Proponent

6.5.18 Visual Impact

This impact is not only associated with the aesthetics of the site, but also the structural integrity of infrastructure. Glint and glare are concerns associated with the panels of the photovoltaic system. The facility is relatively isolated from receptors and will thus have a low glint and glare and visual impact. Operations will require cleaning of the entire slaughtering facility after each slaughtering event.

Desired Outcome: To minimise aesthetic impacts associated with the abattoir.

Actions

Prevention:

- Regular waste disposal and clearing of wastes on the entire premises.
- Solar panels of the photovoltaic system are to be well maintained and cracked or broken panels replaced.
- Earthworks to be conducted in an orderly fashion without scarring of the environment and clear indications of restricted areas.
- Regular waste disposal, good housekeeping and routine maintenance on infrastructure will ensure that the longevity of structures are maximised and a low visual impact is maintained.
- The minimal lighting required should be used at night and it must be directed downwards to ensure a minimal visual impact. Auto dimming lights, when no movement is detected, should be considered for external operational areas.

Responsible Body:

- Proponent
- Contractors

6.5.19 Traffic

Operations of the abattoir will increase traffic flow on the B1 Highway and potential incidents and accidents at the turnoff to the abattoir. Slow moving traffic (tractors) originating from the Hardap Irrigation Scheme use the B1 Highway and increases collision risks.

Desired Outcome: Minimum impact on traffic and no transport or traffic related incidents.

Actions

Prevention:

- Erect clear signage regarding the turnoff from the B1 Highway to the facility.
- All vehicles owned by the Proponent to operate within the Traffic and Transport Act regulation, specifically also in terms of roadworthiness.

Mitigation:

- If any traffic impacts are expected, traffic management should be performed to prevent these.

Responsible Body:

- Proponent
- Contractors

6.5.20 Cumulative Impact

Possible cumulative impacts associated with the operational phase and any maintenance / construction activities are mainly linked to employment (positive impact) and pollution, water demand, traffic and greenhouse gas emissions (negative impacts).

Desired Outcome: To minimise all cumulative negative impacts associated with the facility, while enhancing positive impacts.

Actions

Mitigation:

- Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact.
- Reviewing biannual and annual reports for any new or re-occurring impacts or problems would aid in identifying cumulative impacts and help in planning if the existing mitigations are insufficient.

Responsible Body:

- Proponent

7 MONITORING REQUIREMENTS

Table 7-1 provides a summary of proposed monitoring requirements and frequencies. All incidents and actions must be recorded as soon as it occurs in order to ensure it is not forgotten at a later stage (continuous monitoring). Summaries of these records should be provided in the bi-annual EMP compliance monitoring report to be submitted to MEFT. Where permit or licence conditions' monitoring requirements differ from the EMP, the permit or licence condition must be adhered to.

Table 7-1 Monitoring requirements

Impact	Monitoring	Purpose	Frequency	Included in Bi-Annual Report
Planning	Proof of permits/licences/certificates	For the EMP monitoring report to indicate the Proponent's adherence to relevant legislation	Once off or when it is renewed	♦ Copy of permits/licences/certificates
	EMP/Bi-annual monitoring reports	For the EMP monitoring report to indicate the Proponent's adherence to relevant legislation and the ECC	Once off or when updated	♦ Written verification that copies are available for inspection at Farmers Meat Abattoir
	Managerial structure with assigned responsibilities	For the EMP monitoring report to indicate the Proponent's adherence to the EMP and ECC	Once off or when changed	♦ Written verification of the structure and assigned responsibilities
Employment	Employment figures Proof of Social Security contributions	For the EMP monitoring report to provide a quantitative measure of the positive contribution the Proponent makes towards the employment sector	Bi-annual checks and reporting	♦ Number of male vs female employees ♦ Number of Namibian vs foreign employee ♦ Social security
Skills and Development of Employees	Records of training and copies of certificates and/or references on file	For the EMP monitoring report to provide an overview of the positive contribution the Proponent makes towards the development of employees	Bi-annual checks and reporting	♦ Type of training and number of people who received said training with attendance registers as proof ♦ One or two copies of certificates or references as examples
Economic Resilience	Proof of payment of taxes	For the EMP monitoring report to indicate the Proponent's adherence to relevant legislation	Bi-annual checks and reporting	♦ Tax good standing
Demographic Profile and Community Health	Records of all educational and social upliftment programmes	For the EMP monitoring report to provide an overview of the positive contribution the Proponent makes	Bi-annual checks and reporting	♦ Type of training and number of people who received said training with attendance registers as proof

Impact	Monitoring	Purpose	Frequency	Included in Bi-Annual Report
		towards the social development and wellness of employees		
Employee Health	Presence of MSDS instructions on file and at applicable locations	For the EMP monitoring report to indicate adherence to typical health requirements	Bi-annual checks and reporting	♦ Copy of MSDS file index/table of contents as proof
	Keep records of all mild to serious health related incidents with actions taken.	For the EMP monitoring report to indicate Proponent's commitment to ensuring the health of employees	Continuous record keeping with bi-annual summary report	♦ Summary of incidents and actions
	Legionella risk assessment and management plan on file	To indicate water sources identified as potentially posing a risk of proliferation of *Legionella* bacteria and to indicate proposed measures to prevent, test and/or treat such water.	Once of risk assessment and preparation of management plan with updates as required. Testing and treatment of water as per the management plan, if applicable.	♦ Summary of risk assessment findings ♦ Index/table of contents of management plan as proof ♦ Register of water treatment and/or testing with test results when applicable
	Diseased animal handling procedure on file	For the EMP monitoring report to indicate readiness to deal with any diseased animals encountered.	Once off with updates as required.	♦ Index/table of contents of procedure as proof
	Hazard Analysis and Critical Control Points (HACCP) food management system on file	For the EMP monitoring report to indicate Proponent's food safety commitment.	Once off with updates as required.	♦ Index/table of contents of food management system as proof
Safety	Presence of MSDS instructions on file and at applicable locations	For the EMP monitoring report to indicate adherence to typical safety requirements	Bi-annual checks and reporting.	♦ Copy of MSDS file index/table of contents as proof
	Signage and fencing	For the EMP monitoring report to indicate adherence to typical safety requirements	Bi-annual reports but once-off proof of presence of signage and fencing, thereafter only of any new signage or fencing erected.	♦ Photographs of safety and restricted area signs and fencing as proof

Impact	Monitoring	Purpose	Frequency	Included in Bi-Annual Report
	Keep records of all mild to serious safety related incidents with actions taken	For the EMP monitoring report to indicate Proponent's commitment to ensuring the safety of employees.	Continuous record keeping with bi-annual summary report.	♦ Summary of incidents and actions
	First aid training events	For the EMP monitoring report to indicate Proponent's commitment to ensuring the safety of employees.	Bi-annual checks and reporting	♦ Level of training and number of people who received said training with attendance registers as proof ♦ One or two copies of certificates or references as examples
Security	Security related incidents with action taken to prevent future occurrences	For the EMP monitoring report to indicate the Proponent's commitment to ensuring the security of employees.	Continuous record keeping with bi-annual summary report	♦ Summary of incidents and actions
Fire	Holistic fire protection and prevention plan	For the EMP monitoring report to indicate the Proponent's adherence to the EMP	Once-off proof of presence of such plan	♦ Copy of plan
	Firefighting equipment presence	For the EMP monitoring report to indicate the Proponent's adherence to the fire safety requirements	Once-off proof of presence of such equipment	♦ Photographs of equipment with copy of register of the types and quantity of firefighting equipment
	Servicing of firefighting equipment	For the EMP monitoring report to indicate the Proponent's adherence to the annual service requirements of firefighting equipment	In the bi-annual report corresponding to the date the equipment was serviced	♦ Servicing register with photos of proof or a compliance certificate issued by the service agent.
	Ammonia emergency response plan	For the EMP monitoring report to indicate the Proponent's adherence to the fire safety requirements	Once-off proof of presence of such plan	♦ Copy of plan
	Ammonia leak detection	For the EMP monitoring report to indicate the Proponent's adherence to the fire safety requirements	Once-off proof of presence of such detector	♦ Photograph of detector
	Electrical maintenance / service and inspection plan	For the EMP monitoring report to indicate the Proponent's adherence to the fire safety requirements	Once-off proof of presence of such plan	♦ Copy of plan

Impact	Monitoring	Purpose	Frequency	Included in Bi-Annual Report
	Fire related incidents with action taken to prevent future occurrences.	For the EMP monitoring report to indicate the Proponent's adherence to the EMP	Continuous record keeping with bi-annual summary report	♦ Summary of incidents and actions
Air Quality – Odour, Gas Emissions and Dust	Complaints register	For the EMP monitoring report to indicate the Proponent's adherence to the EMP	Continuous record keeping with bi-annual summary report	♦ Summary of complaints and actions
Noise	Noise producing machinery inspection and servicing register	For the EMP monitoring report to indicate the Proponent's adherence to the EMP	Continuous record keeping with bi-annual summary report	♦ Register of inspection and servicing
	Complaints with action taken to address the complaint	For the EMP monitoring report to indicate the Proponent's adherence to the EMP	Continuous record keeping with bi-annual summary report	♦ Summary of complaints and actions
Liquid Waste – Industrial Waste Water	Effluent management plan	For the EMP monitoring report to indicate the Proponent's adherence to *Code of Practice Volume 2 - Pond Systems General Guidelines*	Once-off proof of presence of such plan	♦ Copy of plan
	Effluent discharge license	For the EMP monitoring report to indicate the Proponent's adherence to the Water Resources Management Act	Once off or when it is renewed	♦ Copy of license
	Effluent sampling and analysis	For the EMP monitoring report to indicate the Proponent's adherence to the effluent discharge license	As per licence conditions	♦ Results of analysis
Liquid Waste – Sewage Effluent	Effluent discharge license	For the EMP monitoring report to indicate the Proponent's adherence to the Water Resources Management Act	Once off or when it is renewed	♦ Copy of license
Waste	Waste reduction and/or recycling plan/initiatives	For the EMP monitoring report to indicate the Proponent's commitment to reduce waste and prevent pollution.	Once-off proof of presence of such plan/initiatives and then when changes to such	♦ Copy of plan or brief description of initiatives

Impact	Monitoring	Purpose	Frequency	Included in Bi-Annual Report
			plan/initiatives are made	
	Waste volumes	For the EMP monitoring report to indicate the Proponent's successful implementation of waste reduction measures	Continuous record keeping with bi-annual summary report	♦ Summary of waste volumes for every six month period
	Hazardous waste	For the EMP monitoring report to indicate the Proponent's proper handling of hazardous waste	Continuous record keeping with bi-annual summary report	♦ Type and volume of waste with hazardous waste safe disposal certificates
	Waste containment	For the EMP monitoring report to indicate the Proponent's adherence to the EMP	Bi-annual checks and reporting	♦ Photos of waste storage areas showing successful (or not) containment of waste
Ecosystem and Biodiversity	Training of staff on value of biodiversity and protection of the environment	For the EMP monitoring report to indicate the Proponent's commitment to conservation of biodiversity and the environment	Continuous record keeping with bi-annual summary report	♦ Type of training and number of people who received said training with attendance registers as proof
	Communications to employees to warn them of potentially dangerous animals or situations	For the EMP monitoring report to indicate the Proponent's commitment to employee safety and to prevent human wildlife conflict	Once-off or when new communication strategies are devised	♦ Copies attendance register to information sessions
	Incidents register related to encounters with potentially dangerous wild animals	For the Proponent's own record keeping and for the EMP monitoring report to indicate adherence to the EMP	Continuous record keeping with bi-annual summary report	♦ Summary of incidents and actions
	Fencing of all effluent ponds and regular maintenance of fence	For the EMP monitoring report to indicate the Proponent's adherence to relevant legislation	Once-off and when repairs are required	♦ Photographs as proof of fence ♦ Maintenance register
	Presence of MSDS instructions for chemicals on file and at applicable locations	For the EMP monitoring report to indicate adherence to typical pollution prevention requirements	Bi-annual checks and reporting	♦ Copy of MSDS file index/table of contents as proof
	Bird strike and nesting monitoring	For the EMP monitoring report to indicate the Proponent's adherence to the EMP	Every two weeks with bi-annual summary report	♦ Summary of monitoring results

Impact	Monitoring	Purpose	Frequency	Included in Bi-Annual Report
	Alien vegetation management plan	For the EMP monitoring report to indicate the Proponent's adherence to the EMP and forestry legislation	Once-off proof of presence of such plan	♦ Copy of the plan
	Alien eradication events	For the EMP monitoring report to indicate the Proponent's adherence to the EMP	When required	♦ Summary and photo record of alien vegetation removal and management
Soil structure disturbance and / or contamination	Machinery and vehicle with pollution potential inspection and servicing register	For the EMP monitoring report to indicate the Proponent's adherence to the EMP	Continuous record keeping with bi-annual summary report	♦ Register of inspection and servicing
	Consumer installation certificate	For the EMP monitoring report to indicate the Proponent's adherence to the EMP and Petroleum Products and Energy Act	Once-off	♦ Copy of certificate
	Spills or leakages	For the EMP monitoring report to indicate adherence to the EMP	Continuous record keeping with bi-annual summary report	♦ Product and estimated volume spilled with date of spill, duration of spill and remedial action taken
	Spill clean-up equipment	For the EMP monitoring report to indicate the Proponent's adherence to the EMP	Once-off	♦ Photographs and register of equipment
	Flood management strategy	For the EMP monitoring report to indicate the Proponent's adherence to the EMP	Once-off with updates as required	♦ Copy of strategy
Groundwater and Surface Water Contamination	Embankments of oxidation ponds and pond depth inspection and maintenance register	For the EMP monitoring report to indicate the Proponent's adherence to Water Resource Management Act and *Code of Practice volume 2 Pond Systems General Guidelines*	Embankments - every two weeks Pond depth – Every six months	♦ Inspection and maintenance register
	Spills or leakages	For the EMP monitoring report to indicate adherence to the EMP	Continuous record keeping with bi-annual summary report	♦ Product and estimated volume spilled with date of spill, duration of spill and remedial action taken

Impact	Monitoring	Purpose	Frequency	Included in Bi-Annual Report
	Effluent sampling	For the EMP monitoring report to indicate adherence to the effluent disposal permit conditions	Parameters and frequency as set out by the effluent disposal permit	♦ Summary of effluent analysis results
Water Supply	Water management programme	For the EMP monitoring report to indicate the Proponent's efforts to reduce water use and ensure reliable water supply	Once-off with updates as required	♦ Copy of programme
	Water quality analysis	For the EMP monitoring report to indicate the Proponent's commitment to only use clean water in the abattoir	As determined by the water management programme	♦ Analysis results
Visual	Complaints	For the EMP monitoring report to indicate adherence to the EMP	Continuous record keeping with bi-annual summary report	♦ Complaints register
Traffic	Signage	For the EMP monitoring report to indicate the Proponent's adherence to the EMP	Once-off or as signage is added / replaced	♦ Photographs
	Complaints	For the EMP monitoring report to indicate adherence to the EMP	Continuous record keeping with bi-annual summary report	♦ Complaints register

7.1 DECOMMISSIONING AND REHABILITATION

Decommissioning is not foreseen during the validity of the ECC. Construction activities may however include modification and decommissioning of some onsite structures. Should decommissioning occur at any stage, rehabilitation of the area may be required. Prior to the complete decommissioning of the abattoir, the post closure land use should be assessed. It is recommended that the abattoir either be sold, or all infrastructure be offered to the local community in order to continue with the operations. This will mitigate the possible impacts associated with job losses etc. The existing EIA and EMP should further be transferred to the new owner to ensure continual compliance with EMP requirements.

In the event where the abattoir cannot be sold, decommissioning will entail the complete removal of all infrastructure including buildings and underground infrastructure, if any, not forming part of post decommissioning land use. Any pollution present on the site must be remediated. The impacts associated with this phase include noise and waste production as structures are dismantled. Noise must be kept within the required limits and waste should be contained and disposed of at an appropriately classified and approved waste facility and not dumped in the surrounding areas. Should operations be decommissioned with no employment or remuneration plan for the employees, a significant social and economic impact will be suffered by the local community. The EMP for the abattoir will have to be reviewed and updated prior to decommissioning to cater for changes made to the site and implement guidelines and mitigation measures related to social and environmental aspects.

7.2 ENVIRONMENTAL MANAGEMENT SYSTEM

The Proponent could implement an Environmental Management System (EMS) for their operations. An EMS is an internationally recognized and certified management system that will ensure ongoing incorporation of environmental constraints. At the heart of an EMS is the concept of continual improvement of environmental performance with resulting increases in operational efficiency, financial savings and reduction in environmental, health and safety risks. An effective EMS would need to include the following elements:

- A stated environmental policy which sets the desired level of environmental performance;
- An environmental legal register;
- An institutional structure which sets out the responsibility, authority, lines of communication and resources needed to implement the EMS;
- Identification of environmental, safety and health training needs;
- An environmental program(s) stipulating environmental objectives and targets to be met, and work instructions and controls to be applied in order to achieve compliance with the environmental policy; and
- Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS.
- The EMP.

8 CONCLUSION

Operations of the abattoir have a positive impact on the agricultural sector operational in the area and Namibia. It provides employment opportunities and skills development to a local workforce. Revenue is generated and the export of meat will contribute to a positive trade balance.

Negative impacts associated with the operations and maintenance / construction activities related to some onsite structures, can successfully be mitigated. Implementing a safety, health, environment and quality (SHEQ) policy will contribute to effective management procedures to prevent and mitigate impacts. All regulations relating to abattoirs, the meat industry and health and safety legislation should be implemented. Groundwater and soil pollution must be prevented at all times and this requires adequate treatment of wastewater in the biological effluent ponds and septic tanks. As well as adequate decomposition of slaughterhouse wastes without overloading the soil with nutrients. Fire prevention

should be key and fire response plans must be in place and regular training provided. Any waste produced must regularly be removed and/or disposed of. Beneficial use or recycling of waste should be investigated / promoted where possible. Hazardous waste must be disposed of at an approved hazardous waste disposal site.

The updated EMP should be used as an on-site reference document for the operations of the abattoir. Parties responsible for transgressing of the EMP should be held responsible for any rehabilitation that may need to be undertaken. The Proponent could use an in-house environment management system in conjunction with the environmental management plan. All operational personnel must be taught the contents of these documents.