

OPERATIONS ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE PROPOSED GLASS BOTTLE MANUFACTURING PLANT

Portion 1/238, Leeuwkuil 596 IQ, Gauteng

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Project Manager	Matthew Hemming
Project Manager e-mail	mhemming@slrconsulting.com
Author	Matthew Hemming
Reviewer	Jonathan Crowther
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ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIAR	Environmental Impact Assessment Report
EMPr	Environmental Management Programme
EO	Contractor's on-site Environmental Officer or Site Agent.
GDARD	Gauteng Department of Agriculture and Rural Development
GN	Government Notice
I&APs	Interested and Affected Parties
NEMA	National Environmental Management Act, 1998 (No. 107 of 1998)
NEMWA	National Environmental Management Waste Act, 2008 (No. 59 of 2008)
S&EIA	Scoping and Environmental Impact Assessment
SAB	The South African Breweries (Pty) Ltd
SHE	Safety, Health and Environment
SLR	SLR Consulting (South Africa) (Pty) Ltd

1 INTRODUCTION

1.1 PROJECT BACKGROUND

The South African Breweries (Pty) Ltd (SAB), together with future Black owned business partner(s), is proposing to enter the glass bottle manufacturing industry in order to transform its glass bottle procurement spend, whilst providing a unique opportunity for new Black economic entrant(s). The intention is for the facility to be majority Black owned. Ownership of the plant is still being determined and SAB is likely to only be a minority shareholder in the future business.

SAB has made application for an integrated Environmental Authorisation in terms of the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA) and the National Environmental Management: Waste Act, 2008 (No. 59 of 2008) (NEMWA). SLR Consulting (South Africa) (Pty) Ltd (SLR) was appointed as the environmental assessment practitioner (EAP) to undertake the environmental assessment for the proposed project.

1.2 AIMS OF THIS DOCUMENT

This Operations Environmental Management Programme (EMPr) has been compiled as part of the Scoping and Environmental Impact Assessment (hereafter collectively referred to as "S&EIA") process in compliance with Appendix 4 of the EIA Regulations 2014 (as amended).

The purpose of this EMPr is to ensure that impacts associated with the operations phase of the project are avoided and, where they cannot be avoided, are kept to a minimum and rehabilitated. The EMPr, which has as its basis the technical design controls and mitigation measures listed in the Environmental Impact Assessment Report (EIAR), sets environmental targets for the owner and operator and reasonable standards against which the project's environmental performance can be measured during the operations phase.

1.3 PROJECT DESCRIPTION

1.3.1 Summary of Property/Site Information

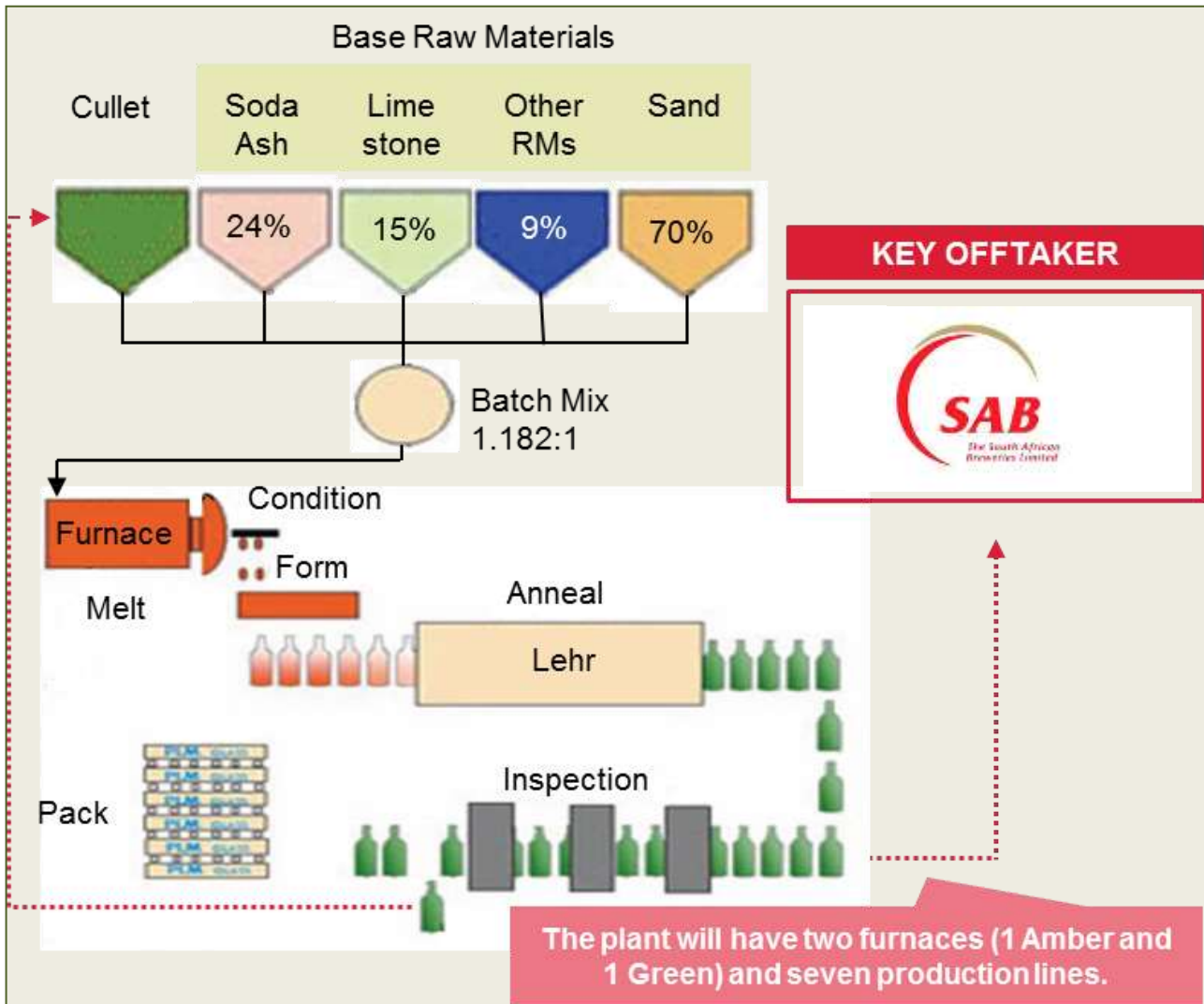
Farm name:	Portion 238 (a portion of portion 149) of the farm Leeuwkuil 596 IQ. NB - there is a town planning application underway to subdivide and rename this as Portion 295 of the farm Leeuwkuil 596 IQ.
Physical address:	Corner of Boy Louw Street (R 28) and Lager Avenue, Vereeniging
Surveyor General 21 digit code:	T0IQ0000000059600238
Property size:	Currently 67.26 ha, but the subdivided portion will be 29.23 ha
Development footprint size:	Approximately 15 000 m ² (15 ha)
Local municipality	Emfuleni Local Municipality in the Sedibeng District Municipality
Centre coordinates of site:	Latitude (S): 26°40'3.60"S
	Longitude (E): 27°54'9.10"E

1.3.2 Description of the Proposed Glass Bottle Manufacturing Project

SAB, with Black owned partner(s), is intending to enter the glass bottle manufacturing industry in order to transform its glass bottle procurement spend, while at the same time providing a unique opportunity for new Black economic entrant(s). Ownership of the plant is still being determined and SAB is only likely to be a minority shareholder in the future business.

The proposed plant would produce green and amber coloured bottles. The facility would comprise a batch plant, main manufacturing building with gas fired furnaces and a warehouse. The annual glass bottle production target would be approximately 290 000 tons. Glass is a non-crystalline amorphous solid made of the fusion of a diverse range of non-organic oxides found in sand, soda ash, limestone and other raw materials.

The conceptual process flow of the proposed project is illustrated in the diagram below and the main components are described in the text.



1.3.2.1 Batch Plant

The batch plant building would be used to receive, store and mix the raw materials required in glass manufacture. The key raw materials are sand, soda ash and limestone, with a number of other raw materials also required. Recycled glass, known as cullet, would also be utilised as a raw material. The raw materials are stored in a variety of silos, hoppers and bunds, before being mixed according to specific recipes for each glass product. Once mixed, the raw material batches would be conveyed across to the main manufacturing building.

1.3.2.2 Main Manufacturing Building

The main manufacturing building would comprise a single large covered hall, approximately 45 000 m² in extent. The building consists of three areas (named the Furnace, Hot End and Cold End areas) in which, the glass is melted, formed into bottles and inspected for quality and defects.

1.3.2.3 Furnaces

The two furnaces would utilise natural gas or Liquid Petroleum Gas (LPG) as a heat source. The green glass furnace would have capacity to melt 390 metric tons per day (mtpd). This furnace would feed to three bottle manufacturing lines. The amber glass furnace, with a capacity to melt 530 mtpd, would feed to four bottle manufacturing lines. In the furnace the raw materials would be melted into glass at temperatures of up to 1 530°C and degassed. Emissions from the furnaces would be cleaned in order to comply with the minimum emissions standards and released via a stack.

1.3.2.4 Hot End

In the Hot End the molten glass would be channelled to a series of glass forming machines that cool and meter the glass before using mechanical and pneumatic means to create the specific glass containers. The bottles would be hot end coated to enhance surface resistance and cooled in an annealing oven in a controlled manner, so as to avoid internal stresses.

1.3.2.5 Cold End

At the Cold End the bottles would be further coated and then subject to inspection for defects by high precision equipment that measure capacity, dimensions, impact, pressure resistance and other tests. Bottles that do not meet specifications would be crushed and conveyed back to the furnaces where the cullet is re-used in the raw material mix. Completed bottles would be packaged by automated palletizers and moved to the warehouse for storage and distribution.

1.3.2.6 Warehouse

The warehouse building would have an area of approximately 40 000 m². Storage of the bottles would be in plastic wrapped, bulk pallets up to three pallets high. Pallets would be mobilized using single or dual fork lifts and loaded onto trucks for distribution to customers.

1.3.2.7 Utilities

The glass production process requires several utility systems (gas and liquids) for operation. Support services associated with the proposed project would include an office building, canteen and gate house. The facility would also have a gas station to regulate gas supply, a diesel fuel oil storage facility as a back-up furnace fuel, diesel generators for emergency electricity supply and emergency water storage.

1.3.2.8 Associated Services

Access and Transport: Access to the facility would be via Lager Avenue, off the R28. Transport of goods to, and products from, the facility would be by truck.

Water: Potable and process water would likely be sourced from the Emfuleni Local Municipality via a new bulk water connection from the Rand Water connection in Botha Street.

Power: Electrical power would likely be sourced from the Emfuleni Local Municipality. The electrical connection would be via underground cables from the substation located adjacent to the R 59.

Gas: The proposal is to source gas for the furnaces from the existing pipeline that runs on the facility-side of the R59. A connection metering station and underground pipe would be installed

Sewage: Sewage generated at the facilities would likely be treated in an on-site package plant. Treated effluent will be used for local irrigation or discharged to the environment.

Waste: Wastes generated by the plant and associated operations will be separated at source, as much as is feasible, and then directed to appropriate recycling, re-use or disposal facilities.

1.4 EAP DETAILS

The details and expertise of the EAP who prepared the EMPr are included below. CVs of the EAP are included in Appendix 2 of the EIAR (SLR, November 2018).

General				
Organisation	SLR Consulting (South Africa) (Pty) Ltd			
Postal address	PO Box 1596, Cramerview, 2060			
Tel No.	(011) 467 0945			
Fax No.	(011) 467 0978			
Name	Qualifications	Professional registrations	Experience (Years)	Tasks and roles
Jonathan Crowther (SLR)	M.Sc. (Env. Sci.). University of Cape Town	Pr.Sci.Nat., CEAPSA, Member IAIAsa	30	Report and process review
Matthew Hemming (SLR)	M.Sc. (Cons. Biol.), University of Cape Town	Pr.Sci.Nat., Member IAIAsa	13	Management of the S&EIA process, including public consultation, process review, specialist study review and report compilation.

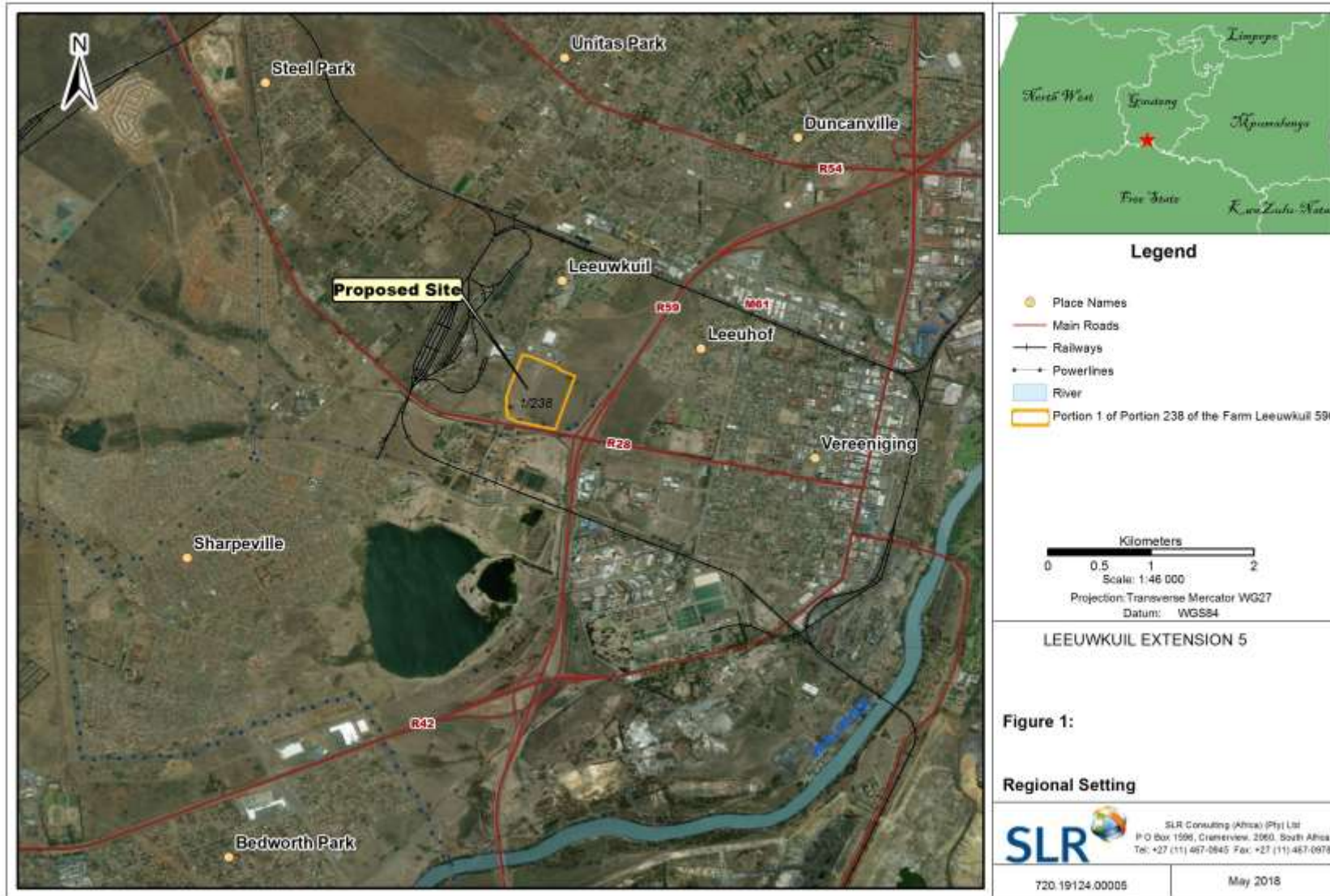


FIGURE 1-1: REGIONAL SETTING OF THE PROPOSED GLASS BOTTLE MANUFACTURING PLANT

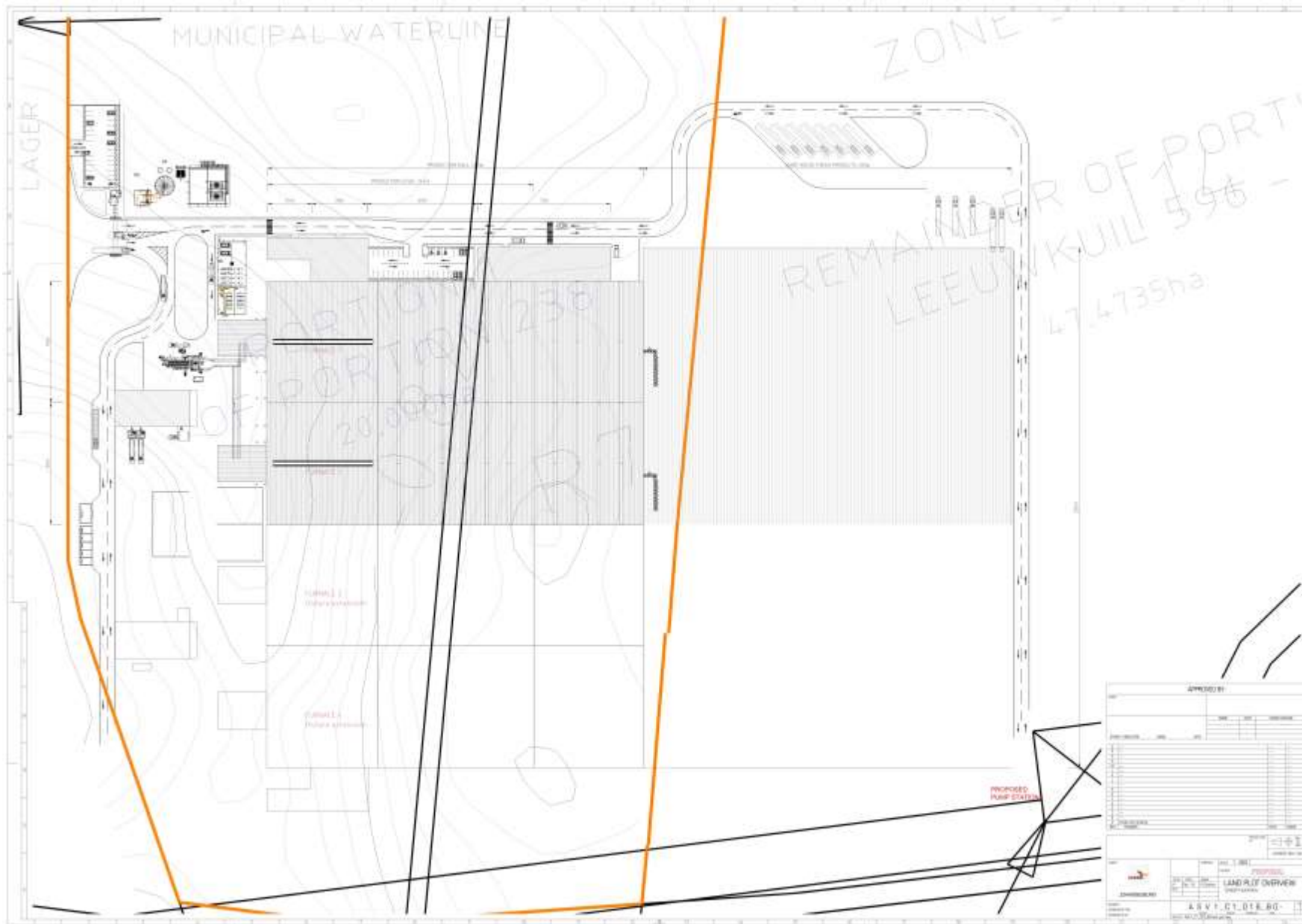


FIGURE 1-2: CONCEPTUAL SITE DEVELOPMENT PLAN

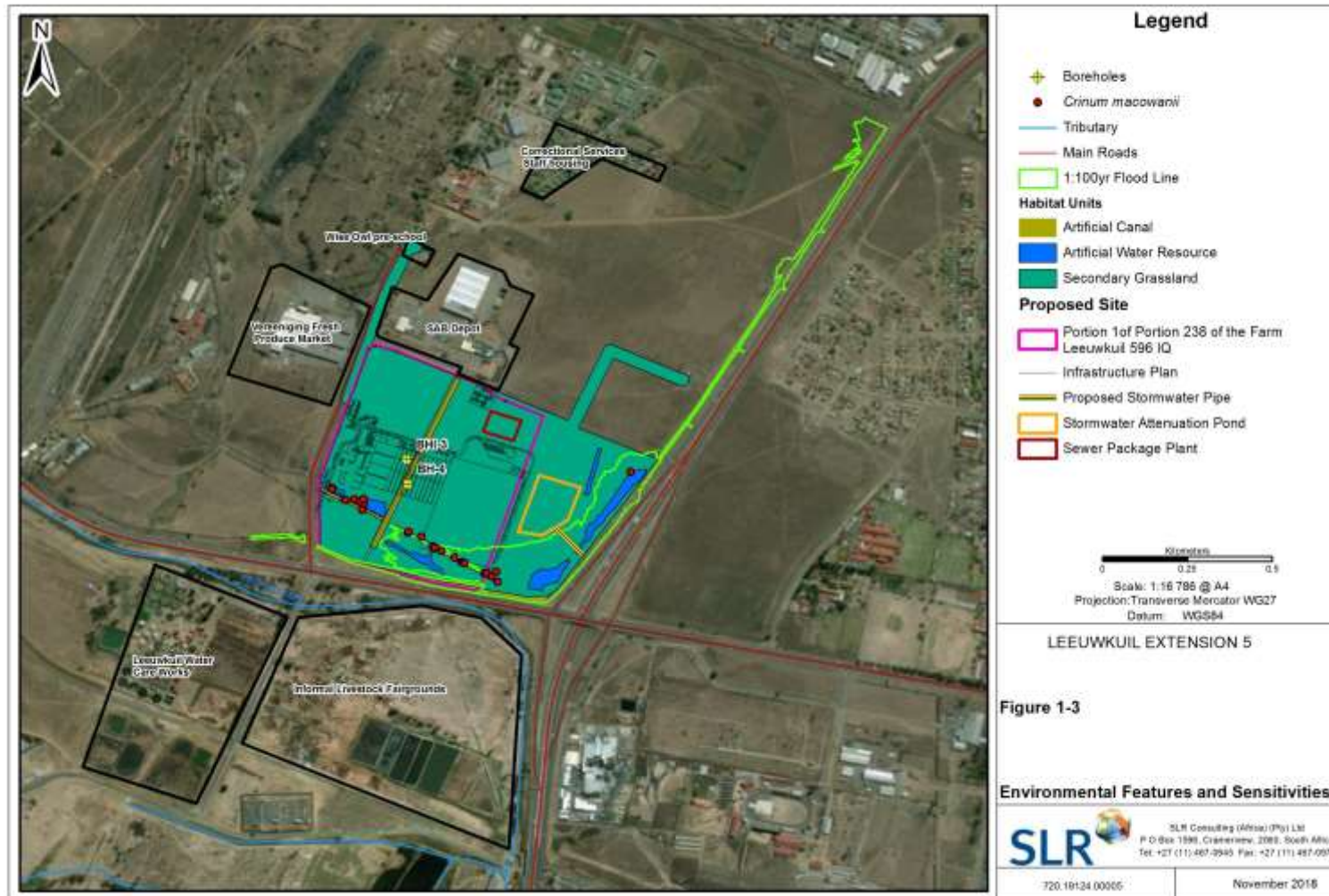


FIGURE 1-3: SITE SENSITIVITY PLAN

2 ADMINISTRATION AND REGULATION OF THE EMPr

2.1 ORGANISATIONAL STRUCTURE

The implementation of this EMPr requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during the planning and construction phase. Details of the management structure for this EMPr are presented below. All official communication and reporting lines including instructions, directives and information shall be channelled according to the management structure presented below.

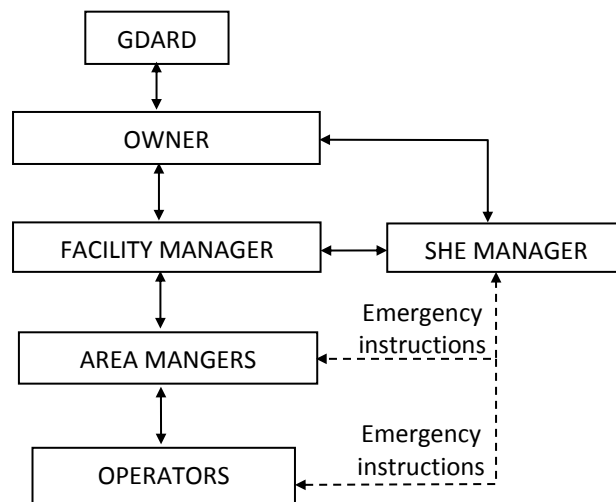


FIGURE 2-1: ORGANISATIONAL STRUCTURE FOR EMPr IMPLEMENTATION

2.2 ROLES AND RESPONSIBILITIES

2.2.1 Department of Agriculture and Rural Development (GDARD)

GDARD is the designated authority responsible for authorising this EMPr and has overall responsibility for ensuring that the holder complies with this EMPr and any conditions listed in the integrated Environmental Authorisation. GDARD will be responsible for approving any significant amendments that may be required to the EMPr.

2.2.2 Holder of Integrated Environmental Authorisation

The holder of the integrated Environmental Authorisation is ultimately responsible for the implementation of the EMPr and the financial cost of all environmental control measures. The holder must ensure that any person acting on its behalf complies with the conditions / specifications contained in this EMPr. The holder is responsible for the appointment of a Facility Manager and a Safety, Health and Environmental (SHE) Manager.

The holder shall address any site problems pertaining to the environment at the request of the GDARD, Facility Manager and/or the SHE Manager.

2.2.3 Facility Manager

The Facility Manager shall oversee the operation and maintenance of the project. Any on-site decisions regarding environmental management are ultimately the responsibility of the Facility Manager. The Facility Manager shall assist the SHE Manager to address any site problems pertaining to the environment. The Facility Manager shall provide the necessary support and resources to the SHE and Stakeholder Managers in order that they can implement the EMPr requirements.

2.2.4 SHE Manager

The SHE Manager shall act as the holder's on-site implementing agent and has the responsibility to ensure that their obligations are executed in compliance with the EMPr. The SHE Manager shall assist the Facility Manager where necessary and shall have the following responsibilities in terms of the implementation of this EMPr:

- Day-to-day monitoring and verification that the EMPr requirements are adhered to at all times and taking action if specifications are not followed;
- Undertaking regular site visits to ensure compliance with the EMPr and verifying that environmental impacts are kept to a minimum throughout the operations;
- Advising the Area Operators and / or the Facility Manager on environmental issues with operations;
- Assisting the Facility Manager in finding environmentally responsible solutions to problems;
- Monitoring as required in terms of the EMPr;
- Keeping a photographic record of progress on site from an environmental perspective;
- Recommending additional environmental protection measures should this be necessary;
- Maintenance of the necessary environmental authorisations and permits;
- Ensuring environmental awareness and presenting related awareness training to site staff;
- Communicating environmental issues and learnings to the Area Manager(s).
- Advising the Facility Manager to suspend any activity if he/she believes the environment has been or is likely to be seriously harmed / impacted; and
- Reporting any incidents that may or have caused damage to the environment or breaches of the EMPr to GDARD.

The SHE Manager shall communicate directly with the Facility Manager. Should problems arise on site that cannot be resolved with the Facility Manager, the SHE Manager shall take the matter up with the holder. If the holder does not respond, the SHE Manager shall take the matter up with GDARD.

2.3 EMPr ADMINISTRATION

Copies of this EMPr shall be kept at the site office(s) and shall be made available to the Facility Manager, SHE Manager and the Area Operators. All senior personnel shall familiarise themselves with the contents of this document.

Suggestions for revisions or updates to the EMPr should be directed to the SHE Manager. Any significant revisions to the EMPr document must be approved by GDARD before the EMPr is revised. The SHE Manager shall be responsible for the distribution of any "approved" revisions to the EMPr.

2.4 NOTIFICATION OF COMMENCEMENT OF OPERATIONS

The SHE Manager shall give GDARD written notice prior to the commencement of operations. A general notification letter shall also be sent to neighbouring residents and businesses listed on the I&AP database.

2.5 OPERATIONS PHASE EMPR

This section caters for the operations phase and forms the basis for the environmental specifications that the Facility Manager will be obliged to adhere to during operations.

2.5.1 Environmental management outcomes

Environmental objectives and goals to control, remedy or stop identified environmental impacts emanating from the site which may impact on communities and I&APs are outlined below (Table 2-1).

TABLE 2-1: ENVIRONMENTAL OBJECTIVES AND GOALS - OPERATIONS

Aspect	Environmental objective	Goals
Security and access control	To prevent physical harm to third parties and animals.	To prevent and control unauthorised access to the site.
Soil	To prevent unnecessary damage to soil resources.	To prevent contamination or erosion of soil on the site.
Vegetation	To prevent unacceptable disturbance of biodiversity and related ecosystem functionality	To manage open spaces as natural landscapes.
Water and aquatics	To prevent and minimise contamination of resources and unacceptable loss of aquatic ecosystems and related functionality.	To minimise water use and maximise water recycling. To operate within the regulatory framework and avoid contamination of freshwater resources.
Air quality	To prevent unacceptable air quality related impacts.	To operate within the regulatory framework and responsibly in terms of the existing ambient site conditions.
Noise	To limit excessive noise pollution from project activities and facilities.	To operate within the regulatory framework and as a responsible neighbour.
Visual	To limit excessive visual impacts.	To maintain a plant that is aesthetically pleasing and appropriate for its location.
Stakeholders	To support open and transparent communication between the project and stakeholders.	To support open and transparent communication between the project and stakeholders.
Socio-economic	To promote local employment and maximise local socio-economic benefits. To enhance positive and minimise negative economic impacts. To minimise the loss of socio-economic conditions due to relocation. To prevent unacceptable impacts on surrounding land uses and their economic activity.	To work together with existing structures and organisations. To maintain a good working relationship with surrounding stakeholders. To maximise benefits to local communities. To negatively impact existing land uses as little as possible.
Traffic	To reduce the potential for project-related impacts on third party road users.	To ensure the use of public roads is done in a responsible manner.

2.5.2 Management action plan

The operations management action plan is presented below in tabular format, together with timeframes for each action (see Table 2-2). This section will form the basis for the environmental specifications that the owner/operator will be obliged to adhere to during operations. The action plan includes the frequency for implementing the mitigation measures and identifies the responsible party. A specific waste management plan is also included in Table 2-3.

2.5.3 Monitoring programme

The purpose of the monitoring programme is to review the site's impact on various aspects of the environment and to report on changes needed to the management programme as proposed in this report.

A monitoring programme is included in Table 2-4. The location of monitoring points is provided in Figure 2-2. The programme includes EMPr monitoring and performance assessment as well as the monitoring of environmental aspects including water resources, air, noise and transport.

TABLE 2-2: IMPACT MANAGEMENT ACTION PLAN - OPERATIONS

Aspect	Action plan and control measures	Action plan		
		Timeframe	Frequency	Responsible parties
Maintenance	<ul style="list-style-type: none"> Maintain facilities in proper working condition to ensure compliance with the design controls and EMPr commitments. Upkeep the aesthetics of the plant to minimize negative visual impacts. Undertake inspections of facilities and use these to inform improvements on site. 	Entire operations phase	Regularly	Facility and SHE Managers
Security and access control	<ul style="list-style-type: none"> Establish and maintain security control measures. Undertake regular patrols of plant perimeter. Implement community awareness programme. Handle any injury or death in accordance with the emergency response procedure (see Section 2.10). 	From start From start From start Emergency	Continuous Weekly At start and then quarterly As required	Facility Manager Facility Manager Stakeholder Manager Facility Manager
Stakeholder engagement plan	<ul style="list-style-type: none"> Implement the stakeholder communication and engagement strategy. Implement and maintain a formal complaints (grievance) procedure. 	From start From start	Continuous, quarterly meetings Continuous	Stakeholder Manager SHE Manager
Vegetation management plan	<ul style="list-style-type: none"> Implement waste management plan and maintain waste management systems (Table 2-3). Maintain containment measures in proper working conditions and with sufficient capacity. Maintain park-type landscapes. Handle major spillage incidents in accordance with the emergency response procedure. 	From start From start From start Emergency	Continuous Continuous Continuous As required	Facility Manager Facility Manager Facility Manager SHE Manager
Effluent management plan	<ul style="list-style-type: none"> Conduct regular testing of the effluent quality to ensure that only effluent of an acceptable standard is being released to the receiving environment. Monitor water quality in the Vaal tributary. Handle any significant contamination incident in accordance with the emergency response procedure (see Table 2-9). 	As per Table 2-4. As per Table 2-4. Emergency	As per Table 2-4. As per Table 2-4. As required	SHE Manager SHE Manager SHE Manager
Storm water and flood management	<ul style="list-style-type: none"> Reuse and recycle treated effluent within the plant as far as possible. Measure flows within the plant. Measure discharge volumes on a continuous basis (i.e. flow meter). Maintain a dynamic climatic water balance for the site to inform water uses on site, attenuation of storm water and discharge requirements. Store and handled dangerous goods in bunded areas. Handle any significant flood or failure incident in accordance with the emergency response procedure (see Table 2-9). 	From start From start As per Table 2-4. From start From start Emergency	Continuous Continuous As per Table 2-4. Continuous Continuous As required	Facility Manager Facility Manager SHE Manager Facility Manager Facility Manager SHE Manager
Air quality management	<ul style="list-style-type: none"> Manage the furnaces as per the Subcategory 5.8 listed activity and conditions of the AEL. Ensure that a 98% control efficiency is achieved on the Batch Plant extraction 	From start From start	Continuous Continuous	Facility Manager SHE Manager

Aspect	Action plan and control measures	Action plan		
		Timeframe	Frequency	Responsible parties
	systems. <ul style="list-style-type: none"> Implement dust suppression. Reduce vehicle entrainment emissions from the paved access roads using a mechanical sweeper (to achieve an 80% control efficiency), strict enforcement of speed limits (maximum 20 km/h on access roads), covers for vehicles and regular clean-ups of road spillages. Monitor emissions and ambient air quality. Implementation of the reporting procedures. 	During dry periods From start	As required Continuous	SHE Manager SHE Manager
		As per Table 2-4. As per Table 2-4.	As per Table 2-4. As per Table 2-4.	SHE Manager SHE Manager
Noise management	<ul style="list-style-type: none"> Maintain all equipment and vehicles in proper working order. Implement an equipment and vehicle maintenance plan. Any change in the noise emission characteristics of equipment will serve as trigger for withdrawing it for maintenance. Records will be kept for auditing purposes. Maintain road surfaces regularly to repair potholes and any damages. Avoid unnecessary idling times at all times. Minimise the need for trucks/equipment to reverse. When reversing, vehicles should travel in a direction away from receptors if possible. Conduct noise monitoring. 	From start From start From start	Continuous As per schedule in plan As required	Facility Manager Facility Manager Facility Manager
		From start From start From start From start From start As per Table 2-4.	As required Continuous Continuous Continuous As per Table 2-4.	Facility Manager Facility Manager Facility Manager Facility Manager SHE Manager
Traffic management	<ul style="list-style-type: none"> Maintain road and traffic upgrades. Maintain all equipment and vehicles in proper working order. Comply with Hazchem requirements for the transport of any hazardous substances. Report any issues pertaining to damages and poor road conditions in close proximity of the project to the applicable authority and custodian of the respective roads. Handle any road accident involving or caused by project related traffic in accordance with the emergency response procedure (see Table 2-9). 	From start From start As required From start	Regularly Regularly As required As required	Facility Manager Facility Manager Facility Manager Facility Manager
		Emergency	As required	SHE Manager
Socio-economic development plan	<ul style="list-style-type: none"> Implement recruitment and procurement policies and procedures. Implement local corporate social investment strategies. Implement influx management plan. Implement health management plan for employees. 	From start From start From start From start	As required As required As required As required	Stakeholder Managers

TABLE 2-3: WASTE MANAGEMENT PRACTICES FOR DOMESTIC AND INDUSTRIAL SOLID WASTE

Aspect	Action plan and control measures
Classification and record keeping	<ul style="list-style-type: none"> • Waste management procedures for the site should cover the storage, handling and transportation of waste from the site. • Contractors responsible for waste management must be made aware of the procedures prior to their appointment. • Management actions for each waste stream must be reviewed annually to assess whether there are alternative uses for the material. Alternative uses should be prioritized over the disposal option. • Wastes (except those listed in Annexure 1 of the Waste Regulations) should be classified in accordance with SANS 10234 within 180 days of generation. • Waste should be re-classified every five (5) years, or within 30 days of a modification to the process or activity that generated the waste, changes in raw materials or other inputs, or any other variation of relevant factors. • Ensure safety data sheets for hazardous waste (prepared in accordance with SANS 10234) are available where required in terms of the Regulations. • Maintain an accurate and up to date record of the management of the wastes generated, which records must reflect: <ul style="list-style-type: none"> - the classification of the wastes; - the quantity of each waste generated, expressed in tons or m³ per month; - the quantities of each waste that has either been re-used, recycled, recovered, treated or disposed of; and - by whom the waste was managed. • If activities generate more than 20 kg of hazardous waste per day, then the facility must register with the Gauteng Waste Information System and submit records as required by the National Waste Information Regulations. • Written evidence of safe disposal of waste to licensed disposal facilities must be kept. • Waste related records must be retained for a period of at least 5 years and should be made available to the Department on request. • Any container or storage impoundment holding waste must be labelled, or where labelling is not possible, records must be kept, reflecting: <ul style="list-style-type: none"> - the date on which waste was first placed in the container; - the date on which waste was placed in the container for the last time when the container was filled, closed, sealed or covered; - the dates when, and quantities of, waste added and waste removed from containers or storage impoundments, if relevant; - the specific category or categories of waste in the container or storage impoundment as identified in terms of the National Waste Information Regulations, 2012; and - the classification of the waste in terms of Regulation 4 once it has been completed (if required).
On-site waste management	<ul style="list-style-type: none"> • Littering must not be permitted. • No waste may be buried or burned on site. • Waste generated on-site must be: <ul style="list-style-type: none"> - separated into general and hazardous waste. - further separated into recyclable and non-recyclable wastes where appropriate. - placed in appropriate containers. • Designated waste collection points or storage areas must be established on site at locations that do not pose risk to the quality of storm water runoff. • Ensure that there are sufficient collection points with adequate capacity and that these are serviced frequently. • Provide sanitary facilities with adequate capacity and that are serviced frequently during construction. • No waste may be stored outside of the demarcated construction site. • Inert building and demolition waste may be stored in stockpiles, which must not exceed demarcated areas and should be located away from storm water flow paths. • General waste should be placed in designated bins or skips for temporary storage. • Hazardous wastes should be placed in designated, labelled containers with a lid or under cover for temporary storage. Such containers must be placed in a designated area marked as "Hazardous Waste Area".

Aspect	Action plan and control measures
	<ul style="list-style-type: none"> Waste may not be mixed or treated where this would reduce the potential for re-use, recycling or recovery; or result in treatment that is not controlled and not permanent. Waste may be blended or pre-treated to enable potential for re-use, recycling, recovery or treatment; or reduce the risk associated with management of the waste.
Off-site waste management	<ul style="list-style-type: none"> Unless collected by the municipality, it must be ensured that wastes are directed to a qualified waste management contractor for management at an appropriately licensed facility, except where not required. Only qualified waste management subcontractors should undertake the waste transport. Wastes that consist of re-useable containers or packaging should be returned to suppliers. Recyclable materials must be passed onto legitimate waste recyclers. Where waste is destined for disposal, it must be ensured that it is assessed in accordance with the Norms and Standards for Assessment of Waste for Landfill Disposal set in terms of section 7(1) of the NEMWA prior to the disposal of the waste to landfill. It must be ensured that the disposal of waste to landfill is done in accordance with the Norms and Standards for Disposal of Waste to Landfill set in terms of section 7(1) of the NEMWA. General wastes should only go to appropriately licensed facility. Hazardous wastes should only go to appropriately licensed facility. Contractors must provide an inventory of each load of waste collected and of proof of delivery to the waste management facility or disposal at a licensed facility. Waste management related records must be retained for a period of at least 5 years.

TABLE 2-4: MONITORING PLAN - OPERATIONS

Impact	Parameter	Location of monitoring	Key performance indicator	Method of monitoring	Responsible person	Frequency	Reporting mechanism	Thresholds / standards	Recommended action
EMPr MONITORING AND PERFORMANCE ASSESSMENT									
Overall impact of the project	EMPr, EA conditions, project scope as per this report	Site activities	Compliance	Site inspection and verification of monitoring data	SHE Manager	Monthly	Internal reports	EMPr and EA conditions	Implement additional measures where required
						Annually	External audit report for submission to GDARD		
WATER									
Surface water quality	See Table 2-5, initial analysis to include full list. Once trends are	At discharge point	Comply with relevant water quality limits	Grab sampling	SHE Manager and appropriately qualified	Monthly	Internal and external reports	Compare against baseline quality and authorisation limits	Implement additional measures in consultation with authorities and

Impact	Parameter	Location of monitoring	Key performance indicator	Method of monitoring	Responsible person	Frequency	Reporting mechanism	Thresholds / standards	Recommended action
	established this list will be revised to monitor parameters of concern more regularly and other parameters less frequently	Receiving watercourse – upstream and downstream of discharge point (Figure 2-2)	As a minimum maintain baseline quality	Grab sampling	specialist	Monthly		Compare against baseline quality and authorisation limits	water specialist
Groundwater quality		Boreholes as shown in Figure 2-2, can be amended with input from specialist	Maintain baseline quality; however, if contamination does migrate off site corrective action must be taken.	Grab sampling		Continuous		Compare against authorisation	
Surface water flow	Discharge volumes	At discharge point	In-stream flow objectives set by DWS	Flow meter		Continuous		Compare against service agreement	
BIOMONITORING									
Aquatic habitats and ecosystems	Aquatic ecosystem health	Receiving watercourse – upstream and downstream of discharge point (Figure 2-2)	As a minimum maintain baseline conditions	SASS5, Rapid Assessment	SHE Manager and appropriately qualified specialist	Every six months	Internal report	As a minimum maintain baseline conditions	Implement additional measures in consultation with authorities and specialist.
						After incident and then quarterly	Annual report submitted to DWS.	Until impacts of incident no longer noticeable	
AIR									
Air emissions	PM _{2.5} , PM ₁₀ , SO ₂ and NO ₂	At site boundary	NAAQS limits (see Tables 2-6 and 2-6)	Ambient	SHE Manager and appropriately qualified specialist	Every six months	Internal and external reports	NAAQS limits	Implement additional measures in consultation with GDARD and specialist.
Dust fallout	TSP	At site boundary	NDCR for residential areas (see Table 2-8)	Dust buckets		Continuous	Internal and external reports	NDCR for residential areas	
NOISE									
Increase in ambient noise levels	dBA	At correctional services accommodation	55 dBA during the day and 45 dBA during the night	Day and night measurements with suitable	SHE Manager and appropriately	Annually	Internal and external reports	55 dBA during the day and 45 dBA during the night	Implement additional measures in consultation with

Impact	Parameter	Location monitoring of	Key performance indicator	Method of monitoring	Responsible person	Frequency	Reporting mechanism	Thresholds standards /	Recommended action
	dB	Livestock fairgrounds	Below 85 to 90 dB	instruments.	qualified specialist	Annually		Below 85 to 90 dB	GDARD and noise specialist.
SOCIAL									
Negative social impacts	Development's impact on local communities	Surrounding areas	Progress on implementation of policies and plans No. of complaints	Document review, complaints register	Stakeholder Manager	Every three months	Internal report	Awareness of communication channels,	Implement additional measures in consultation with authorities and specialist.

TABLE 2-5: WATER MONITORING PARAMETERS

In field measurements						
pH		Turbidity		Electrical conductivity		Total dissolved solids
Laboratory analysis						
pH	Total dissolved solids	Carbonate as CO ₃	Alkalinity as CaCO ₃	Bicarbonate as HCO ₃	Sodium	Chloride
Electrical conductivity	Free and Saline Ammonia as N (NH ₃)	Nitrate as N (NO ₃)	Hydrocarbons	ICP- scan for trace metals (dissolved concentrations)	Calcium	Sulphate
Suspended solids	Orthophosphate (as P)	Manganese	Potassium	Faecal coliform units (FCU)	Fluoride	

TABLE 2-6: MINIMUM EMISSION STANDARDS FOR SUB-CATEGORY 5.8

Description		The production of glass containers, flat glass, glass fibre and mineral wool.	
Application		All installations producing 100 ton per annum or more.	
Substance or mixture of substances		Plant Status	mg/Nm ³ under normal conditions of 10% O ₂ , 273 Kelvin and 101.3 kPa
Common name	Chemical symbol		
Particulate Matter	N/A	New	30
Oxides of nitrogen	NO _x expressed as NO ₂	New	1500
Sulphur Dioxide (gas fired furnace)	SO ₂	New	800

TABLE 2-7: PARTICULATE MATTER CRITERIA

Pollutant	Averaging period	Frequency of exceedance		Compliance date
		Concentration (µg/m ³)	Occurrences per year	
PM _{2.5}	24 hour	40	4	1 January 2016 – 31 December 2029
	24 hour	25	4	1 January 2030
	1 year	20	Not applicable	1 January 2016 – 31 December 2029
	1 year	15	Not applicable	1 January 2030
PM ₁₀	24 hour	75	4	Immediate

Pollutant	Averaging period	Frequency of exceedance		Compliance date
		Concentration ($\mu\text{g}/\text{m}^3$)	Occurrences per year	
	1 year	40	Not applicable	Immediate

TABLE 2-8: DUSTFALL CREIERIA

Pollutant	Limit values	Frequency of exceedance
	Dustfall rate ($\text{mg}/\text{m}^2/\text{day}$)	Occurrences per year
Dustfall – residential areas	$D < 600$	Two within a year, not sequential months
Dustfall – non-residential areas	$600 < D < 1200$	

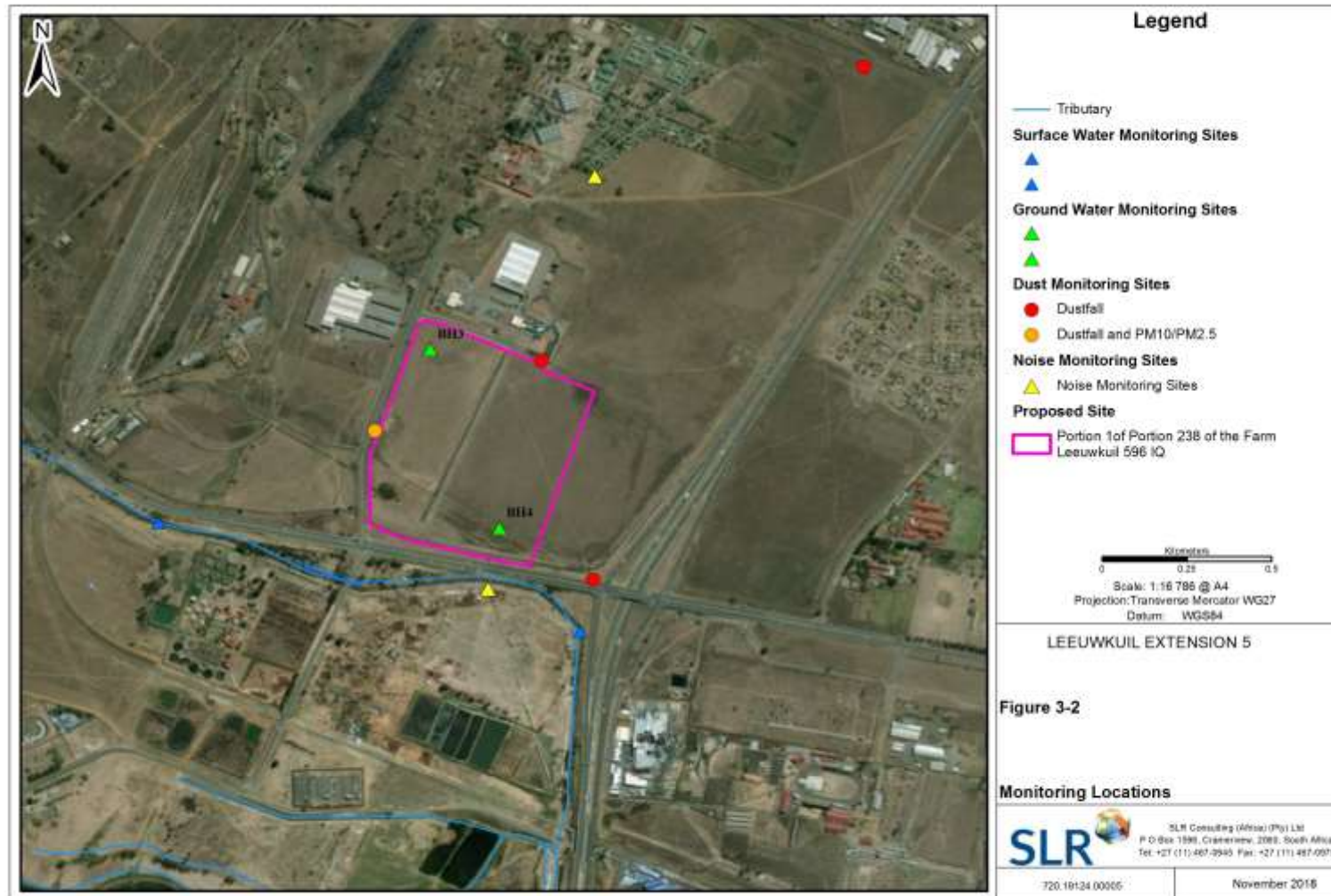


FIGURE 2-2: MONITORING NETWORK

2.6 DECOMMISSIONING AND CLOSURE

No planning has been undertaken for decommissioning and closure. The facility owner should develop a plan for decommissioning and closure at least two years prior to the planned closure of the facility. Closure planning should be undertaken in terms of the regulatory framework relevant at the time, with cognisance of the local environmental conditions and planned land uses.

To ensure management of environmental impacts, the decommissioning plan should (depending on the future use) consider the following broad objectives:

- making the facility safe;
- removal of any excess materials and products;
- dismantling of the equipment,
- sale and final disposal of all components,
- demolition of structures;
- decontamination of any contaminated areas;
- the final disposal of wastes; and
- the rehabilitation of the site to a condition suitable for an end land use.

2.7 ENVIRONMENTAL AWARENESS PLAN AND TRAINING

This section includes an environmental awareness plan for the site. The plan describes how contractors or employees would be informed of environmental risks which may result from their work, the manner in which the risk must be dealt with in order to avoid contamination or degradation of the environment and the training required for general environmental awareness and the dealing of emergency situations and remediation measures for such emergencies. This plan should be applied throughout operations.

All contractors that conduct work on the site would be bound by the content of the EMPr and a contractual condition to this effect shall be included in all such contracts entered into. If contractors are used, the responsibility for ensuring compliance with the EMPr would remain with the owners and managers of the plant.

The purpose of the environmental awareness plan is to ensure that all personnel and management understand the general environmental requirements of the site. In addition, greater environmental awareness must be communicated to personnel involved in specific activities which can have a significant impact on the environment and ensure that they are competent to carry out their tasks on the basis of appropriate education, training and/or experience. The environmental awareness plan should enable the site to achieve the objectives of an environmental policy.

2.7.1 Environmental policy

The environmental policy would be displayed prominently at the facility entrance and on key notice boards. The core objectives of the environmental policy are described below.

- To minimise impact on the environment (including social) wherever possible.
- To comply with all applicable environmental legislation and the commitments contained in the Environmental Management Programme (EMPr).
- To ensure that all employees, contractors and sub-contractors:
 - Are aware of the impact of their activities on the environment

- Are informed about the measures required to prevent, mitigate and manage environmental impacts
- Apply these principles whilst carrying out their work.
- To establish and maintain a good relationship with stakeholders and other I&APs with regard to the activities on site.
- To develop a localised environmental strategy with the local authority and relevant stakeholder groups.
- To provide relevant and constructive consultation/public participation on the management of the potential environmental impacts posed by the site.

2.7.2 Steps to achieve the environmental policy objectives

The environmental policy would be realised by setting specific and measurable objectives. It is proposed that new objectives are set throughout the life of the plant. Initial objectives are outlined below.

- Management of environmental responsibilities:
 - Appoint a Safety, Health and Environmental Manager at senior management level, who will be provided with the necessary resources to carry out the management of all environmental aspects of the site as a primary function, for example:
 - compliance with environmental legislation and EMPr commitments;
 - implementing and maintaining an environmental management system;
 - developing environmental emergency response procedures and coordinating personnel during incidents;
 - managing routine environmental monitoring and data interpretation;
 - environmental trouble shooting and implementation of remediation strategies;
 - closure planning (when required).
- Communication of environmental issues and information:
 - Carry out meetings, consultations and progress reviews and include:
 - set the discussion of environmental issues and feedback on environmental projects as an agenda item at all company board meetings;
 - provide progress reports on the achievement of policy objectives and level of compliance with the approved EMPr to the GDARD;
 - ensure environmental issues are raised at monthly management meetings and relevant meetings at all levels;
 - ensure environmental issues are discussed at all general liaison meetings with local communities and other interested and affected parties.
- Environmental awareness training:
 - Environmental awareness training would be provided to all individuals at a level of detail specific to the requirements of their job, but would generally comprise:
 - Basic awareness training for all prior to granting access to site (e.g. short video presentation requiring registration once completed). Employees and contractors who have not attended the training will not be allowed on site;
 - General environmental awareness training will be given to all employees and contractors as part of the Safety, Health and Environment (SHE) induction programme. All non-plant personnel who will be on site for more than five days must undergo the SHE induction training;
 - Specific environmental awareness training will be provided to personnel whose work activities can have a significant impact on the environment (e.g. workshops, waste handling, sanitation, effluent treatment, etc.).
- Review and update the environmental topics identified in the EMPr.
- Design all projects to minimise impact on the environment.

- Maintain records of all environmental training, monitoring, incidents, corrective actions and reports.

2.7.3 Training objectives and general contents of the environmental awareness plan

An environmental awareness plan ensures that training needs are identified and that appropriate training is provided. The environmental awareness plan should communicate:

- the importance of conformance with the environmental policy, procedures and other requirements of good environmental management;
- the significant environmental impacts and risks of individuals' work activities and explain the environmental benefits of improved performance;
- individuals' roles and responsibilities in achieving the aims and objectives of the environmental policy; and
- the potential consequences of not complying with environmental procedures.

To achieve the objectives of the environmental awareness plan the general contents of the training plans should be as follows:

- Module 1 – Basic training plan applicable to all personnel entering the site:
 - Short (15min) presentation to indicate the site layout and activities at specific business units together with their environmental aspects and potential impacts.
 - Individuals to sign off with site security on completion in order to gain access to the site.
- Module 2 – General training plan applicable to all personnel at the site for longer than 5 days:
 - General understanding of the environmental setting of the plant (e.g. local communities and proximity to natural resources).
 - Understanding the environmental impact of individuals' activities on site (e.g. excessive production of waste, poor housekeeping, energy consumption, water use, noise, etc.).
 - Indicate potential site specific environmental aspects and their impacts.
 - The site's environmental management strategy.
 - Identifying poor environmental management and stopping work which presents significant risks.
 - Reporting incidents.
 - Examples of poor environmental management and environmental incidents.
 - Procedures for emergency response and cleaning up minor leaks and spills.
- Module 3 – Specific training plan dependent on the employees work specification:
 - Environmental setting of the workplace (e.g. proximity of residential areas and natural resources, etc.);
 - Specific environmental aspects and the impact of these aspects.
 - Site's duty of care.
 - Purpose and function of the environmental management system.

Individuals required to complete Module 3 (Specific training module) would need to complete Modules 1 and 2 first. On completion of Module 3, individuals would be subject to a short test (written or verbal) to ensure the level of competence has been achieved. Individuals who fail the test would be allowed to re-sit the test after further training.

The actual contents of the training modules would be developed based on a training needs analysis. Key personnel would be required to undergo formal, external environmental management training (e.g. how to operate the environmental management system, waste management and legal compliance). In addition to the above the site would:

- Conduct refresher training/presentations on environmental issues for employees (permanent and contractors) at regular intervals.

- Promote environmental awareness using relevant environmental topic posters displayed at strategic locations on the site. These topics would be changed monthly, and would be reviewed annually by the SHE Manager to ensure relevance.
- Participate and organise events which promote environmental awareness, some of which would be tied to national initiatives e.g. National Arbour Week, World Environment Day and National Water Week.

2.8 INTERNAL REVIEW AND AUDITING

The SHE Manager shall establish an internal review procedure to monitor the progress and implementation of the EMPr. The SHE Manager shall report quarterly to the Facility Manager on overall compliance with the EMPr.

Where necessary, and upon the recommendation of the SHE Manager, procedures that require modification shall be changed to improve the efficiency of the EMPr. Any significant revisions to the EMPr document must be approved by GDARD and recorded in the revised EMPr. Any non-significant changes or adjustments to the EMPr shall be registered in the records of the SHE Manager. Adjustment and update of the original EMPr document is not required when these *ad hoc* changes are made.

An environmental audit report shall be compiled and submitted to GDARD at the frequency as specified in the Environmental Authorisation. This report shall be compiled by the SHE Manager and shall, as a minimum, outline the implementation of the EMPr, and highlight any problems and issues that arose during the period.

2.9 PERMITS AND LICENCES

2.9.1 Integrated Environmental Authorisation

The SHE Manager shall ensure that the integrated environmental authorisation remains valid and applicable to the operations.

2.10 PROCEDURES IN CASE OF ENVIRONMENTAL EMERGENCIES

Emergency procedures apply to incidents that are unexpected and that may be sudden, and which lead to serious danger to the public and/or potentially serious contamination of, or detriment to the environment (immediate and delayed). Procedures to be followed in case of environmental emergencies are described in Section 2.10.2 below. The procedures will be applied throughout operations.

2.10.1 General Emergency Procedure

The general procedure that should be followed in the event of all emergency situations is outlined below.

- The Facility and SHE Managers must be notified of an incident upon discovery;
- Area to be cordoned off to prevent unauthorised access and tampering of evidence;
- If controls are partially or totally failing and this cannot be prevented, the emergency siren is to be sounded (nearest one available). After hours the Plant Manager on shift must be notified;
- Take photographs and samples as necessary to assist in investigation;

- The SHE Department must comply with Section 30 of the National Environmental Management Act (107 of 1998) such that:
 - The SHE Manager must immediately notify the Director-General (DEA, DWS, as appropriate), the South African Police Services and relevant fire prevention service, the provincial head of GDARD or municipality, the head of the regional DWS office and any persons whose health may be affected, of:
 - the nature of the incident;
 - any risks posed to public health, safety and property;
 - the toxicity of the substances or by-products released by the incident; and
 - any steps taken to avoid or minimise the effects of the incident on public health and the environment.
 - The SHE Department must as soon as is practical after the incident:
 - take all reasonable measures to contain and minimise the effects of the incident including its effects on the environment and any risks posed by the incident to the health, safety and property of persons;
 - undertake clean up procedures;
 - remedy the effects of the incident; and
 - assess the immediate and long term effects of the incident (environment and public health).
 - Within 14 days the SHE Department must report to the Director-General (DEA, DWS, as appropriate), the provincial head of GDARD and the local municipality, the head of the regional DWS office such information as is available to enable an initial evaluation of the incident, including:
 - the nature of the incident;
 - the substances involved and an estimation of the quantity released;
 - the possible acute effects of the substances on the persons and the environment (including the data needed to assess these effects);
 - initial measures taken to minimise the impacts;
 - causes of the incident, whether direct or indirect, including equipment, technology, system or management failure; and
 - measures taken to avoid a recurrence of the incident.

2.10.2 Identification of Emergency Situations

Project-specific emergency situations that have been identified together with specific emergency response procedures are outlined in Table 2-9.

TABLE 2-9: EMERGENCY RESPONSE PROCEDURES

Item	Emergency Situation	Response in addition to general procedures
1	Spillage of chemicals, engineering substances, waste	Where there is a risk that material will contaminate the land (leading to a loss of resource), surface water and/or groundwater, the site will: <ul style="list-style-type: none"> • Notify users downstream of the contamination incident. • Identify and provide alternative resources should contamination impact adversely on the existing environment. • Cut off the source of the spill) and make the infrastructure 'safe'. • Contain the spill (e.g. construct temporary earth bund around source) or redirect the spill to a contained area. • Pump excess hazardous liquids on the surface to temporary containers for appropriate disposal. • Remove hazardous substances from damaged infrastructure to an appropriate storage area before it is removed / repaired.
2	Discharge of dirty water or effluent to the environment	Apply the principals listed for Item 1 above. To stop spillage from the dirty water system the site will: <ul style="list-style-type: none"> • Pump dirty water to available containment. • Apply for emergency discharge as a last resort.
3	Groundwater contamination	<ul style="list-style-type: none"> • Use the downstream monitoring borehole as a scavenger well to pump out the polluted groundwater for re-use in the water circuit (hence containing the contamination and preventing further migration). Ensure this pumping will not affect the dolomites and stability of the ground. • Investigate the source of contamination and implement control/mitigation measures.
4	Air emissions	<ul style="list-style-type: none"> • Implement shut down procedures if the air emissions control equipment fails. • Notify the air quality control officer as required in the AEL. • Apply the relevant principals listed for Item 1 above
5	Burst water pipes (loss of resource and erosion)	<ul style="list-style-type: none"> • Shut off the water flowing through the damaged area and repair the damage. • Apply the principals listed for Item 1 above if spill is from the dirty/process water circuit.
6	Failure of surface water control infrastructure	<ul style="list-style-type: none"> • Evacuate the area downstream of the failure. • Using the emergency response team, rescue/recover and medically treat any injured personnel and/or animal (where applicable). • Temporarily reinstate/repair storm water diversions during the storm event (e.g. emergency supply of sandbags). • Close the roads affected by localised flooding or where a storm water surge has destroyed crossings/bridges.
7	Risk of drowning from falling into water dams	<ul style="list-style-type: none"> • Attempt rescue of individuals from land by throwing lifeline/lifesaving ring. • Get assistance of emergency response team whilst attempting rescue. • Ensure medical assistance is available to recovered individual (where applicable).
8	Fire	<ul style="list-style-type: none"> • Evacuate employees from areas at risk. • Notify downwind residents and industries of the danger. • Assist those in imminent danger/less able individuals to evacuate until danger has passed. • Provide emergency fire-fighting assistance with available trained personnel and equipment.
9	Road traffic accidents	<ul style="list-style-type: none"> • The individual discovering the accident (be it bystander or able casualty) must raise the alarm giving the location of the incident. Able personnel at the scene should shut down vehicles where it is safe to do so. • Access to the area should be restricted and access roads cleared for the emergency response team. • Vehicles must be made safe first by trained professionals (e.g. crushed or overturned vehicles). • Casualties will be moved to safety by trained professionals and provided with medical assistance. • Medical centres in the vicinity with appropriate medical capabilities will be notified if multiple seriously injured casualties are expected.

AFRICAN OFFICES

South Africa

CAPE TOWN

T: +27 21 461 1118

FOURWAYS

T: +27 11 467 0945

SOMERSET WEST

T: +27 21 851 3348

Namibia

WINDHOEK

T: + 264 61 231 287

SWAKOPMUND

T: + 264 64 402 317