

December  
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# Environmental Management Plan



# ENVIRONMENTAL MANAGEMENT PLAN

FOR WHALE ROCK CEMENT (PTY) LTD, OTJIWARONGO,  
OTJOZONDJUPA REGION

DECEMBER 2021

## PROJECT DETAILS

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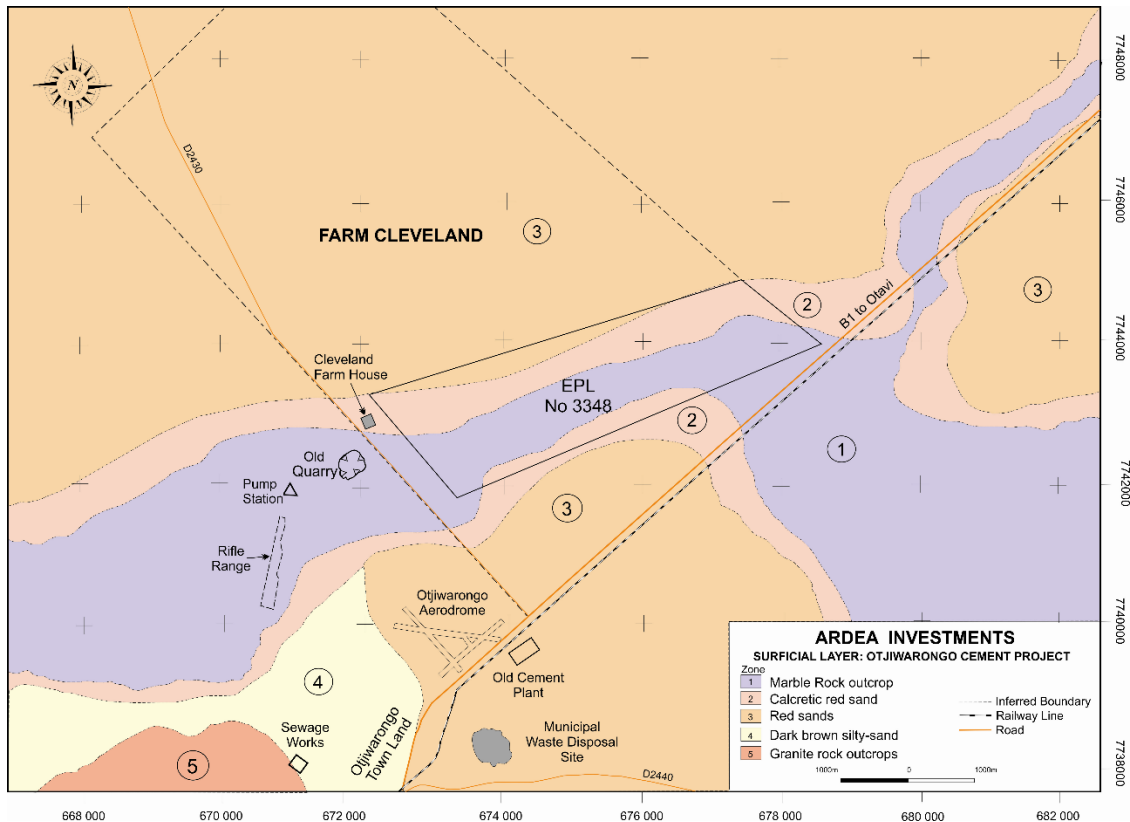
**ANNEXURE A:** PROOF OF SUBMISSION OF BI-ANNUAL REPORTS (APR 2020 – DEC 2021)

**ANNEXURE B:** ENVIRONMENTAL CLEARANCE CERTIFICATE

**ANNEXURE C:** WATER QUALITY GUIDELINES

## 1. INTRODUCTION

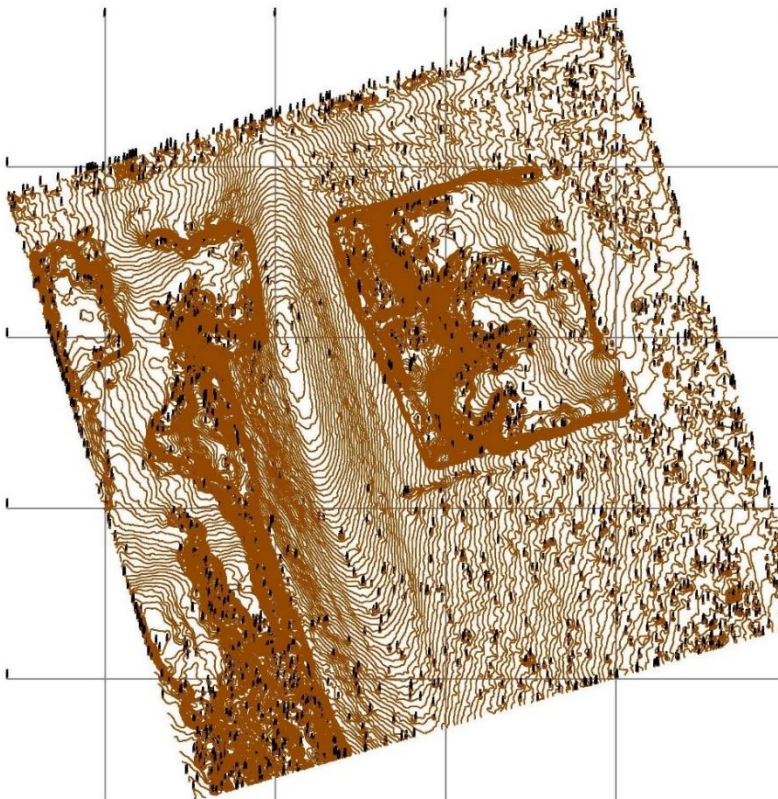
Whale Rock Cement (Pty) Ltd (WRC) owns and operates a cement production facility on Farm Cleveland situated approximately 3.3 km north of the town of Otjiwarongo, see **Figures 1 and 2** below for locality maps of the area. For its clinker production, the cement plant obtains its raw material from limestone and clay deposits see (**Figure 3**), about 1.2 km away under the Mining License (ML) No. 146. The cement plant lies at the coordinates Latitude  $-20.418991^{\circ}$ , Longitude  $16.675129^{\circ}$ .



**Figure 1:** Map of EPL 3348, on which ML 146 is located (RBS 2, 2016)



**Figure 2:** Google Earth Map of the site (RBS 2, 2016)



**Figure 3:** Mining Pits

In terms of section 27 of the Environmental Management Act, 2007 (Act 7 of 2007) certain activities, including mining and quarrying, may not be undertaken without an Environmental Clearance Certificate (ECC).

In compliance with the legal requirements WRC has obtained an ECC for their operations in 2016, and a subsequent renewal in 2019. The existing ECC is due to expire on 16 April 2022. WRC has thus appointed Environam Consultants Trading (ECT) to apply for the renewal of the ECC on its behalf.

## 2. ENVIRONMENTAL MANAGEMENT PLAN

Key to the issuance of an Environmental Clearance Certificate is the submission of an Environmental Management Plan (EMP) which provides for a description of how an activity might impact on the natural environment in which it occurs and clearly sets out commitments from the proponent on how identified impacts will be avoided, minimised and managed so that they are environmentally acceptable.

An EMP is one of the most important outputs of the Environmental Assessment process as it synthesises all of the proposed mitigation and monitoring actions, set to a timeline and with specific assigned responsibilities. As part of the application for a renewal of the ECC, an EMP is attached that will outline the appropriate management actions. The EMP is a revised version based on the one submitted to the Environmental Commissioner in support of the initial renewal of the existing ECC.

An EMP will generally detail the mitigation and monitoring actions to be implemented during the following phases of a development:

- Planning and Design – the period, prior to construction, during which preliminary legislative and administrative arrangements, are made and engineering designs are carried out. The preparation of construction tender documents forms part of this phase;
- Construction – the period during which the owner, having dealt with the necessary legislative and administrative arrangements, appoints a contractor for the development of services infrastructure as well as any other construction process(s) within the development area;
- Operation and Maintenance – the period during which the services infrastructure and other structures will be fully functional and maintained.

The infrastructure on site already exists and are operational, therefore the EMP will only cover the operation and maintenance phases, it will also exclude the decommissioning phase as the proponent has appointed a consultant to develop a rehabilitation plan for the closure of the mine and infrastructure.

### 3. ROLES AND RESPONSIBILITIES

Whale Rock Cement (Pty) Ltd is ultimately responsible for the implementation of the EMP. The proponent may delegate this responsibility as the project progresses through its life cycle. In this case the delegated responsibility for the effective implementation of this EMP will rest on the following key individuals:

- Owner's Representative;
- Environmental Control Officer; and
- Contractor (Operations and Maintenance).

#### 3.1. OWNER'S REPRESENTATIVE

The owner may assign the responsibility of managing all aspects of this development to a designated member of staff, referred to in this EMP as the Employer' Representative (ER). The owner may decide to assign this role to one person for the full duration of this development, or may assign a different ER to each of the development phases. The ER's responsibilities are as follows:

**Table 3-1:** Responsibilities of ER

Responsibility	Project Phase
Making sure that the necessary approvals and permissions laid out in the Tables in <b>Chapter 4</b> are obtained/adhered to.	Throughout the lifecycle of this development
Suspending/evicting individuals and/or equipment not complying with the EMP	Operation and maintenance
Issuing fines for contravening EMP provisions	Operation and maintenance

#### 3.2. ENVIRONMENTAL CONTROL OFFICER

The ER may assign the responsibility of overseeing the implementation of the whole EMP on the ground during the operation and maintenance phase to a designated member of staff, referred to in this EMP as the Environmental Control Officer (ECO). The PR /Proponent may also decide to assign this role to an independent



environmental consultant. The ECO will have the following responsibilities during this development:

- Management and facilitation of communication between the Owner, ER, the contractors, and Interested and Affected Parties (I&APs) with regard to this EMP;
- Conducting site inspections (recommended minimum frequency is bi-monthly) of all infrastructure maintenance areas with respect to the implementation of this EMP (monitor and audit the implementation of the EMP);
- Submitting bi-annual reports to the office of the Environmental Commissioner;
- Assisting the Contractor in finding solutions with respect to matters pertaining to the implementation of this EMP;
- Advising the ER on the removal of person(s) and/or equipment not complying with the provisions of this EMP;
- Making recommendations to the ER with respect to the issuing of fines for contraventions of the EMP; and
- Undertaking an annual review of the EMP and recommending additions and/or changes to this document.
- Applying for the renewal of the ECC upon expiry.

### 3.3. CONTRACTOR

Contractors appointed by the owner are automatically responsible for implementing all provisions contained within the relevant chapters of this EMP. Contractors will be responsible for the implementation of this EMP applicable to any work outsourced to subcontractors. The Tables in **Chapter 4** apply to contractors appointed during the operation and maintenance phase. In order to ensure effective environmental management, the aforementioned chapters should be included in the applicable contracts for outsourced operation and maintenance work.

### 3.4. ASSUMPTIONS AND LIMITATIONS

This EMP has been drafted with the acknowledgment of the following assumptions and limitations:

- This EMP has been drafted based on the information presented by the proponent. ECT will not be held responsible for the potential consequences that may result from any alterations to the existing infrastructure.

#### 4. MANAGEMENT ACTIONS

The tables in this chapter detail the management measures associated with the roles and responsibilities that have been laid out in **Chapter 3**. The aim of the management actions in this chapter is to avoid potential impacts where possible. Where impacts cannot be avoided, measures are provided to reduce the significance of these impacts.

The tables provide the management actions recommended to manage the potential impacts associated this development: The owner should assess these commitments in detail and should acknowledge their commitment to the specific management actions detailed in the tables below.

The following abbreviations are used to indicate who should be responsible for the implementation:

1. Whale Rock Cement (WRC)
2. Project Manager (PM),
3. Activity Contractor (AC),
4. Environmental Coordinator (EC).

**Table 4-1:** Quarry and Cement plant planning and implementation

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<p>Establish a strong Environmental Awareness Protocol from the beginning of the development in order to ensure the least possible impact to the environment.</p>	<ul style="list-style-type: none"> <li>• Resources (Human and Financial) are provided for Environmental Awareness and Training, Regular Safety, Health and Environment meetings and for internal and external environmental monitoring costs as well as for any rehabilitation costs that may arise.</li> <li>• Appointment of a senior person (Environmental Coordinator) to assume responsibility for environmental issues.</li> <li>• All individuals including sub-contractors who work on, or visit, the sites are aware of the contents of the Environmental Policy and the EMP.</li> <li>• The EMP and Environmental Policy will be included in Tender Documents.</li> </ul>	<ul style="list-style-type: none"> <li>• At the start and for the duration of, each phase of the quarry and cement plant operations development.</li> <li>• In all tender documents.</li> </ul>	<p>WRC, PM, AC and EC</p>

**Table 4-2:** Implementation of the EMP

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>• Define roles and responsibilities in terms of the EMP. To make all personnel, contractors and sub-contractors aware of these roles and responsibilities to ensure that activities are conducted in compliance with the EMP.</li> <li>• Implement environmental management that is preventative and proactive.</li> </ul>	<ul style="list-style-type: none"> <li>• Senior staff and senior contractors are aware of, and practice the EMP requirements. These persons shall be expected to know and understand the objectives of the EMP and will, by example, encourage suitable environmentally friendly behaviour to be adopted during the operational phase.</li> <li>• Recognition will be given to appropriate environmentally acceptable behaviour.</li> <li>• Inappropriate behaviour will be corrected. An explanation to why the behaviour is unacceptable must be given, and, if necessary, the person will be disciplined. e.g., fees set out for non-compliance.</li> </ul>	<ul style="list-style-type: none"> <li>• At the start and throughout the duration of the quarry and cement plant operations development.</li> <li>• Senior staff use the EMP and make every effort to see that new personnel on site have been introduced to the EMP.</li> </ul>	<p>WRC, PM, AC and EC</p>

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>Establish the resources, skills, etc. required for effective environmental management.</li> </ul>			

**Table 4-3:** Public relations.

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>Maintain sound relationships with the surrounding landowners and all surrounding communities.</li> <li>Discourage the influx of unemployed people to the area.</li> </ul>	<ul style="list-style-type: none"> <li>Permission to enter the farm is obtained</li> <li>Gates are kept closed.</li> <li>No littering or any other activity prohibited by the landowner</li> <li>Permission to utilise borehole water is obtained from the relevant Ministry / farmer / community / landowner.</li> <li>Every person who joins the operation team shall be given a copy of the Environmental Policy and EMP requirements explained.</li> </ul>	<ul style="list-style-type: none"> <li>At the start, and for the duration of the quarry and cement plant operations development activities.</li> <li>From the start and for the duration of the different phases</li> </ul>	WRC, PM, AC and EC

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>Develop a standardised recruitment method for sub-contractor and field workers.</li> </ul>		of the project development activities.	

**Table 4-4:** Recruitment of labour.

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>Discourage the influx of unemployed people to the area.</li> <li>Develop a standardised recruitment method for sub-contractor and field workers.</li> </ul>	<ul style="list-style-type: none"> <li>Recruitment of people through the recommended recruitment process.</li> <li>Contractors will be informed of the method of recruitment of casual and other labourers.</li> </ul>	<ul style="list-style-type: none"> <li>From the start and for the duration of the different phases of the project development activities.</li> </ul>	WRC, PM, AC and EC

**Table 4-5:** Environmental awareness briefing and training.

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>Implement environmental awareness briefing / training for individuals who visit, or work on site.</li> </ul>	<ul style="list-style-type: none"> <li>Every senior/supervisory member of the team shall familiarise themselves with the contents of the EMP. They shall understand their roles and responsibilities with regard to personnel and project compliance with the EMP.</li> <li>Briefings on the EMP and Environmental Policy shall be held to discuss the potential dangers to the environment, in respect of the following activities: landownership and public relations, littering, off-road driving, waste management, poaching &amp; plant theft etc. The need to preserve soil, conserve water and implement water saving measures shall be presented.</li> <li>Individuals can be questioned on the Environmental Philosophy and EMP and can recall contents.</li> </ul>	<ul style="list-style-type: none"> <li>At the start of the each of the phases and every month there after</li> </ul>	<p>WRC, PM, AC and EC</p>

**Table 4-6:** Establishment of the mining and production plant supporting infrastructure.

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<p>Establishment of the mining and plant supporting infrastructure shall be done on an area with the least disturbance to the environment.</p>	<ul style="list-style-type: none"> <li>• Adhere to the integrated site plan and site layout.</li> <li>• All related infrastructure (e.g. water tanks, offices) are not situated on environmental sensitive area and have disturbed as less as possible.</li> <li>• No evidence of littering.</li> <li>• No scattered scrap metals.</li> </ul>	<p>At the start and for the duration of each phase of any of the planned activities</p>	<p>WRC, PM, AC and EC</p>



**Table 4-7:** Use of existing access roads and tracks.

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>• Plan a road/track network that considers the environmental sensitivity of the area and a long-term use and which is constructed in a technically and environmentally sound manner.</li> <li>• Consult the land owners regarding suitable development of new tracks.</li> <li>• Minimise construction of</li> </ul>	<ul style="list-style-type: none"> <li>• Documented consultation with the stakeholders.</li> <li>• The following activities will minimise damage to the soil, vegetation and archaeology:               <ol style="list-style-type: none"> <li>1. Signs are erected and visible to all drivers visiting the project site;</li> <li>2. Use only existing tracks where possible;</li> <li>3. Leave vehicles on tracks and walk to point of interest, when possible;</li> <li>4. Use single tracks;</li> <li>5. Drive slowly and carefully;</li> <li>6. Use 4x4 drive to minimise damage to flora;</li> <li>7. Repair deep ruts rather than creating a new route;</li> <li>8. Encourage the use of "3-point-turns" rather than "U-turns";</li> <li>9. Prohibit the use of vehicles for recreational use.</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>• At the start and for the duration of each phase of any of the project development.</li> <li>• Establish access plan before entering the quarry and cement plant operations area.</li> </ul>	<p>WRC, PM, AC and EC</p>

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
new tracks and to rehabilitate tracks.			

**Table 4-8:** Management of the natural environment.

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
Avoid, or reduce, the potential negative impact on the biophysical environment, including the scenic value thereof.	<ol style="list-style-type: none"> <li>1. Rocky outcrops in the area avoided for site operation.</li> <li>2. No dumping sites, overburden/storage sites &amp; associated infrastructure in sensitive areas – e.g. in/close to drainage lines, other rocky outcrops in the area, etc.</li> <li>3. No access routes (roads &amp; tracks) through sensitive areas – e.g. over rocky outcrops/ridges and along drainage lines.</li> </ol>	At the start and for the duration of each phase of any of the quarry and cement plant operations activities.	WRC, PM, AC and EC

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
	<ol style="list-style-type: none"> <li>4. No driving randomly through the area (i.e. "track discipline"), only permanently placed roads/tracks being used.</li> <li>5. Unique tree species and any other local features deemed sensitive relocate to a less sensitive/disturbed.</li> <li>6. Unique habitats and features incorporated into the site layout and serving as protected islands or even are incorporated into the "gardening" of the quarry and cement plant operations.</li> <li>7. Disused disturbed areas such as the actual quarry and associated areas as well as prospecting "scars" and associated tracks rehabilitated.</li> <li>8. Incidents of poaching or illegal plant or reptile collection are reported.</li> <li>9. No domestic or other animals are brought to the site.</li> </ol>		

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
	10. Persons causing willful or malicious damage to the environment held responsible for repairing the damage.  11. No cutting of trees and bushes for firewood collection or any other purposes.		

**Table 4-9:** Surficial material management.

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>Avoid and to limit damage to the fragile surface soil / gravel layer</li> </ul>	<ul style="list-style-type: none"> <li>If <b>appropriate</b> the top 20 cm of topsoil / seed bank layer is removed from areas to be disturbed and stockpiled in 1.5 m high piles that are protected against wind erosion.</li> </ul>	At the start and for the duration of each phase of any of the quarry and cement plant operations activities.	WRC, PM, AC and EC

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<p>through careful planning of excavation activities and the preservation of the topsoil seed bank layer in areas where disturbance does occur.</p> <ul style="list-style-type: none"> <li>• Maximise the availability of topsoil for rehabilitation and preserve the inherent characteristics and potential of the topsoil to support vegetation growth.</li> </ul>	<ul style="list-style-type: none"> <li>• Areas where hazardous materials could pollute the soil are banded (secondary containment).</li> <li>• Reduce trampling and removal of vegetation to what is strictly necessary in order to proceed with any activities.</li> </ul>		

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>Minimise soil erosion from disturbed areas and stockpiles.</li> <li>Minimise the risks of soil pollution.</li> </ul>			

**Table 4-10:** Managing natural heritage sites and artefacts.

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>Avoid disturbance of</li> </ul>	<ul style="list-style-type: none"> <li>Known archaeological and palaeontological sites likely to be</li> </ul>	At the start and for the duration of each phase	WRC, PM, AC and EC

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<p>known archaeological or paleontological sites.</p> <ul style="list-style-type: none"> <li>Record new sites found and report to the responsible authority.</li> </ul>	<p>affected by project activities are clearly marked and fenced off.</p> <ul style="list-style-type: none"> <li>Documented consultation with the National Heritage Council of Namibia.</li> <li>All individuals are aware of which areas are sensitive.</li> <li>In the surrounding area every pile of stones is treated as a possible archaeological site. Do not use them, as the rocks could be a burial cairn or hunting blind.</li> <li>No heritage objects are moved without a permit from the National Heritage Council of Namibia and any permitted removal of heritage objects is done under the supervision of a qualified archaeologist, palaeontologist or historian.</li> <li>Archaeological sites are not disturbed.</li> <li>They should be carefully photographed, the location recorded and the finding reported to the National Heritage Council of Namibia.</li> </ul>	<p>of any of the quarry and cement plant operations activities.</p>	

**Table 4-11:** Surface and groundwater management.

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>• Conserve water.</li> <li>• Avoid water pollution and prevent polluted water from entering stream channels or underground aquifers.</li> <li>• Monitor the rest water levels and quality of production boreholes</li> <li>• Protect groundwater.</li> </ul>	<ul style="list-style-type: none"> <li>• If a local borehole is used, borehole rest water levels and quality are recorded and monitored.</li> <li>• Working areas, where hazardous substances are handled or stored, are designed to collect and contain hazardous substances.</li> <li>• Impervious materials are provided for drip trays, or sumps to collect and contain liquid pollutants.</li> <li>• Latrines and French drains built &gt;100m from watercourses or marble deposit to avoid pollution of aquifer.</li> <li>• All individuals can answer questions on water saving measures.</li> <li>• Quarries depth shall never exceed 25 m deep.</li> </ul>	<p>At the start and for the duration of each phase of any of the quarry and cement plant operations activities</p>	<p>WRC, PM, AC and EC</p>



**Table 4-12:** Management of hazardous substances.

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>• Minimise the risk of pollution through the implementation of all reasonable measures to prevent leakage, spillage or inappropriate disposal of hazardous substances.</li> <li>• Minimise the risk of hazardous substances affecting the health of all individuals,</li> </ul>	<ul style="list-style-type: none"> <li>• Protocols and guidelines for the handling hazardous substances have been put in place.</li> <li>• Least polluting, most rapidly biodegradable cleaning product, solvent, etc being used.</li> <li>• Protective clothing provided and being used.</li> <li>• Evidence of awareness and education about the safe and proper methods for handling hazardous substances available.</li> <li>• Procedures for the containment and clean-up of accidental hazardous accidents available.</li> <li>• Contingency plan on accidents including spillages available.</li> </ul>	<ul style="list-style-type: none"> <li>• At the start and for the duration of each phase of any of the quarry and cement plant operations activities</li> <li>• At any time when there is a hazardous spill / leakage.</li> </ul>	<p>WRC, PM, AC and EC</p>

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
plants and animal life. <ul style="list-style-type: none"> <li>• Use biodegradable products as far as is reasonably possible.</li> </ul>			

**Table 4-13: Waste management.**

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>• Adopt a sound and hierarchical approach to waste management, which would include waste minimisation, re-use, recovery, recycling, treatment, and proper disposal.</li> <li>• Maintain a clean and tidy site.</li> <li>• Anything taken in shall be taken out.</li> </ul>	<p>Following waste management procedures are implemented:</p> <ul style="list-style-type: none"> <li>• Amounts of waste produced minimised;</li> <li>• Where possible, waste compacted to reduce its bulk;</li> <li>• Waste bins with suitable lids are provided on site;</li> <li>• Individuals are encouraged to use appropriate bins or bags for rubbish;</li> <li>• Waste bins are emptied when full, at an approved disposal facility;</li> <li>• No illegal dumping and littering found on site;</li> <li>• Specific drums are provided for the disposal of waste oils / diesel or grease and should be periodically taken to a suitable disposal facility.</li> </ul>	<ul style="list-style-type: none"> <li>• At the start and for the duration of each phase of any of the quarry and cement plant operations activities.</li> </ul>	<p>WRC, PM, AC and EC</p>

**Table 4-14:** Air quality management.

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>• Implement the best practicable means to prevent fugitive dust and offensive gases and odours.</li> <li>• Protect employees and work force during handling of substances that can produce potential harmful gases or vapours.</li> </ul>	<p>Implemented measures to manage dust and harmful gases include:</p> <ul style="list-style-type: none"> <li>• Use of appropriate technologies including filters</li> <li>• Avoidance of unnecessary vehicle movement;</li> <li>• Limitation of vehicle speed;</li> <li>• Limitation of disturbed areas to as small an area as is practicable;</li> <li>• No open fires, except braziers or 'braai drums' used for cooking. Preferably gas or electricity is provided for cooking purposes;</li> <li>• Individuals wear protective clothing when dealing with harmful gases;</li> </ul>	<p>At the start and for the duration of each phase of any of the quarry and cement plant operations activities.</p>	<p>WRC, PM, AC and EC</p>

**Table 4-15:** Visual quality management.

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>• Preserve the scenic aspects of the site area and the surroundings.</li> <li>• Minimise visual impacts created by the project development as far as is reasonably possible.</li> </ul>	<ul style="list-style-type: none"> <li>• Plant and quarry sites as well as any site stockpile, field drill or bulk sample sites, etc. appear tidy and the entire surrounding area.</li> <li>• The areas in which different activities take place are clearly demarcated in order to contain the possible degradation of the site's appearance.</li> <li>• The movement and use of vehicles are limited to prevent unnecessary damage to vegetation. Activities are undertaken on foot as far as it is possible.</li> <li>• Roads and tracks are kept to a minimum.</li> <li>• Mining area profile lines, roads and any other disturbed area are maintained and rehabilitated.</li> </ul>	<p>At the start and for the duration of each phase of any of the quarry and cement plant operations activities.</p> <ul style="list-style-type: none"> <li>• Rehabilitation should be ongoing.</li> </ul>	<p>WRC, PM, AC and EC</p>

**Table 4-16:** Plant and mining licence areas ongoing and final rehabilitation.

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>Rehabilitate the quarry, plant and infrastructure supporting sites to as close an approximation of the pristine state as it is technically, financially and reasonably possible.</li> </ul>	<p>Develop an Environmental rehabilitation Plan. As a minimum, the following rehabilitation actions are included:</p> <ul style="list-style-type: none"> <li>Scrap metals and litter from the site is being taken to the appropriate disposal site.</li> <li>Debris, scrap metal, etc has been removed on rehabilitated areas.</li> <li>Disused infrastructure has been dismantled and removed.</li> <li>Tracks on site and the access roads have been rehabilitated by smoothing the 'middle mannetjie' (middle ridge between the tracks) and raking the surface.</li> <li>The following have been undertaken at all disturbed areas that require further rehabilitation:               <ul style="list-style-type: none"> <li>If applicable the stockpiled subsoil to be replaced (spread) and/or the site is neatly contoured to establish effective drainage patterns;</li> <li>Re-place the stored topsoil seed bank layer.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Ongoing from the start and for the duration of each phase of any of the quarry and cement plant operations activities.</li> </ul>	<p>WRC, PM, AC and EC</p>

**Table 4-17:** Health and safety.

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>To establish and maintain a safe working environment for staff, contractors, and visitors.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that all personnel are properly trained depending on the nature of their work.</li> <li>Provide for a first aid kit and a properly trained person to apply first aid when necessary.</li> <li>A wellness program should be initiated to raise awareness on health issues, especially the impact of sexually transmitted diseases.</li> <li>Provide free condoms in the workplace.</li> <li>Facilitate access to Antiretroviral medication.</li> <li>Restrict unauthorised access to the site and implement access control measures</li> <li>Clearly demarcate the construction site boundaries along with signage of “no unauthorised access”.</li> <li>Clearly demarcate dangerous areas and no-go areas on site.</li> </ul>	<p>Ongoing during all from the start and for the duration of each phase of any of the quarry and cement plant operations activities.</p>	<p>WRC, PM, AC and EC</p>

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
	<ul style="list-style-type: none"> <li>• Staff and visitors to the site must be fully aware of all health and safety measures and emergency procedures.</li> <li>• The proponent must comply with all applicable occupational health and safety requirements.</li> <li>• The workforce should be provided with all necessary Personal Protective Equipment where appropriate.</li> <li>• Adhere to Covid-19 Protocols as and when they are applicable.</li> </ul>		

**Table 4-18:** Environmental data collection.

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<ul style="list-style-type: none"> <li>• Collect data that will add to the information necessary for Environmental</li> </ul>	<ul style="list-style-type: none"> <li>• Copies of the environmental monitoring report compiled and submitted by the Environmental Coordinator to the regulators every six (6) months available.</li> </ul>	At the start and for the duration of each phase of any of the quarry and cement plant operations activities.	WRC , PM, AC and EC



OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<p>Monitoring and Reporting to the regulators.</p> <ul style="list-style-type: none"> <li>Collect data that will add to the general scientific and geographic knowledge of the environment.</li> <li>Acknowledged that the requisite skills and knowledge to collect all the suggested data may not be available within the project team,</li> </ul>	<ul style="list-style-type: none"> <li>The following types of information have been collected:</li> <li>All standard climatic parameters.</li> <li>Relevant air quality parameters and analysis.</li> <li>Fauna. Tracks or signs of animal activity seen with photographs and GPS/coordinate recordings. Animals, birds etc. identified. Alternatively provide a description and/ or photo if unidentified.</li> <li>Water quality monitoring data in the surrounding area.</li> <li>Unusual weather conditions, e.g. records of the prevailing wind direction and the direction from which storm events come.</li> <li>Vegetation. Records of trees, shrubs, grass, etc. that are found in the vicinity of the site. Some plants do only occur after rainfall and might not have been seen for decades.</li> <li>Any archaeological, cultural or historical sites that may have be found. GPS</li> </ul>		

OBJECTIVES	INDICATOR	TIMING	RESPONSIBILITY
<p>however, as much data as is practical should be collected.</p>	<p>coordinates, photograph and plot the position on a 1: 50 000 map provided.</p> <ul style="list-style-type: none"> <li>• Notes on the anecdotes of the farmers / others from the area. For example, 'the painting somewhere in the mountains', etc.</li> <li>• Records of other features including surface water, spring, large scale geological features etc.</li> </ul>		

## 5. CONCLUSION AND RECOMMENDATIONS

The ECC contains conditions that have to be adhered to during the period of its validity; in particular it calls for regular environmental monitoring and evaluations on environmental performance to be conducted, as well as the setting and monitoring of targets for improvement. As part of this exercise bi-annual reports have to be submitted to the Office of the Environmental Commissioner for the duration of the ECC.

In order to compile the bi-annual reports, environmental monitoring inspections are conducted on a quarterly basis. WRC appointed Environam Consulting Trading (ECT) CC as environmental consultants to undertake the monitoring and evaluation exercise for the period covering June 2021 to October 2022.

The Environmental Management Plan (EMP) developed for WRC makes provision for management actions. It is the management actions contained in the EMP that form the basis of the bi-annual reports. In preparation for the bi-annual reports, ECT conducts extensive site inspections once every 3 months.

The inspections comprise of two main parts, the first consisting of verbal feedback on the various identified impacts and mitigation measures as delineated in the EMP, with the second part taking the form of a visual inspection and verification throughout the mine and production site. The bi-annual reports are supported by the respective inspection reports carried out during the period in review.

The monitoring and evaluation exercises revealed that the operations on site are carried out with high regard to environmental sensitivities and that the provisions of the Environmental Management Plan for the activities on the cement plant and quarries have been met to a large extent. While challenges are likely to occur in an operation of this magnitude WRC has shown willingness to confront these challenges by willingly subjecting itself to environmental monitoring with the view to act on those aspects that have a potential to negatively impact on the environment they operate in.

A number of best practices were also observed such as the preservation of indigenous trees to blend in with the infrastructure on site as well as the ongoing

planting of trees in and around the site. The cement plant is a high-tech facility that employs advanced technologies and is also relatively new having been in operation for just over 3 years.

Whale Rock Cement (Pty) Ltd is encouraged to continue with the commitment to carry out regular monitoring and evaluation exercises and to endeavour to timely address any deviations identified during the course of such exercises.

It is recommended that the Environmental Clearance Certificate for the Mining Licence (ML) 146 and Cement Plant in the Cleveland Farm, Otjiwarongo, Otjozondjupa Region be approved.

## 6. PHOTO PLATE



**Figure 4:** Limestone mining site (a)



**Figure 5:** Limestone mining site (b)



**Figure 6:** Tracks leading to and around the quarries (a)



**Figure 7:** Tracks leading to and around the quarries (b)





**Figure 8:** Clay Pit (a)



**Figure 9:** Clay Pit (b)



**Figure 10:** Tree Planting Around Site



**Figure 11: Production Area**

## 7. REFERENCE:

1. Risk Based Solutions (RBS) 1, 2006. Final Environmental Management Programme Report (EMPR) for the Proposed Quarry and Plant: Cement Project in Farm Cleveland near Otjiwarongo, Otjozondjupa Region, Central Namibia.
2. Risk Based Solutions (RBS) 2, 2006. Presentation. EIA Study Findings and EMP Recommendations for the Proposed Cement Project, Farm Cleveland, Otjiwarongo.
3. Risk Based Solutions (RBS) 3, 2016. FIRST YEAR INDICATIVE FINAL MINE REHABILITATION, CLOSURE AND AFTERCARE LIABILITIES FOR THE MINING LICENSE (ML) 146 WHALE ROCK CEMENT CC, TO BE VALIDATED ANNUALLY AND OVERALL MINE REHABILITATION PLAN MUST BE PREPARED.
4. Risk Based Solutions (RBS), 2019. Final Environmental Compliance Monitoring / Audit Report for Preconstruction, Construction and Operational Stages for the Period February 2016 – February 2019 for the Limestone / Marble and Clay Quarries in the Mining License (ML) No. 146 and Cement Plant, Farm Cleveland, Otjiwarongo, Otjozondjupa Region, CENTRAL NAMIBIA.

## 8. CONTACT DETAILS

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**Mine Manager**



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**Environmentalist**



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P.O. Box 24056

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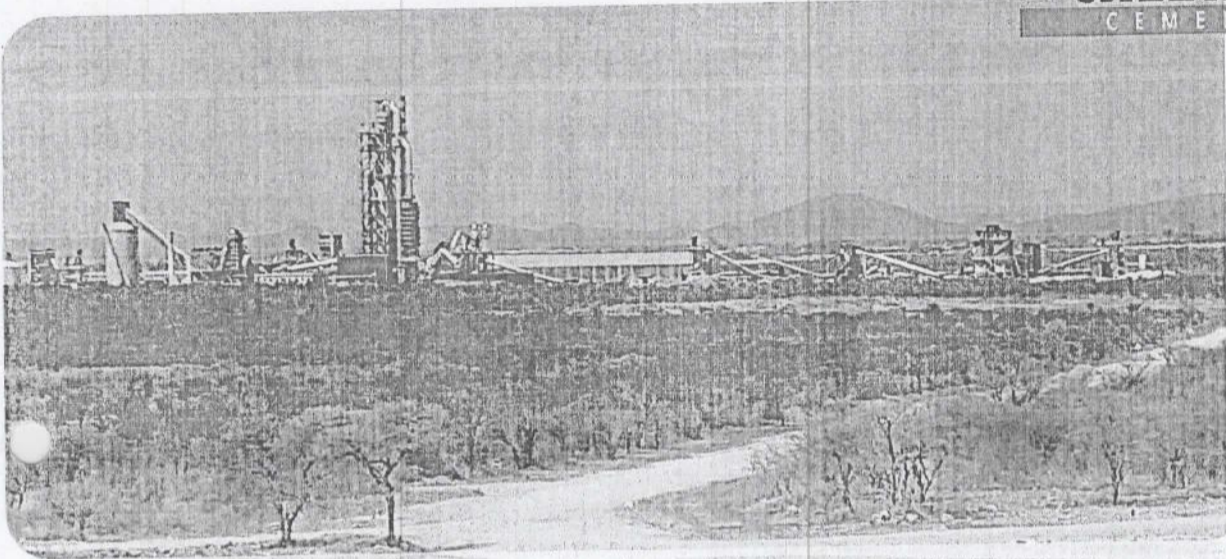
Windhoek

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Email: [colin@environam.com](mailto:colin@environam.com)/  
[namenec@gmail.com](mailto:namenec@gmail.com)

**ANNEXURE A: PROOF OF SUBMISSION OF BI-ANNUAL REPORTS (APR 2020 – DEC 2021)**

WHALE ROCK CEMENT (PTY) LTD



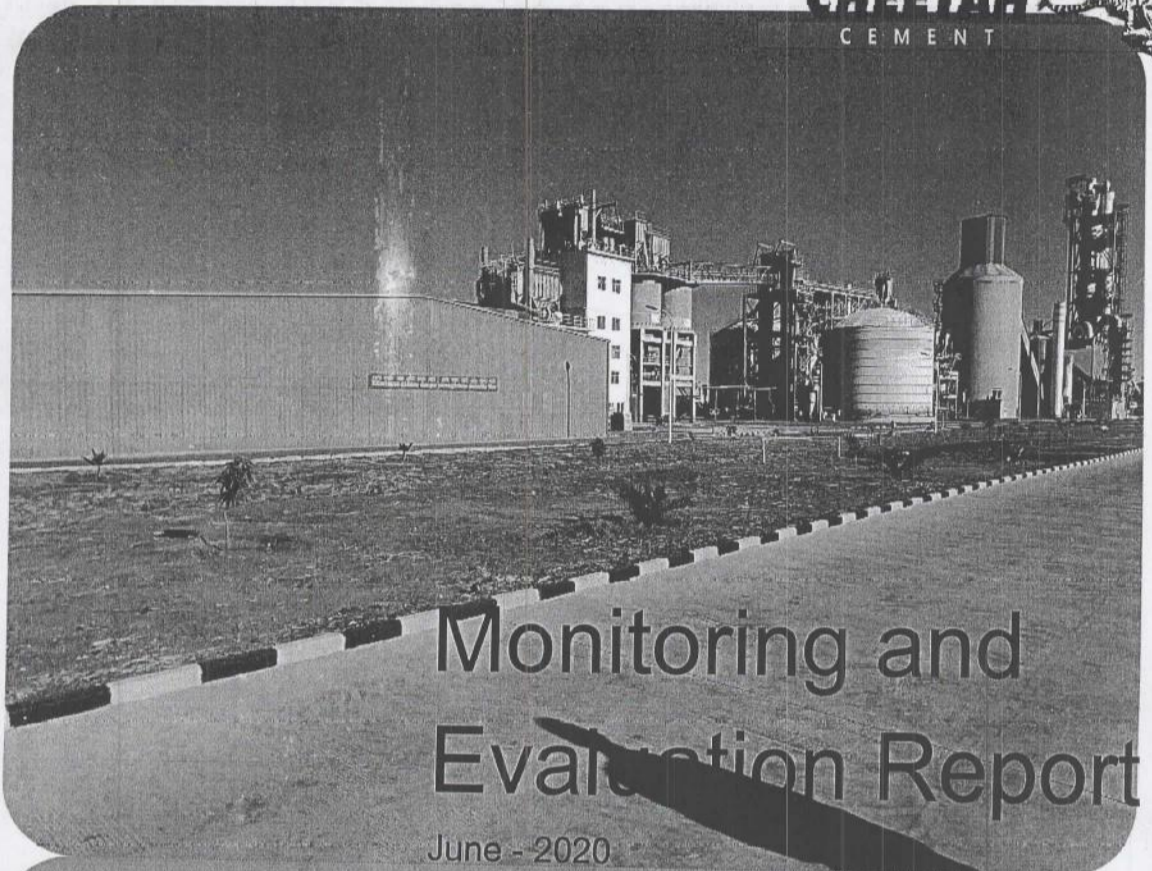
# Monitoring and Evaluation Report

November - 2019





WHALE ROCK CEMENT (PTY) LTD



# Monitoring and Evaluation Report

June - 2020



MINISTRY OF ENVIRONMENT,  
FORESTRY AND TOURISM

DIRECTORATE OF ENVIRONMENTAL AFFAIRS

30 JUN 2020

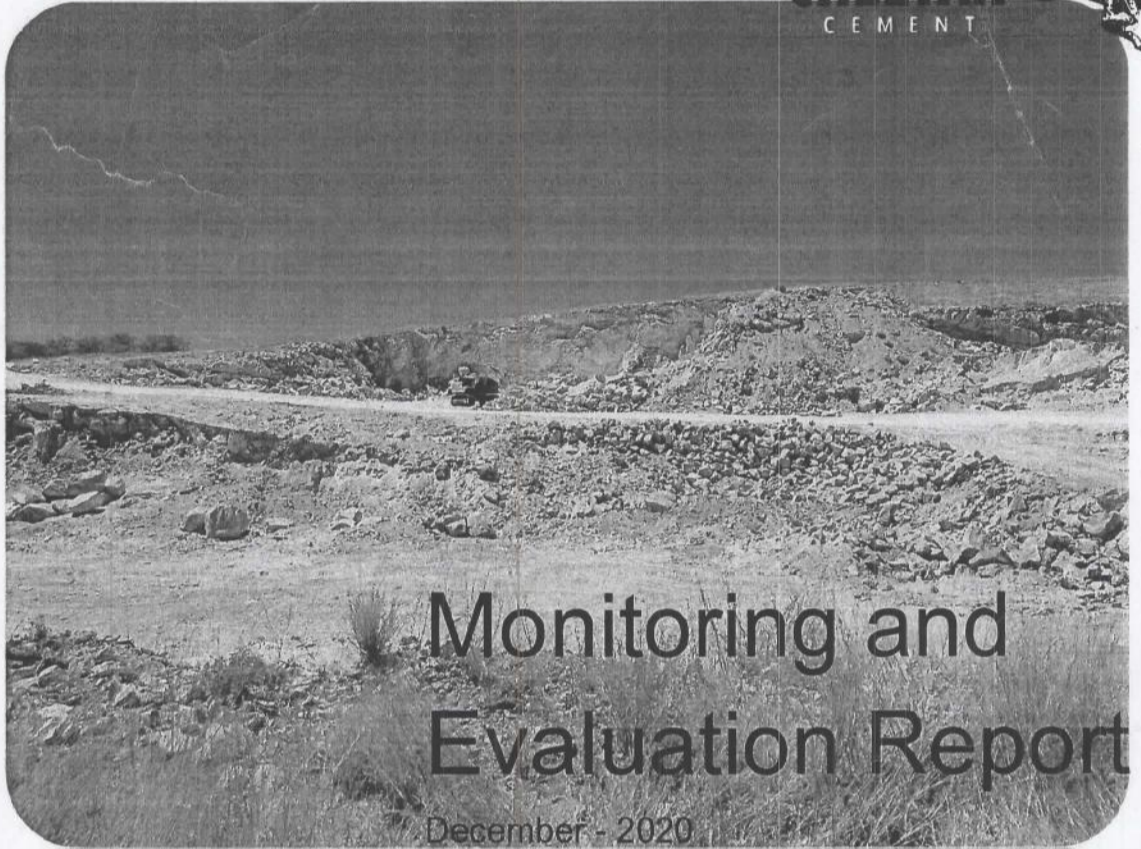
Tel: 061 251 2701

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WHALE ROCK CEMENT (PTY) LTD

MINISTRY OF ENVIRONMENT,  
FORESTRY AND TOURISM  
DIRECTORATE OF ENVIRONMENTAL AFFAIRS  
09 DEC 2020  
Tel: 061 284 2701  
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Signature:.....



# Monitoring and Evaluation Report

December - 2020



WHALE ROCK CEMENT (PTY) LTD

MINISTRY OF ENVIRONMENT,  
FORESTRY AND TOURISM  
DIRECTORATE OF ENVIRONMENTAL AFFAIRS  
15 JUL 2021  
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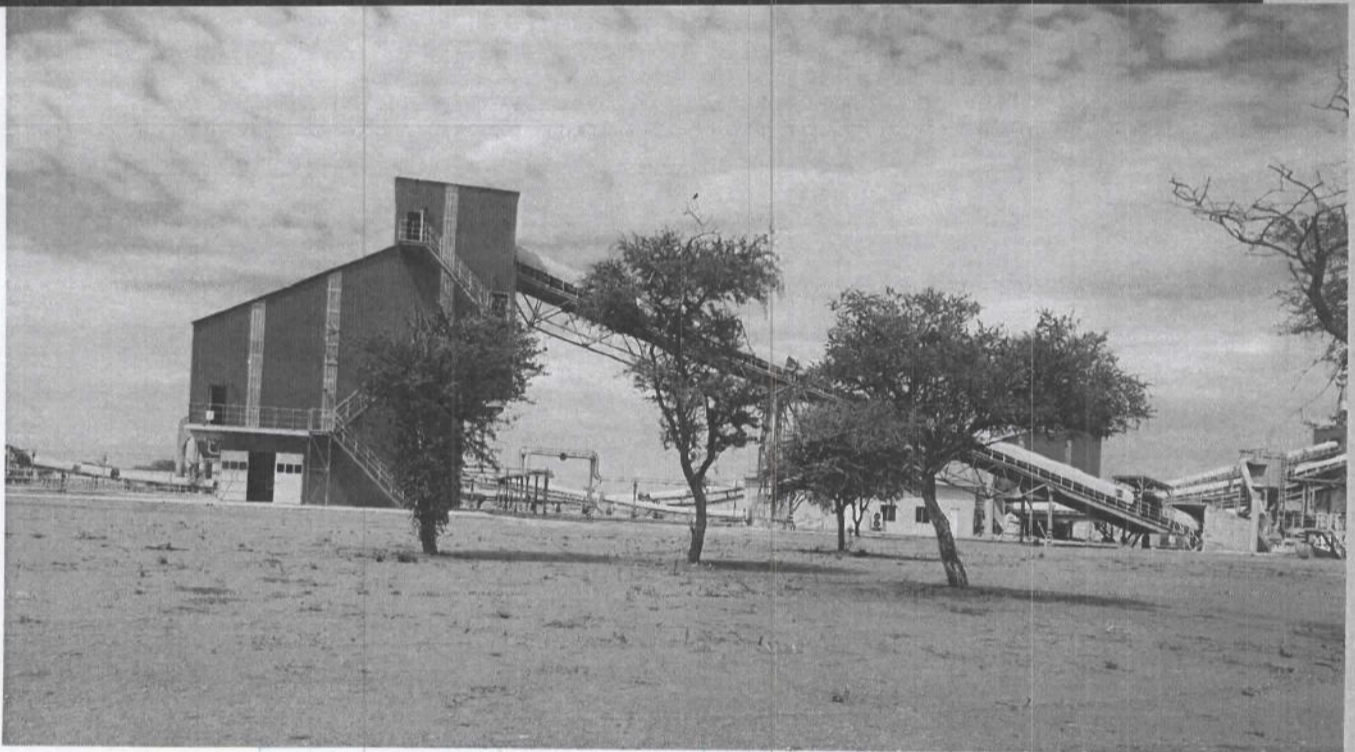
Bi-annual  
**Monitoring and  
Evaluation Report**

June - 2021



December  
2021

# Bi-annual Monitoring and Evaluation Report



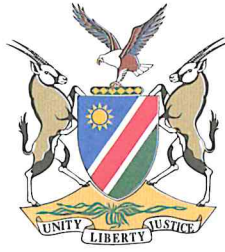
MINISTRY OF ENVIRONMENT AND  
FORESTRY AND TOURISM  
DIRECTORATE OF ENVIRONMENTAL AFFAIRS  
07 DEC 2021

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Signature: *[Handwritten Signature]*



**ANNEXURE B: ENVIRONMENTAL CLEARANCE CERTIFICATE**



REPUBLIC OF NAMIBIA

## MINISTRY OF ENVIRONMENT AND TOURISM

Tel: (00 26461) 284 2111  
Fax: (00 26461) 232 057

Cnr Robert Mugabe &  
Dr Kenneth Kaunda Street  
Private Bag 13306  
Windhoek  
Namibia

**Enquiries:** Mr. Josafat K Hiwana  
E-mail: [josafat.hiwana@met.gov.na](mailto:josafat.hiwana@met.gov.na)

16 April 2019

### OFFICE OF THE ENVIRONMENTAL COMMISSIONER

The Managing Director  
Whale Rock Cement (Pty) Ltd  
P.O. Box 40193  
Ausspanplatz  
Windhoek  
Namibia

Dear Sir/Madam

**SUBJECT: ENVIRONMENTAL CLEARANCE CERTIFICATE FOR THE MINING LICENCE (ML) 146 AND CEMENT PLANT SITUATED IN THE CLEVELAND FARM, OTJIWARONGO, OTJOZONDJUPA REGION**

The Environmental Management Plan submitted is sufficient as it made provisions of the environmental management concerning the proposed activities. From this perspective, regular environmental monitoring and evaluations on environmental performance should be conducted. Targets for improvements should be established and monitored throughout this process.

This Ministry reserves the right to attach further legislative and regulatory conditions during the operational phase of the project. From this perspective, I issue this environmental clearance certificate with the following condition (s); (a) relevant permitting authority involved must be properly consulted and written consent obtained from them; and (b) any KEY biodiversity habitats must be protected.

On the basis of the above, this letter serves as an environmental clearance certificate for the project to continue. However, this clearance letter does not in any way hold the Ministry of Environment and Tourism accountable for any misleading information, nor any adverse effects that may arise from this project's activities. Instead, full accountability rests with Whale Rock Cement (Pty) Ltd.

This environmental clearance is valid for a period of 3 (three) years, from the date of issue unless withdrawn by this office.

Yours sincerely,

  
Fredrick Mupoti Sikabongo  
DEPUTY ENVIRONMENTAL COMMISSIONER



**“Stop the poaching of our rhinos”**

All official correspondence must be addressed to the Permanent Secretary



**ANNEXURE C: WATER QUALITY GUIDELINES**

# **THE WATER ACT, 1956 (ACT 54 OF 1956 ) AND ITS REQUIREMENTS IN TERMS OF WATER SUPPLIES FOR DRINKING WATER AND FOR WASTE WATER TREATMENT AND DISCHARGE INTO THE ENVIRONMENT**

## **1. INTRODUCTION**

The provisions of the Water Act are intended, amongst other things, to promote the maximum beneficial use of the country's water supplies and to safeguard water supplies from avoidable pollution.

The drinking water guidelines are not standards as no publication in the Government Gazette of Namibia exists to that effect. However the Cabinet of the Transitional Government for National Unity adopted the existing South African Guidelines (461/85) and the guidelines took effect from 1 April 1988 under the signature of the then Secretary for Water Affairs.

The sections of the Water Act that relate to the discharge of industrial effluents are:

- Section 21(1) which states that
  - The purification of waste water shall form an integral part of water usage and
  - that purified effluents shall comply with the General Standard Quality restrictions as laid out in Government Gazette R553 of 5 April 1962 and
- Section 21(2) which further stipulate that this purified effluent be returned as close as possible to the point of abstraction of the original water.

Where a local authority has undertaken the duty of disposing of all effluents from an industrial process the provisions of Section 21(1) and 21(2) apply to the local authority and not the producer of the effluents. If there is difficulty in complying with these provisions then the applicant may apply for an exemption from the conditions in terms of Section 21(5) and 22(2) of the Water Act. The Permanent Secretary after consultation with the Minister may grant the issuance of a Waste Water Discharge Permit under Sections 21(5) and 22(2) subject to such conditions as he may deem fit to impose.

After independence, the Government of the Republic of Namibia decided that for the interim the existing guidelines will continue to be valid and to remain in use until a proper study has been conducted and new standards have been formulated (Article 140 of Act 1 of 1990).



## **2. GUIDELINES FOR THE EVALUATION OF DRINKING-WATER QUALITY FOR HUMAN CONSUMPTION WITH REGARD TO CHEMICAL, PHYSICAL AND BACTERIOLOGICAL QUALITY**

Water supplied for human consumption must comply with the officially approved guidelines for drinking-water quality. For practical reasons the approved guidelines have been divided into three basic groups of determinants, namely:

- Determinants with aesthetic / physical implications: TABLE 1.
- Inorganic determinants: TABLE 2.
- Bacteriological determinants: TABLE 3.

### **2.1 CLASSIFICATION OF WATER QUALITY**

The concentration of and limits for the aesthetic, physical and inorganic determinants define the group into which water will be classified. See TABLES 1 and 2 for these limits. The water quality has been grouped into 4 quality classes:

- Group A: Water with an excellent quality
- Group B: Water with acceptable quality
- Group C: Water with low health risk
- Group D: Water with a high health risk, or water unsuitable for human consumption.

Water should ideally be of excellent quality (Group A) or acceptable quality (Group B), however in practice many of the determinants may fall outside the limits for these groups.

If water is classified as having a low health risk (Group C), attention should be given to this problem, although the situation is often not critical as yet.

If water is classified as having a higher health risk (Group D), urgent and immediate attention should be given to this matter.

Since the limits are defined on the basis of average lifelong consumption, short-term exposure to determinants exceeding their limits is not necessarily critical, but in the case of toxic substances, such as cyanide, remedial measures should immediately be taken.

The overall quality group, into which water is classified, is determined by the determinant that complies the least with the guidelines for the quality of drinking water.

**TABLE 1: DETERMINANTS WITH AESTHETIC / PHYSICAL IMPLICATIONS**

DETERMINANTS	UNITS*	LIMITS FOR GROUPS			
		A	B	C	D**
Colour	mg/l Pt***	20			
Conductivity	mS/m !at 25 °C	150	300	400	400
Total hardness	mg/l CaCO <sub>3</sub>	300	650	1300	1300
Turbidity	N.T.U****	1	5	10	10
Chloride	mg/l Cl	250	600	1200	1200
Chlorine (free)	mg/l Cl	0,1- 5,0	0,1 – 5,0	0,1 – 5,0	5,0
Fluoride	mg/l F	1,5	2,0	3,0	3,0
Sulphate	mg/l SO <sub>4</sub>	200	600	1200	1200
Copper	µg/l Cu	500	1000	2000	2000
Nitrate	mg/l N	10	20	40	40
Hydrogen Sulphide	µg/l H <sub>2</sub> S	100	300	600	600
Iron	µg/l Fe	100	1000	2000	2000
Manganese	µg/l Mn	50	1000	2000	2000
Zink	mg/l Zn	1	5	10	10
pH****	pH-unit	6,0 – 9,0	5,5 – 9,5	4,0 – 11,0	4,0 – 11,0

\* In this and all following tables "l" (lower case L in ARIAL) is used to denote dm<sup>3</sup> or litre

\*\* All values greater than the figure indicated.

\*\*\* Pt = Platinum Units

\*\*\*\* Nephelometric Turbidity Units

\*\*\*\*\* The pH limits of each group exclude the limits of the previous group

**TABLE 2: INORGANIC DETERMINANTS**

DETERMINANTS	UNITS	LIMITS FOR GROUPS			
		A	B	C	D*
Aluminium	µg/l Al	150	500	1000	1000
Ammonia	mg/l N	1	2	4	4
Antimonia	µg/l Sb	50	100	200	200
Arsenic	µg/l As	100	300	600	600
Barium	µg/l Ba	500	1000	2000	2000
Beryllium	µg/l Be	2	5	10	10
Bismuth	µg/l Bi	250	500	1000	1000
Boron	µg/l B	500	2000	4000	4000
Bromine	µg/l Br	1000	3000	6000	6000
Cadmium	µg/l Cd	10	20	40	40
Calcium	mg/l Ca	150	200	400	400
Calcium	mg/l CaCO <sub>3</sub>	375	500	1000	1000
Cerium	µg/l Ce	1000	2000	4000	4000
Chromium	µg/l Cr	100	200	400	400
Cobalt	µg/l Co	250	500	1000	1000
Cyanide (free)	µg/l CN	200	300	600	600
Gold	µg/l Au	2	5	10	10
Iodine	µg/l I	500	1000	2000	2000
Lead	µg/l Pb	50	100	200	200
Lithium	µg/l Li	2500	5000	10000	10000
Magnesium	mg/l Mg	70	100	200	200
Magnesium	mg/l CaCO <sub>3</sub>	290	420	840	840
Mercury	µg/l Hg	5	10	20	20
Molybdenum	µg/l Mo	50	100	200	200
Nickel	µg/l Ni	250	500	1000	1000
Phosphate	mg/l P	1	See note below	See note below	See note below
Potassium	mg/l K	200	400	800	800
Selenium	µg/l Se	20	50	100	100
Silver	µg/l Ag	20	50	100	100
Sodium	mg/l Na	100	400	800	800
Tellurium	µg/l Te	2	5	10	10
Thallium	µg/l Tl	5	10	20	20
Tin	µg/l Sn	100	200	400	400
Titanium	µg/l Ti	100	500	1000	1000
Tungsten	µg/l W	100	500	1000	1000
Uranium	µg/l U	1000	4000	8000	8000
Vanadium	µg/l V	250	500	1000	1000

\* All values greater than the figure indicated.

**Note FOR Table 2 on phosphate:** Phosphates are not toxic and essential for all life-forms. Natural water will, however, seldom contain phosphate; it is generally seen as an indicator of pollution and is usually accompanied by other pollutants. Wherever drinking water is combined with or consists wholly of reclaimed or recycled water, it may be expected to contain phosphate. The general guideline for a concentration level to be aimed at is 1 mg/l as P. But in many cases this may be difficult to achieve technically. For this reason the Department will allow a phosphate concentration level of up to 5 mg/l as P in water intended for human consumption. Please refer also to the “Note on Phosphate” under Section 3: General Standards for Waste/Effluent.

## 2.2 BACTERIOLOGICAL DETERMINANTS

The bacteriological quality of drinking water is also divided into four groups, namely:

- Group A: Water which is bacteriological very safe;
- Group B: Water which is bacteriological still suitable for human consumption;
- Group C: Water which is bacteriological risk for human consumption, which requires immediate action for rectification;
- Group D: Water, which is bacteriological unsuitable for human consumption.

**TABLE 3: BACTERIOLOGICAL DETERMINANTS**

DETERMINANTS	LIMITS FOR GROUPS			
	A**	B**	C	D*
Standard plate counts per 1 ml	100	1000	10000	10000
Total coliform counts per 100 ml	0	10	100	100
Faecal coliform counts per 100 ml	0	5	50	50
<i>E. coli</i> counts per 100 ml	0	0	10	10

\* All values greater than the figure indicated.

\*\* In 95% of the samples.

NB If the guidelines in group A are exceeded, a follow-up sample should be analysed as soon as possible.

## 2.3 FREQUENCY FOR BACTERIOLOGICAL ANALYSIS OF DRINKING-WATER SUPPLIES

The recommended frequency for bacteriological analysis of drinking water is given in Table 4.

**TABLE 4: FREQUENCY FOR BACTERIOLOGICAL ANALYSIS**

POPULATION SERVED	MINIMUM FREQUENCY OF SAMPLING
More than 100 000	Twice a week
50 000 – 100 000	Once a week
10 000 – 50 000	Once a month
Minimum analysis	Once every three months

### 3 GENERAL STANDARDS FOR WASTE / EFFLUENT WATER DISCHARGE INTO THE ENVIRONMENT

All applications in terms of Section 21(5) and 22(2), for compliance with the requirements of Section 21(1) and 21(2) of the Water Act (Act 54 of 1956) that purified water shall comply with the General Standard as laid out in Government Gazette Regulation R553 of 5 April 1962.

**TABLE 5 GENERAL STANDARDS FOR ARTICLE 21 PERMITS (EFFLUENTS)**

DETERMINANTS	MAXIMUM ALLOWABLE LEVELS
Arsenic	0,5 mg/l as As
Biological Oxygen Demand (BOD)	no value given
Boron	1,0 mg/l as B
Chemical Oxygen Demand (COD)	75 mg / l as O
Chlorine, residual	0,1 mg/l as Cl <sub>2</sub>
Chromium, hexavalent	50 µg/l as Cr(VI)
Chromium, total	500 µg/l as Cr
Copper	1,0 mg/l as Cu
Cyanide	500 µg/l as CN
Oxygen, Dissolved (DO)	at least 75% saturation**
Detergents, Surfactants, Tensides	0,5 mg/l as MBAS – See also Note 2
Fats, Oil & Grease (FOG)	2,5 mg/l (!gravimetric method)
Fluoride	1,0 mg/l as F
Free & Saline Ammonia	10 mg/l as N
Lead	1,0 mg/l as Pb
Oxygen, Absorbed (OA)	10 mg / l as O*
pH	5,5 – 9,5
Phenolic Compounds	100 µg/l as phenol
Phosphate	1,0 mg/l as P - See also Note 1
Sodium	not more than 90 mg/l Na more than influent
Sulphide	1,0 mg/l as S
Temperature	35°C
Total Dissolved Solids (TDS)	not more than 500 mg / l more than influent
Total Suspended Solids (TSS)	25 mg/l
Typical faecal Coli.	no typical coli should be counted per 100 ml
Zinc	5,0 mg/l as Zn

\* Also known as *Permanganate Value* (or *PV*).

\*\* In Windhoek the saturation level is at approx. 9 mg/l O<sub>2</sub>.

**Note (1) on phosphate:** Phosphates are not toxic and essential for all life forms. Natural water will seldom contain phosphate; it is generally seen as an indicator of pollution and is usually accompanied by other pollutants. Wherever drinking water is combined with or consists wholly of reclaimed or recycled water, it may be expected to contain phosphate. There is no general guideline for phosphate contained in the Regulation 553. But generally it is assumed that eutrophication or algal bloom in dams is promoted by nutrient concentrations as low as 0,01 mg/l as P; generally a phosphate concentration limit for dams of 0,1 mg/l is recommended. All water that is consumed and subsequently discharged, will eventually end up in rivers, dams or

groundwater – that is why for potable water, a concentration level of 1 mg/l as P is aimed at.

But, again, in many cases of waste and effluent treatment, this may be difficult to achieve technically, or the required waste and effluent treatment infrastructure is not available; as the required infrastructure is sophisticated and expensive. The current situation calls for a compromise and for this reason, this Department will judge each application individually on its merits and allow, in certain cases, a phosphate concentration level of up to 15 mg/l as P in any effluent or waste stream to be discharged into the environment. This regulation is subject to be reviewed every two years, calculated from the date of approval of this document.

**Note (2) on detergents, surfactants and ten sides:** The MBAS (or methylene blue active substances) – test does not encompass all surface active compounds currently, commercially available. The limit given is therefore only a guideline. Many of the cleaning agents are toxic to biological life-forms in rivers and dams.

It should be taken into consideration that some commercial products interfere with the effective removal of oil, fat and grease by grease and fat traps, by breaking up such long-chain molecules into shorter ones. These cleaning agents thus effectively allow such components to pass through the traps and land into sections of a treatment plant further down the line and interfere with the process there.

Many cleaning agents contain very powerful disinfectants, and/or biocides. Such substances may interact with biological treatment processes. They may reduce the effectiveness of such treatment or 'kill' it completely, if they land in septic tanks, biofilters or even activate-sludge plants. Their activity may be attenuated by dilution.

#### **4. AUTHORIZATION**

Herewith, the Guidelines for the Evaluation of Drinking Water for Human Consumption with regard to Chemical, Physical and Bacteriological Quality, as well as the General Standards for Article 21\* Permits, amended for detergents, surfactants, ten sides, as well as phosphates, are confirmed and remain in force until further notice.

Issued under my hand with the authority vested in my office, within the Ministry for Agriculture, Water and Rural Development,

**PERMANENT SECRETARY**  
**Dr V Shivute**

**WINDHOEK,**

**DATE STAMP**