mora
ecological services
(Pty)LTD

COROBRIK®

IWWMP
For
Corobrik Midrand

PROJECT DETAILS

Client	Corobrik (Pty) Ltd: Midrand Factory
Report Name	IWWMP
Report Type	Draft
Report Date	August 2024
Report no	001

DOCUMENT REVIEW

Remarks	**Name**	**Position**	**Signature**	**Date**
Prepared By	Mokgatla Molepo	Biodiversity Specialist		12/08/2024
Reviewed By	Tshepo Makgopa	Environmental Engineer/Project Manager		12/08/2024

EXECUTIVE SUMMARY

Corobrik (Pty) Ltd (Corobrik) is in the Manufacturing Sector, but because of their clay quarry operations, to secure raw material for brick manufacture, they fall in the Mining Sector

Corobrik Midrand is situated adjacent to the M18 road (Glen Road) between Irene and Tembisa, approximately 5 kilometres (km) north of the Irene Country Club and approximately 1 km east of the Olifantsfontein Wastewater Treatment Works (WWTW). Corobrik Midrand is on the northern boundary of the Olifantsfontein / Clayville area, with the Midstream Estate area situated to the northwest.

Corobrik Midrand Quarry is mined once a year for 3 to 4 months. The extracted raw material is transported and stockpiled at the Corobrik Midrand Factory. The raw material is used to manufacture brick products. The quarry is situated adjacent to the factory.

Once the mining and stockpiling is complete; the mining team moves off-site leaving the Midrand Quarry unoccupied for the rest of the year. No income is directly generated from the Midrand Quarry, income is only generated from the Midrand Factory once the raw materials have been used to make brick products and sold to customers.

Corobrik is undertaking a Water Use License Application (WULA) to the Department of Water and Sanitation (DWS) in terms of chapter 4 of the National Water Act, 1998 (Act, No 36 of 1998):

The proposed activities associated with the Midrand factory that require licensing in terms of Section 21 of the NWA (1998) include:

- Abstraction of water from a site borehole,
- Abstraction of water from the old quarry,
- Storing of raw water from the old quarry,
- Dewatering of water from the operational quarry for a period of three months, and
- Stockpiling of clay material.

Mora Ecological Services (Pty) Ltd was appointed by Corobrik, to compile a 2024 Integrated Water and Waste Management Plan (IWWMP) associated with the above WULA for the Corobrik, Midrand operation located in Gauteng.

The IWWMP demonstrates that water and waste will be managed on site in an integrated manner and presents a plan of action for management of water and waste related issues will be addressed in a structured and progressive manner. The IWWMP identifies all relevant water and waste issues and defines knowledge gaps with associated action plans.

The IWWMP for Corobrik is therefore developed in support of the following objectives:

- Update of the IWWMP for Corobrik as required by the WULA that is undertaken at Corobrik;

- Characterise the present status of Corobrik;
- Formulate measures to address the management of storm water, process water, groundwater and waste; and
- To formulate the action plan for management of storm water, process water, groundwater and waste to ensure that it takes place to the satisfaction of the regulatory authority as well as assisting Corobrik in ensuring that water and waste is managed in an efficient and effective manner.

LIST OF ABBREVIATIONS

bgl	below ground level
BEE	Black Economic Empowerment
CoE	City of Ekurhuleni
DWS	Department of Water and Sanitation
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
GN704	Government Notice No. 704 of 4 June 1999
ha	hectares
I&AP	Interested and Affected parties
IUA	Integrated Units of Analysis
IWUL	Integrated Water Use Licence
WULA	Integrated Water Use Licence Application
IWWMP	Integrated Water and Waste Management Plan
LM	Local Municipality
MAR	Mean Annual Runoff
MAP	Mean Annual Precipitation
NGOs	Non-Governmental Organization
NWA	National Water Act, 1998 (Act 36 of 1998)
RQO	Resource Quality Objectives

SHE	Safety, Health, Environment
SWMP	Storm water management plan
TDS	Total dissolved solids
WMA	Water Management Area
WML	Waste Management Licence
WUL	Water Use Licence

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

Corobrik (Pty) Ltd (Corobrik) is in the Manufacturing Sector, but because of their clay quarry operations, to secure raw material for brick manufacture, they fall in the Mining Sector

Corobrik Midrand is situated adjacent to the M18 road (Glen Road) between Irene and Tembisa, approximately 5 kilometres (km) north of the Irene Country Club and approximately 1 km east of the Olifantsfontein Wastewater Treatment Works (WWTW). Corobrik Midrand is on the northern boundary of the Olifantsfontein / Clayville area, with the Midstream Estate area situated to the northwest (Groundwater Abstract (Pty) Ltd, 2024).

Corobrik Midrand and Midrand Extension Quarries are mined once a year for 3 to 4 months. The extracted raw material is transported and stockpiled at the Corobrik Midrand Factory. The raw material is used to manufacture brick products. The quarry is situated adjacent to the factory (CoroBrik (Pty) Ltd, 2013).

Once the mining and stockpiling is complete; the mining team moves off-site leaving the Midrand Quarry unoccupied for the rest of the year. No income is directly generated from the Midrand Quarry, income is only generated from the Midrand Factory once the raw materials have been used to make brick products and sold to customers (CoroBrik (Pty) Ltd, 2013).

Corobrik is undertaking a Water Use License Application (WULA) to the Department of Water and Sanitation (DWS) in terms of chapter 4 of the National Water Act, 1998 (Act, No 36 of 1998):

The proposed activities associated with the Midrand factory that require licensing in terms of Section 21 of the NWA (1998) include:

- Abstraction of water from a site borehole,
- Abstraction of water from the old quarry,
- Storing of raw water from the old quarry,
- Dewatering of water from the operational quarry for a period of three months, and
- Stockpiling of clay material.

The above proposed activities require the following water uses to be applied for in the WULA in terms of Section 21 of the NWA (1998):

are applied for in terms of the following:

- Section 21 (a): Taking of water from a water resource,
- Section 21 (b): Storing of water,
- Section 21 (g): Disposing of wate in a manner which may detrimentally impact on a water resource, and

- Section 21 (j): Removing, discharging, or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.

Mora Ecological Services (Pty) Ltd was appointed by Corobrik, to compile a 2024 Integrated Water and Waste Management Plan (IWWMP) associated with the above WULA for the Corobrik, Midrand operations located in Gauteng.

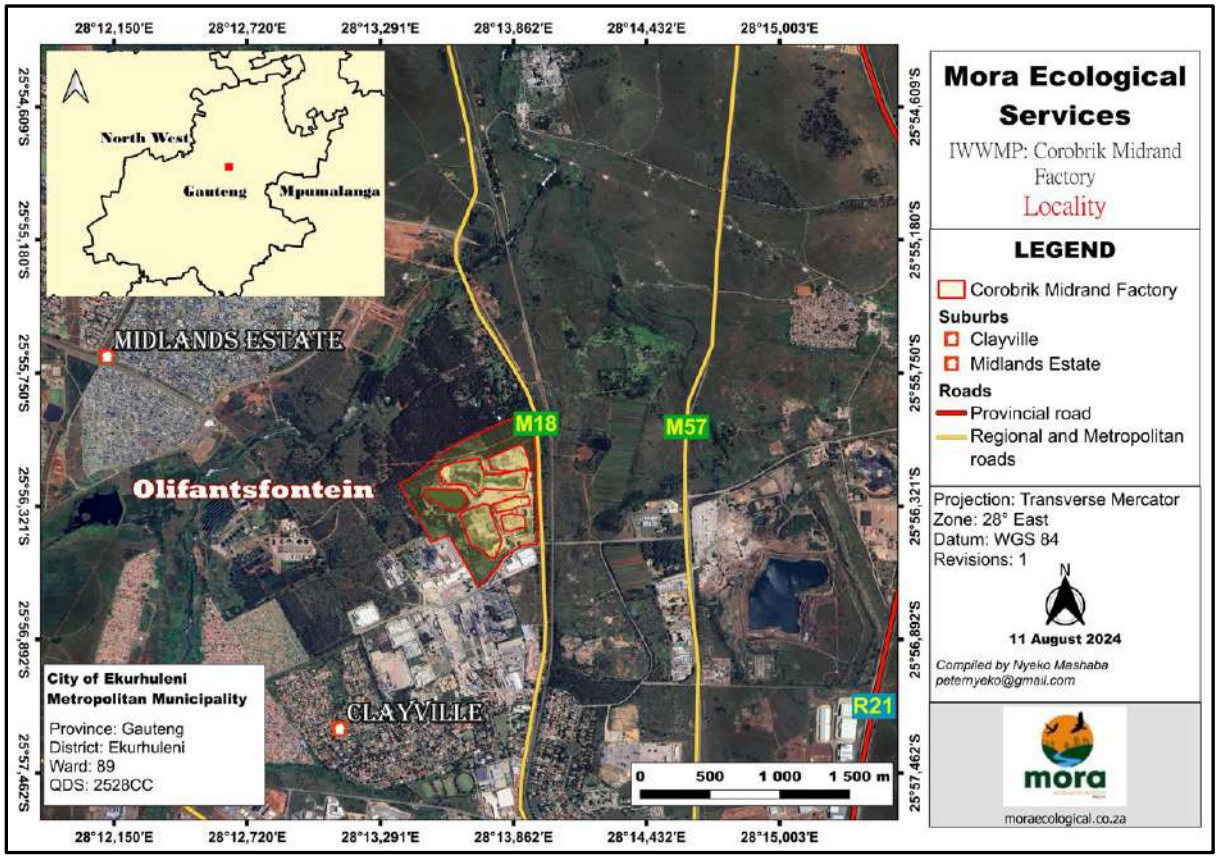


Figure 1:1: Locality map

1.1 Activity Background

Midrand Factory mines and beneficiates various earth's raw materials. Various clays are quarried and stockpiled on site, while some are supplied from other Corobrik Operations. The various clay types include Creamy Grey, Plastic Clay, Fireclay, Carbonaceous Plastic Clay, and Carbonaceous Fireclay. The clays are drawn by front end loader from the different stockpiles and pre-blended by volume before being fed into the brick making plant. The pre-blended clays pass through crushers all along the mechanical preparation process, further mixing, and enhancement of the mix takes place. Water is added to the material when it passes through the mixers then passed on to the extrusion point. At the extrusion point, the stiffness of the mix, as well as the dimensions of the column, is determined and controlled for the next stage of cutting. The cut bricks get loaded onto kiln cars. The loaded cars

proceed through to a tunnel dryer for final controlled drying to the desired moisture content. The bricks are then passed through the tunnel kiln (firing). Before the bricks are packed, they pass through a de-hacking process, where they are dipped into the water at the dipping station. Once dipped, the bricks are carried by forklift, to the stock bins, ready for dispatch to the customers

Contact details

The client's contact person is indicated in Table 1.1.

Table 1.1: Contact details

Area of Responsibility	Contact Details
Company	Corobrik (Pty) Ltd
Client Contact Person	Martha Monoke
Responsibility	Mining Regulatory Coordinator
Postal Address	Corobrik Extension Quarry PO Box 1051 Olifantsfontein 1665
Telephone	011 871 8730
E-mail address	martha.monoke@corobrik.co.za

1.2 Regional Setting and Location of Activity

The site is located on the Remaining Extent of portion 25 of the Farm Olifantsfontein 402 JR. The site is relatively flat, sloping gently in a general north-westerly direction, the property is covered by Blue Gum trees. Sunlawns Agricultural Holdings is located to the immediate north of the site. The easterly boundary of the site is adjacent to the Olifantsfontein- Irene Road (CoroBrik (Pty) Ltd, 2013).

The surface elevation ranging from approximately 1500 mamsl (metres above mean sea level) along the southwestern corner of the property to 1460 mamsl in the northeast, near the M18 road few rock outcrops were observed, and areas of solid, continuous outcrop were not found (Groundwater Abstract (Pty) Ltd, 2024)

1.3 Property description

The operation is situated in the farm property indicated in Table 1.2.

Table 1.2: Property Details

Farm Name and Number	Registration Division	Farm Portion
Remaining Extent of Olifantsfontein 402 JR	T0JR00000000000040200025	25

1.4 Purpose of IWWMP

The IWWMP demonstrates that water and waste will be managed on site in an integrated manner and presents a plan of action for management of water and waste related issues will be addressed in a structured and progressive manner. The IWWMP identifies all relevant water and waste issues and defines knowledge gaps with associated action plans.

The IWWMP for Corobrik is therefore developed in support of the following objectives:

- Update of the IWWMP for Corobrik as required by the WULA that is undertaken at Corobrik;
- Characterise the present status of Corobrik;
- Formulate measures to address the management of storm water, process water, groundwater and waste; and
- To formulate the action plan for management of storm water, process water, groundwater and waste to ensure that it takes place to the satisfaction of the regulatory authority as well as assisting Corobrik in ensuring that water and waste is managed in an efficient and effective manner.

It should be noted that the IWWMP will deal with all the water uses on site, even those already licensed so that it will represent an overall updated Water and Waste Management Plan. This IWWMP will therefore be representative of the site-specific situation and will include the proposed measures on site with regards to water and waste management.

The overall purpose of the IWWMP is to provide a planning framework that will achieve site specific objectives related to the management of water and waste. These objectives will be set to relate to corporate environmental policy, regulatory requirements and legal compliance.

The information contained in this IWWMP has been obtained from a series of the available environmental specialist studies, technical and design reports, monitoring reports, site specific policies and plans as well as from the previous water management plan. These reports are attached as Appendices to this IWWMP and should be referred to should additional information be required.

This IWWMP has subsequently been structured and to achieve the objectives of the published Government Notice Regulation 267 “Regulations regarding the procedural requirements for water use licence applications and appeals” dated 24 March 2017 (GN R.267).

2. CONTEXTUALISATION OF ACTIVITY

2.1 Description of activity

The quarrying operation will consist of opencast quarrying involving excavator and trucks, load and haul operations. An excavator will be used to extract the clay material from the quarry to a maximum depth of around 20m, loaded onto trucks and transported on internal Corobrik Midrand roads to a prepared stockpiling area at the Corobrik Midrand Factory site (a distance of about 0.5 km) where it will be stockpiled for later use in the brickmaking process. This quarrying and stockpiling operation will last for approximately 4 months per year (CoroBrik (Pty) Ltd, 2013).

The material from the factory stockpiles will then be blended in with other clays in order to produce different face brick product mixes. This material mix will then be prepared (mixing, moistening), extruded into bricks, dried and then fired in kilns to produce the final brick products (CoroBrik (Pty) Ltd, 2013).

Rehabilitation of the worked-out sections of the quarry will be caried out concurrently with the quarrying operations during the quarrying period by a mining contractor. This entails the separate stripping of topsoil and subsoil (overburden) from the intended mining area, reprofiling (shaping) of worked-out quarry slopes, backfilling of stripped subsoil into the reprofiled areas, spreading of stripped seed-bearing topsoil over reprofiled and backfilled areas (prepared areas) and profiling (smoothing) of placed topsoil (CoroBrik (Pty) Ltd, 2013).

2.2 Extent of Activity

The site is 7.1478 ha in extent of which only about 2.6ha is quarried in total. The quarrying operation will consist of opencast mining, excavator and trucks, load and haul operations (CoroBrik (Pty) Ltd, 2013).

Figure 2:1: Mine Extent (MVD Kalahari Consulting, 2024)

COROBRIK

CM.QOP.PRO-01

CLAY PREPARATION

From Quarry

to Stockpiles **S**
Refer to the "Raw Materials Management Manual"

Feeder Bins

By means of a Front-End Loader into the Feeder Bins

Blending is Controlled – Refer CM.WI.8.5.1-01

Crusher Control Refer Pragma System

Incla Pans Refer Pragma System

Vibra-Mech Screens Refer Pragma System

S Double Shaft Mixer Checks Refer Pragma System and Water Addition Refer CM.WI.8.5.1-02

Check Refining Rolls Gap Refer CM.WI.8.5.1-18

Check Condition of Side Plates

Refer Pragma System Check Particle Size refer CM.WI.8.5.1-03 **S**

Approved by:	Compiled by:	Revision:	Page Number:
Factory Manager	SHEQ Department	2	4 of 7
		Date: September 2022	

COROBRIK®

CM.QOP.PRO-01

EXTRUSION

From the Refining Rolls

to the Holding Bays for curing

Sample at holding bay to determine the Carbon Content of the Clay
Refer CM.WI.8.5.1-04

Manganese is added for Specific products.
Addition is controlled
Refer to CM.WI.8.5.1-05

Before extrusion a Clayfix solution is added **S**
Determine concentrate and control of Addition Refer CM.WI.8.5.1-06

Augers and Liners are controlled through Pragma System
Vacuum is controlled CM.WI.8.5.1-08
Die Balance is determined
Refer CM.WI.8.5.1-09
Extrusion Moisture is Determined
Refer CM.WI.8.5.1-10

At Push-Through cutter the following is controlled:

Green Dimensions	CM.WI.8.5.1-11
Core hole Dimensions	CM.WI.8.5.1-12
Squareness of Green Product	CM.WI.8.5.1-13
Visual Inspection of Green Product	CM.WI.8.5.1-14

Kiln Car Setting
Refer CM.WI.8.5.1-20
S

After Drying: **S**

Dry Dimensions	CM.WI.8.5.1-15
Residual Moisture Content	CM.WI.8.5.1-16

Approved by:	Compiled by:	Revision:	Page Number:
Factory Manager	SHEQ Department	2	5 of 7
		Date: September 2022	

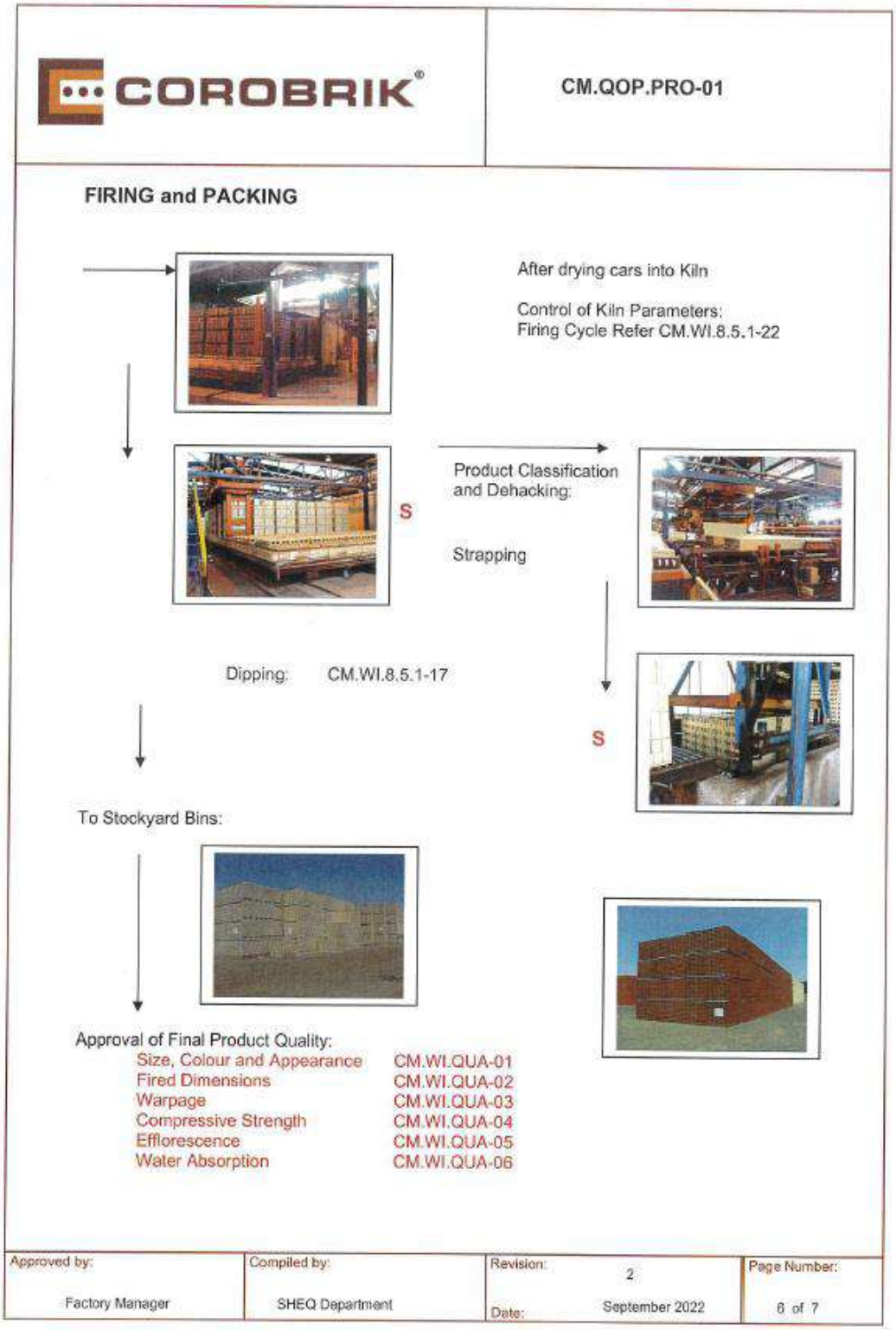


Figure 2:2: An illustration of a typical process diagram

2.3 Key activity related processes and products

Processes at Corobrik Midrand includes mining and beneficiation of raw earth materials. Various clays are quarried and stockpiled on site. The mining operation consists of opencast quarrying involving excavator and trucks, load and haul operations. Raw earth materials are also imported from other areas and stockpiled on site. The clays are drawn from the different stockpiles and pre-blended by volume before being fed into the brick making plant. A total of 30 000 to 40 000 cubic meters of clay per annum is mined from the quarries on site. An additional 30 000 to 60 000 cubic meters of clay is imported from other quarries throughout the year (Groundwater Abstract (Pty) Ltd, 2024).

The pre-blended clays pass through crushers, and all along the mechanical preparation process, further mixing, and enhancement of the mix takes place. Water is added to the material when it passes through the mixers then passed on to the extrusion point. At the extrusion point, the stiffness of the mix as well as the dimensions of the column is determined and controlled for the next stage of cutting. The cut bricks get loaded onto kiln cars. The loaded cars proceed through to a tunnel dryer for final controlled drying to the desired moisture content. The bricks are passed through the tunnel kiln (firing). Before the bricks are packed, they pass through a de-hacking process where they are dipped into the water using a packing robot. They washed bricks are loaded onto sorting belt for the final stages of, sorting and quality approval, stockpiling and despatch to the customers (Groundwater Abstract (Pty) Ltd, 2024)

2.4 Activity life description

Clay is quarried annually during the winter months (+/- 4 months) and stockpiled at the Corobrik Midrand Factory for brick manufacture. The estimated annual raw material required for clay brick production from the quarry is 31 600 bank m^3. This material forms part of the raw material mix used in the manufacture of brick products at the Midrand Factory. The consumption rate is based on a maximum production of 52 million bricks per year at the Midrand Factory (CoroBrik (Pty) Ltd, 2013)

The raw material reserve, annual consumption rate (based on a maximum production of 52 million bricks per year at the Midrand Factory) and life of mine for the different raw materials is shown in Table 2.1.

Table 2.1: Consumption Rates, Estimated Reserves and Estimated Life of Mine (CoroBrik (Pty) Ltd, 2013)

Clay	Reserve (bank m^3)	Annual Consumption Rate (bank m^3)	Life of Mine (years)
Creamy Grey	36 700	8150	4.5

Clay	Reserve (bank m^3)	Annual Consumption Rate (bank m^3)	Life of Mine (years)
Clean Fireclay	220 000	16 700	13.2
Plastic Clay	25 000	6 750	3.7

2.5 Activity infrastructure description

Corobrik Midrand Factory is divided into the following key infrastructures:

2.5.1 Mineral Processing Plant (Manufacturing Plant)

The quarried clay is transported to the Corobrik Midrand Factory for Processing. The factory consists of existing infrastructure for brick manufacturing by means of a gas-fired kiln.

2.5.2 Quarry

There is an existing quarry on site where useable clays (Fire clay, plastic clay and creamy clay) are extracted from. The estimated depth of the quarry is approximately 20 m below ground surface.

2.5.3 Water Pollution Management Facilities

Surface Water Pollution Control

Silt contaminated run-off from the working areas is trapped in worked-out sections of the quarry. Clean run-off from the site is channelled away from the operating areas into the natural drainage system via cut-off drains/ berms.

Sewage

The ablution facilities at the Midrand Factory are used by mining personnel during the quarrying contract period.

2.6 Key water uses and waste streams

2.6.1 Water uses

The proposed water uses in the WULA are as follows:

- Section 21 (a): Taking of water from a water resource,
- Section 21 (b): Storing of water,

- Section 21 (g): Disposing of wate in a manner which may detrimentally impact on a water resource, and
- Section 21 (j): Removing, discharging, or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.

2.6.2 Waste streams

2.6.2.1 Solid Waste Management Facilities

Industrial Waste Disposal

All industrial waste is collected by a registered waste removal company and removed to a licensed waste disposal site (CoroBrik (Pty) Ltd, 2013).

Domestic Waste Disposal

All domestic waste generated from the site is placed in containers and taken off-site by the quarrying contractor and disposed of at a licensed waste disposal facility on a daily basis during the quarrying contract period.

Monitoring and management of waste collection and disposal procedures are carried out on an ongoing basis (CoroBrik (Pty) Ltd, 2013).

Mine Residue Disposal

The mine residue (non-brickmaking materials) consists of topsoil and subsoil (overburden). These are stripped separately during the quarrying operations. The stripped subsoil is backfilled into the worked-out sections of the quarry. The stripped topsoil is then spread out over the backfilled areas. These operations forms part of the concurrent rehabilitation process (CoroBrik (Pty) Ltd, 2013).

2.7 Organisational structure of activity

The SHE Officer under the operations and environmental managers, as well as the waste contractors, should ensure compliance with and implementation of the water and waste management procedures.

The management responsibilities are set out as follows:

- The SHE Officer is responsible for communicating the Environmental Management System to all employees and contractors; and
- The SHE Officer is responsible to drive the Environmental Management System, to ensure that legal compliances are met in their respective areas of responsibility.

The Corobrik organisational chart outlining the responsibilities and Authorities is included in Figure 2:3.

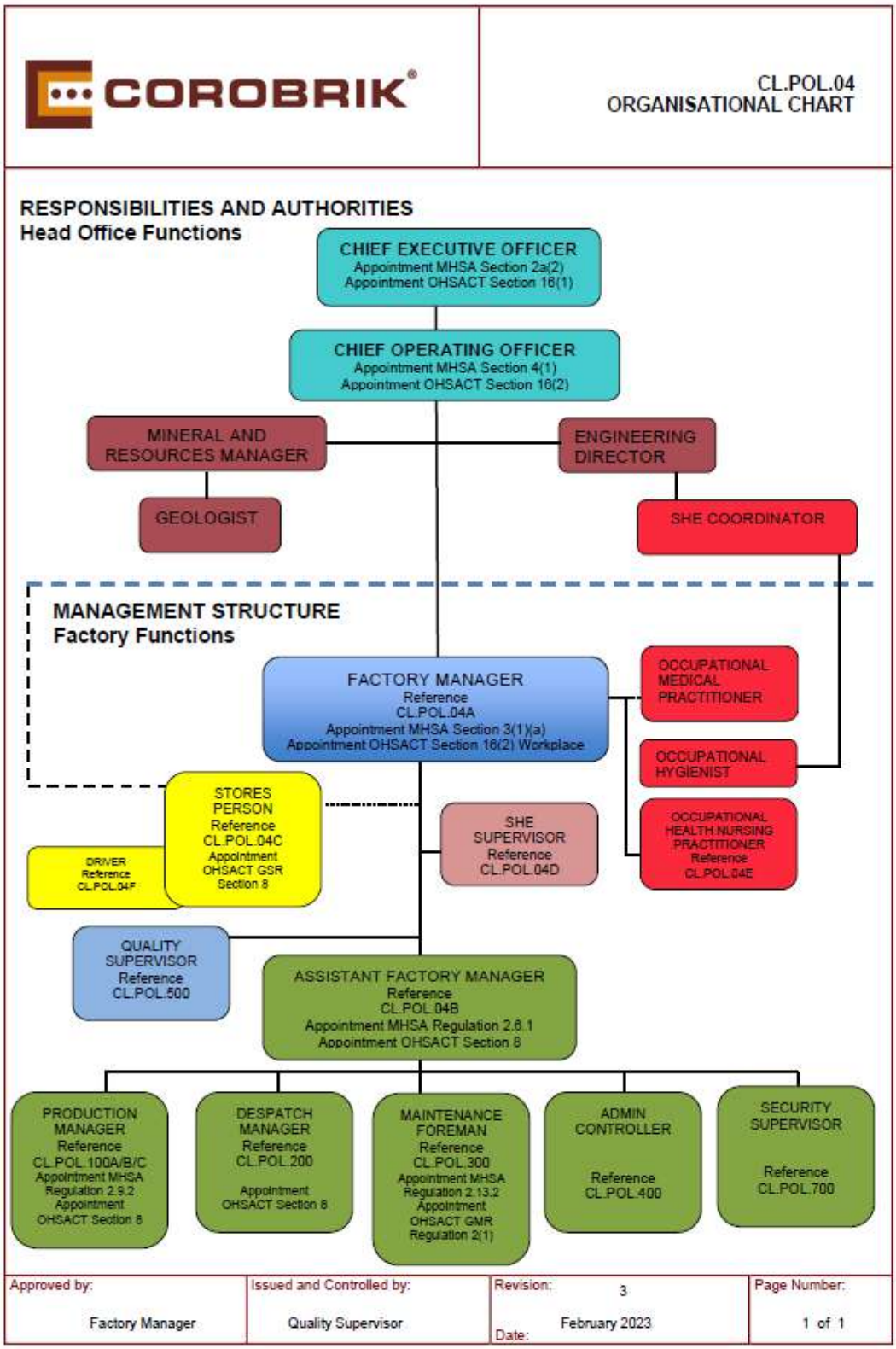


Figure 2:3: Corobrik organisational chart

2.8 Business and corporate policies

Corobrik aims to achieve high standards in Safety, Health and Environmental management in order to provide for the production of tired clay building and paving bricks, cement blocks and pavers at Factories/Mines located throughout the country. The clay and non-ferrous Minerals are mined on site and also source from remote sources and quarries Using surface mining techniques. in the case of our cement products, most of raw materials are sourced from outside suppliers. Corobrik strives to achieve leading industry practices and recognition and is committed to:

- Implementing and maintaining an effective Safety, Health and Environmental Management system which drives continual improvement.
- The identification, and assessment of hazards, aspects, management risks and impacts to employees, visitors, contractors, the environment and communities in which we operate by using the hierarchy of controls.
- Prevention of injury, ill-health, and occupational disease, by providing Safety, Health and Wellness programmes.
- Comply and adhere to all applicable Safety, Health and Environmental legislation as well as other requirements and obligations to which Corobrik subscribes! including best practices.
- Define Safety, Health and Environmental objectives. Ensure that these objectives are understood, reviewed and communicated throughout the company.
- Strive to reduce, re-use and recycle waste to optimise and promote the efficient use of natural resources.
- Consider effective technologies for the prevention and reduction of all forms of pollution by minimizing the impact of our operations on the environment, through the control of waste and the conservation of natural resources.
- Lead and develop our employees/ employee representatives and provide resources to achieve objectives. Provide training and development programmes which enhance employee awareness in order to achieve active participation in Safety Health, Occupational hygiene and Environmental! related matters.
- Provide adequate financial means and resources for the sustainability of Safety, Health and Environmental management plans and systems, and design processes that ensure cost effectiveness and quality of products and services.
- Ensure sufficient means and competencies to manage potential emergencies. Support the fundamental human rights of employees, contractors, and communities in which we operate in order to safeguard them from any possible exposure and to ensure a healthy and safe working environment to ail employees and affected parties.
- This policy shall be communicated to all employees and contractors and made available to interested and affected parties upon request.

3. REGULATORY WATER AND WASTE MANAGEMENT FRAMEWORK

3.1 Summary of all water uses

Water use is defined broadly in the NWA and includes the following activities as described in Section 21 of the Act:

(a) taking water from a water resource;

(b) storing water;

(c) impeding or diverting the flow of water in a watercourse;

(d) engaging in a stream flow reduction activity contemplated in section 36;

(e) engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);

(f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;

(g) disposing of waste in a manner which may detrimentally impact on a water resource;

(h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;

(i) altering the bed, banks, course or characteristics of a watercourse;

(j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and

(k) using water for recreational purposes.

In terms of Section 22(1) a person may only undertake the abovementioned water uses if it is appropriately authorised:

22(1) A person may only use water

(a) without a licence

if that water use is permissible under Schedule 1;

if that water use is permissible as a continuation of an existing lawful use; or

if that water use is permissible in terms of a general authorisation issued under section 39;

(b) if the water use is authorised by a licence under this Act; or

if the responsible authority has dispensed with a licence requirement under subsection (3)

3.2 Existing lawful water uses

In terms of Section 32 of the National Water Act, 1998 (Act 36 of 1998) (NWA), an existing lawful water use (ELWU) is defined as follows:

> *"Water use which has taken place at any time during a period of two years immediately before the date of commencement of the Act (1 October 1996 to 30 September 1998) and which was authorised by or under any law which was in force immediately before the date of commencement of this Act, or which has been declared an existing lawful water use in terms of Section 33 of the Act".*

No ELWU is applicable to the Corobrik operations.

3.3 Relevant exemptions

The Minister of Water and Sanitation is responsible for the protection, use, development, conservation, management and control of the water resources of South Africa on a sustainable basis. The requirements prescribed in terms of the regulations must be seen as minimum requirements to fulfil this goal.

The Regulations on use of water for mining and related activities aimed at the protection of water resources made in terms of Section 26 of the National Water Act, (Act No. 36 of 1998), published GNR. 704 stipulates the following:

- In terms of regulation 3 of GNR. 704 the Minister may in writing authorise an exemption from the requirements of regulations 4, 5, 6, 7, 8, 10 or 11 on his or her own initiative or on application, subject to such conditions as the Minister may determine;
- In terms of regulation 4 of GNR. 704 there are restrictions on locality. No person in control of a mine or activity may place or dispose of any residue or substance which causes or is likely to cause pollution of a water resource, in the workings of any underground or opencast mine excavation, prospecting diggings, pit or any other excavation;
- In terms of Regulation 5 of GNR. 704 there are restrictions on use of material and no person in control of a mine or activity may use any residue or substance which causes or is likely to cause pollution of a water resource for the construction of any dam or other impoundment or any embankment, road or railway, or for any other purpose which is likely to cause pollution of a water resource; and
- In terms of regulation 7 of GNR. 704, the Protection of water resources every person in control of a mine or activity must take reasonable measures prevent water containing waste or any substance which causes or is likely to cause pollution of a water resource from entering any water resource, either by natural flow or by seepage, and must retain or collect such substance or water containing waste for use, re-use, evaporation or for purification and disposal in terms of the Act.

The following is however noted from the Water Quality Management, Operational Guideline No. M6.1: Guideline document for the implementation of Regulations on the use of water for mining and related activities aimed at the protection of water resources:

- "Should an exemption from any requirements of these regulation imply the necessity for a water use licence, the person in control of a mine or activity need only to apply for a water use licence, i.e. a water use licence has higher authority than the regulations. However, the following clause needs to be incorporated into the water use licence: In terms of the conditions of this licence, the Licence Holder is exempted from the clause (specific regulation) of the regulations on use of water for mining and related activities aimed at the protection of water resources (GNR. 704)."

No exemptions are applicable to the Corobrik Midrand operation.

3.4 Generally authorised water uses

In terms of Section 22(1) of the NWA a person may use water without a licence if that water use is permissible in terms of a General Authorisation (GA) issued under Section 39 of the NWA.

During the compilation of this IWWMP, No General Authorisation application is applicable or approved for the Corobrik.

3.5 New water uses to be authorised

A water use licence is required as the proposed activities trigger listed activities under Section 21 of the NWA; thus the requisite application must be lodged with the DWS. Water uses for which authorisation must be obtained are presented in Table 3.1 below.

Table 3.1: Proposed water-uses to be authorised by DWS

Water Use	Description	Property (Farm name and portion)	Coordinates	Capacity/Surface area/Volumes (m^3/a)
Section 21 (a) - Taking water .	Abstraction of water from Site borehole which is used for brick manufacturing and dust suppression.	Portion 25 of Remaining Extent of Olifantsfontein 402 JR	25°56'36.99"S 28°13'41.80"E	17 741
	Abstraction of water from site quarry which is used for brick manufacturing and dust suppression.	Portion 25 of Remaining Extent of Olifantsfontein 402 JR	25°56'12.17"S 28°13'42.06"E	2 682
Section 21 (b) Storing of water.	Storing of water in the Old Quarry (Site Dam)	Portion 25 of Remaining Extent of Olifantsfontein 402 JR	25°56'17.52"S 28°13'34.90"E	73 700
Section 21 (g) - Disposing of waste in a manner which may detrimentally impact on a water resource.	Stockpiling of the clay stockpile.	Portion 25 of Remaining Extent of Olifantsfontein 402 JR	25°56'24.89"S 28°13'44.06"E	11 034
Section 21 (j)- Removing, discharging, or disposing of water found underground if it	Dewatering of water from the Midrand quarry for a period of three months.	Portion 25 of Remaining Extent of Olifantsfontein 402 JR	25°56'12.17"S 28°13'42.06"E	2 682

Water Use	Description	Property (Farm name and portion)	Coordinates	Capacity/Surface area/Volumes (m^3/a)
is necessary for the efficient continuation of an activity or for the safety of people.				

3.6 Waste management activities

Waste is regulated under the National Environmental Management Waste Act 59 of 2008 (NEMWA). NEMWA defines "waste" as:

"Any substance, whether or not that substance can be reduced, re-used, recycled and recovered –

- *that a surplus, unwanted, rejected, discarded, abandoned or disposed of;*
- *which the generator has no further use for;*
- *that must be treated or disposed of; or*
- *that is identified as a waste by the Minister by notice in the Gazette, and includes waste generated by the mining, medical or other sector, but – A by-product is not considered waste; and*
- *Any portion of waste, once re-used, recycled, and recovered, ceases to be waste."*

3.7 Waste related authorisations

In terms of the National Environmental Management: Waste Amendment Act 26 of 2014 (NEMWAA), "Wastes resulting from exploration, mining, quarrying, and physical and chemical treatment of minerals" are classified as hazardous waste and this include:

a) wastes from mineral excavation;
b) wastes from physical and chemical processing of metalliferous minerals;
c) wastes from physical and chemical processing of non-metalliferous minerals; and
d) wastes from drilling muds and other drilling operations [wastes].

The above mining wastes are usually disposed to:

- ''residue deposits'' which includes any residue stockpile remaining at the termination, cancellation or expiry of a prospecting right, mining right, mining permit, exploration right or production right; and
- ''residue stockpile'' which includes any debris, discard, tailings, slimes, screening, slurry, waste rock, foundry sand, mineral processing plant waste, ash or any other product derived from or incidental to a mining operation and which is stockpiled, stored or accumulated within the mining area for potential re-use, or which is disposed of, by the holder of a mining right, mining permit or, production right or an old order right, including historic mines and dumps created before the implementation of this Act.

3.8 Other authorisations (EIA's, EMPs, RODs, Regulations)

Corobrik Midrand Factory is authorised for the following:

- Environmental Management Programme (EMPr) in terms of Section 102 of the minerals and Petroleum resources development Act, 2002 (Act 28 of 2002) is approved for Corobrik (Pty) Ltd (CoroBrik (Pty) Ltd, 2013)

4. PRESENT ENVIRONMENTAL SITUATION

4.1 Climate

Corobrik Midrand is situated in the central Highveld climatic zone. Precipitation occurs as convectional thunderstorms during the summer months (October to March). The winter months are characterized by mild to warm days, with cold nights and frost (Groundwater Abstract (Pty) Ltd, 2024).

In the Centurion and Irene areas, the climate is warm and moderate. With an average of 28.1°C, January is the warmest month. June is the coldest month, with temperatures averaging 18.6°C (Groundwater Abstract (Pty) Ltd, 2024)

Table 4.1: Average precipitation data for Irene (Groundwater Abstract (Pty) Ltd, 2024)

Variable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature (°C)	28.1	27.8	26.8	23.6	22.0	18.6	18.5	21.9	26.3	27.5	27.6	28.0
Precipitation (mm)	97	54	44	31	4	3	1	2	8	44	71	87

4.2 Regional Climate rainfall

Midrand Factory provided monthly rainfall data from 2001 until 2023. Furthermore, the Midrand factory provided annual rainfall for the period starting in 1989 until 2023. The annual rainfall is used to understand the general trend in rainfall and shows that there is a marginal increase in rainfall over the years, as presented in Figure 4:1. The average Mean Annual Precipitation (MAP) is approximately 672 mm/year (CM Eclectic (Pty) Limited, 2024).

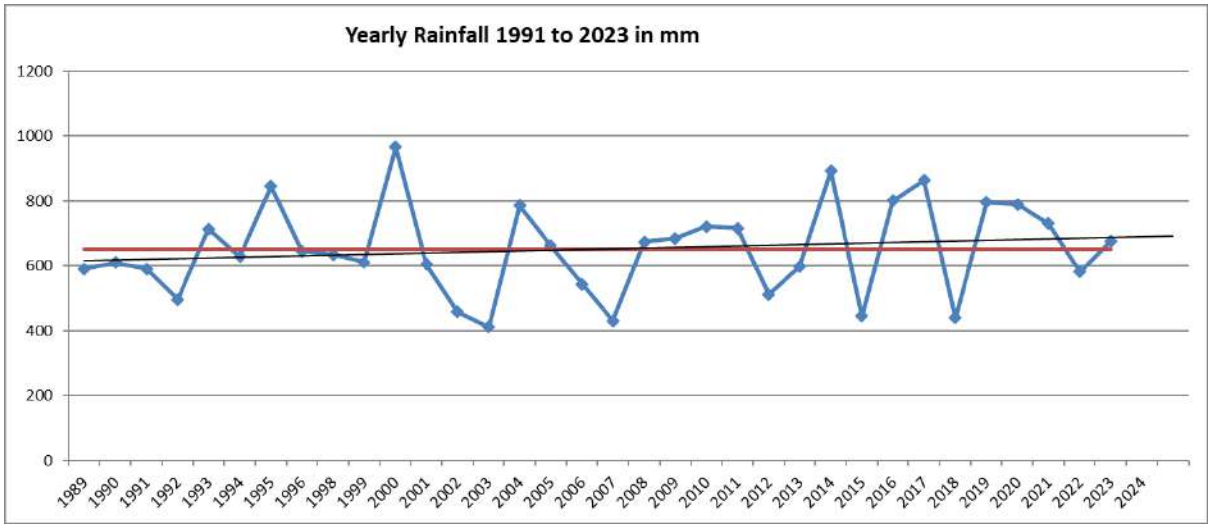
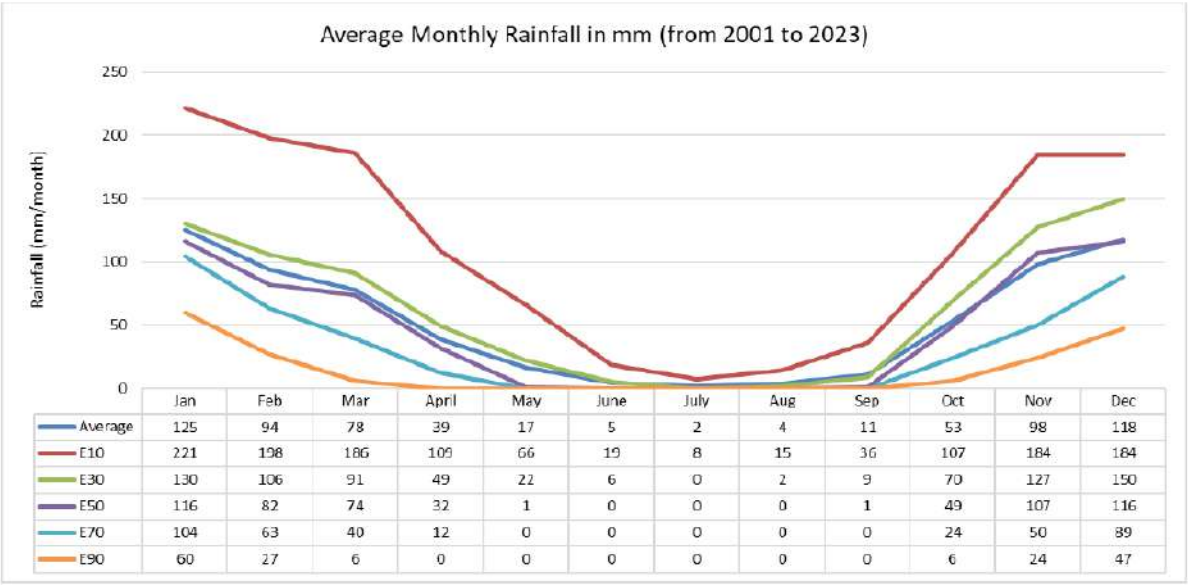


Figure 4:1 Yearly Rainfall at Midrand Quarry in mm (CM Eclectic (Pty) Limited, 2024)

The average monthly distribution of rainfall distribution is shown in Figure 4:2. The E10 to E90 represents a range of exceedance probability of events – this is the likelihood of rainfall of a certain magnitude being exceeded. The median (exceeded 50%) presented by the E50 is close to the average for the wet months, while it records zero in the dry months, which is more realistic. As a result, the average rainfall series was used in the water balance model; however, the model only calculates runoff if rainfall is above 10mm.



	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Average	125	94	78	39	17	5	2	4	11	53	98	118
E10	221	198	186	109	66	19	8	15	36	107	184	184
E30	130	106	91	49	22	6	0	2	9	70	127	150
E50	116	82	74	32	1	0	0	0	1	49	107	116
E70	104	63	40	12	0	0	0	0	0	24	50	89
E90	60	27	6	0	0	0	0	0	0	6	24	47

Figure 4:2 Monthly Average Rainfall Distribution (CM Eclectic (Pty) Limited, 2024)

4.3 Evaporation

WR2012 provides evaporation as Symon's Pan (S-pan) evaporation and pan coefficients obtained from the (WR90)2project converted the S-pan evaporation to open water evaporation applied in the model for dam and pond. Table 4.2 presents the monthly distribution of open water evaporation for the Corobrik Midrand Factory (CM Eclectic (Pty) Limited, 2024).

Table 4.2: Average Monthly Rainfall and Evaporation (CM Eclectic (Pty) Limited, 2024)

Month	**Open water Evaporation (mm)**
January	160
February	137
March	128
April	95
May	75
June	58
July	66
August	93
September	129
October	159
November	161
December	168
Annual Total	**1 427**

4.4 Surface water

The study area is drained by the Olifantspruit, a tributary of the Hennops River. The Olifantspruit merges with the Hennops River near the Irene Country Club. Surface drainage in the Corobrik Midrand area (locally) flows in a westerly direction towards the Olifantspruit (Groundwater Abstract (Pty) Ltd, 2024).

Depending on the residual weathering products and the texture of the transported materials, the surface soils may have highly variable permeability. This, together with uncertainty of bedrock properties, changes in land cover and regional groundwater levels, may result in localised zones of increased infiltration or runoff, areas associated with water ponding on surface and/ or groundwater movement possibly mimicking surface topography (Groundwater Abstract (Pty) Ltd, 2024).

4.5 Water Management Area

The Corobrik Midrand property is in the A21B quaternary catchment, and forms part of the Limpopo (formerly Crocodile West and Marico) Water Management Area (WMA). The A21B quaternary catchment covers an area of approximately 527 km^2 and includes most of the Tembisa, Midrand, Centurion and Tshwane south areas (Groundwater Abstract (Pty) Ltd, 2024).

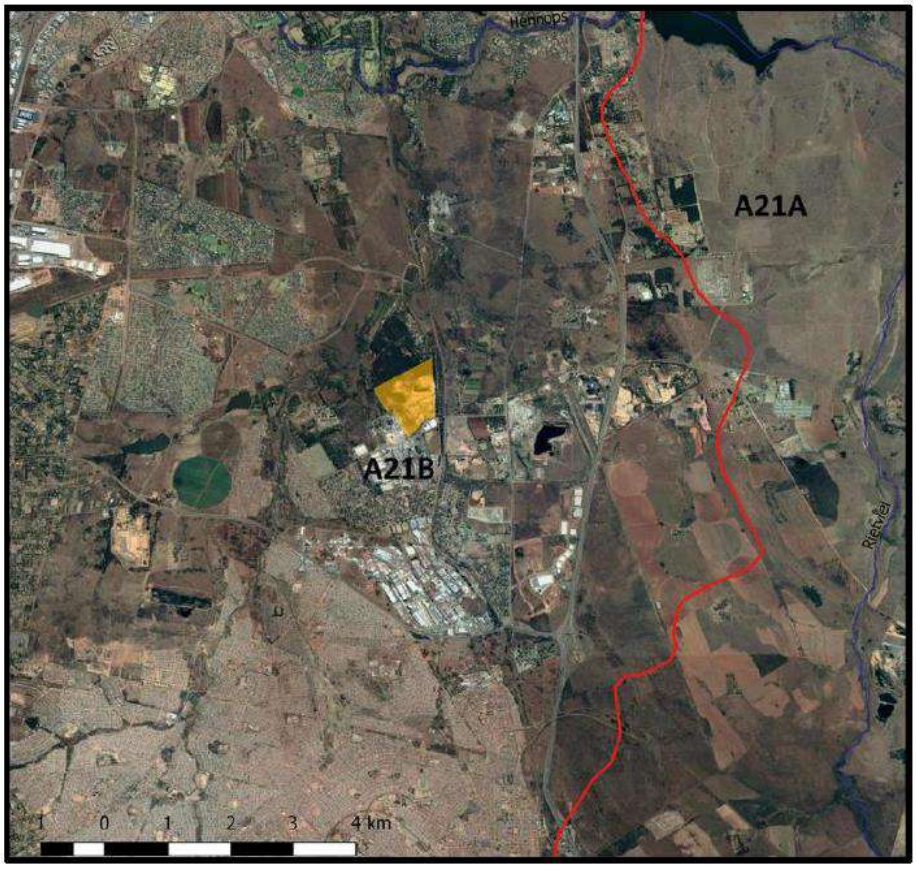


Figure 4:3 Hydrology Map (MVD Kalahari Consulting, 2024)

4.6 Surface water hydrology

There are no discernible natural watercourses or water bodies on the property. The Olifantspruit, a south to north draining stream, is situated to the northwest of the site a distance of about 1 km. this drains into the Sesmylspruit to the north (CoroBrik (Pty) Ltd, 2013)

There is no discernible natural watercourse or waterbodies on the property (MVD Kalahari Consulting, 2024).

4.7 Surface water quality

4.7.1 Receiving environment water quality

Corobrik Midrand Factory has an ongoing monitoring programme for the quarry on site which is currently used for the retention of storm water generated on site. Data obtained from this monitoring programme was considered in this report as it will be representative of the impacts the operation is likely to pose to the receiving water environment.

4.7.2 Midrand quarry water quality

Water sample locations were established from geographical reports and preliminary environmental impact assessments for the specific site, the sampling location at the site is summarised in Table 4.3 below.

Table 4.3: Surface water sampling points (NOHS Consultants (Pty) Ltd, 2024)

No	Sampling Point Location	Sample Number
1	Rayton Quarry	2/Q/B/15/04/2024

The results from the April 2024 Corobrik Midrand water quality report (NOHS Consultants (Pty) Ltd, 2024) are given in Table 4.4.

Table 4.4: Results of Chemical Analysis of Samples- Quarry Water (NOHS Consultants (Pty) Ltd, 2024)

Determinant	Formula	Detection Limit	Maximum Allowable Limit (As per MHSA)	2/Q/B/15/04/2024 Rayton Quarry
Water Quality				
pH	-	-	ALL: 5.5 – 9.5 REC: 6 – 9	6,09
Conductivity	-	-	MAX: 300 mS/m REC: 70 mS/m	1,68
Turbidity (NTU)	-	-	MAX: 5 NTU REC: 1 NTU	2,83
Total Dissolved Solids (mg/l)	-	0.100	1000	12

Determinant	Formula	Detection Limit	Maximum Allowable Limit (As per MHSA)	2/Q/B/15/04/2024 Rayton Quarry
Macro Determinants (mg/l)				
Total Hardness	$CaCO_3$	-	650	9
Ammonia	NH_3	0.058	1.0	0,10
Magnesium	Mg	0.0017	100	0,80
Calcium	Ca	0.0046	150	2,10
Potassium	K	0.0039	50	0,51
Sodium	Na	0.0022	400	1,35
Chloride	Cl	0.027	600	1,10
Sulphate	SO_4	0.580	600	2,15
Nitrite	N	0.059	Sum = 10	0,15
Nitrate		0.043		
Fluoride	F	0.037	1.5	0,04
Zinc	Zn	0.00012	5.0	<0.010

4.8 Mean Annual Runoff

All runoff in the plant yard reaches the stormwater collection point and is conveyed to the site dam. Most of the rainfall received in the stockpiles yard is lost to evaporation and interstitial storage, and any residual runoff is assumed to flow to the nearest quarry as some few erosion rills were observed on small sections of the quarry walls (CM Eclectic (Pty) Limited, 2024).

Table 4.5: Combined Assessments Results (CM Eclectic (Pty) Limited, 2024)

Area	Footprint (m^2)
Plant	65 560
Quarry	97 336
Quarry Pool Area (area of ponded water in quarry)	16 519
Dam Area Catchment	62 880
Dam Area	35 031

Area	Footprint (m^2)
Stockpiles runoff to Dam	87 670
Stockpiles Total	174 623

Different runoff ratios were used for the estimation of runoff (CM Eclectic (Pty) Limited, 2024):

- Quarries = 0.25
- Stockpiles = 0.1
- Irrigation Dam upstream catchment = 0.3
- Plant yard = 0.65

4.9 Resource class and river health receiving water quality objectives and reserve

On 22 April 2016, the Minister of Water and Sanitation, published the Classes and Resource Quality Objectives of water resources for catchments of the Upper Vaal WMA, as GN No. 468 in Government Gazette No. 39943. This notice provides a summary of the water resource classes and ecological categories for Integrated Units of Analyses (IUAs).

The water resource classes for Mokolo, Matlabas, Crocodile (West) and Marico catchments are listed in Table 4.6. according to the overall class per IUA.

IUAs are classified in terms of their extent of permissible utilisation and protection as either Class I: indicating high environmental protection and minimal utilisation; or Class II: indicating moderate protection and moderate utilisation; and Class III: indicating sustainable minimal protection and high utilisation (DWS, 2016).

The table below indicates the Resource Class set for the A21B Quaternary Catchment, within which Corobrik Midrand site is situated, as well as its Ecological Category.

Table 4.6: : Summary of Water Resource Classes per Integrated Unit of Analysis and Ecological Categories – Crocodile (West), Marico, Mokolo and Matlabas catchments (DWS, 2016)

IUA	Water Resource Class for IUA	Biophysical Node Name	Resource Unit	Quaternary Catchment	River Name	Ecological Category to be maintained
Upper Crocodile/ Hennops/ Hartebeespoort	III	HN2	1_3	A21B	Sesmylspruit with its' tributaries to	D

IUA	Water Resource Class for IUA	Biophysical Node Name	Resource Unit	Quaternary Catchment	River Name	Ecological Category to be maintained
					confluence with Hennops	

4.10 Surface water user survey

Corobrik Midrand is bounded by open land and ERWAT's Olifantsfontein Wastewater Treatment Works to the west, the Big Red Barn function venue in the north, the Clayville / Olifantsfontein industrial area to the south and agricultural activities in the east. The Olifantspruit is approximately 700 meters to the northwest. Most of the greater area has access to municipal connections (Groundwater Abstract (Pty) Ltd, 2024).

4.11 Sensitive Areas Survey

4.11.1 Flora

The property is covered by mature Blue Gum trees. Virtually no indigenous natural vegetation occurs on the property.

The natural vegetation in the area consists of grassveld, which may be classified as Bankenveld, a false grassveld ecosystem. The vegetation is heterogenous and occurs on a variety of soils, including quartzite, dolomite, chert and granite. The grassveld is generally very sour (CoroBrik (Pty) Ltd, 2013).

The enrichment and pollution of water has resulted in extensive reed beds developing along the river courses in the area. The natural vegetation is highly threatened by urbanisation, agriculture, mining activities and frequent burning (CoroBrik (Pty) Ltd, 2013).

4.11.2 Watercourses, dams and wetlands

There are no discernible natural watercourses or water bodies on the property (CoroBrik (Pty) Ltd, 2013).

4.12 Groundwater

All groundwater information was obtained from the May 2024, hydrogeology report compiled by (Groundwater Abstract (Pty) Ltd, 2024).

4.12.1 Geology

The property is underlain by dolomite and chert of the Chuniespoort Group, Transvaal Supergroup, with syenite sills and dykes occurring in the area (Figure 4:4). The dolomite is underlain by the Black Reef Formation (found along the western boundary of Midstream Estate) and overlain by the Pretoria Group (found to the east of the R21 road, and parallel to the R21) (Groundwater Abstract (Pty) Ltd, 2024).

The Malmani Subgroup dolomite, of the Chuniespoort Group, is subdivided in four formations, with the subdivision being based on chert content and type of algal structures. From a groundwater perspective, the chert content is the most important, with the chert-rich formations forming the main aquifers (DWAF, December 2006). The subdivisions include:

- Eccles – Chert-rich dolomite;
- Lyttleton – Dark, chert-free dolomite;
- Monte Christo – Light coloured, recrystallised dolomite with abundant chert; and
- Oaktree – Darker towards the top, with chocolate coloured weathering.

Dolomite owes its permeability mainly to secondary fissures such as faults, joints and bedding planes which enable circulating groundwater, thus promoting deep weathering of the dolomite, largely by carbonate solution or karstification. The weathering residue is a brown clay / wad, with chert rubble and boulders (Groundwater Abstract (Pty) Ltd, 2024).

The prominent, near vertical dolerite dyke swarms associated with the Pilanesberg Complex intruded into the Malmani Group rocks. The Pilanesberg dyke swarm is the oldest, together with a younger East Rand dyke swarm. A third group of dykes, with an east-west direction are of post-Karoo age. These dykes are believed to be vertical or near-vertical mafic intrusions (Water Research Commission, March 2014). The dykes are generally considered to be (mostly) impermeable or have a low permeability, and therefor act as barriers to groundwater flow. Close to surface these dykes usually weathered and allow groundwater flow across dykes does occur, while at depth the dykes are essentially impermeable. Bredenkamp (2002) is of the opinion that fracturing at depth due to tectonic activity does occur thereby allowing some trans-compartmental flow, and not necessarily creating a no-flow boundary. The main dykes strike in an approximate north-south and east-west direction (Figure 5) (Water Research Commission, March 2014) (Groundwater Abstract (Pty) Ltd, 2024).

Regional syenite dykes and sills, together with the dolerite dykes compartmentalise the dolomitic areas. The Corobrik Midrand property is associated with the Doornkloof West dolomitic compartment – quarry and plant areas, as well as with the Sterkfontein West dolomitic compartment – southern section of the property, including the borehole locality. The Doornkloof West dolomitic compartment covers an area of approximately 42.4 km^2 and the Sterkfontein West dolomitic compartment covers an area of approximately 45.9 km^2 (Water Geosciences Consulting, June 2009). The Sterkfontein dyke forms the boundary between the two dolomitic compartments and thus crosses the property in an

east-west direction. The Pretoria dyke is approximately 1 km towards the east. The Pretoria dyke is an extensive syenite dyke and extends from Pretoria to Tembisa in the south. These regional dykes create separate groundwater compartments in the dolomite that often influence groundwater movement and often act as barriers, resulting in different responses to groundwater recharge, abstraction or contamination impacts (Water Research Commission, March 2014) (Groundwater Abstract (Pty) Ltd, 2024).

The dolomite dips at approximately 20 degrees to the east. This is due largely to the emplacement of the Johannesburg basement granite-gneiss dome, as well as the intrusion of the Bushveld Igneous Complex (Trollip Nicole Yvette-Marie Ghislaine, August 2006) (Groundwater Abstract (Pty) Ltd, 2024).

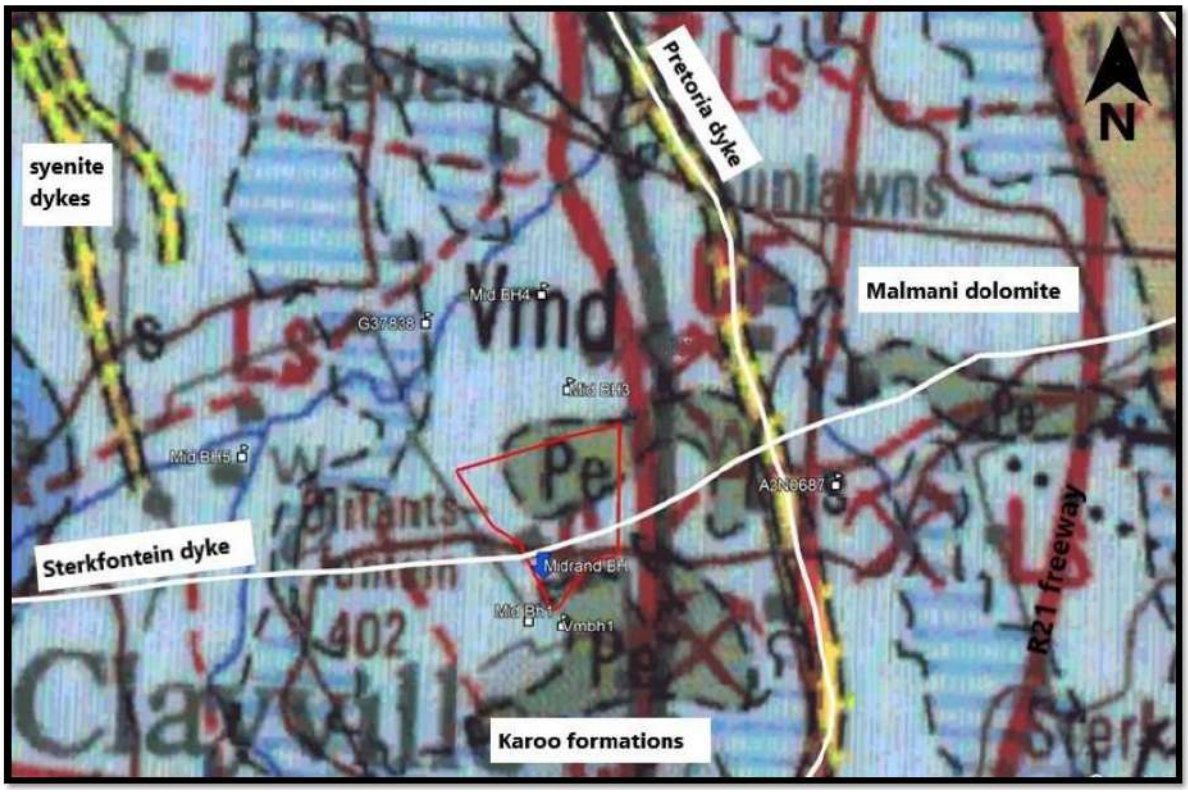


Figure 4:4: Geology Map (Groundwater Abstract (Pty) Ltd, 2024)

4.13 Aquifer Characterisation

Aquifer characterisation is done based on the information presented, and guidelines and maps provided by the DWS (Groundwater Abstract (Pty) Ltd, 2024).

4.13.1 Groundwater Vulnerability

Groundwater vulnerability indicates the tendency or likelihood for contamination to reach a specified position in the groundwater system after introduction at some location above the uppermost aquifer.

Based on the aquifer vulnerability map published by the DWS, in July 2013 the dolomite is classified as a vulnerable aquifer, which is vulnerable to pollutants except those strongly absorbed or readily transformed in many pollution scenarios (DWS, July 2013) (Groundwater Abstract (Pty) Ltd, 2024).

Dolomite aquifers are particularly vulnerable to surface pollution due to the relatively rapid rate of groundwater flow, often via fissures where little retardation of pollutants can occur (Barnard, 2000). In addition, sinkholes and other features in karstic environments provide direct routes for surface water into the subsurface (i.e., bypassing the soil zone) (Groundwater Abstract (Pty) Ltd, 2024).

4.13.2 Aquifer Susceptibility

Aquifer susceptibility is a qualitative measure of the relative ease with which a groundwater body can potentially be contaminated by anthropogenic activities and includes both aquifer vulnerability and the relative importance of the aquifer in terms of its classification. Based on the classification above the dolomite highly susceptible to contamination (Groundwater Abstract (Pty) Ltd, 2024).

4.13.3 Aquifer Classification

Based on the aquifer classification map published by the DWS in August 2012 the aquifer classification system defines the dolomite in the Centurion area as a major aquifer region, which is a high-yielding system of good water quality (Groundwater Abstract (Pty) Ltd, 2024).

4.14 Groundwater Quality

Three (3) groundwater samples were collected from the sampling points indicated in Figure 4:5 during the 2024 hydrocensus conducted by (Groundwater Abstract (Pty) Ltd, 2024).

Samples were taken using single valve, decontaminated bailers or from pump discharge lines, or water supply taps in the case of boreholes which were equipped and in use. Sterilized 500 millilitre (ml), plus 100 ml sample bottles were used and filled to the top. Samples were stored in a cooler box until delivered to Aquatico for analysis; Aquatico is a SANAS accredited laboratory (Groundwater Abstract (Pty) Ltd, 2024).

The water samples were analysed for basic inorganic parameters and the results were compared against the SANS 241:2015 Drinking Water Standards (Table 4.7).

The water sampled from the three boreholes is of acceptable quality, based on the parameters used in the laboratory analysis and the results presented in Table 4.7. No health impact exceedances were noted, based on the health drinking water guideline limits.

The following conclusions were drawn in terms of the sampled water qualities (Table 4.7):

- Aesthetic / Operational effects:

- Total Hardness – an elevated total hardness level was measured for the Corobrik Midrand borehole (493 mg/L) and for the borehole at Big Red Barn Venue (528mg/L). Water hardness is influenced by the presence of calcium and magnesium salts. Other metals such as strontium, iron, aluminium, zinc and manganese may occasionally contribute to the hardness of water, but the calcium and magnesium hardness usually predominates. Temporary hardness is due to the presence of bicarbonates of calcium and magnesium and can be removed by boiling, whereas permanent hardness is attributed to other salts such as sulphate and chloride salts, which cannot be removed by boiling. Excessive hardness of water can give rise to scaling in plumbing and household heating appliances and hence has adverse economic implications. It also poses a nuisance in personal hygiene. Excessive softness may lead to aggressive and corrosive water qualities which are of concern where copper plumbing installations are used. Water hardness depends on whether it is caused by bicarbonate salts or nonbicarbonate salts, such as chloride, sulphate and nitrate. Bicarbonate salts of calcium and magnesium precipitate on heating and cause scaling in hot water systems and appliances, whereas the non-bicarbonate salts do not precipitate on heating.
- Turbidity – The turbidity value exceeded the aesthetic / operational limits for the borehole at Norcros SA (borehole Mid BH1). The Turbidity value of 4.25 is above the aesthetic guideline limit of 1. The borehole is in use and fine material is possibly entering the borehole through the casing slots (if any) or from below the cased zone.

Based on the SANS241 drinking water guideline and on the sampled borehole water results, the water from the sampled sites is fit for human consumption, but treatment is recommended before use as domestic water (Groundwater Abstract (Pty) Ltd, 2024).

The DWS uses a water classification system where the water is defined in different classes based on a fitness for use classification (Table 4.8). The element concentrations are like the SANS guideline limits, but with the DWS system a classification is assigned to the water sample, e.g., Class 2 water (Groundwater Abstract (Pty) Ltd, 2024).

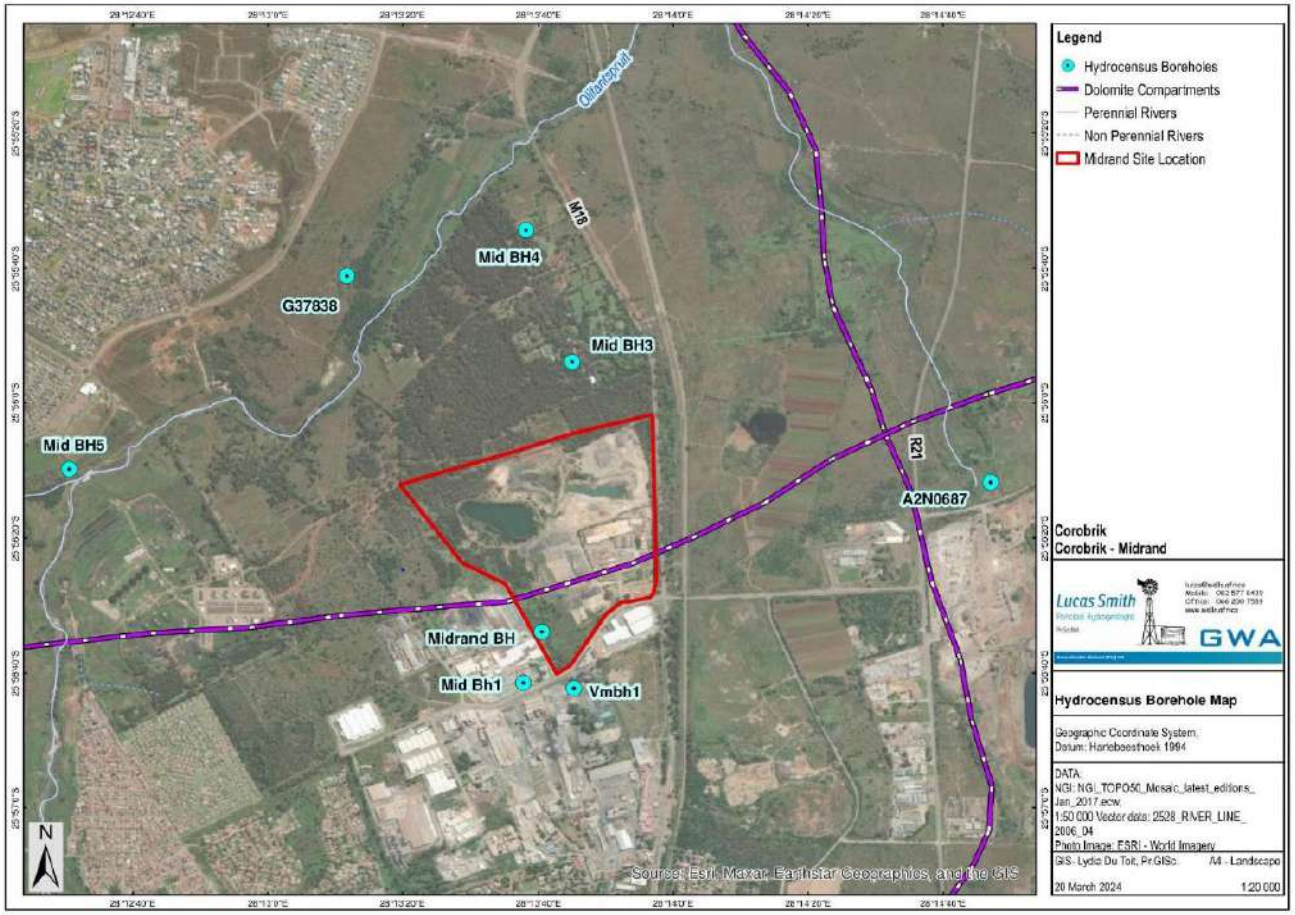


Figure 4:5: Hydrocensus borehole locality map (Groundwater Abstract (Pty) Ltd, 2024)

Table 4.7: Hydrocensus Water Quality Data (Groundwater Abstract (Pty) Ltd, 2024)

	DWS Drinking Water Guideline Limits					ANS241:2015 Drinking Water Standard Limits		Corobrik Midrand BH	Mid BH1	Mid BH3
	Class 0	Class 1	Class 2	Class 3	Class 4	Aesthetic effects	Chronic health effects			
pH	*5-9.5*	**4.5-5 or 9.5-10**	4-4.5 or 10-10.5	3-4 or 10.5-11	<3 or >11	≥5 to ≤9.7		6.97	8.41	7.50
Electrical Conductivity	*<70*	**70-150**	150-370	370-520	>520	Aesthetic ≤170		**92.7**	36.3	**107**
TDS	*<450*	**450-1000**	1000-2400	2400-3400	>3400	Aesthetic ≤1200		**594**	245	**684**
Turbidity	*0 - 1*	**1 - 5**	5 - 10	>10		Operational ≤ 1	Aesthetic ≤ 5	0.5	**4.25**	0.271
Aluminium		**0 - 0,15**	0,15 - 0,5	>0,5		Operational ≤ 0,30		<0.002	<0.002	<0.002
Calcium	*<80*	**80-150**	150-300	>300				**98.1**	43.4	**104**
Copper	*<1*	**1-1,3**	1,3-2	2-15	>15		Chronic health ≤2	<0.002	0.004	<0.002
Iron	*<0,5*	**0,5-1**	1-5	5-10	>10	Aesthetic ≤0,3	Chronic health ≤2	<0.004	<0.004	<0.004
Magnesium	*<70*	**70-100**	100-200	200-400	>400			60.2	18.9	65.4
Manganese	*<0,1*	**0,1-0,4**	0,4-4	4-10	>10	Aesthetic ≤0,1	Chronic health ≤0,4	<0.001	0.005	<0.001
Nickel							Chronic health ≤0.07	<0.002	<0.002	<0.002
Zinc	*0 - 5*	**5 - 10**	10 - 50	50 - 700	>700	Aesthetic ≤5		<0.002	2.51	<0.002
Chromium	*0 - 0,05*		0,05 - 1	1 - 5	>5		Chronic health ≤0,05	<0.003	<0.003	<0.003
Cadmium							Chronic health ≤0.003	<0.002	<0.002	<0.002
Lead							Chronic health ≤0.01	<0.004	<0.004	<0.004
Potassium	*<25*	**25-50**	50-100	100-500	>500			0.914	3.67	2.24

	DWS Drinking Water Guideline Limits					ANS241:2015 Drinking Water Standard Limits		Corobrik Midrand BH	Mid BH1	Mid BH3
	Class 0	Class 1	Class 2	Class 3	Class 4	Aesthetic effects	Chronic health effects			
Sodium	*<100*	**100-200**	200-400	400-1000	>1000	Aesthetic ≤200		23.2	16.7	35.2
Chloride	*<100*	**100-200**	200-600	600-1200	>1200	Aesthetic ≤300		37.3	17.4	72.8
Fluoride	*<0,7*	**0,7-1**	1-1,5	1,5-3,5	>3,5		Chronic health ≤1,5	<0.263	**0.979**	<0.263
Ammonium (NH_4) as N	*0 - 1*	**1 - 2**	2 - 10	>10		Aesthetic ≤1,5		0.124	0.27	0.072
Nitrate	*<6*	**6 - 10**	10 - 20	20-40	>40		Acute health ≤11	**8.73**	1.04	3.69
Total oxidised nitrogen as N								8.73	1.04	3.69
Sulphate	*<200*	**200-400**	400-600	600-1000	>1000	Aesthetic ≤250	Acute health ≤500	115	32.4	**208**
Total Alkalinity								299	148	295
Total Hardness	<200	200-300	300-600	>600		120–180 mg/l, hard // more than 180 mg/l, very hard	493	186	528	
Total organic carbon							Chronic health ≤10	1.53	1.70	1.06
Langelier Saturation Index	**A positive Langelier index indicates scale-forming tendency and a negative Langelier index indicates a scale-dissolving tendency, with the possibility of corrosion**							0.18	0.29	0.77
Total Coliform Bacteria		0 - 5	5 - 100	>100		≤ 10		6	<1	1
E. coli							Not detected	<1	<1	<1
DWS Classification								2	1	2

- *Red cells indicate concentrations exceeding the SANS health guideline limits.*
- *Yellow cells indicate concentrations exceeding the SANS drinking water standard limits, but only has an operational / aesthetic impact.*

Table 4.8: DWS water quality "fitness for use" classes currently used in South Africa (Groundwater Abstract (Pty) Ltd, 2024)

Water use	Categorization	Description
Domestic	Class 0	Water of ideal quality, which has no health or aesthetic effects, and which is suitable for lifetime use without negative effects. No treatment necessary.
	Class 1	Water of good quality, suitable for lifetime use with few health effects. Aesthetic effects may be apparent. Home treatment will usually be sufficient.
	Class 2	Water which poses a definite risk of health effects, following long term or lifetime use. However, following short-term or emergency use, health effects are uncommon and unusual. Treatment will be required to render the water fit for continued use.
	Class 3	Water is unsuitable for use, especially by children and the elderly, as health effects are common. Conventional or advanced treatment necessary

Based on the DWS classification system (Table 4.8) the sampled water is categorized as (Groundwater Abstract (Pty) Ltd, 2024):

- Corobrik Midrand BH – Class 2 water (water is unsuitable for use) due to the Total Hardness value. Thereafter, Class 1 (good quality) due to the Calcium and Nitrate concentrations. The rest of the parameters fall in the Class O range (ideal water quality range).
- Mid BH1 – Class 1 water (good quality) due to the Fluoride and Turbidity concentrations; and then Class 0 for the rest of the parameters.
- Mid BH3 – Class 2 water (water is unsuitable for use) due to the Total Hardness value. Thereafter, Class 1 due to the Calcium and Sulphate concentrations. The rest of the parameters fall in the Class O range (ideal water quality range).

The three boreholes listed above are in daily use. Considering the parameters tested for and the results received it does not appear as if there is any contamination of the sampled groundwater environments, e.g., from agricultural or industrial practices, or from the WWTW (Groundwater Abstract (Pty) Ltd, 2024).

4.15 Hydrocensus

A hydrocensus was conducted across the Corobrik Midrand study area during February 2024 by (Groundwater Abstract (Pty) Ltd, 2024). The survey included Corobrik Midrand and neighbouring properties and concentrated on identifying existing boreholes to enhance the knowledge of the groundwater systems and current groundwater use.

Corobrik Midrand is bounded by open land and ERWAT's Olifantsfontein Wastewater Treatment Works to the west, the Big Red Barn function venue in the north, the Clayville / Olifantsfontein industrial area to the south and agricultural activities in the east. The Olifantspruit is approximately 700 meters to the northwest. Most of the greater area has access to municipal connections.

During the hydrocensus the following information was collected for each site:

- Borehole position (X, Y, Z-coordinates);
- Information relating to equipment installed;
- Borehole yield – if known;
- Groundwater level, if possible; and
- Current use.

A summary of the hydrocensus information is available in Table 4.9. All coordinates were taken with a hand-held Garmin GPS (Global Positioning System) (WGS84).

During the February 2024 hydrocensus 8 boreholes were identified Table 4.9, with only 2 boreholes in a 1-kilometre radius from the Corobrik Midrand BH – borehole Mid BH1 and VMBH1. The furthest

borehole (of the 8 boreholes) is borehole Mid BH5, at Midstream Indoor Sport Arena and golf driving range (approximately 2.1 km to the northwest) (Figure 4:5).

- Corobrik Midrand BH, Mid BH1 and VMBH1 appear to be in the same dolomitic compartment – Sterkfontein West dolomitic compartment. Borehole A2N0687 is possibly in the Sterkfontein East dolomitic compartment. The rest of the boreholes identified during the hydrocensus are in the Doornkloof West dolomitic compartment.
- Only 5 of the 8 boreholes are equipped and in use. The remaining boreholes are old, open boreholes, or used for monitoring purposes – historically used by the DWS as groundwater monitoring boreholes. The boreholes not in use are VMBH1, A2N0687 and G37838.
- Mid BH3 and Mid BH4 are at The Big Red Barn venue, and both are in use. Boreholes Mid BH3 and Mid BH4 are the only water supply source available to the landowner and are between 1.3 km and 1.8 km north of the Corobrik Midrand BH, but they appear to be in a different dolomitic compartment compared to the Corobrik Midrand BH.
- Borehole Mid BH5 is utilised by the Midstream residential area and is approximately 2.1 km northwest of the Corobrik Midrand BH. The borehole is located at the Midstream Indoor Sport Arena and is located behind the golf driving range, close to the Olifantspruit and appears to be in a different dolomitic compartment compared to the Corobrik Midrand BH.
- The Olifantspruit Wastewater Treatment Works (WWTW) is approximately 900 meters west (downstream) from the Corobrik Midrand BH. The WWTW has three monitoring boreholes, but they are potentially not in the same dolomitic compartment as the Corobrik Midrand BH. The exact borehole localities are not known.

Groundwater level measurements were possible from 6 of the 8 boreholes; the rest are blocked or sealed for security reasons (Table 4.9). Groundwater levels were measured by using a dip meter to measure the distance from the mouth of the borehole (borehole collar elevation) to the groundwater table depth in the borehole. The height of the borehole collar was subtracted from the measured water level to define a water level below surface (measured in mbgl) (Table 4.9). The mbgl measurement was subtracted from the borehole's surface elevation to define the groundwater table elevation in metres above mean sea level (mamsl), for all borehole measurements (Groundwater Abstract (Pty) Ltd, 2024).

The local groundwater level below surface varied between a maximum depth of 14.71 mbgl (borehole G37838), and a minimum of 2.23 mbgl for borehole A2N0687, just north of the Olifantsfontein Dolomite Mine (Table 4.9). If the groundwater levels are viewed as an elevation above sea level, then the highest groundwater elevations can be found at borehole Mid BH1 (1496.97 mamsl) (east of Corobrik). The Corobrik Midrand borehole plus the two neighbouring boreholes present the highest groundwater elevations, as measured during the 2024 hydrocensus. The lowest water table

elevations are at borehole G37838 in the north (approximately 1458.46 mamsl). The regional groundwater flow in the area appears to be in a northerly direction (Groundwater Abstract (Pty) Ltd, 2024).

The correlation between topography and groundwater elevation is very good (approximately 97%), as shown in Figure 4:6,considering the hydrocensus boreholes. This means that the groundwater elevations correlate well with the surface elevations (topography), indicating that on a local scale groundwater flow seems to follow the surface topography (Groundwater Abstract (Pty) Ltd, 2024).

If the groundwater elevation of borehole A2N0687 is included in the analysis then the correlation between topography and groundwater elevation is slightly less, approximately 92%, which is still a good fit, but it also indicates that borehole A2N0687 is in a different hydrogeological unit / dolomitic compartment (Groundwater Abstract (Pty) Ltd, 2024).

Table 4.9: Hydrocensus Summary (Groundwater Abstract (Pty) Ltd, 2024)

Site ID	Lat (WGS84)	Long	Elev (mamsl)	Water depth (mbgl)	Collar height (m)	Water elevation (mamsl)	BH depth (m)	Yield (L/hr)
Midrand BH	25°56'33.87" S	28°13'40.49" E	1502	6,80	0,10	1495,30	20,60	+100000
Mid BH1	25°56'41.45" S	28°13'37.72" E	1509	12,43	0,40	1496,97	---	---
Mid BH3	25°55'53.89" S	28°13'44.98" E	1501	blocked at 30m	0,00	---	--	--
Mid BH4	25°55'34.38" S	28°13'38.13" E	1471	sealed	0,06	---	--	--
Mid BH5	25°56'09.82" S	28°12'30.54" E	1475	8,55	0,35	1466,80	--	--
VMBH1	25°56'42.25" S	28°13'45.21" E	1507	12,81	0,57	1494,76	30,00	---

Site ID	Lat (WGS84)	Long	Elev (mamsl)	Water depth (mbgl)	Collar height (m)	Water elevation (mamsl)	BH depth (m)	Yield (L/hr)
A2N0687	25°56'11.72" S	28°14'47.03" E	1485	2,23	0,30	1483,07	--	--
G37838	25°55'41.16" S	28°13'11.74" E	1473	14,71	0,17	1458,46	38,00	140000

New ID	Casing diameter (mm)	Sampled	Use	Owner	Note
Midrand BH	230	Submersible	Plant	Corobrik	Corobrik Midrand borehole
Mid BH1	165	Submersible	Plant And Domestic	Norcros SA	Two boreholes next to each other. Only use 1 at a time.
Mid BH3	sealed	Submersible	Domestic / Farm	Dominique Cullinan	Borehole near houses
Mid BH4	165	Submersible	Domestic / Farm		Borehole at bottom near AcroBranch
Mid BH5	165	Submersible	Domestic / Landscaping	Midstream Electrical Services	Used by Midstream area incl Sports Centre. BH behind golf driving range
VMBH1	100	None	Monitoring	Vesuvius	Groundwater monitoring borehole
A2N0687	260	None	Not In Use	M&T Development	Old DWS borehole

G37838	265	Submersible	Domestic	M&T Development	Old Botha Borehole. Not currently in use.

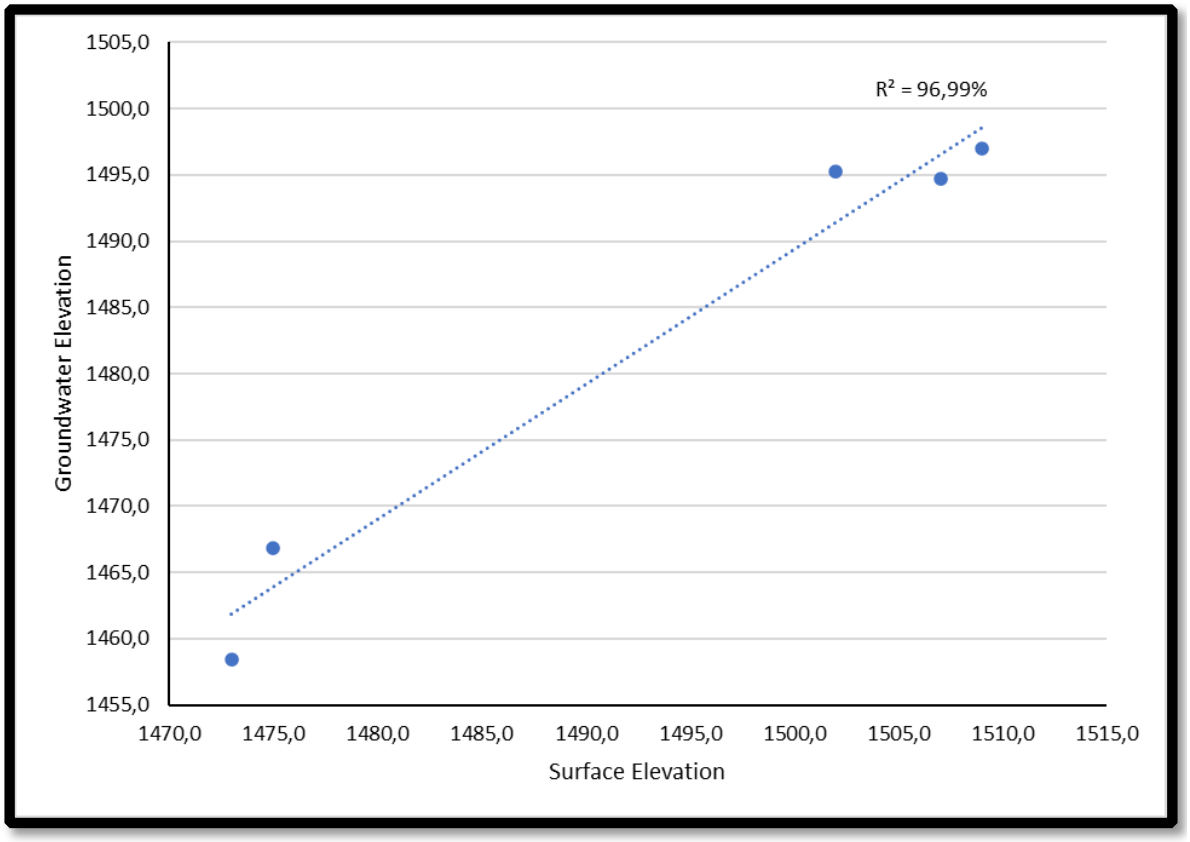


Figure 4:6: Correlation between surface and groundwater elevations (Groundwater Abstract (Pty) Ltd, 2024)

The groundwater level monitoring information supplied by ERWAT Olifantsfontein WWTW indicates three boreholes on site, with groundwater levels varying between 7.5 m and 11.0 m below surface. This is like the levels measured at the Corobrik Midrand BH, Mid BH1 and VMBH1. Unfortunately, the exact locality of the three boreholes were not provided at the time of writing this report, to include the 3 boreholes in the water elevation assessment (Groundwater Abstract (Pty) Ltd, 2024).

Thus, on a localised scale the groundwater flow is towards the Olifantspruit (either west or northwest), but regionally it is in a northerly direction. The 8 boreholes identified are potentially in 3 different dolomitic compartments, i.e., Doornkloof West, Sterkfontein West and Sterkfontein East (Groundwater Abstract (Pty) Ltd, 2024).

The water elevation for the Olifantspruit is roughly 1465 to 1469 mamsl, directly northwest of Corobrik Midrand. If the groundwater elevations for some of boreholes closest to the Olifantspruit is considered (Groundwater Abstract (Pty) Ltd, 2024):

- Corobrik Midrand BH – groundwater elevation of approximately 1495 mamsl – much higher compared to the stream level.
- For Mid BH5 the groundwater level is similar compared to the nearby stream elevation, therefor there will be groundwater – surface water interaction.

The groundwater elevations versus stream elevation are however very similar. Site-specific, long-term monitoring is required, with accurately surveyed coordinates and borehole collar heights, to accurately assess and monitor the surface water groundwater interaction.

4.16 Potential Pollution Source Identification

Based on the results of the site investigations, groundwater abstraction for domestic and irrigation use, discharges from sewage systems, industrial waste spills / discharges, and herbicides and pesticides from farming activities, plus hydrocarbon pollution are all potential impacts to the local groundwater environment. With the addition of quarry mining activities, cumulative impacts include (CM Eclectic (Pty) Limited, 2024):

- drop in the local groundwater level and possible drying up of surrounding boreholes;
- deterioration of the current groundwater quality;
- the backfilled opencast will have a very high hydraulic conductivity, accelerating the movement of any plume in the area;
- changes in turbidity levels in groundwater due to quarry / backfill operations; and
- interruption of groundwater conduit flow paths by rock / clay removal.

These impacts are typical for mining operations and should be managed and mitigated where required.

4.17 Groundwater Model

At the time of compilation of this IWWMP, no groundwater model had been developed for Corobrik Midrand.

4.18 Socio-economic Environment

The City of Ekurhuleni (CoE) one of the three metropolitan municipalities located in Gauteng Province occupies 1975km² of the land area in the province. It represents the industrial heartland of South Africa and is home to the OR Tambo International Airport. The amalgamation of two existing regional

entities, namely Kyalami Metropolitan and the Eastern Gauteng Services Council served as the beginning of the now large City that accommodates a population of 3 379 104 inhabitants. The City is characterized by its multi-nodal spatial structure with a total of nine (9) towns and seventeen (17) townships. There are significant concentrations of historically disadvantaged communities situated on the outskirts of the main urban areas, which represent about 62% of the CoE population (City of Ekurhuleni, 2024).

Demographic Analysis

The CoE population has grown exponentially by 6% from an estimated 3 379 104 in 2016 to 4 066 691 in 2022 with a percentage change of 27,94%; its current population representing approximately 6% of the total population of South Africa (Stats SA: 2022). It is projected that the population of the city will grow at a slower rate at less than 2% resulting in an expected over 5 million residents by 2030 and 8,8million residents by 2050. An important feature of this growth in the population is the net migration into the city (City of Ekurhuleni, 2024).

The table below (Table 4.10) illustrates the population by gender for the four (4) census periods and the 2016 Community Survey with a gender split. According to the below, for all Census years including the Community Survey 2016, males have accounted for 51% of the population whilst females accounted for 49%. According to IHS Markit Regional eXplorer version 2340, the same pattern where the population distribution is 51% males and 49% of females except in Kempton Park, Alberton and Edenvale where women constitute between 51% and 53% respectively is confirmed.

Table 4.10: Ekurhuleni population by gender: Cogta Ekurhuleni Municipal Overview Report (City of Ekurhuleni, 2024)

Population by Gender	**1996**	**2001**	**2011**	**2016**	**2022**
Males	1 033 316	1 254 741	1 627 504	1 736 739	2 077 352
Females	992 506	1 227 108	1 550 489	1 642 343	1 989 339
Population density (persons/ha)	8.68	12.56	16.08	17.10	20.6
Total Population	2 025 821	2 481 850	3 177 993	3 379 082	4 066 691

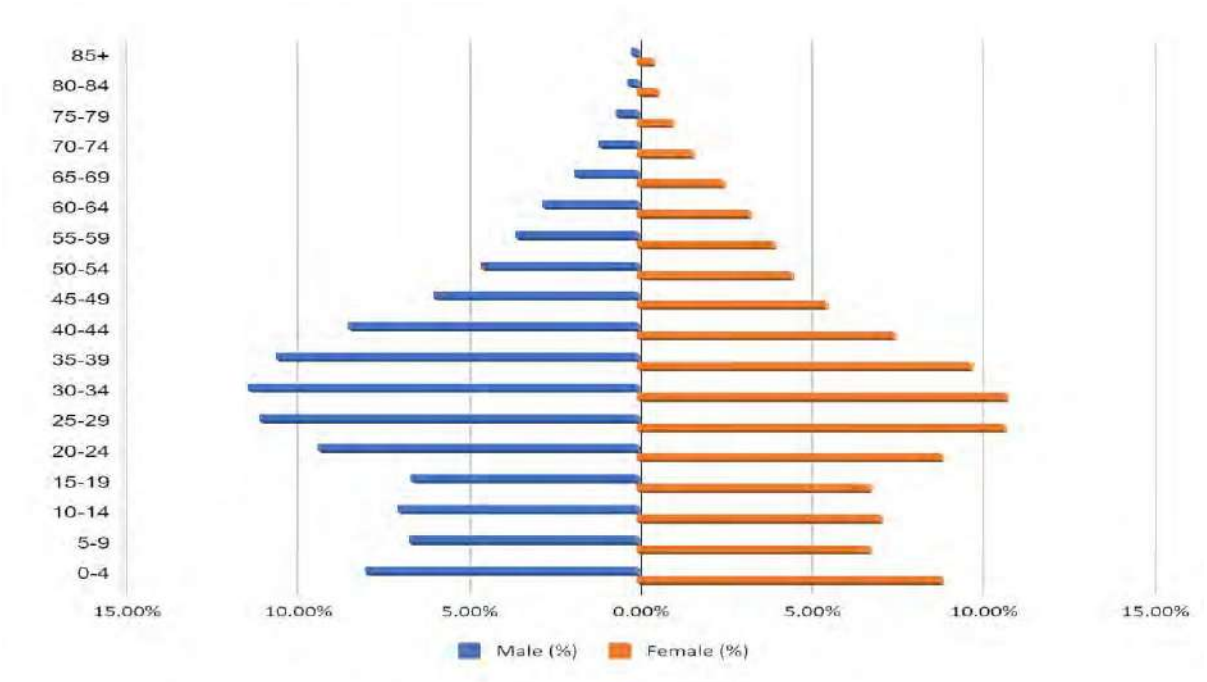


Figure 4:7: Sex and Age Distribution-Stats SA Census 2022 (City of Ekurhuleni, 2024)

Approximately 66% of the population in the city were of working age (between the ages of 18 and 64) whilst 53% of these were between the ages of 20 and 49. The median age of the city was 30 years which was slightly higher than that of Gauteng (29 years) and 20% higher than that of South Africa (25 years). The city has a relatively young population, which is about the same rate as that of Gauteng, (Community Survey 2016) (City of Ekurhuleni, 2024).

Black Africans represent 85% of the population of Ekurhuleni as per the city's population demographic distribution illustrated in the figure below, followed by the Whites at 10% (which is 4% less than in 2011 Census), the Coloureds at 3% and the Indians at 2%. There is an additional 0,2% (other) who do not identify according to the groups categorized (Figure 4:8).

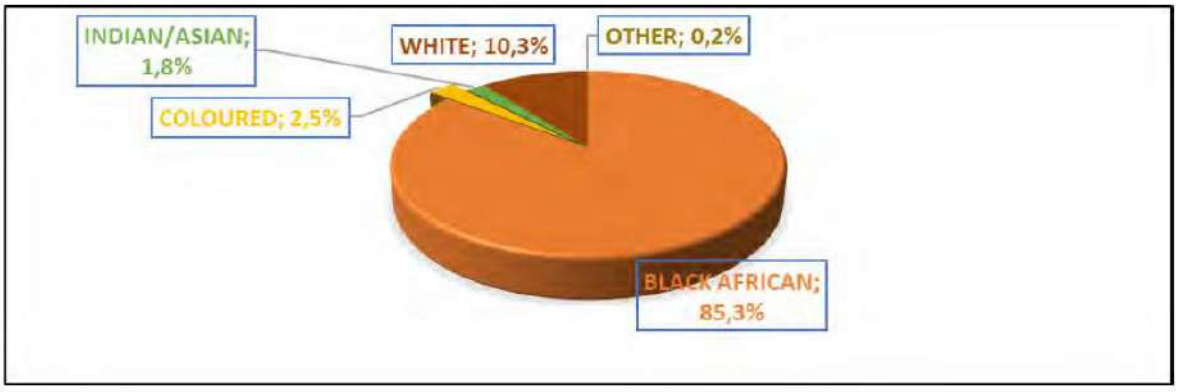


Figure 4:8: Population group -Stats SA Census 2022 (City of Ekurhuleni, 2024)

Economic Analysis

The City of Ekurhuleni (CoE) is regarded as a major economic and social role-player in South Africa by means of its strong industrial characteristics as well its contribution to the national economy. According to the 2018 figures in the diagram below; the average economic growth rate over the past 20 years was 3.95%, with the most significant contribution to the total value of the local economy coming from business services (23.7%) and manufacturing (18.2%) sectors. Agriculture (0.4%), mining (2.4%) and utilities (1.9%) are the smallest contributing sectors. In terms of the sectors that have shown the worst growth over this period, mining (-0.6%) has performed the worst, with utilities (0.105) and agriculture (0.6%) also showing small growth. Construction and business services have shown the strongest growth out of all the sectors, with an average growth rate of 11.1% and 8.7%, respectively. Other sectors that have shown growth above the overall average include trade (6%), transport (6%) and government services (4.9%) (City of Ekurhuleni, 2024).

The dominance of business services and manufacturing are clear; the extent of GVA per sector is shown in the figure below. However, the vulnerability of the manufacturing sector to the global economic crisis of 2008 is also illustrated, and the sector is still struggling and has not come close to the levels of pre-2008 (City of Ekurhuleni, 2024).

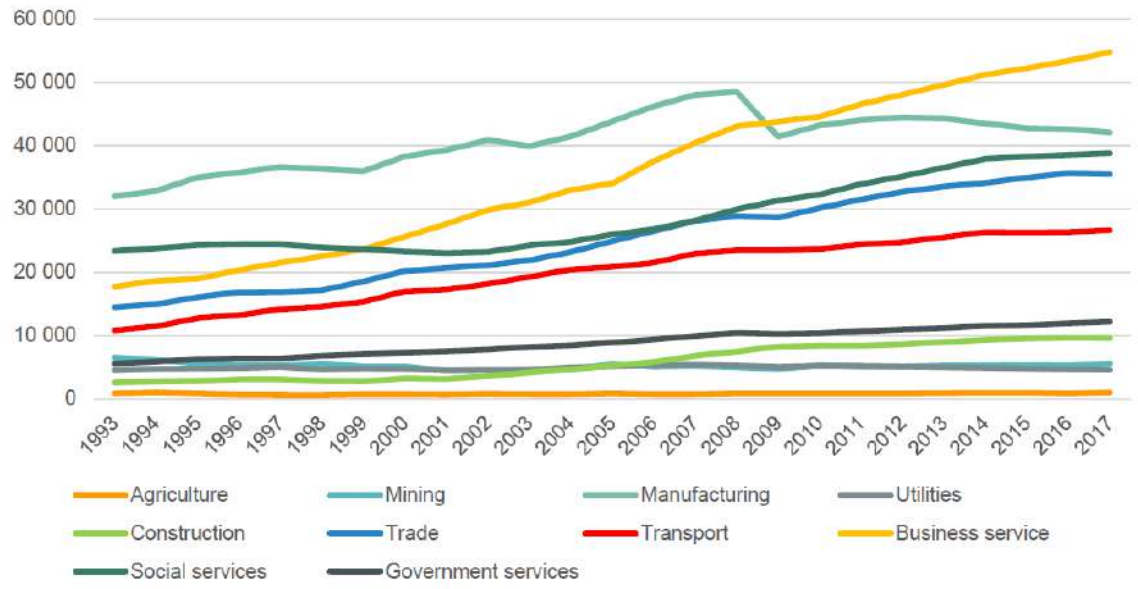


Figure 4:9: GVA at constant prices 2010 [R million]- Quantec 2018 (City of Ekurhuleni, 2024)

Gross Domestic Product

With a Gross Domestic Product (GDP) of R 334 billion in 2018 (up from R 160 billion in 2008), the CoE contributed 19.67% to the Gauteng GDP of R1.7 trillion in 2018 increasing in the share of the Gauteng from 19.57% in 2008. The CoE contributed 6.85% to the GDP of South Africa, which had R 4.87 trillion in 2018 (measured in current prices). In 2018, the CoE achieved an annual economic growth rate of 1.09% which is close to the Gauteng one of 1.12%, and higher than South Africa, whose growth rate was 0.79%. In 2018 the CoE ranked third relative to other regional economies to Gauteng Provincial GDP. This ranking remained the same since 2008 with its share, in 2018 (19.7%) comparable to what it was in 2008 (19.6%). CoE is projected to grow at an average annual rate of 1.75% from 2018 to 2023. Gauteng and South Africa are projected to grow at 1.72% and 1.60% respectively. The economic growth in Ekurhuleni peaked in 2010 at 5.65 With a Gross Domestic Product (GDP) of R 331 billion in 2019 (up from R 160 billion in 2008), which dropped significantly due to the impact of Covid in 2020. The CoE contributed 19.7% to the Gauteng GDP and 6.91% to the GDP of South Africa, which had R 5,9 trillion in 2022 (measured in current prices). In 2022, the CoE achieved an annual economic growth rate of 2.9% which is higher than the Gauteng one of 2,7%, and that of South Africa, whose growth rate was 2.0%. In 2021 the CoE ranked higher than other regional economies to Gauteng Provincial GDP. This ranking remained high for all the years except 2020 where the growth rate was sitting at -5.8%. The economic growth in Ekurhuleni peaked in 2021 at 5.1% (City of Ekurhuleni, 2024).

Table 4.11: Gross Domestic Product (GDP)-CoE, Gauteng and National Total, 2012-2022 [Annual percentage change, constant prices 2010] (City of Ekurhuleni, 2024)

Year	Ekurhuleni	Gauteng	National Total
2012	2,8%	2,6%	2,4%
2013	2,7%	2,8%	2,5%
2014	1,3%	1,7%	1,4%
2015	1,5%	1,2%	1,3%
2016	1,3%	1,1%	0,7%
2017	1,2%	1,1%	1,2%
2018	2,1%	1,8%	1,5%
2019	0,8%	0,7%	0,3%
2020	-5,8%	-5,8%	-6,3%
2021	5,1%	4,5%	4,9%
2022	2,9%	2,7%	2,0%
Average Annual Growth			
2012-2022	1,29%	1,14%	0,91%

CoE GVA Growth by Sector

For the period 2012 to 2022, the agricultural sector had the highest annual growth rate in Ekurhuleni at 5.38% followed by the finance sector at 2.83% and community services at 2.36%. The mining sector had the lowest average annual growth of -3.41% followed by construction at -2.16% and -2.02% electricity sector. Overall growth existed for all the industries in 2022 with an annual growth rate of 1.26% (City of Ekurhuleni, 2024).

The 2021 3-sector economic model distribution shows that the tertiary sector contributed the most to the GVA within the CoE at 71% which is very similar to the national economy of 69%. The secondary sector contributed 27% (ranking second), while the primary sector contributed

the least at 2% (City of Ekurhuleni, 2024)..

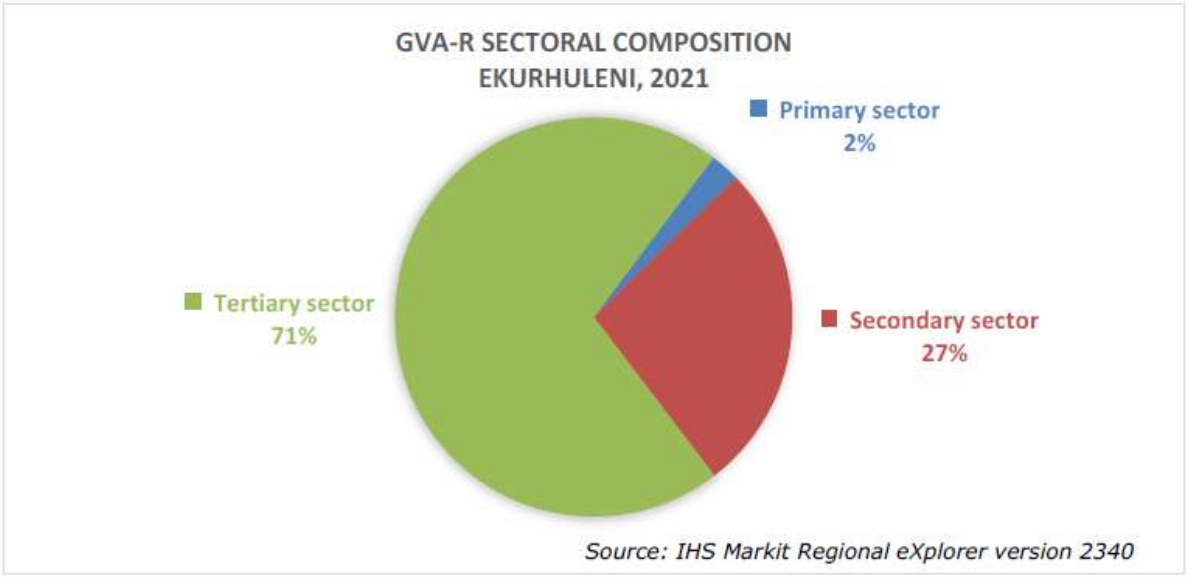


Figure 4:10: GVA by aggregate economic sector CoE-2021 [percentage] (City of Ekurhuleni, 2024)

The primary sector consists of two broad economic sectors namely the mining and the agricultural sector. Between 2012 and 2022, the agriculture sector experienced the highest growth in 2022 with an average growth rate of 1.5%. The mining sector reached its highest point of growth of 4.4% in 2017. Both the agriculture and mining sectors are generally characterized by volatility in growth over the period.

The secondary sector consists of three (3) broad economic sectors namely the manufacturing, electricity and the construction sector. During the period under review (between the year 2012 and year 2022), the sectors experienced the highest growth in various years: the manufacturing sector (0.06, 2021), construction sector (0.05, 2021) and electricity (0.01, 2013). The sectors were also hard hit as a result of the effects of the global pandemic (Covid-2019) in 2020; all experienced their lowest

recorded growth. The Figure below (Figure 4:11) shows the figures for the manufacturing sector (0.11, 2020), construction sector (0.17, 2020) whilst electricity was (0.05, 2020).

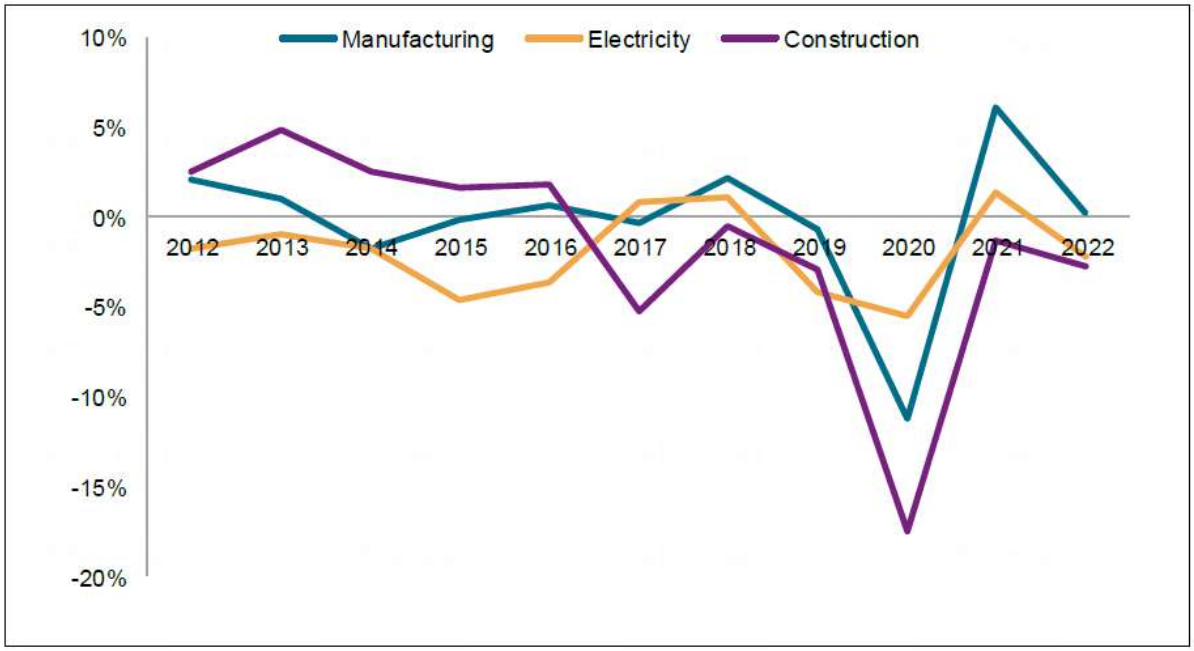


Figure 4:11: Secondary sector 2012-2022 (annual percentage) (City of Ekurhuleni, 2024)

The tertiary sector consists of four (4) broad economic sectors namely the trade, transport, finance and the community services sector (Figure 4:12). The trade sector experienced the highest growth in 2021 at 6.0%, the transport sector in 2022 at 9%, and the finance sector in 2022 at 4%. The Trade sector hit the lowest growth rate in 2020 at -11%. The community services sector experienced its highest growth in 2021 at 4.0% and the lowest growth rate in 2020 at -13.7% was for transport (City of Ekurhuleni, 2024).

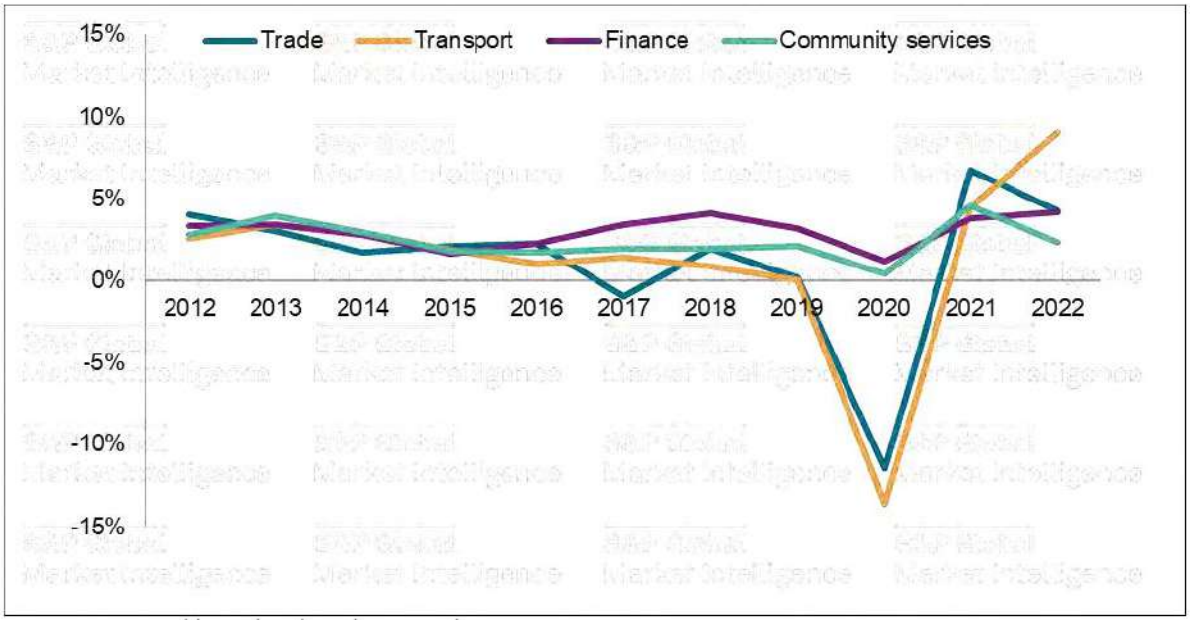


Figure 4:12: GVA by tertiary sector, 2012-2022 (annual percentage) (City of Ekurhuleni, 2024)

Socio-Economic Analysis

Labour Market Analysis

Employment and the level of employment directly affect the long-term financial well-being of the municipality. Employment eventually translates into growth in the potential revenue base of the city. On the other hand, the challenges in employment and eventual unemployment increases poverty (City of Ekurhuleni, 2024).

The unemployed population is defined as the number of people that are able and willing to work between the ages of 15 and 65, but who are currently not working. The unemployment rate for the city decreased from 33.3% in 2023 to 32.3% (Quarter2,2023) (City of Ekurhuleni, 2024).

The economically active population (EAP) is defined as the number of people that are able and willing to work between the ages of 15 and 65, which includes both employed and unemployed people. The economically active population in Ekurhuleni in 2021 was 1.8 million, whilst Gauteng was 6.9 million and the national figure 22.2 million (City of Ekurhuleni, 2024).

According to Statistics SA Labour Force Survey, working age population is defined as the number of people who are between the ages of 15 and 65. The working age population in Ekurhuleni in 2021 was 2.67 million, whilst Gauteng was 10.4 million and the national figure 39.4 million. The graph below combines all the facets of the labour force in the CoE into one compact view. The graph is divided into "place of residence" on the left, which is measured from the population side, and "place of work" on the right, which is measured from the business side (City of Ekurhuleni, 2024).

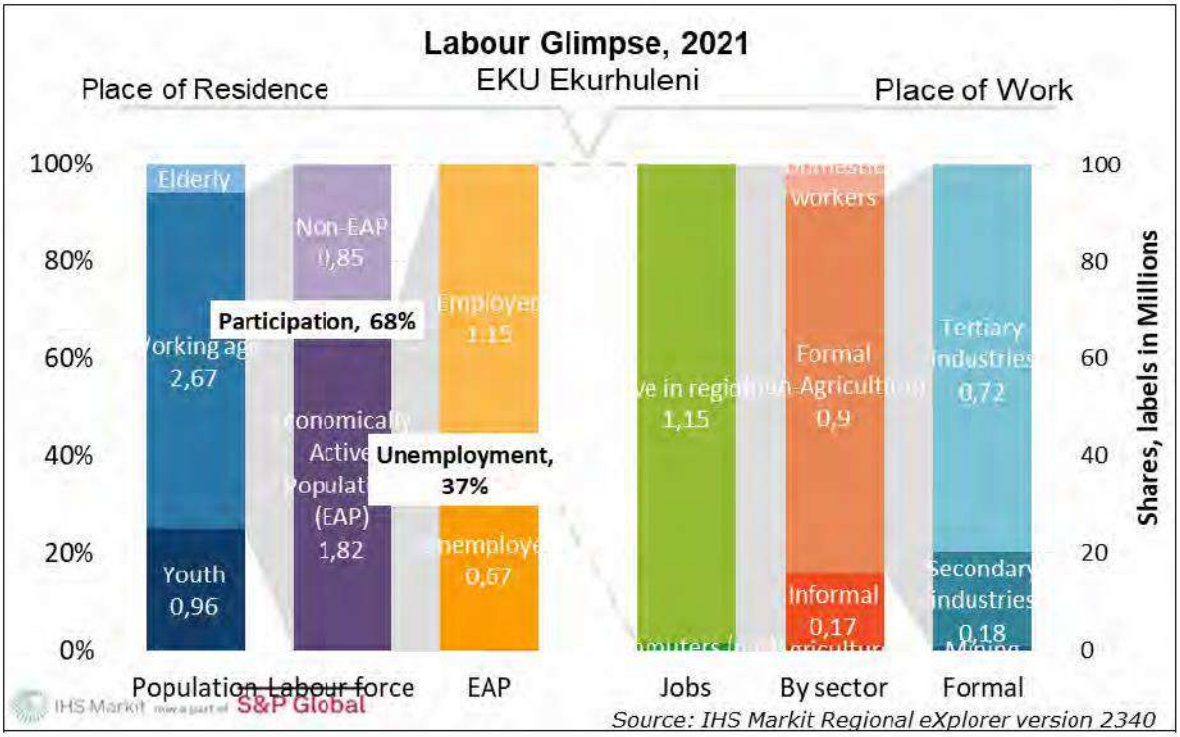


Figure 4:13: Labour glimpse-CoE, 2021 (City of Ekurhuleni, 2024)

In theory, a higher or increasing population dividend is supposed to provide additional stimulus to economic growth. People of working age tend to uphold higher consumption patterns (Final Consumption Expenditure, FCE) and a denser concentration of working age people is supposed to decrease dependency ratios - given that the additional labour which is offered to the market, is absorbed (City of Ekurhuleni, 2024).

Labour Market Trends

In the second (2nd) quarter of 2023, the unemployment rate in South Africa stood at 32.6% showing a decrease of 1,3% compared to the same period in 2022. The Gauteng unemployment rate is above the national rate by 0,5% whilst the figure of 34,4% remained the same in the 2022 period. Moreover, the City's movement per quarter led to a decrease of 0.8% from 33,1% to 32,3% in the quarter 4 (City of Ekurhuleni, 2024).

The labour force was significantly lower than the national average of 0.6%. The employment rate in the city was higher 1,7% than that of the national average of 1.0% whilst the provincial figure is at a lower figure of 0,1%. The unemployment rate saw a decrease of 1.6% in the city whilst the provincial rate improved by 1%. The overall number of discouraged job seekers decreased by 2,9% for the country, 3,8% for the city whilst the provincial average decreased by 9,4% (City of Ekurhuleni, 2024).

Table 4.12: CoE quarterly unemployment rates: StatsSA, QLFS Q2:2023 (City of Ekurhuleni, 2024)

	City of Ekurhuleni	Gauteng	South Africa
Population 15-64	0,4%	0,4%	0,3%
Labour Force	0,1%	0,2%	0,6%
Employed	1,7%	0,1%	1,0%
Unemployed	-3,3%	0,5%	-0,1%
Discouraged jobseekers	-3,8%	-9,4%	-2,9%

Formal and Informal Employment

The formal sector employment increased in five (5) to eight (8) industries whilst a decline was recorded in three (3) industries. Formal sector employment is measured from the formal business side, and the informal employment is measured from the household side where formal businesses have not been established. The number of formally employed people in CoE counted 983 415 in 2022, which is about 82.57% of total employment, while the number of people employed in the informal sector counted 207 573 of the total employment (City of Ekurhuleni, 2024).

In City of Ekurhuleni, the economic sectors that recorded the largest number of formal employments in 2022 were: the finance sector with 271 316 (22.78%), followed by the community services at 197 183 (16.5%) and trade sector with 194 163 (16.3%). The sectors that employed the least number of people were the mining sector with 5353 (0.4%) and the electricity sector with 5232 (0.4%) (City of Ekurhuleni, 2024).

Informal employment in Ekurhuleni has reportedly increased from 144 379 in 2012 to an estimated 207 573 in 2022. The trade sector recorded the highest number of informally employed people with 66 770 employees in 2012 whilst the number grew to 80 959 in 2022 resulting in an increase of 14 189 over the period of 10 years. This can be expected as the barriers to enter the Trade sector in terms of capital and skills required are less than with most of the other sectors (City of Ekurhuleni, 2024).

The community services sector recorded the second highest figure of 23 273 employees in 2012 of which the number increased to 33 667 which translates to a growth of 10 394 over a period of 10 years. The sector that employed the least in 2012 was the finance sector with 11 568 employees and the least in 2022 was the manufacturing sector with 14 066 (City of Ekurhuleni, 2024).

The mining industry, due to well-regulated mining safety policies, and the strict registration of a mine, has little or no informal employment. The Electricity sector is also well regulated, making it difficult to get information on informal employment (City of Ekurhuleni, 2024).

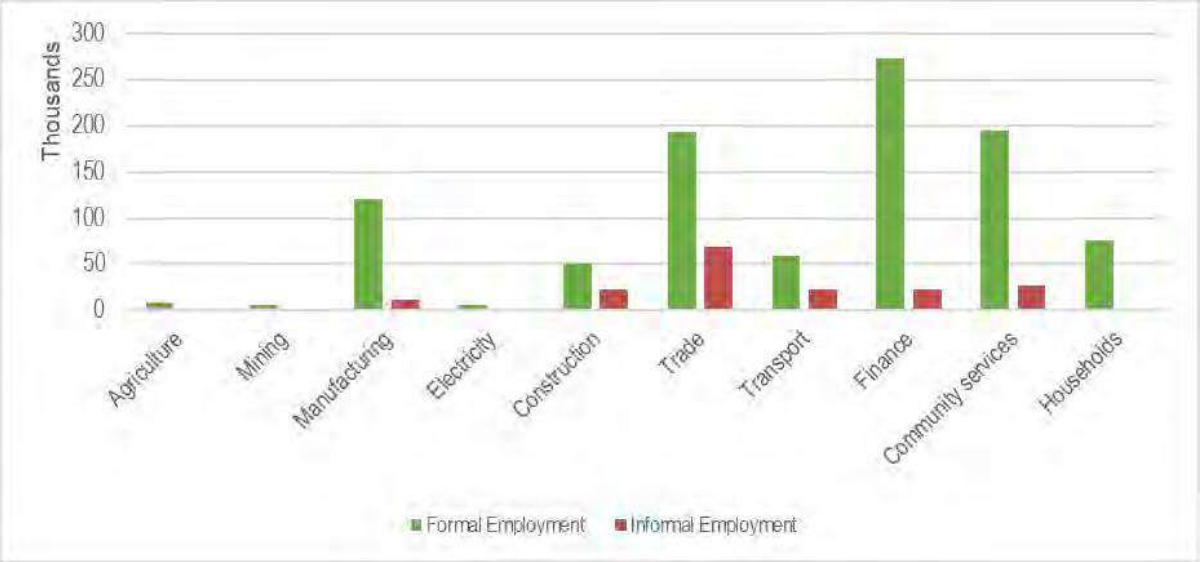


Figure 4:14: Formal and informal employment by broad economic sector-CoE, 2021 [Numbers] (City of Ekurhuleni, 2024)

5. Analyses and characterisation of Activity

5.1 Site Delineation for Characterisation

In order to enable a proper activity characterisation, all activities at Corobrik were identified and have been delineated into different facilities. These facilities were thereafter assessed separately to determine the extent of implementation of water and waste management required at each delineated facility.

Service, Administration Area and Brickmaking Factory plant

The Corobrik Midrand site consists of an administrative area, where staff offices and ablution facilities are found. This area is located adjacent to the brick manufacturing plant. At the time of the site visit, the area was observed to be well paved and well adequate stormwater management (Figure 5:1).

The factory consisting of brick forming machines, gas-fired kiln (to fire/burn the bricks to the required temperature) and to the drying, strip batching and Potassium Carbonate (K2CO3) dipping tank sections. Water used in the factory is obtained from quarry.

Figure 5:1: Service and Administration Area

Midrand Quarry

There is an existing quarry on site where useable clays (Fire clay, plastic clay and creamy clay) are extracted from. The estimated depth of the quarry is approximately 20 m below ground surface (Figure 5:2 and Figure 5:3).

Figure 5:2: Midrand quarry

Figure 5:3: Midrand quarry

Midrand Dam (Old Quarry)

The old quarry has been rehabilitated and filled up with water, with the main contribution being direct rainfall, groundwater ingress, and runoff from minor upstream contributing areas (Figure 5:4 and Figure 5:5).

Figure 5:4: Midrand Dam (Old quarry)

Figure 5:5: Midrand Dam (Old quarry)

Stockpile facilities

The site consists of various stockpile areas for different material. The brick stockpiles are positioned in the southerly brick making processing yard.; while clay stockpiles are situated west and north of the brick making processing yard (Figure 5:6 and Figure 5:7).

The mine residue (non-brickmaking materials) consists of topsoil and subsoil (overburden). These are stripped separately during the quarrying operations. The stripped subsoil is backfilled into the worked-out sections of the quarry. The stripped topsoil is then spread out over the backfilled areas.

Figure 5:6: Clay stockpiles

Figure 5:7: Brick Stockpiles

5.2 Water and Waste Management

5.2.1 Water Supply

Water sources at Corobrik Midrand are (Groundwater Abstract (Pty) Ltd, 2024):

- Groundwater and stormwater ingress into the quarry dam.
- Stormwater collected from the dirty catchment including stockpiles and plant area.
- Potable water from the Rand Water Board.
- Water supply borehole.

Process and domestic water are obtained via pipeline from Rand Water, while water for dust suppression is abstracted from the quarry located at the western part of the site (Groundwater Abstract (Pty) Ltd, 2024)

5.2.2 Water Management

The brick factory operations' water usage prioritises reusing quarry water through the storage dam quarry for onsite dust suppression. However, the brickmaking and dehacking are currently using clean water from the borehole. Any domestic water uses are supplied from the municipal water supply line. Stormwater from around the production plant is collected in a stormwater collection point sump and routed to the Site Dam. Sewage effluent is disposed to the municipal system (City of Ekurhuleni, 2024).

5.2.3 Surface Water Pollution Control

Silt contained run-off from the quarry faces is trapped in worked out sections of the quarry. Clean run-off from the site is channelled away from the operating areas into the natural drainage system via cut-off drains/berms and collected in the old quarry (site dam) (CoroBrik (Pty) Ltd, 2013).

5.2.4 Waste Management

The following waste streams have been identified:

Industrial Waste Disposal

- All industrial waste is collected by a registered waste removal company and removed to a licensed waste disposal site.

Domestic Waste Disposal

- All domestic waste generated on site is placed in suitable containers and taken off-site by the quarrying contractor and disposed off at a licensed waste disposal site on a daily basis during the quarrying contract period (CoroBrik (Pty) Ltd, 2013).
- No domestic waste is allowed to be disposed on the site. Monitoring and management of waste collection and disposal procedures are carried out on an ongoing basis (CoroBrik (Pty) Ltd, 2013).

Mine Residue Disposal

- The mine residue (non-brickmaking materials) consists of topsoil and subsoil (overburden). These are stripped separately during the quarry operations. The stripped subsoil is backfilled into the worked-out sections of the quarry. The stripped topsoil is then spread out over the backfilled areas. These operations form part of the concurrent rehabilitation process (CoroBrik (Pty) Ltd, 2013).

5.3 Process water

The water circuit is defined as follows:

Water sources (inflows) are as follows (CM Eclectic (Pty) Limited, 2024):

- All industrial waste is collected by a registered waste removal company and removed to a licensed waste disposal site.
- Groundwater and stormwater ingress into the quarry and the site dam;
- Stormwater is collected into the stormwater collection point from the plant catchment;
- Potable water from the Municipality; and,
- Process water from the water supply borehole.

Water sinks (losses) through the following (CM Eclectic (Pty) Limited, 2024):

- Water evaporation from the quarry sump, the site dam, and stockpiles;
- Interstitial lockup in the stockpiles;
- Water loss during the drying and firing processes in the drier and kilns;
- Dust suppression at the stockpiles, including road dust control; and,
- Potable water consumption, losses to the municipal sewer system

Stormwater, groundwater, and process water are collected within the following storage facilities for reuse including (CM Eclectic (Pty) Limited, 2024):

- Site storage dam quarry; and
- Quarry sumps.

The simplified schematic in Figure 5:8 presents the site infrastructure layout at the Corobrik Midrand Factory.

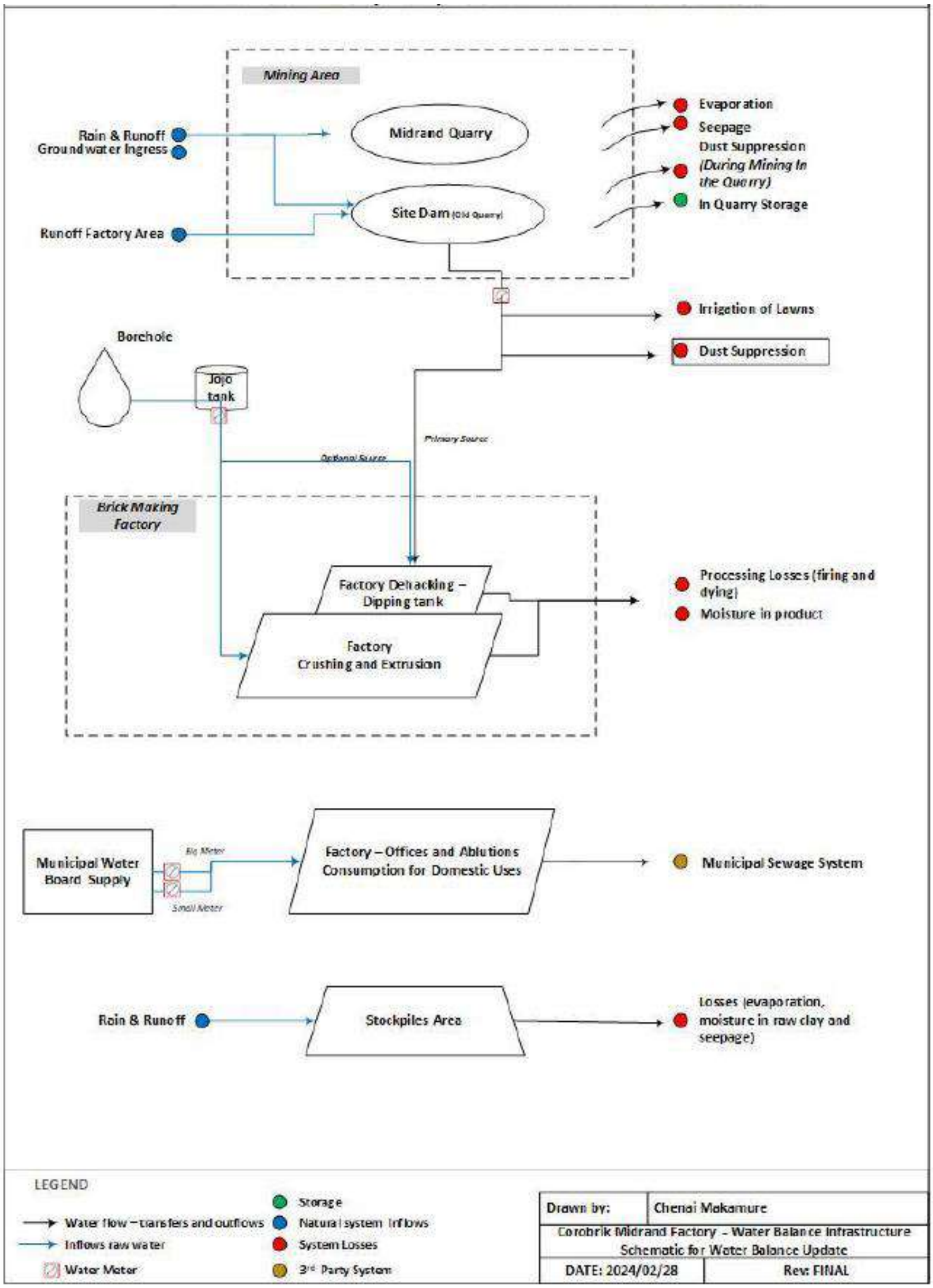


Figure 5:8: Corobrik Midrand Factory- Simplified Schematic for the Water Balance (CM Eclectic (Pty) Limited, 2024)

An average groundwater inflow of 156 m^3/month is estimated for the Midrand quarry sumps, and the Storage Dam is estimated at 6 142 m^3/month, equivalent to water demand from the dam (220 m^3/d). The groundwater inflows need to be assessed should the quarry start undertaking water level measurements in the dam (CM Eclectic (Pty) Limited, 2024).

Considering the municipal withdrawal of 220m^3/ day for the 100 employees, per capita water use is estimated at 123 l/person/day. This is a relatively average usage rate compared to typical domestic usage, which ranges from 90l—280l/person/day in the mining sector (CM Eclectic (Pty) Limited, 2024).

From the monthly average records, the biggest water uses are dust suppression and irrigation, which are supplied by the Site Dam The quarry comprises runoff water, plant overflows, and groundwater ingress. The water abstracted from the borehole for factory uses comprises 19% of the total water used at Midrand Factory, as presented in the pie chart in Figure 5:9. Municipal water is only used for domestic uses, therefore only account for 4% of total water used at Midrand Factory.

Table 5.1: Water use averages measured by Midrand Factory (CM Eclectic (Pty) Limited, 2024)

Water Use	**Volume (m^3/day)**	**Volume (m^3/month)**	**Volume m^3/annum**	**Volume m^3/week**
Site Dam for dust suppression and irrigation	220.0	6 141.7	73 700.0	1535.4
Borehole for processing uses	53.0	1 478.4	17 740.8	369.6
Municipal for domestic uses	12.3	344.0	4 128.0	86.0

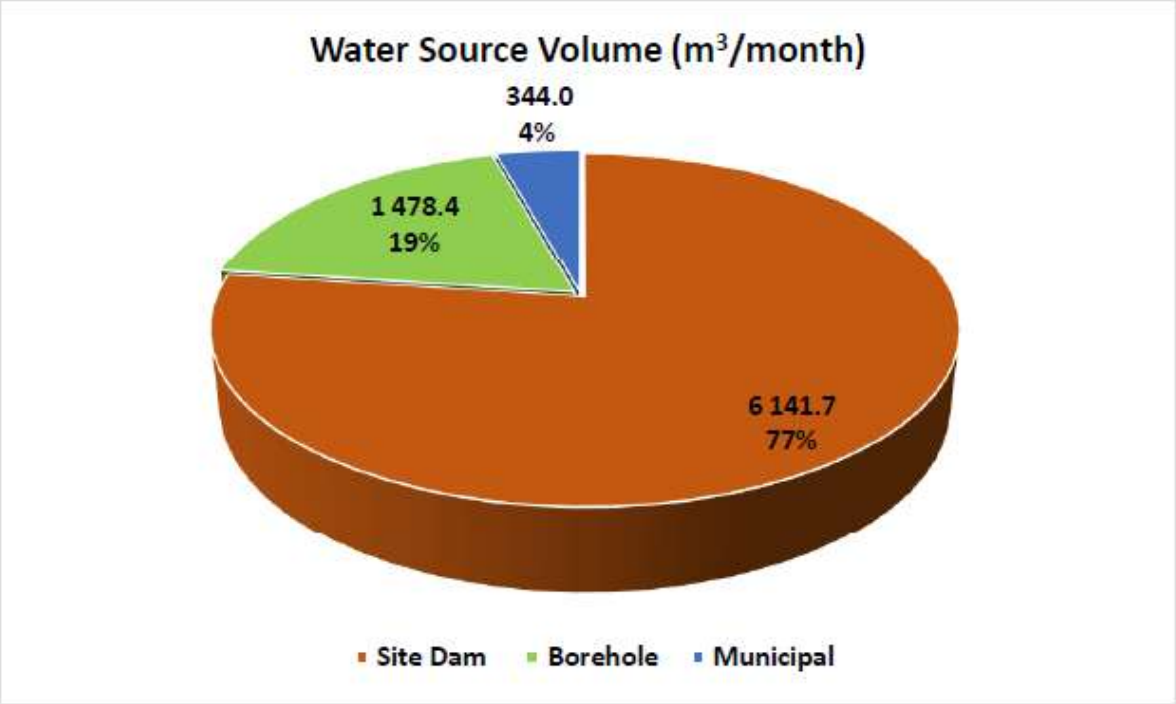


Figure 5:9: Midrand Factory Monthly water sources distribution by volumes (CM Eclectic (Pty) Limited, 2024)

Table 5.2 and Figure 5:10 through to Figure 5:12summarise the calculated average wet season, average dry season and average climate conditions water balances, respectively. All three climate conditions indicate a balance in storage for the overall site balance.

Table 5.2: Average Monthly and Annual Water Balance Summary (CM Eclectic (Pty) Limited, 2024)

Facility Name	**Water In**			**Water Out**		
	Water Stream	**Monthly (m^3/mon)**	**Annual (m^3/annum**	**Water Stream**	**Monthly (m^3/mon)**	**Annual (m^3/annum**
Domestic and Potable Water	Small and Big Meter Municipal Supply	344	4 128	Consumption	52	619

Facility Name	Water In			Water Out		
	Water Stream	**Monthly (m^3/mon)**	**Annual (m^3/annum**	**Water Stream**	**Monthly (m^3/mon)**	**Annual (m^3/annum**
				Municipal Sewer Discharge	292	3 509
	Subtotal	**344**	**4 128**	**Subtotal**	**344**	**4 128**
Midrand Quarry	Rainfall-runoff	1 281	15 377	Pit dust suppression uses and losses	1 214	14 571
	Groundwater Ingress and Recharge	156	1 877	Quarry Dewatering to Site Dam	224	2 682
	Subtotal	**1 438**	**17 253**	**Subtotal**	**1 438**	**17 253**
Site Dam	Rainfall-runoff - Upstream Catchment	2 537	30 447	Water Tanks Dust Suppression	6 142	73 700
	Direct Rainfall	1 774	21 286	Losses and Storage	2 917	35 000
	Groundwater Ingress and Recharge	6 142	73 700	Storage	1 394	16 733
	Subtotal	**10 453**	**125 434**	**Subtotal**	**10 453**	**125 434**
Factory	Site Dam	0	0	Processing losses (firing and drying)	1 478	17 741

Facility Name	Water In			Water Out		
	Water Stream	**Monthly (m^3/mon)**	**Annual (m^3/annum**	**Water Stream**	**Monthly (m^3/mon)**	**Annual (m^3/annum**
	Borehole	1 478	17 741			
	Subtotal	**1 478**	**17 741**	**Subtotal**	**1 478**	**17 741**
Stockpiles	Rainfall runoff	920	11 034	Losses (Evaporation and Interstitial)	920	11 034
	Subtotal	**920**	**11 034**	**Subtotal**	**920**	**11 034**
Total Water in Circulation		**14 633**	**175 590**		**14 633**	**175 590**

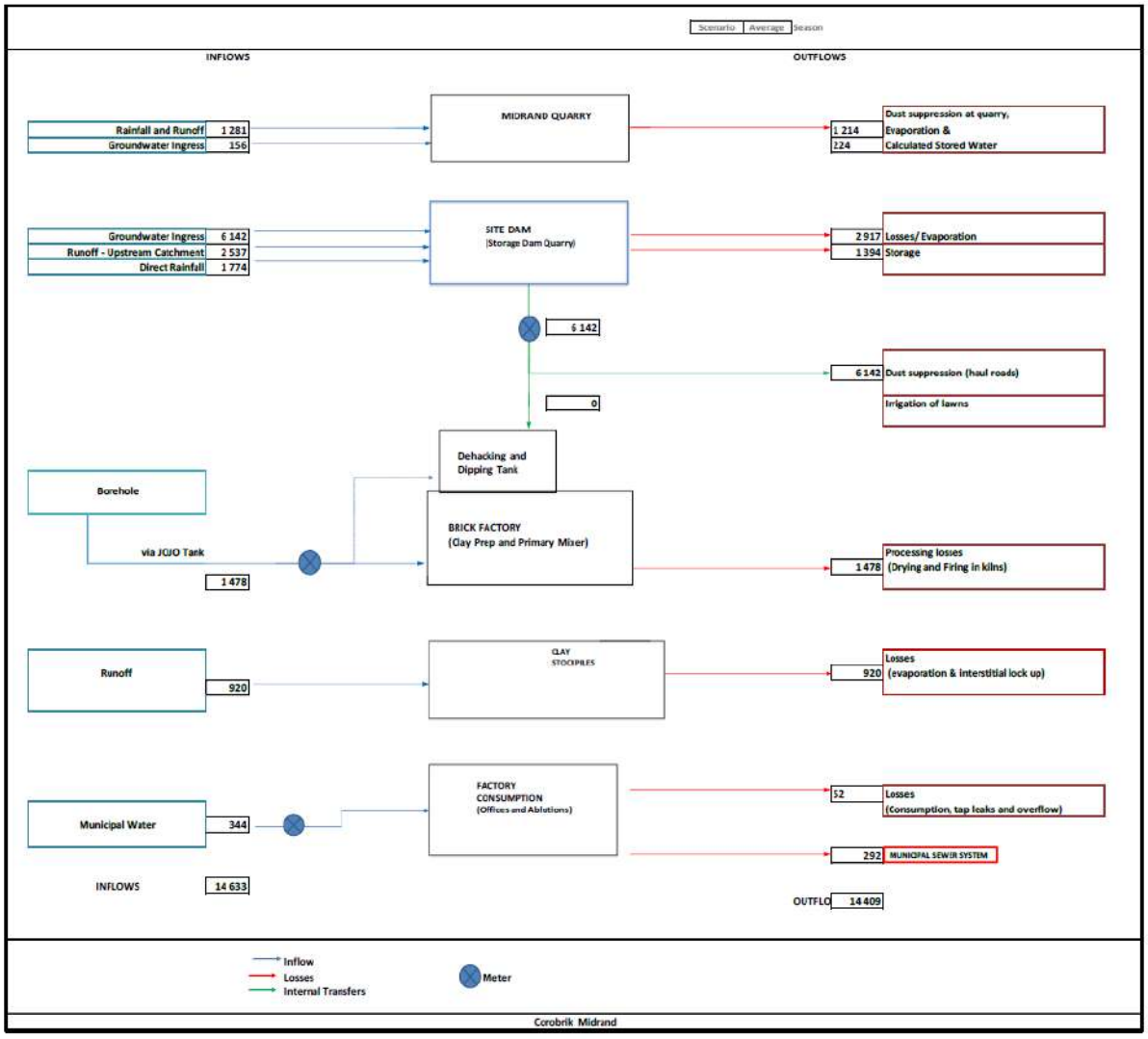


Figure 5:10: Annual Average Water Balance (CM Eclectic (Pty) Limited, 2024)

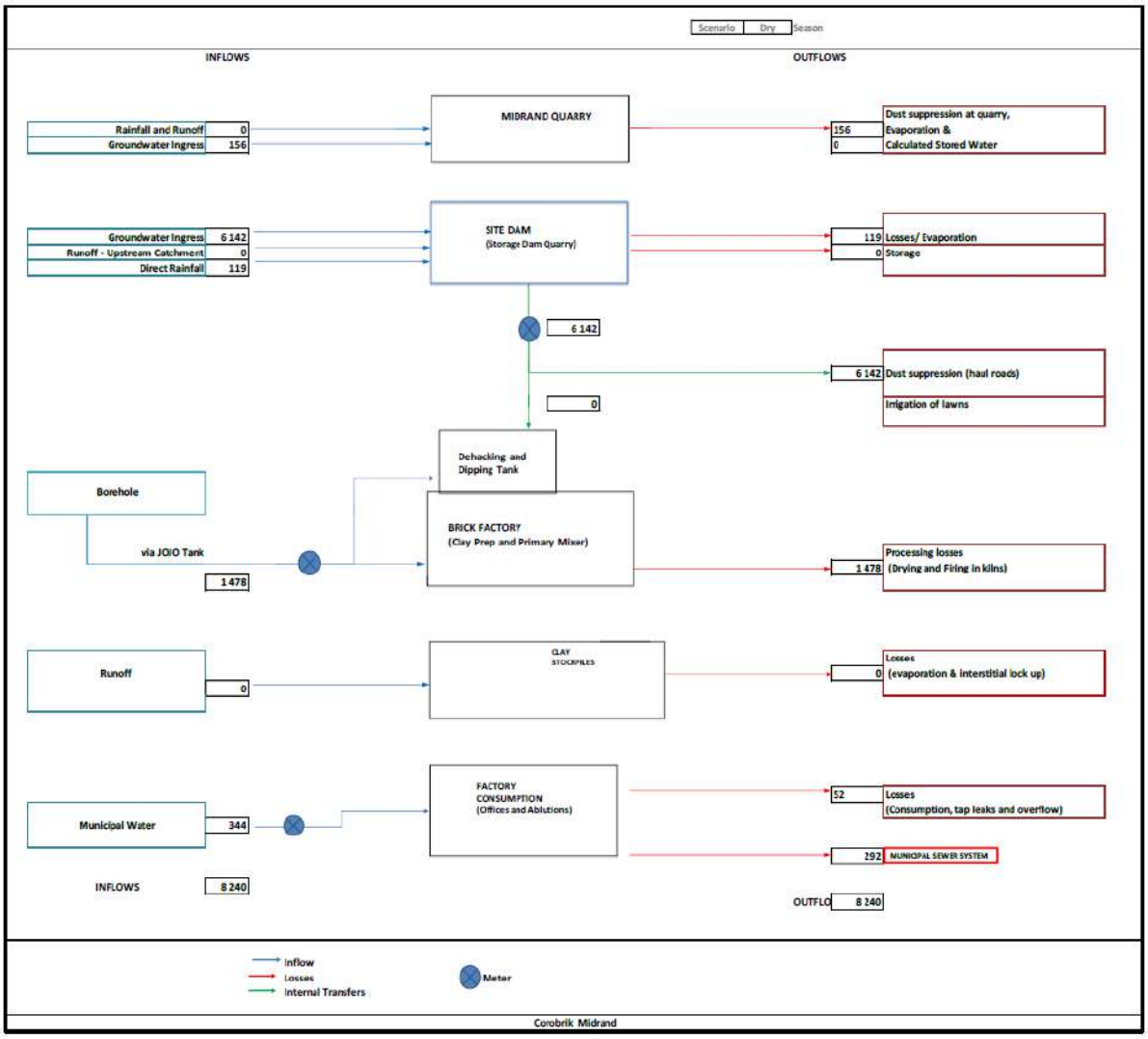


Figure 5:11: Average Dry Season Water Balance (CM Eclectic (Pty) Limited, 2024)

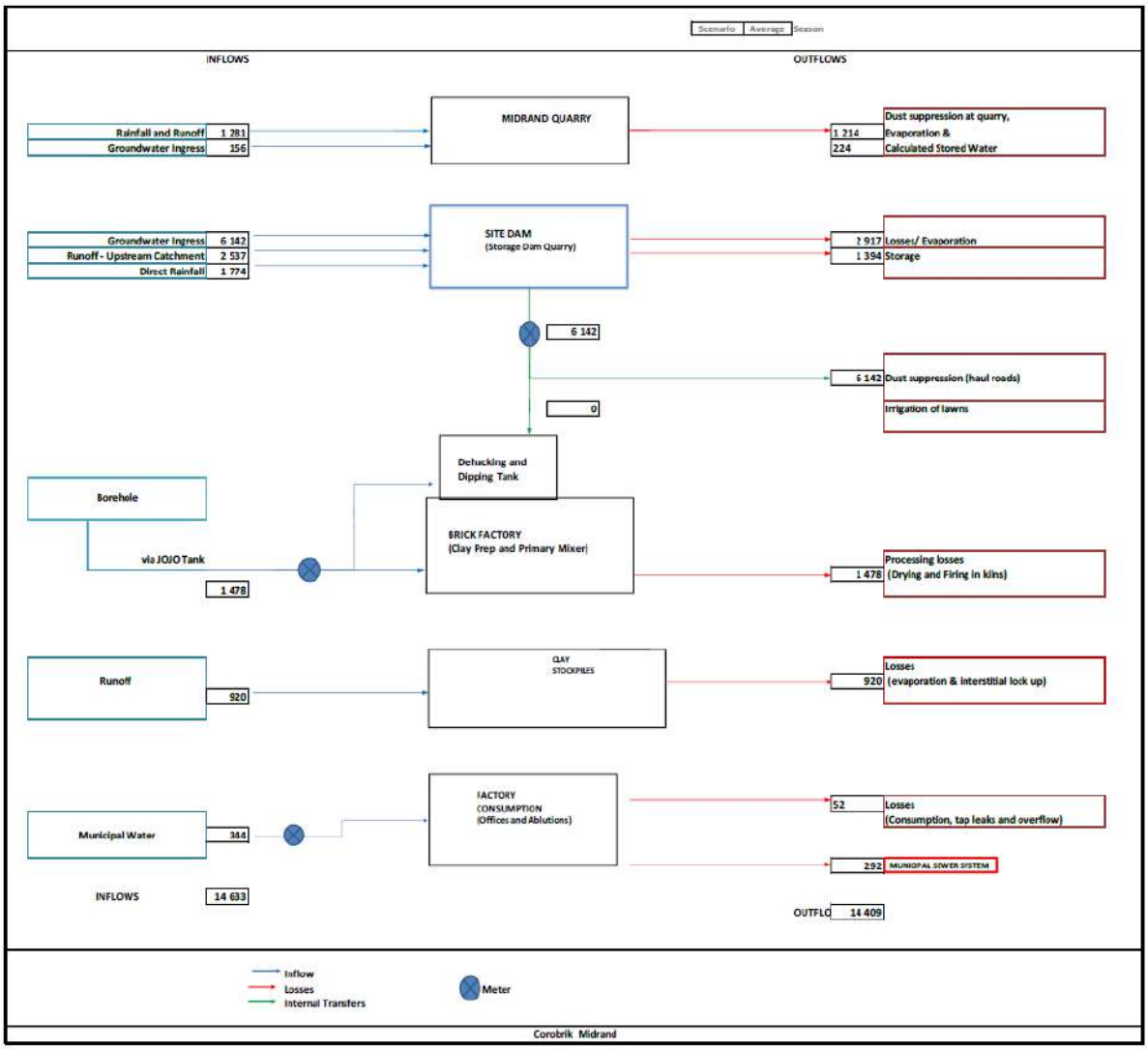


Figure 5:12: Average Wet Season Water Balance (CM Eclectic (Pty) Limited, 2024)

5.4 Stormwater

Clean and dirty water generating catchments, affected by the proposed project have been delineated and illustrated in the Storm Water Management Plan as indicated in Figure 5:13.

Runoff from the catchment upstream of the site is considered to be clean, as indicated in Figure 5:14. All clean water within the site should be diverted around the dirty water areas, as per the GN 704, to ensure that clean water never enter dirty water areas. Earth berms are recommended to secure these dirty areas. Existing storm water structures (concrete/earth channels) is illustrated in Figure 5:15 (MVD Kalahari Consulting, 2024).

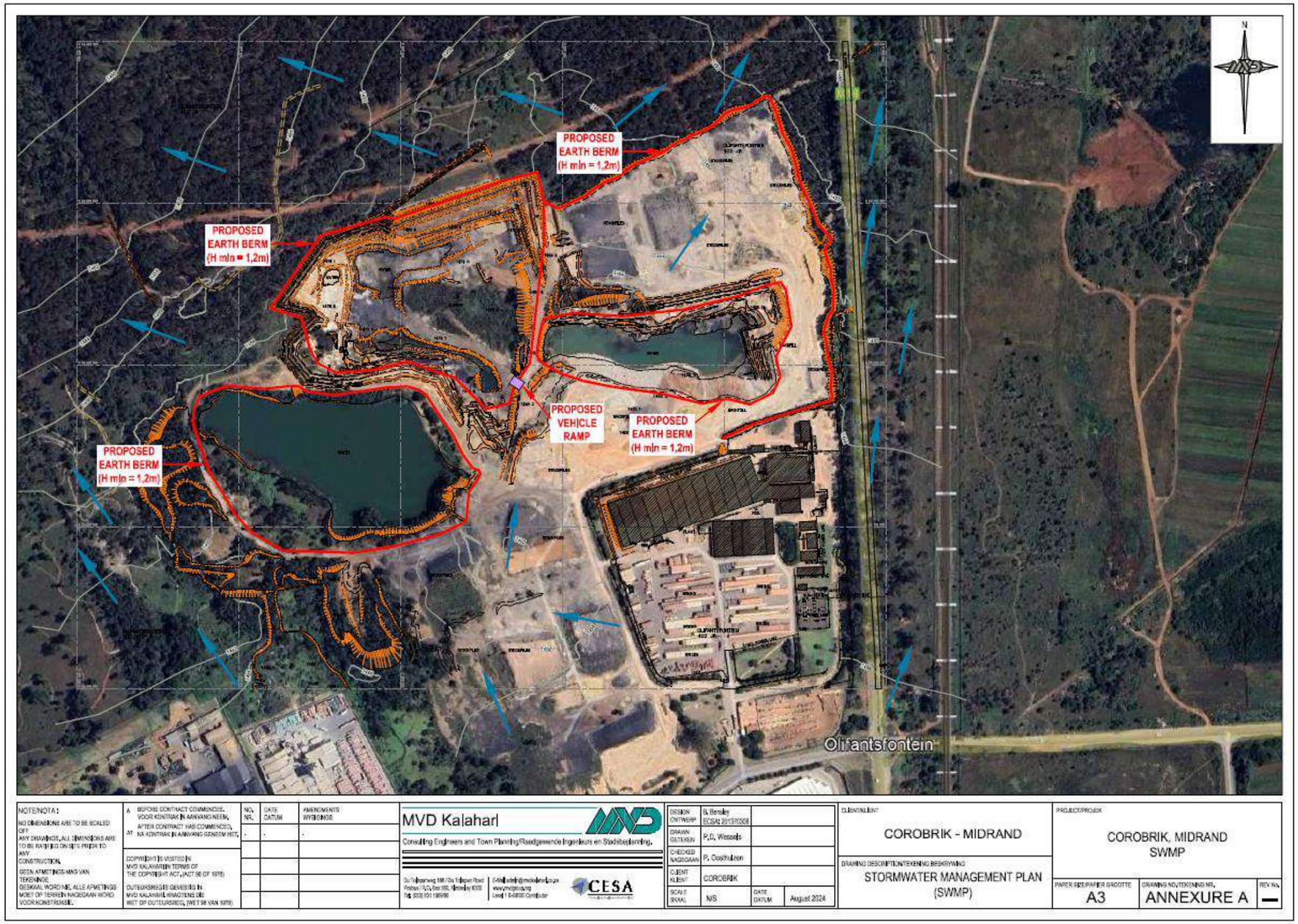


Figure 5:13: Stormwater Management Plan (MVD Kalahari Consulting, 2024)

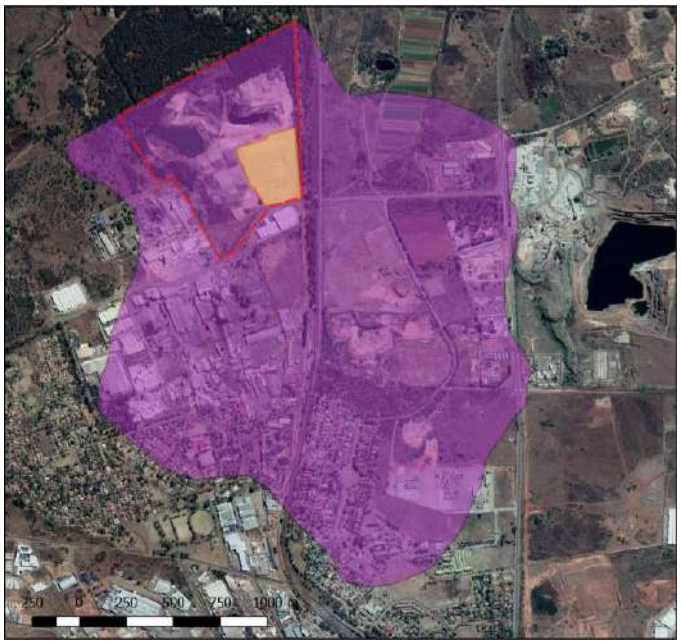


Figure 5:14: Clean and Dirty Water Catchments (Surrounding area) (MVD Kalahari Consulting, 2024)

Figure 5:15: Existing Storm Water Structures (MVD Kalahari Consulting, 2024)

5.4.1 Storm Water Structures

To ensure effective management of storm water the following structures will be implemented on the site:

Quarry Berms

Earth berms to be constructed as stipulated in the stormwater management plan compiled by (MVD Kalahari Consulting, 2024) along perimeter of each quarry. Ramps to be constructed at every entrance to the quarries to ensure no surface run-off towards the quarry. As the clay mining progresses and water management infrastructure get damaged, then should it immediately be rectified to comply to the designed specifications.

Mine Residue Stockpile Berms

Earth berms to be constructed as stipulated in the stormwater management plan compiled by (MVD Kalahari Consulting, 2024) along perimeter of each stockpile. Ramps to be constructed at every entrance to the stockpiles to ensure no surface run-off towards the stockpiles. As the clay mining progresses and water management infrastructure get damaged, then should it immediately be rectified to comply to the designed specifications (MVD Kalahari Consulting, 2024).

Process Coal Stockpile

It is recommended to construct a reinforced concrete slab with sump at the coal storage facility to ensure that a coal stockpile is secured on an impermeable surface. It is also recommended to keep the coal storage area and loading area within the roofed structure where coal is stored under roof to minimize contamination. The roofed area can also be extended to ensure full coverage of stockpile and loading area. The final dimensions of the slab size to be confirmed with Corobrik. Coal stockpiles can be stored in duplicating the proposed reinforced concrete cell (MVD Kalahari Consulting, 2024).

By implementing the recommended mitigation measures it is anticipated that the negative impacts can be mitigated.

Stockpiles Containing Lignite

An earth berm to be constructed to enclose these areas, thus preventing storm water flow from surrounding areas to enter the lignite stockpile areas (MVD Kalahari Consulting, 2024).

5.5 Groundwater Management

Groundwater management measures should be implemented to minimise impacts on the groundwater resource, but also infrastructure. Most of these form part of good house-keeping measures. The following objectives and targets are proposed for groundwater management in the area (Groundwater Abstract (Pty) Ltd, 2024):

- Implement a water management plan aimed at reducing and/or eliminating adverse impacts on sensitive receptors in the area, as well as infrastructure.
- Implement monitoring procedures to measure the effectiveness of groundwater management and impacts on private boreholes and surface water resources.
- Analyse the information obtained from all monitoring sites to establish groundwater level and water quality trends. Should the trends indicate negative impacts on groundwater levels and/or water quality, implement suitable measures within the shortest possible time to remediate and/or eliminate such impacts.
- Record groundwater levels, abstraction volumes and pumping timeframes.
- Ensure that drawdown is limited and does not exceed the capacity of the borehole.
- Ensure that sufficient information is available on all private boreholes around the Corobrik Midrand borehole (1 km radius) to quantify groundwater status.
- Ensure sufficient budget to implement and maintain the water monitoring programme.
- Develop effective surface runoff management plans to ensure that all dirty runoff is kept away from all production boreholes or sensitive surface water systems, and no ponding occurs on site.
- Review the groundwater flow and level data for all monitoring sites monthly to ensure effective and safe use of the resource.
- Use the monitoring data to define seasonal groundwater level and water quality trends for the area.

5.6 Waste Management

The waste stream identification and management has already been discussed under Sections 2.6 and 5.2. The purpose of this section is to characterise these waste streams to specifically represent the situation at the Corobrik and assess them in terms of the legal requirements of NWA and the National Environmental Management Waste Act of 2008 (NEMWA).

5.7 Operational Management

The SHE Officer under the operations and environmental managers, as well as the waste contractors, should ensure compliance with and implementation of the water and waste management procedures.

The management responsibilities are set out as follows:

- The SHE Officer is responsible for communicating the Environmental Management System to all employees and contractors; and

- The SHE Officer is responsible to drive the Environmental Management System, to ensure that legal compliances are met in their respective areas of responsibility.

5.8 Organisational Structure

The organisational structure of Corobrik is reflected in section 2.7 of this report.

5.9 Resources and Competencies

Both the Factory manager, as well as the SHE officer are qualified and experienced to conduct the water and waste management at Corobrik. Their work experience, as well as educational background contributes towards fulfilling their management tasks.

5.10 Education and Training

Education and training at Corobrik are currently governed by the operation's Social Labour Plan (SLP). Among the education and training topics discussed are:

- Skills Development;
- Career Progression and Mentorship; and
- Career Development.

5.11 Internal and External Communication

Internal Communication

Most of the internal communication with regards to water and waste management takes place through meetings and induction sessions.

External Communication

Communication with Interested and Affected Parties (I&AP's) is taking place.

Communication with the local and departmental authorities is taking place. Any pollution incidents that occur are communicated to the relevant regulatory authorities.

Next to correspondence and communication with external parties, Corobrik also provides insight in their environmental management through making the environmental reports conducted for the operation available to the public on request (e.g. public participation).

5.12 Awareness Raising

The environmental management ensures that all employees, where relevant, and contractors are made fully aware of the contents, conditions and environmental management aims of the Environmental Management Programme.

The management of Corobrik meets with employees and contractors on a regular basis to ensure environmental awareness raising. The current meetings for imparting and discussing environmental management matters are:

- Induction Sessions- for new employees and annually for existing employees;
- Safety meetings- monthly;
- Mining meetings- fortnightly during mining period; and
- Shop Stewards Meetings-monthly between management and shop stewards (the trade union representatives).

The induction program given to all employees and contractors includes topics on environmental awareness with topics covering elements on the physical, chemical, biological and social factors affecting an individual human being or a community.

The topics are:

- Environmental Risk Assessment (Occupational Hygiene);
- Occupational Health (Medicine);
- Safety on the job;
- Water consumption;
- air pollution;
- energy usage;
- waste management and disposal;
- emergency preparedness; and
- education and training.

5.13 Monitoring and Control

The objective of water monitoring at Corobrik is to:

- Report on water quality requirements and other monitoring related conditions stipulated by the water monitoring programme.

5.14 Surface Water Monitoring

Water sample locations were established from geographical reports and preliminary environmental impact assessments for the specific site, the sampling location at the site is summarised in Table 5.3 below.

Table 5.3: Surface water sampling points (NOHS Consultants (Pty) Ltd, 2024)

No	Sampling Point Location	Sample Number
1	Rayton Quarry	2/Q/B/15/04/2024

It is proposed that water quality monitoring include the following surface monitoring locations (MVD Kalahari Consulting, 2024):

- The old quarries
- Existing channels along the plant
- Water exiting oil water separator
- Water exiting silt barriers (during storm event)

5.15 Groundwater Monitoring

It is recommended to implement an initial groundwater monitoring programme as presented in this report. The key objectives of a Groundwater Monitoring Programme are to (Groundwater Abstract (Pty) Ltd, 2024):

- Report on water quality requirements and other monitoring related conditions stipulated by the water monitoring programme.
- Detect short and long-term groundwater level trends;
- Early detection of changes in groundwater quality and levels;
- Measure impacts and define mitigation options; and
- Improve / adjust the monitoring systems.

Monitoring Locations

The preliminary groundwater monitoring network is listed in Table 5.4. Additional, new monitoring boreholes are not recommended at this stage. If negative groundwater impacts are observed, then the monitoring programme must be expanded (Groundwater Abstract (Pty) Ltd, 2024).

Table 5.4: Proposed groundwater monitoring positions (Groundwater Abstract (Pty) Ltd, 2024)

Borehole	Latitude	Longitude	Groundwater level	Groundwater quality
Corobrik Midrand BH	25°56'33.87"S	28°13'40.49"E	Yes	Quarterly
Mid BH1	25°56'41.45"S	28°13'37.72"E	Yes	Quarterly
Mid BH3	25°55'53.89"S	28°13'44.98"E	Yes	Quarterly
VMBH1	25°56'42.25"S	28°13'45.21"E	Yes	Quarterly

Monitoring Parameters

The parameters to be monitored should include general chemistry are as followed (Groundwater Abstract (Pty) Ltd, 2024):

- pH
- Electrical Conductivity
- TDS
- Turbidity
- Aluminium
- Calcium
- Copper
- Iron
- Magnesium
- Manganese
- Nickel
- Zinc
- Chromium
- Cadmium

- Lead
- Potassium
- Sodium
- Chloride
- Fluoride
- Ammonium (NH_4) as N
- Nitrate
- Total oxidised nitrogen as N
- Sulphate
- Total Alkalinity
- Total Hardness
- Total organic carbon
- Total Coliform Bacteria
- E. coli

If the water use license is issued, compliance, as stated in the permit, should be included in the water quality monitoring objectives.

5.16 Bio-Monitoring

An existing biomonitoring programme has not been developed by Corobrik.

5.17 Waste Monitoring

The objective of waste monitoring is to ensure the following:

- Minimisation of general waste;
- Minimising the consumption of natural resources;
- Reduction, recycling and recovery of waste;
- Preventing pollution and ecological degradation; and
- Meeting regulatory requirements.

Waste monitoring will be conducted as required and the volumes generated and disposed for the different waste streams will be recorded.

5.18 Risk Assessment/ Best Practice Assessment

Risk Assessment Methodology

The significance of each identified impact was determined using the approach outlined below (terminology from the Department of Environmental Affairs and Tourism Guideline document on EIA Regulations, April 1998). This approach incorporates two aspects for assessing the potential significance of impacts, namely occurrence and severity, which are further sub-divided as follows:

Table 5.5: Aspects for assessing the potential significance of impacts

Occurrence		**Severity**	
Probability of occurrence	Duration of occurrence	Scale/extent of impact	Magnitude (severity) of impact

To assess each of these factors for each impact, the following four ranking scales are used:

Table 5.6: Risk assessment ranking scales

Magnitude	**Duration**
10 - Very high / Unknown	5 – Permanent (post closure)
8 – High	4 - Long-term (impact ceases after site closure has been obtained)
6 – Moderate	3 - Medium-term (impact ceases after operational life of the activity)
4 – Low	2 - Short-term (impact ceases after the construction phase)
2 – Minor	1 – Immediate
Scale	**Probability**
5 – International	5 – Definite / Unknown
4 – National	4 - Highly Probable
3 – Regional	3 - Medium Probability
2 – Local	2 - Low Probability
1 - Site only	1 - Improbable
0 – None	0 – None

Once these factors are ranked for each impact, the significance of the aspects, occurrence and severity, is assessed using the following formula:

SP (significance points) = (Magnitude + Duration + Scale) x Probability

The maximum value is 100 significance points (SP). The impact significance will then be rated as follows:

SP >60	Indicates high environmental significance	An impact which could influence the decision about whether or not to proceed with the project regardless of any possible mitigation.
SP 30 – 60	Indicates moderate environmental significance	An impact or benefit which is sufficiently important to require management, and which could have an influence on the decision unless it is mitigated.
SP <30	Indicates low environmental significance	Impacts with little real effect and which should not have an influence on or require modification of the project design.
+	Positive impact	An impact that is likely to result in positive consequences / effects.

For the methodology outlined above, the following definitions were used:

- ***Magnitude*** is a measure of the degree of change in a measurement or analysis (e.g., the severity of an impact on human health, well-being, and the environment), and is classified as none/negligible, low, moderate, high, or very high/unknown.
- ***Scale/Geographic*** extent refers to the area that could be affected by the impact and is classified as site, local, regional, national, or international.
- ***Duration*** refers to the length of time over which an environmental impact may occur i.e. immediate/transient, short-term, medium term, long-term, or permanent.
- ***Probability*** of occurrence is a description of the probability of the impact occurring as improbable (less than 5% chance), low probability (5% to 40% chance), medium probability (40% to 60% chance), highly probable (most likely, 60% to 90% chance) or definite (impact will definite occur)

Table 5.7: Risk Assessment for Corobrik Midrand

Item	ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	Magnitude	Duration	Scale	Probability	Significance	Significance without	Magnitude	Duration	Scale	Probability	Significance	Significance with	Detailed Mitigation Measures	Mitigation Type	Time period for implementation	Responsible person
Stormwater and Surface Water																			
1	Runoff from old Quarries	Siltation of surrounding water courses due increased erosion during periods of high rainfall events. Deterioration of surface water quality as result of runoff from the quarries.	Water Quality	8	4	2	4	**56**		6	2	1	2	**18**		Earth berms to be constructed along perimeter of each of the quarries as per the stormwater management plan. Alien invasive species must be managed in and around the quarries. The berms will also ensure the diversion of clean water around the quarries. Berms around quarries should be inspected monthly for signs of erosion especially after a heavy rain spell. Rehabilitated areas should be revegetated as soon as possible. Continue with surface and groundwater quality monitoring at the at the current monitoring locations and frequency. The operation and maintenance of water management facilities must be in accordance with GN R 704 capacity requirements.	Implementation of the stormwater management plan. Diversion of clean water around the quarries to minimise the risk of surface water degradation. Control through impact management and monitoring	Duration of operational Phase	Environmental Manager
2	Runoff from the brick manufacturing plant	Runoff from the brick manufacturing plant could potentially carry hydrocarbons to surrounding water sources.	Water Quality	6	1	1	4	**32**		4	1	1	2	**12**		Silt barriers must be installed downstream of the plant area. The operational area is kept clean and tidy. Grease, lubricants, paints, flammable liquids, and other combustible materials used should be placed and stored in a controlled manner and in an approved designated area. Immediate and corrective action to be taken when any type of spillage occurs with the removal of the spillage.	Polluted surface water to be contained in storm water dam that would minimise the risk of surface water degradation. Only in the event of spilling caused by exceptional rainfall event (>1:50 storm event) will short term surface water degradation be experienced.	Duration of operational Phase	Environmental Manager

Item	ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	Magnitude	Duration	Scale	Probability	Significance	Significance without	Magnitude	Duration	Scale	Probability	Significance	Significance with	Detailed Mitigation Measures	Mitigation Type	Time period for implementation	Responsible person
3	Runoff from the workshop and wash bay	Runoff from the workshop and wash bay could potentially carry hydrocarbons to surrounding water sources which holds a potential risk of pollution.	Water Quality	6	1	1	4	**32**		4	1	1	2	**12**		Oil/Water separator is required at the wash bay. The separated water (wash bay) from the oil/water separator to be stored in a sump. Contaminated sludge from the oil water separator to be removed by licensed contractor. Proof of collection to be kept on file at the site. The wash bay area to be shaped with reinforced concrete lined channels installed to allow water flow towards the oil water separator. Wash bay area to be covered by impermeable surface. Oil/Water separator must be inspected regularly and maintained in good working order. Contaminated storm water collected within the system is to be collected by an approved Contractor and transported to a licensed/approved dumping site. Grease, lubricants, paints, flammable liquids, and other combustible materials used should be placed and stored in a controlled manner and in an approved designated area. Immediate and corrective action to be taken when any type of spillage occurs with the removal of the spillage as specified in the EMP. All diesel depots and chemical storage facilities should be within bunded areas constructed on a concrete or other impermeable surface, including a water containment system, to reduce the risk of pollution of downstream watercourses.	Implementation of the stormwater management plan. Control through impact management and monitoring	Duration of operational Phase	Environmental Manager

Item	ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	Magnitude	Duration	Scale	Probability	Significance	Significance without	Magnitude	Duration	Scale	Probability	Significance	Significance with	Detailed Mitigation Measures	Mitigation Type	Time period for implementation	Responsible person
4	Stockpiling of process clay	The clay stockpile poses a potential risk of impacting on surface and ground water quality.	Water Quality	8	4	2	4	**56**		6	3	1	1	**10**		The clay stockpile must be placed on an impermeable surface. It is proposed that a reinforced concrete slab is used for the coal stockpile. Reduce, control, and manage the height of material drops (e.g., RoM Stockpile loading). Process clay stockpiling and transportation to be done using road tipper trucks and to be covered with tarpaulin covers. Trucks should not be overloaded to minimise the risk of clay spillages. Continue with water quality monitoring at the current monitoring locations and frequency. The operation and maintenance of water management facilities must be in accordance with GN R 704 capacity requirements. Ensure that the stockpile is constructed within the planned disturbed areas. Operate, manage and maintain the stockpile in line with the design plans, as-built plans and operating and maintenance manual.	Implementation of the stormwater management plan.	Duration of operational Phase	Environmental Manager
5	Mine residue Stockpiles (Lignite, discard, softs)	The mine residue stockpile poses a potential risk of impacting on water quality.	Stormwater/Water quality	8	4	2	4	**56**		6	3	1	1	**10**		Conduct a Waste Classification of mine residue stockpiles to prevent environmental impacts by ensuring that the waste is adequately managed as per the waste type. Earth berms to be constructed along perimeter of each of the stockpiles as indicated Alien invasive species must be managed in and around the Stockpiles. The berms will also ensure the diversion of clean water around the Stockpiles. Berms around stockpiles should be inspected monthly for signs of erosion especially after a heavy rain spell. Rehabilitated areas should be revegetated as soon as possible. Continue with surface and groundwater quality monitoring at the at the current monitoring locations and frequency; and	Polluted surface water to be channelled to storm water dam that would minimise the risk of surface water degradation.	Duration of operational Phase	Environmental Manager

Item	ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	Magnitude	Duration	Scale	Probability	Significance	Significance without	Magnitude	Duration	Scale	Probability	Significance	Significance with	Detailed Mitigation Measures	Mitigation Type	Time period for implementation	Responsible person
6	The use of roads by mining vehicles and runoff from roads	The risk of pollution is mainly from mining vehicles that could leak hydrocarbons while using the roads. Runoff from roads during high rainfall events could also lead to increased erosion.	Water Quality	8	4	2	4	**56**		6	2	1	2	**18**		Existing access and haulage routes should be utilised as far as reasonably possible. Haul roads should be constructed with the shortest distance from the quarry to the plant. Utilised roadways should be inspected on a weekly basis for erosion and degradation. Areas of erosion or degradation identified should be maintained as described in the EMP. Dust suppression should be applied to all gravel access, maintenance, and haulage routes daily. Stockpiles higher than 3 m should also be subject to measures that reduce the risk of materials entering the surrounding environment via aeolian and fluvial processes. Records of the inspections must be kept on site. All potential hydrocarbon spillages and leaks must be cleaned up immediately and the soils remediated. Spillage control kits will be readily available on site to contain the mobilisation of contaminants and clean up spills. All vehicles and machinery to be serviced in a hard park area or at an off-site location. Storage of hydrocarbons and explosives must be managed according to the Hazardous Substances Act, 1973 (Act No. 15 of 1973). Hydrocarbons and explosives storage facilities must be in a hard park bunded facility. Vehicles with leaks must have drip trays in place.	Implementation of the stormwater management plan. Control through impact management and monitoring Surface inspection should be continuously undertaken to allow runoff to drain onto the natural streams.	Duration of operational Phase	Environmental Manager
Process Water																			
1	Insufficient water quantity monitoring data at key areas	Currently, there is no monitoring of water accumulating in the quarry and no groundwater model of inflows into the quarries. Furthermore, the network of water meters does not provide a comprehensive understanding of the internal distribution of water consumption (dust suppression vs water for irrigation of lawns) which may result to a water balance that is inaccurate.	Water quantity	6	3	1	2	**20**		4	2	1	0	**0**		Additional water meters/measurement locations are recommended to improve water balance data collection and confidence in the model: • A meter/ record of dewatering from the quarries as and when it is carried out; and • Dust suppression records separated from the irrigation water from the recorded volumes at the Site Dam. Periodic estimation of the volume of water in the Site Dam, as best as possible will assist in refining the model for groundwater contribution. Monthly record keeping of water meter records to be able to provide trends.	Control through impact management and monitoring	Duration of operational Phase	Environmental Manager

Item	ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	Magnitude	Duration	Scale	Probability	Significance	Significance without	Magnitude	Duration	Scale	Probability	Significance	Significance with	Detailed Mitigation Measures	Mitigation Type	Time period for implementation	Responsible person
Groundwater																			
1	Stockpiling of Mine residue	Contamination of the borehole water with seepage from local, private sewer systems, industrial discharges and contaminated storm water. Poor water quality associated with leachate from material stockpiles, or the carbonaceous shale stockpile areas.	Groundwater quality	8	4	2	4	**56**		4	2	1	1	**7**		A surface and groundwater monitoring programme must be in place to monitor groundwater level and water qualities, to assess what impact the Corobrik Midrand has on the local aquifers and dolomite stability. Conduct a Waste Classification of mine residue stockpiles to prevent environmental impacts by ensuring that the waste is adequately managed as per the waste type. Develop a groundwater model to assess the potential impacts of stockpiling and to determine the potential seepage of contaminants from the material into the groundwater system.	Control through impact management and monitoring.	Duration of operational Phase	Environmental Manager
2	Abstraction of water from site borehole.	Boreholes Mid BH1 and VMBH1 are outside the calculated zone of influence of the Corobrik Midrand, the radius of influence for borehole Mid BH1 might intercept that of the Corobrik Midrand borehole if used simultaneously. Over utilization of the aquifer system intercepted by the various boreholes, including the Corobrik Midrand borehole and the associated dolomite stability issues.	Groundwater quantity	10	5	2	4	**68**		6	3	1	2	**20**		GWA recommends that boreholes Mid BH1, VMBH1 and Mid BH3 serve as groundwater monitoring boreholes, to assess potential groundwater level impacts over time. Additional, new monitoring boreholes might be required in future based on the outcome of the groundwater monitoring program. The groundwater level in the Corobrik Midrand borehole must also be recorded over time to assess what impact the abstraction has on the local aquifer. A reading just before pump start and again just before pump stop will help to determine pumping efficiencies and impacts. The level data must be used to effectively manage water abstraction from boreholes and the quarries, plus other production boreholes in the area, on a monthly and seasonal basis. Use a water purification system if the water is to be used for human consumption.	Control through impact management and monitoring.	Duration of operational Phase	Environmental Manager
3	Insufficient groundwater quantity monitoring data related ingress into quarries.	No groundwater model of inflows into the quarries. Groundwater ingress rates in the quarry and the dam were unavailable at the time of the development of the 2024 water balance, which may result to a water balance that is inaccurate.	Groundwater quantity	6	3	1	2	**20**		4	2	1	0	**0**		A groundwater model can be used to estimate inflows into the quarry and the Site Dam. Once groundwater inflows information is available, and quarry storage volumes can be estimated, the water balance should be updated.	Control through impact management and monitoring.	Duration of operational phase	Environmental Manager
Legal Compliance																			

Item	ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	Magnitude	Duration	Scale	Probability	Significance	Significance without	Magnitude	Duration	Scale	Probability	Significance	Significance with	Detailed Mitigation Measures	Mitigation Type	Time period for implementation	Responsible person
1	Unauthorised water uses occurring on site.	Section 21 (a): abstraction of water from a water resource needs a license. The operation obtains its water for brickmaking from site borehole and the old quarry. Section 21 (b) for storing of raw water from the old quarry. Section 21 (g): Quarry mining needs a license for the stockpiling of the clay stockpile. Dust suppression with water from the quarry requires licensing. Section 21 (j) Dewatering of water from the operational quarry for a period of three months. .	Legal compliance	10	4	1	5	**75**		2	1	0	0	**0**		Water use activities on site should be included in the water use license application, failure to do so may lead to potential legal impacts with the relevant authorises.	Control through impact management, monitoring, and compliance.	Duration of operational phase	Environmental Manager
Waste																			
1	Waste from the Brick manufacturing	Environmental and water pollution from the clay waste leftovers which could be washed down by stormwater and contaminate the surrounding areas.	Waste	8	4	2	4	**56**		4	1	1	1	**6**		Conduct a Waste Classification of mine residue stockpiles to prevent environmental impacts by ensuring that the waste is adequately managed as per the waste type. Once Corobrik develops a waste classification report. Corobrik is to implement the recommendation from the report to manage the waste.	Control through impact management and compliance.	Duration of operational phase	Environmental Manager

5.19 Issues and Responses from Public Consultation Process

Public participation is the cornerstone of the EIA process. The principles of the NEMA govern many aspects of EIA's, including public participation. These include provision of sufficient and transparent information on an ongoing basis to stakeholders to allow them to comment on the proposed project, which includes the water uses. In addition to the above, the NWA, 1998 (Act 36 of 1998) requires the holders/applicants and water use licence applicants to provide proof of consultation with the interested and affected parties for the water use activities triggered by the Corobrik water use activities.

A detailed Public Participation Process will be undertaken in accordance with the Regulations 17 to 19 regarding the procedural requirements for the water use licence applications and appeals (Government Notice R. 267) of the NWA. Proof of consultation will be attached or uploaded on the DWS electronic (eWULAAS) system as part of technical information compiled for the application.

5.20 Matters Requiring Attention/ Problem Statement

The matters requiring attention at Corobrik is indicated in Table 5.8

Table 5.8: Matters Requiring Attention

Theme	Issues/matter
Stormwater and Surface water	▪ Siltation of surrounding water courses due increased erosion during periods of high rainfall events. ▪ Deterioration of surface water quality as result of runoff from the quarries. ▪ Runoff from the brick manufacturing plant, workshop and wash bay could potentially carry hydrocarbons to surrounding water sources. ▪ All fuel storage areas should be appropriately bunded and spill kits should be in place, and construction workers trained in the use of spill kits, to contain and immediately clean up any potential leakages or spills ▪ It is proposed that water quality monitoring include the following additional surface monitoring locations : • The old quarries • Existing channels along the plant • Water exiting oil water separator • Water exiting silt barriers (during storm event)
Process Water	▪ Currently, there is no monitoring of water accumulating in the quarry and no groundwater model of inflows into the quarries.

Theme	Issues/matter
	▪ The network of water meters does not provide a comprehensive understanding of the internal distribution of water consumption (dust suppression vs water for irrigation of lawns).
Groundwater	▪ Boreholes Mid BH1 and VMBH1 are outside the calculated zone of influence of the Corobrik Midrand, the radius of influence for borehole Mid BH1 might intercept that of the Corobrik Midrand borehole if used simultaneously. ▪ Over utilization of the aquifer system intercepted by the various boreholes, including the Corobrik Midrand borehole and the associated dolomite stability issues.
Legal compliance	**Water use license** ▪ There are unauthorised water uses which are occurring on site. All Water use activities on site should be included in the water use license application, failure to do so may lead to potential legal impacts with the relevant authorises.

5.21 Assessment of Level and Confidence of Information

The information documented in this IWWMP has been obtained from numerous sources, including detailed specialist studies, annual monitoring reports, detailed designs and design reports, site-specific management plans, licences, authorisations etc. as well as from a whole host of information that has been recorded on site.

6. Water and Waste Management

6.1 Water and Waste Management Philosophy (Process water, Stormwater, Groundwater and Waste)

Process Water

In terms of process water, the following actions must be taken to realise the desired water and waste management philosophy:

- Process water usage should be minimised to conserve water. Water minimisation has been driven by the increasing cost of raw/potable water and effluent treatment or discharge charges as well as more stringent environmental regulation. Unnecessary water addition into the process circuit could cause unnecessary process water discharge into dirty water sumps and in turn unnecessary overflow into the environment.

- Process water containing waste should be classified and separated based on the level of contamination and possible uses. It is important to keep water reticulation circuits separate from each other to prevent cross-contamination.
- Cross-contamination should be prevent by storing all materials, chemicals and products separately. Reactive chemicals (such as lime) that readily dissolve in water should be stored in closed areas to prevent contact with water (rain or runoff). This storage may include silos (powder chemicals), closed tanks (solutions), sealed drums (oils), closed hoppers (to allow direct addition to process) or sealed bags on pellets within a building with a roof and concrete floor (granular chemicals). Where a process spillage risk exists, appropriate bunding structures should be constructed.
- Special measures should be employed to prevent leakage of contents from high contamination risk areas. Such areas may include acid storage areas and specific plant areas.
- Good cleaning practices should be followed to conserve water and to avoid cross-contamination.
- Equipment should be kept in working condition and should promote water conservation
- Water management systems should be designed and operated to last throughout the different phases of the processing plant life cycle to ensure sustainability.

Stormwater

The following principles must be acknowledged for storm water management:

- Clean storm water systems must be designed for an extreme event, both for the peak flood periods and the volume.
- Process and dirty water areas should be bunded with no contamination of clean water areas.
- Surge capacity of extreme events must be available for dirty storm water.
- Safety must be provided at dams.
- Maintenance of storm water infrastructure should be undertaken as required.
- Regular inspections for blockage, scour, sediment and litter should be undertaken.

Groundwater

In order to successfully use groundwater, its effective management is essential. The following principles must therefore be acknowledged:

- Water must be treated as a scarce and valuable commodity;
- The contamination of a groundwater resource can also impact surface water bodies as contaminants can find their way to rivers, streams and dams;

- A groundwater monitoring programme must be implemented in order to ensure that up to date and appropriate information is collected for decision making and corrective action as and when required; and
- Groundwater must be abstracted on a sustainable basis to ensure that no other legitimate groundwater users are impacted upon and that the base flow and other ecological water requirements are met.

Waste

The following principles must be implemented to guide waste management:

- Different waste steams must be identified and characterised in order for the disposal and handling to be in accordance with the respective waste stream classification and relevant legislation.
- Waste generation must be minimised as far as possible.
- Where possible, waste must be recycled.

6.2 Strategies (Process water, Stormwater, Groundwater and Waste)

To give effect to the water and waste management philosophies formulated above, more specific strategies will be formulated to support the management actions.

Process water strategy

The strategies pertaining to process water at Corobrik can be listed as follows:

- Ensure the surety of supply of process water to the operation;
- Investigate and implement new technologies to reduce the use of process water during production;
- Maximise the reuse and recycling of dirty water (including dirty storm water) and minimise the intake of clean water;
- Support the implementation of a water management plan by means of monitoring and measuring to maintain a high confidence metered site wide water balance; and
- Prevent discharge of process water to the receiving environment through the provision of adequate storage capacity, maintenance of related infrastructure and provision of backup pumps.

Storm water strategy

The strategies related to the management of storm water at Corobrik include the following:

- Collect and contain contaminated storm water runoff to be reused and recycled as process water;
- Maintain storm water management infrastructure in a functional state;

- Capture runoff in areas generating dirty storm water in storm water drains;
- Route clean storm water runoff emanating from clean areas to the natural receiving environment;
- Implementing sediment trapping measures; and
- Implement monitoring, measurement and reporting of water quantity and quality.

Groundwater strategy

The strategies related the management of groundwater at Corobrik include:

- Prevent the off-site migration of groundwater pollution plumes; and
- Maintain fitness for use of groundwater resource.

Waste strategy

The strategies related the management of waste at Corobrik are:

- Implement monitoring, measurement and reporting of waste generated in the operation to facilitate effective waste management;
- Dispose of waste generated at the operation, based on waste stream, in accordance with current waste management guideline; and
- Investigate improved technologies to reduce waste generated by reuse, recycling and/or recovering.

6.3 Performance Objectives/goals

The performance objectives for Corobrik are shown in Table 6.1.

Table 6.1: Performance Objectives

Theme	Performance objectives
Storm water	▪ Provision of adequately sized, properly designed dirty water management and conveyance systems. ▪ All surface stormwater management facilities should be desilted to ensure infrastructure functionality.
Surface water	▪ No impact on the downstream users and the receiving water resource during operation and post closure (maintain fitness for us of water resources)
Groundwater	▪ Ensure that activities do not significantly impact groundwater. ▪ Ensure that the volume of water abstracted from groundwater sources are monitored using flow meters and compliant with the licenced conditions.

Theme	Performance objectives
	▪ Update of groundwater model to determine impact on groundwater quantity and quality. ▪ Ongoing groundwater monitoring to verify and calibrate the groundwater model to inform post closure groundwater impact prediction. ▪ Maintain fitness for use of groundwater resource quantify post closure operation water impact and develop management measures.
Process water	▪ Water containing waste to be separated from clean water ▪ Prevent contamination of soil, surface and groundwater resources ▪ Follow good cleaning practices to conserve water and to avoid cross-contamination ▪ Equipment should be kept in working condition to promote water conservation ▪ Ensure sustainability
Wetlands	▪ No activities should take place in the buffer zone, riparian zone, and/or wetland regulated areas without authorisation from the DWS.
Legal compliance	▪ No waste and water use activities should take place without a valid authorisation.
Rehabilitation	▪ The Corobrik should implement a rehabilitation and closure plan for historical and dormant facilities.
Post-Closure water management	▪ Ensure adherence to the rehabilitation and closure plan commitments.

6.4 Measures to Achieve and Sustain Performance Objectives

Measures to achieve and sustain performance objectives for process water, storm water, groundwater and waste are contained in the IWWMP Action Plan.

6.5 Options Analyses and Motivation for Implementation of Preferred Option

Corobrik is an existing operation, and an option analysis is not possible. Should any new activities be undertaken, Corobrik will assess all possible options and the most practical, environmentally friendly and economically viable option will be chosen.

6.6 IWWMP Action Plan

The action plan for Corobrik is indicated in Table 6.2

Table 6.2: IWWMP Action Plan For Corobrik Midrand

Theme	Objective	Action	Responsible person	Start Date	End Date
Stormwater and Surface Water	No impact on the downstream users and the receiving water resource during operation and post closure (maintain fitness for us of water resources) Provision of adequately sized, properly designed dirty water management and conveyance systems. All surface stormwater management facilities should be desilted to ensure infrastructure functionality	Earth berms to be constructed along perimeter of each of the quarries as per the stormwater management plan.	SHE	FY 2025	FY 2026
		Silt barriers must be installed downstream of the plant area as per the stormwater management plan.		FY 2025	FY 2027
		Berms around quarries should be inspected monthly for signs of erosion especially after a heavy rain spell.		FY 2024	Ongoing
		Alien invasive species must be managed in and around the quarries.		FY 2024	Ongoing
		Continue with surface and groundwater quality monitoring at the at the current monitoring locations and frequency.		Ongoing	
		It is recommended that water quality monitoring include the following additional surface monitoring locations : - The old quarries - Existing channels along the plant - Water exiting oil water separator - Water exiting silt barriers (during storm event)		FY 2025	FY 2026
		The operational areas should kept clean and tidy. Grease, lubricants, paints, flammable liquids, and other combustible materials used should be placed and stored in a controlled manner and in an approved designated area. Immediate and corrective action to be taken when any type of spillage occurs with the removal of the spillage.		Ongoing	
		Oil/Water separator is required at the wash bay. The separated water (wash bay) from the oil/water separator to be stored in a sump. Contaminated sludge from the oil water separator to be removed by licensed contractor. Proof of collection to be kept on file at the site.		FY 2025	FY 2027
		The wash bay area to be shaped with reinforced concrete lined channels installed to allow water flow towards the oil water separator. Wash bay area to be covered by impermeable surface.		FY 2025	FY 2027
		Oil/Water separator must be inspected regularly and maintained in good working order. Contaminated storm water collected within the system is to be collected by an approved Contractor and transported to a licensed/approved dumping site.		Ongoing	
		All diesel depots and chemical storage facilities should be within bunded areas constructed on a concrete or other impermeable surface, including a water containment system, to reduce the risk of pollution of downstream watercourses.		Ongoing	

Theme	Objective	Action	Responsible person	Start Date	End Date
		The coal stockpile must be placed on an impermeable surface. It is proposed that a reinforced concrete slab is used for the coal stockpile. Reduce, control, and manage the height of material drops (e.g., RoM Stockpile loading). Process Coal stockpiling and transportation to be done using road tipper trucks and to be covered with tarpaulin covers.		FY 2025	FY 2027
		Utilised roadways should be inspected on a weekly basis for erosion and degradation. Areas of erosion or degradation identified should be maintained as described in the EMP. Records of the inspections must be kept on site. Dust suppression should be applied to all gravel access, maintenance, and haulage routes daily.		FY 2024	Ongoing
		All potential hydrocarbon spillages and leaks must be cleaned up immediately and the soils remediated.		FY 2024	Ongoing
		Spillage control kits should be readily available on site to contain the mobilisation of contaminants and clean up spills. All vehicles and machinery to be serviced in a hard park area or at an off-site location. Vehicles with leaks must have drip trays in place.		FY 2024	Ongoing
		Storage of hydrocarbons and explosives must be managed according to the Hazardous Substances Act, 1973 (Act No. 15 of 1973). Hydrocarbons and explosives storage facilities must be in a hard park bunded facility.		FY 2024	Ongoing
Process water	▪ Water containing waste to be separated from clean water ▪ Prevent contamination of soil, surface and groundwater resources. ▪ Follow good cleaning practices to conserve water and to avoid cross-contamination ▪ Equipment should be kept in working condition to promote water conservation ▪ Ensure sustainability	Additional water meters/measurement locations are recommended to improve water balance data collection and confidence in the model: • A meter/ record of dewatering from the quarries as and when it is carried out; and • Dust suppression records separated from the irrigation water from the recorded volumes at the Site Dam. Periodic estimation of the volume of water in the Site Dam, as best as possible will assist in refining the model for groundwater contribution.	SHE	FY 2024	FY2026
		Monthly record keeping of water meter records to be able to provide trends.		FY 2024	Ongoing
Groundwater	▪ Ensure that activities do not significantly impact groundwater.	A surface and groundwater monitoring programme must be in place to monitor groundwater level and water qualities, to assess what impact the Corobrik Midrand has on the local aquifers and dolomite stability.	SHE	Ongoing	

Theme	Objective	Action	Responsible person	Start Date	End Date
	▪ Ensure that the volume of water abstracted from groundwater sources are monitored using flow meters and compliant with the licenced conditions. ▪ Update of groundwater model to determine impact on groundwater quantity and quality. ▪ Ongoing groundwater monitoring to verify and calibrate the groundwater model to inform post closure groundwater impact prediction. Maintain fitness for use of groundwater resource quantify post closure operation water impact and develop management measures.	Conduct a Waste Classification of mine residue stockpiles to prevent environmental impacts by ensuring that the waste is adequately managed as per the waste type.		FY 2025	FY 2025
		Develop a groundwater model to assess the potential impacts of stockpiling and to determine the potential seepage of contaminants from the material into the groundwater system.		FY 2025	FY 2025
		Once a groundwater model is developed, it must be used to estimate inflows into the quarry and the Site Dam. Once groundwater inflows information is available, and quarry storage volumes can be estimated, the water balance should be updated.		FY 2025	FY 2025
		Groundwater Abstract (Pty) Ltd recommends that boreholes Mid BH1, VMBH1 and Mid BH3 serve as groundwater monitoring boreholes, to assess potential groundwater level impacts over time. Additional, new monitoring boreholes might be required in future based on the outcome of the groundwater monitoring program.		FY 2025	Ongoing
		The groundwater level in the Corobrik Midrand borehole must be recorded over time to assess what impact the abstraction has on the local aquifer. A reading just before pump start and again just before pump stop will help to determine pumping efficiencies and impacts.		FY 2025	Ongoing
		Groundwater level data must be used to effectively manage water abstraction from boreholes and the quarries, plus other production boreholes in the area, on a monthly and seasonal basis. Use a water purification system if the water is to be used for human consumption.		FY 2026	Ongoing
		Conduct a Waste Classification of mine residue stockpiles to prevent environmental impacts by ensuring that the waste is adequately managed as per the waste type. Once Corobrik develops a waste classification report. Corobrik is to implement the recommendation from the report to manage the waste.		FY 2025	FY 2025
Legal compliance	No waste and water use activities should take place without a valid authorisation.	Water use activities on site should be included in the water use license application, failure to do so may lead to potential legal impacts with the relevant authorises.	SHE	FY 2024	FY2024

6.7 Control and Monitoring

Corobrik has implemented water quality monitoring and measuring systems to check compliance with performance objectives. The water and waste monitoring measures implemented at Corobrik are discussed in detail under section 5.13 to 5.17.

6.8 Monitoring of Change in Baseline (environment) Information (Surface water, Groundwater, and Bio-monitoring)

Groundwater and surface water studies were conducted, baseline information gathered, and recommendations made by the respective specialists. Changes in the baseline information will be monitored according to the monitoring plans discussed earlier in the document.

6.9 Audit and Report on Performance of Measures

Once the water use license has been issued, the water use activities will be audited in terms of the National Water Act, 1998 (Act no. 36 of 1998) regulations on use of water for activities that will be occurring at the area aimed at the protection of water resources.

An environmental legal compliance audit will also be undertaken during life of the operation by an external consultant.

Actions will be assigned to all non-compliances identified during the assessment and incorporated in the action plan. Recommendations will be made on how the non-compliances and deficiencies that are identified during the assessment are rectified.

6.10 Audit and Report on Relevance of IWWMP Action Plan

The IWWMP action plan will be reviewed and updated annually or alternatively as required.

7. Conclusion

Corobrik is the leading brick manufacturer, distributor and marketer of clay bricks, clay pavers and associated allied building products in South Africa. The company contributes to the country's economy through generation of income from the export of bricks to the other countries around the world, thus contributes to generation of income and foreign exchange which in turn will benefit the country's economy. Further, Corobrik's operations creates employment opportunities for the locals and the country at large.

7.1 Regulatory Status of Activity

To comply with the requirements of the legislation, Corobrik Midrand proposes to undertake the WUL application for the abstraction of water from a site borehole and from the old quarry, storing of raw water from the old quarry, stockpiling of clay and dewatering of water from the operational quarry for a period of three months to allow for continuation of mining. This report therefore serves as a supporting document for the application of new water uses.

7.2 Motivation In Terms of Section 27 (1) OF NWA

The section 27 motivation for Corobrik is summarised in Table 7.1

Table 7.1: Section 27 Motivation

Section	Content	Motivation for Corobrik Midrand
27(1)(a)	Existing lawful water use	According to National Water Act (Act 36 of 1998), an existing lawful water use means a water use – (a) which has taken place at any time during a period of two years immediately before the date of commencement of NWA and which – (i) was authorised by or under any law which was in force immediately before the date of commencement of NWA; (ii) is a stream flow reduction activity contemplated in section 36(1); or (iii) is a controlled activity contemplated in section 37(1); or (b) Which has been declared an existing lawful water use under section 33. In the case of – a) stream flow reduction activity declared under section 36(1); or b) a controlled activity declared under section 38; Existing lawful water use means a water use which has taken place at any time during a period of two years immediately before the date of the declaration". Therefore, no existing lawful water uses were previously authorized or implemented for under any water/environmental related legislation this proposed project.
27(1)(b)	Need to redress the results of past racial and gender discrimination	The proposed project will subscribe to Corobrik's socio-economic objectives and demonstrate exemplary corporate citizenship and harmony with society through continued focus on affirmative action and actively promoting women and disability equity. Further, Corobrik continues to adhere to the B-BBEE codes of conducts by awarding contracts to black, women and youth owned emerging companies. Key

Section	Content	Motivation for Corobrik Midrand
		performance indicators of Corobrik to redress the results of past and gender discrimination are indicated as follows: - Black management professional and supervisory staff; - Women management professional and supervisory staff; - People with disabilities; and Procurement expenditure and supply of services, both capital and operating for Black Economic Empowerment and Women Empowerment.
27(1) (c)	Efficient and beneficial use of water in public interest	The project aims to integrate Corobrik Midrand factory' water use activities with environmental protection and socially responsible practices. The proposed abstraction of water from the quarries will reduce air pollution through the dust suppression. The containment of storm water into quarries will enable Corobrik to use such water for brick manufacturing which will avoid using municipality water. The bricks to be manufactured through the proposed water use activities are perfect material for the government projects such as clinics, housing, hospitals and schools due to their sustainability and strength (https://www.Corobrik.co.za/services/government-projects). When undertaking the proposed activities, the Corobrik will ensure that the possible impacts on water resources are avoided, minimized or reduced. The mitigation measures recommended by the specialists and conditions in the Environmental Management Programme (EMPr) will be implemented to ensure environmental protection and sustainability.
27(1)(d)(i)	Socio-economic impact of the water uses if authorised	In order to ensure the environmental compliance within the operation, Corobrik proposes to undertake a WULA for water uses in terms of Section 21 (a), (b), (g), and (j) of NWA. The proposed activity will ensure the following: - Reliable supply of bricks for both local and export markets; - Increase the opportunities to create more stable job opportunities; - The project will aid economic growth which will in turn benefit the locals, society and the country of South Africa as a whole; and - Encourage a 3R (Reduce, Reuse and Recycle) culture within Corobrik.
27(1)(d)(ii)	Socio-economic impact of failure	If the proposed activity is not authorised, taking of water from boreholes and quarries, storage of water into quarries will not be

Section	Content	Motivation for Corobrik Midrand
	to authorise water use or uses	undertaken. As such the socio-economic benefits outlined above will not be realised. Consequently, the South African economy will be negatively affected, and the livelihood of communities will not improve as expected.
27(1)(e)	Catchment Management Strategy applicable to the relevant water resource	The entire proposed site is situated within the A21B quaternary catchment area with the average rainfall of 672 mm/year.
27(1)(f)	Likely effect of the water use to be authorised on the water resource and other water users (quality and quantity)	**Effect of The Water Use To Be Authorised On Water Resources** It is anticipated that the impact of the proposed water use activities will be of low significance on water resources as there are no proposed developments of any infrastructure within the watercourse. Such identified impacts include: - Possible drying up of surrounding boreholes; - The impact on water quantity in the catchment but it will be minimal; - The impact of water abstraction on water quantity, however, can be considered to be of low significance as the water is only being used dust suppression and factory processing purposes. **Effect of The Water Use On Water Users** It is anticipated that the proposed project will have minimal impacts on other water users as there is no development of a new infrastructure proposed and the proposed activities will be undertaken within the areas owned by Corobrik.
27(1)(g)	Likely effect of the water use on the class and resource quality objectives	The DWS introduced measures to protect water resources by planning and setting objectives for the desired condition of resources and putting measures in place to control water use to limit impacts to sustainable levels, thereby ensuring a healthy functioning aquatic ecosystem together with water that is fit for use for recognised water users. Resource water quality objectives form the basis for management of the water resources quality and support various activities such as scenario analysis, water quality allocations and strategy development.
27(1)(h)	Investments already made and to be made by the water users in	Corobrik supplies face bricks and pavers for substantial buildings and landscaping projects to local and international customers (United States of America, Singapore, Taiwan, South Korea, Japan, Arabian

Section	Content	Motivation for Corobrik Midrand
	respect of the water use	Gulf countries, the Indian Ocean Islands and other African states) which leads to a great investment in terms of the income generation, foreign exchange, increase employment opportunities and improvement in the economy of South Africa
27(1)(i)	Strategic importance of the water use to be authorised	The strategic importance of the proposed project is to ensure that all the aforementioned benefits are realized including job security for skilled and unskilled workers as well as environmental protection and sustainability. The water use activities to be authorised will ensure compliance with legislations and further seek to ensure environmental protection.
27(1)(j)	Quality and quantity of the water in the water resource which may be required for the Reserve and for meeting international obligations	The Limpopo Water Management Area is the most northern WMA in South Africa. The Limpopo WMA North forms part of the internationally shared Limpopo Basin. The Limpopo River forms the entire length of the international border between the WMA and Botswana and Zimbabwe before flowing into Mozambique. The main rivers in the study area form the six major catchment areas in the Limpopo WMA North which include the Matlabas, Mokolo, Lephalala, Mogalakwena, Sand and Nzhelele. These rivers, together with other smaller tributaries, all flow northwards into the Limpopo River. Adjacent catchments supplying water to the Limpopo WMA North include the Luvuvhu and Letaba, Olifants, and Crocodile (West) and Marico. No transfers are currently made from the Limpopo WMA North to other WMAs
27(1)(k)	The probable duration of any undertaking for which a water use is to be authorised	Due to the nature of the proposed water uses, the duration of the project can be seen as permanent. The water use authorization application will thus be for permanent water usage.

8. References

City of Ekurhuleni, 2024. *Annexure A Review of the Integrated Development Plan 2024/25-2026/2027,* s.l.: City of Ekurhuleni.

CM Eclectic (Pty) Limited, 2024. *COROBRIK MIDRAND FACTORY SITE-WIDE WATER BALANCE REPORT,* Broadacres: CM Eclectic (Pty) Limited.

CoroBrik (Pty) Ltd, 2013. *ENVIRONMENTAL IMPACT ASSESSMENT REPORT.* s.l.:s.n.

Groundwater Abstract (Pty) Ltd, 2024. *Corobrik Midrand Groundwater Assessment Report,* Pretoria: Groundwater Abstract (Pty) Ltd.

MVD Kalahari Consulting, 2024. *MIDRAND OPERATIONS STORM WATER MANAGEMENT PLAN,* s.l.: MVD Kalahari Consulting Engineers and Town Planners (Pty) Ltd.

NOHS Consultants (Pty) Ltd, 2024. *Analytical Report on Water Sampling at Corobrik Midrand,* Roodepoort: NOHS Consultants (Pty) Ltd.

REPORT COMPILED BY:

Mokgatla Molepo (MSc)
MORA Director, Ecologist (Zoology) & Avifaunal Specialist.

Email:
mokgatla@moraecological.co.za

Contact:
(+27) 76 559 7692