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The Block Meat Company Water Use Licence Application Technical Report

Report

Version - Final

30 January 2026

GCS Project Number: 24-0773

Client Reference: The Block Meat Company

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EXECUTIVE SUMMARY

Introduction

The Block Meat Company (Pty) Ltd (Block Meat Company), a subsidiary of the Shoprite Group, operates a wholesale meat processing and distribution facility located at Erf 451, Apex Extension 0, in Benoni, Gauteng Province. The facility forms part of Shoprite's national agri-processing and food distribution network and requires a reliable and continuous water supply to meet stringent food safety, hygiene and operational requirements.

To supplement municipal water supply and ensure operational resilience during periods of municipal interruption, Block Meat has developed an on-site borehole (BH2). The abstraction of groundwater from this borehole constitutes a water use in terms of Section 21(a) of the National Water Act, 1998 (Act No. 36 of 1998) (NWA) and therefore requires authorisation under that Act.

This Technical Report supports the Water Use Licence Application (WULA) and demonstrates that the proposed water use is sustainable, manageable and in the public interest.

Water Use Applied For

The application seeks authorisation for the abstraction of up to 5000 cubic metres per annum (m^3/a) of groundwater from borehole BH2 in terms of Section 21(a) of the NWA. The groundwater abstraction will be used solely to supplement municipal supply for operational purposes.

Environmental Baseline and Hydrogeological Context

The site is located within quaternary catchment C21D in the Upper Vaal sub-catchment, which forms part of the Vaal–Orange Water Management Area under the jurisdiction of the Vaal-Orange Catchment Management Agency. Although the broader catchment experiences moderate levels of water stress, localised groundwater reserve assessments confirm that sufficient groundwater is available to support the proposed abstraction without compromising the integrity of the resource.

Groundwater abstraction occurs from a deep, confined fractured aquifer at depths exceeding 150 metres below ground level (mbgl). The borehole has a limited radius of influence (approximately 8.6 m), and no neighbouring groundwater users were identified within a 2.5 km radius. Groundwater quality is compliant with applicable standards and the aquifer is classified as having moderate protection and utilisation (Class II).

Key Risks and Impacts Identified

The impact and risk assessment indicates that potential impacts associated with the proposed groundwater abstraction are low. Key risks relate to the potential for over-abstraction and

the protection of groundwater quality. These risks are considered manageable due to the conservative abstraction volume, the confined nature of the aquifer and the absence of nearby groundwater users or groundwater-dependent surface water features.

Mitigation and Management Measures

A comprehensive management plan has been developed to ensure sustainable groundwater use. Key measures include limiting abstraction to the licensed volume, continuous monitoring through calibrated flow meters, regular groundwater level and quality monitoring, protection of borehole infrastructure, effective stormwater management rigorous effluent control and disposal and implementation of spill prevention and response procedures at the processing facility. An adaptive management approach will be applied should monitoring indicate any emerging risks.

Conclusion and Recommendation

The specialist investigations confirm that the proposed abstraction of 5000 m^3/a of groundwater can be undertaken sustainably and with negligible risk to the groundwater resource or to other water users. The abstraction volume is conservative and well within the available groundwater reserves of the sub-catchment. On this basis, and subject to compliance with the proposed monitoring and management measures, it is concluded that the proposed water use is environmentally acceptable, technically feasible and in the public interest. Granting the Water Use Licence (WUL) in terms of Section 21(a) of the NWA is therefore recommended.

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LIST OF ABBREVIATIONS

Abbreviation	Description
B-BBEE	Broad-Based Black Economic Empowerment
BH	Borehole
BHN	Basic Human Needs
CMS	Catchment Management Strategy
CSI	Corporate Social Investment
DTM	Digital Terrain Model
DWS	Department of Water and Sanitation
ELWU	Existing Lawful Water Use
EWR	Ecological Water Requirements
GA	General Authorisations
GCS	GCS Environment South Africa (Pty) Ltd
GRDM	Groundwater Resource Directed Measures
IWRM	Integrated Water Resource Management
MAE	Mean Annual Evaporation
MAP	Mean Annual Precipitation
NGA	National Groundwater Archive
NGO	Non-Governmental Organisations
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PPP	Public Participation Process
SCM	Site Conceptual Model
SDG	Sustainable Development Goals
SMME	Small, Medium and Micro Enterprises
SRTM	Shutter Radar Topography Mission
UV	Ultraviolet
VOCMA	Vaal-Orange Catchment Management Agency
WARMS	Water Authorisation Registration and Management System
WMA	Water Management Area
WUL	Water Use Licence
WULA	Water Use Licence Application

UNITS OF MEASUREMENT

Unit of Measure	Description
ha	Hectares
km	Kilometres
kl	Kilolitre
l	Litres
m	Metres
m^3	Cubic metres
m^3/a	Cubic metres per annum (per year)
mamsl	metres above mean sea level
mbgl	metres below ground level

Unit of Measure	Description
mm	Millimetres
mm/a	Millimetres per annum
%	Percentage
°C	Degrees Celsius

1 INTRODUCTION

1.1 Activity Background

The Block Meat Company (Pty) Ltd (Block Meat), a subsidiary of the Shoprite Group, operates a 24-hour meat processing facility in Apex, Benoni, within the City of Ekurhuleni in the Gauteng Province. As a food-for-human-consumption processing facility, Block Meat is legally obliged to comply with strict food safety regulations. To ensure uninterrupted processing, sanitation and hygiene, the facility requires a reliable and continuous water supply. In addition to municipal water, the applicant has developed a borehole on site to supplement municipal supply and to maintain operations during periods of municipal service interruption.

The Block Meat Company therefore seeks to apply for a new Water Use Licence (WUL) to authorise the abstraction of groundwater as a supplementary water source. This is critical to sustaining operational continuity, particularly in view of increasing municipal service delivery challenges that result in regular water supply disruptions.

The proposed water use involves the abstraction of groundwater from an existing borehole located on site at the Block Meat Company facility. Two boreholes (BH1 and BH2) have been drilled on site; however, BH1 is dry, while BH2 is equipped and operational. Block Meat proposes to use groundwater abstracted from BH2 to supplement the processing plant's existing water supply.

The abstraction of groundwater from a borehole constitutes a water use in terms of Section 21(a) of the National Water Act, 1998 (Act No. 36 of 1998) (NWA). The Block Meat Company has therefore appointed GCS Environment South Africa (Pty) Ltd (GCS) to prepare this Technical Report in support of the Water Use Licence Application (WULA).

1.1.1 Regional Setting and Location of Activity

The application area is situated approximately 15 kilometres (km) north-east of the town of Benoni, within the Apex Industrial Area in the City of Ekurhuleni Metropolitan Municipality, Gauteng Province. The regional (and geological) setting and site location of the project area are illustrated respectively in Figure 1-1 and Figure 1-2.

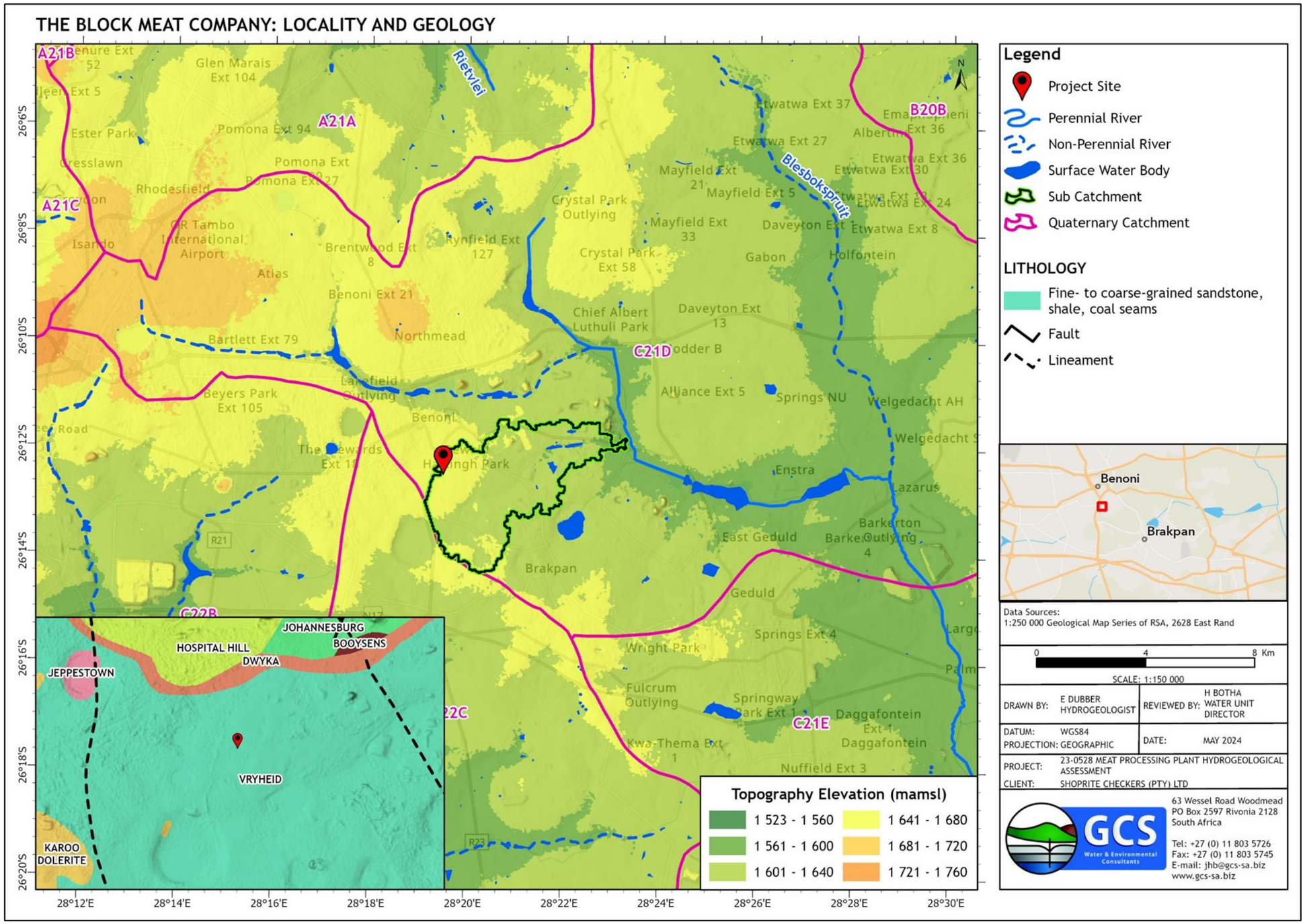

Figure 1-1: Regional Location and Geological Context of the Block Meat Company

Figure 1-2: Site Location of the Block Meat Company

1.1.2 Property Description

The project is located on Erf 451 Portion 0 Apex Extension 0. The cadastral details of the properties where the water uses will take place are listed in Table 1-1.

Table 1-1: Property Details

Farm Name:	ERF 451 Portion 0 IR
Application Area (ha):	~2.99
Magisterial District:	City of Ekurhuleni Metropolitan Municipality
Distance and Direction from Nearest Town	15 km to the northeast of the town of Benoni
Title Deed Number	T14705/2015
21 Digit Surveyor	T0IR00190000045100000

1.1.3 Purpose of this Report

A WUL Technical Report is prepared to support an application under the NWA. Its purpose is to demonstrate that proposed water uses are lawful, sustainable, and will be well-managed. The report outlines the current condition of surface and groundwater resources, assesses potential impacts, and applies risk tools to identify and mitigate threats to water quality and quantity. It also shows alignment with national and catchment strategies while addressing socio-economic benefits. The report provides the Department of Water and Sanitation (DWS) with the technical evidence needed to make an informed licensing decision.

1.2 Contact Details

The contact details of the applicant, Block Meat Company, and the appointed water use consultant, GCS, are provided in Table 1-2 and Table 1-3.

1.2.1 Details of the Applicant

Table 1-2: Applicant Details

Company Name	The Block Meat Company
Telephone Number	011 741 3008
Contact Person	Lance Van Der Sandt
Email Address	lvdsandt@shoprite.co.za
Physical Address	20 Dunedin Street, Apex, Benoni, 1501

1.2.2 Environmental Consultant

Table 1-3: Details of the Water Use Licence Consultant

Company Name	GCS Environment South Africa (Pty) Ltd
Telephone Number	011 803 5726
Contact Person	Paula Tolksdorff
Email Address	paulat@gcs-sa.biz
Postal Address	PO Box 2597, Rivonia,2128
Physical Address	63 Wessel Road, Rivonia, 2128

The Curriculum vitae and qualifications of the Environmental Assessment Practitioner is attached as APPENDIX A.

2 CONTEXTUALISATION OF ACTIVITY

2.1 Description of Activity

Block Meat is a wholesale meat supplier based in Apex, Benoni, Gauteng. The company specializes in the large-scale distribution of various meat products to retailers, restaurants, butcheries, and catering businesses. Operating within the wholesale trade sector, Block Meat focuses on sourcing, processing, and supplying quality meat products in bulk rather than direct retail sale to consumers. The operations are designed to ensure a consistent supply of fresh and processed meats to commercial clients across the region.

As part of the Shoprite Group, Africa's largest supermarket retailer and South Africa's largest private sector employer, Block Meat plays a vital role in supporting the Group's food processing and distribution network. Groundwater abstraction from this on-site borehole will underpin the facility's ability to maintain high hygiene standards, ensure food safety and sustain uninterrupted production, particularly in a region where municipal water supply is subject to periodic challenges. This ensures operational resilience while reducing dependence on municipal infrastructure.

The lawful registration of this borehole aligns with Shoprite's broader sustainability strategy, which integrates resource efficiency, risk mitigation and environmental stewardship. By securing a reliable groundwater supply, the facility contributes to alleviating pressure on public water infrastructure, thereby supporting both corporate operational continuity and the sustainability of the wider community.

From an economic perspective, the continued lawful use of the borehole is essential for maintaining employment, supporting local procurement, and strengthening the regional food value chain. The facility's uninterrupted operation safeguards jobs, supports inclusive economic growth and ensures the stability of supply within the food processing sector.

Beyond operational and economic benefits, the authorised groundwater use supports Shoprite's Corporate Social Investment (CSI) initiatives, including hunger relief programmes, youth employment projects and small business development. These initiatives contribute to national development priorities and advance several United Nations Sustainable Development Goals (SDGs), including SDG 2 (Zero Hunger), SDG 6 (Clean Water and Sanitation) and SDG 8 (Decent Work and Economic Growth).

2.2 Extent of the Activity

The Block Meat Company covers an operational footprint of approximately 2.99 hectares (ha).

2.3 Key Activity Related Processes and Products

The proposed water supply and treatment system comprises several integrated components designed to ensure a reliable and continuous supply of potable-quality water to the processing plant. The system begins with a single borehole drilled to a depth of approximately 160 metres (m) below ground level that serves as a primary groundwater abstraction point.

Abstracted borehole water is initially conveyed to four 20 000 litre (l) storage tanks, which provide bulk raw water storage and buffer capacity to accommodate fluctuations in abstraction rates and operational demand.

Municipal water and borehole (BH) 2 water are incorporated into the system to supplement supply resilience. Both municipal water and borehole water undergo treatment through a duplex water softening system, which operates in parallel to remove hardness-causing minerals, protect downstream infrastructure and ensure uninterrupted operation during maintenance or regeneration cycles.

Following softening, the treated borehole and municipal water is stored in a second set of four 20 000 l tanks, allowing for blending, operational flexibility and adequate reserve capacity. Prior to distribution to the processing plant, the stored water is passed through two G-Chem ultraviolet (UV) treatment systems, which provide final disinfection by destroying microbial contaminants and other impurities.

The combined treatment process improves overall water quality and ensures the supply of water that is suitable for safe consumption, hygiene and food processing requirements. The fully treated water is then supplied directly to the processing plant, supporting continuous operations, sanitation and hygiene requirements essential for a 24-hour meat processing facility. Figure 2-1 provides the key components and process flow of the proposed water supply and treatment system, from groundwater abstraction and storage through to treatment and final supply to the processing plant.

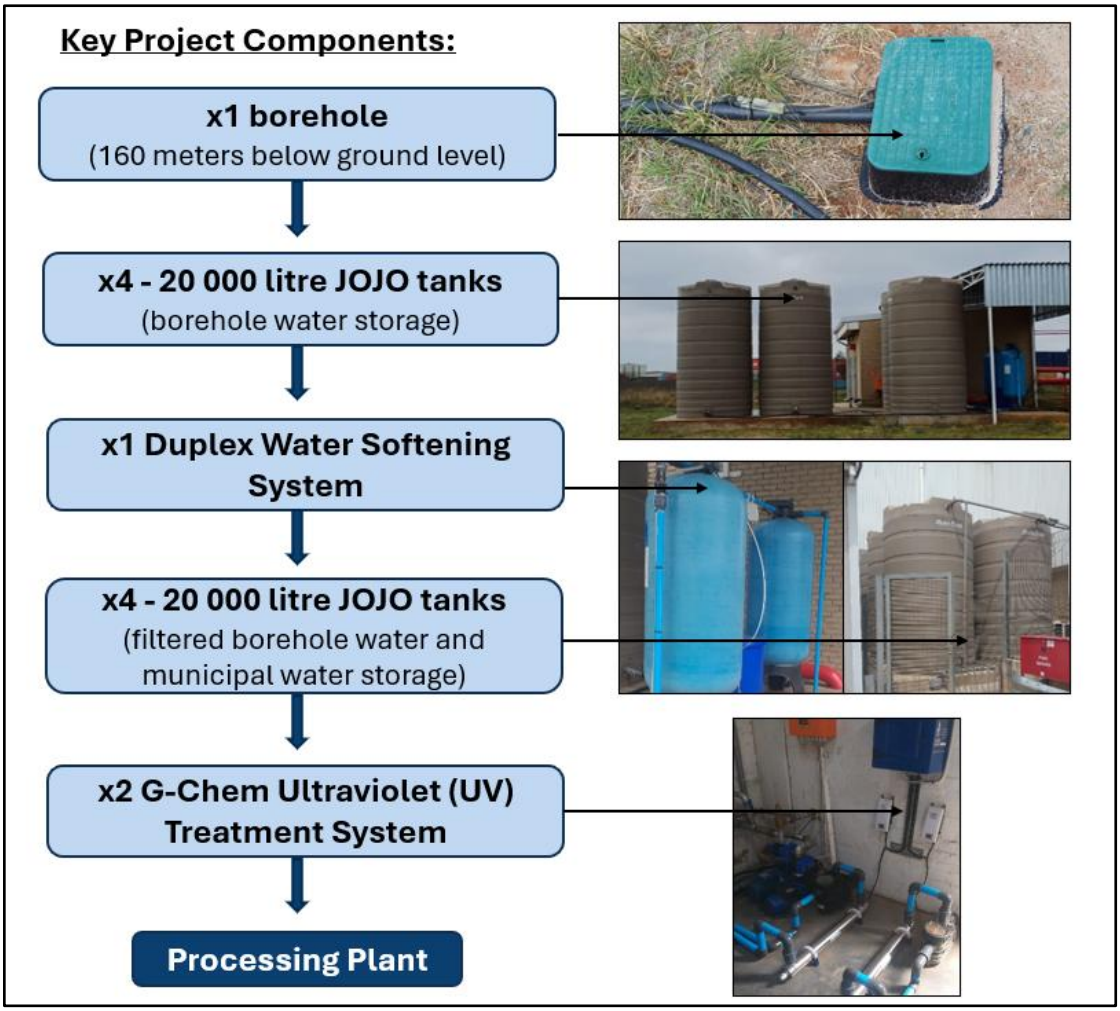

Figure 2-1: Process Flow Diagram of the Borehole and Municipal Water Supply and Treatment System

2.4 Activity Life Description

The anticipated operational lifespan of the borehole will extend until such time the Block Meat Company ceases its operations at the present location.

2.5 Key Water Uses

The key proposed water uses at the Block Meat Company comprise only Section 21(a) water use in terms of NWA. Table 2-1 below outlines the Section 21 water use identified.

Table 2-1: Section 21 Water Use to be included in the Water Use Licence Application

Water Use	Description
Section 21 (a) Taking water from a water resource.	Groundwater is abstracted from a borehole on the property for use in supporting the food processing facility.

2.6 Organisational Structure of Activity

Block Meat bears ultimate responsibility for the implementation of the Water Management Plan and for ensuring compliance with all conditions set out in the WUL. Within this

framework, Block Meat has established a clear operational management structure to ensure accountability, efficiency and effective communication across all functional areas. The structure is summarised below.

Top-Level Governance

- Board of Directors
    - Responsible for the Group's strategic direction and corporate governance.
- Independent Chairman
    - Leads the Board.
    - Currently Wendy Lucas-Bull.
- Board Committees
    - Audit and Risk Committee.
    - Remuneration Committee.
    - Nomination Committee.
    - Social and Ethics Committee.

Executive Management Team

- Group Chief Executive Officer – Pieter Engelbrecht.
    - Overall leadership and accountability for organisational performance.
- Chief Financial Officer – Anton de Bruyn.
    - Financial planning, reporting and risk management.
- Chief Operating Officer
    - Oversight of day-to-day operations and supply chain management.
- Chief People Officer – Athene Van Mazijk.
    - Human resources management and employment equity.
- Chief Marketing Officer
    - Brand management and marketing strategy.

Divisional and Regional Management

- Divisional Managers
    - Supermarkets (South Africa).
    - Supermarkets (Non–South Africa).

- OK Franchise.
- Furniture Division (currently held for sale).

- Regional Managers
  - Supervise multiple stores within defined geographic regions.
  - Ensure operational efficiency, compliance and performance alignment.

Operational Level

- Store Managers
  - Responsible for daily operations of individual stores.
  - Staff management and customer service oversight.
- Department Managers
  - Supervision of specific in-store departments, including:
    - Deli.
    - Bakery.
    - Money Market.
- Front-line Employees
  - Cashiers.
  - Shelf-packers.
  - Customer service staff.

2.7 Business and Corporate Policies

2.7.1 Corporate Governance Framework

The organisation operates within a structured corporate governance framework that is aligned with the principles of the King IV™ Report on Corporate Governance for South Africa (Shoprite Holdings Ltd, 2025a). This approach is informed by the documented application of King IV principles (Shoprite Holdings Ltd, 2025a) by the organisation, which emphasises ethical leadership, accountability, transparency and responsible corporate citizenship.

The Board of Directors is the highest governing body and is responsible for setting the strategic direction of the organisation, ensuring ethical and effective leadership and overseeing compliance with applicable legislation, regulations and non-binding codes, as outlined in the King IV governance framework (Shoprite Holdings Ltd, 2025a). Formal board charters, policies and delegation-of-authority frameworks are in place to define roles, responsibilities and accountability across the organisation, as described in the Application of

the King IV™ Code Principles (Shoprite Holdings Ltd, 2025b).

2.7.2 Ethical Conduct and Organisational Ethics

The organisation is committed to maintaining high standards of ethical conduct and integrity in all its activities. This commitment is guided by an organisation-wide Code of Ethics, as referenced in the Application of the King IV™ Code Principles (Shoprite Holdings Ltd, 2025a) which applies to all employees and members of the Board and provides guidance on ethical behaviour, decision-making and compliance with legal and internal policy requirements.

Ethical governance is further supported through formal oversight structures, including mechanisms for monitoring ethical performance and managing ethical risks such as fraud, corruption and misconduct, as described under the organisational ethics principles of King IV. Confidential reporting mechanisms are in place to allow employees and third parties to report unethical or unlawful behaviour, with appropriate investigation and corrective action undertaken where necessary (Shoprite Holdings Ltd, 2025b).

2.7.3 Social and Ethics Oversight

A formally constituted Social and Ethics Committee assists the Board in overseeing social, ethical, environmental and sustainability-related matters. The Committee is established in terms of section 72(4) of the Companies Act, 2008 and operates in accordance with the approved Social and Ethics Committee Charter (Shoprite Holdings Ltd, 2025b).

As outlined in the Social and Ethics Committee Charter Shoprite Holdings Ltd (2025b), the Committee's mandate includes oversight of the organisation's performance and compliance in relation to:

- Social and economic development.
- Good corporate citizenship.
- Environmental responsibility.
- Health and public safety.
- Labour and employment practices.
- Transformation and equality.
- Ethical governance.
- Sustainability and stakeholder engagement.

2.7.4 Environmental Responsibility

Environmental stewardship forms part of the organisation's commitment to responsible corporate citizenship, as articulated in both the Application of the King IV™ Code Principles (Shoprite Holdings Ltd, 2025a) and the Social and Ethics Committee Charter (Shoprite

Holdings Ltd, 2025b). Oversight structures are in place to monitor compliance with applicable environmental legislation and to assess the environmental impacts of business activities.

In accordance with the Social and Ethics Committee Charter (Shoprite Holdings Ltd, 2025b) the organisation monitors environmental compliance and the impacts of its operations on natural resources, including water resources. Measures are implemented to minimise adverse environmental impacts, promote sustainable resource use and ensure appropriate disclosure of environmental performance.

2.7.5 Compliance and Risk Management

The organisation maintains formal compliance and risk governance frameworks, as described in the Application of the King IV™ Code Principles (Shoprite Holdings Ltd, 2025a; Shoprite Holdings Ltd, 2025b) to ensure adherence to applicable laws, regulations and standards. The Board retains ultimate responsibility for compliance governance, with oversight of risk management and regulatory compliance delegated to relevant board committees.

Compliance risks, including those associated with water use, groundwater abstraction and environmental authorisations, are identified, monitored and managed through internal controls, reporting mechanisms and enterprise risk management processes aligned with King IV principles (Shoprite Holdings Ltd, 2025a).

2.7.6 Stakeholder Engagement and Reporting

A stakeholder-inclusive approach is adopted in line with the principles set out in the Application of the King IV™ Code Principles (Shoprite Holdings Ltd, 2025a). The organisation seeks to balance the needs and expectations of regulators, employees, surrounding communities and other interested and affected parties through transparent and effective communication (Shoprite Holdings Ltd, 2025b).

3 REGULATORY WATER FRAMEWORK

3.1 Summary of all Water Uses

Water resources in the Republic of South Africa are regulated under the NWA. The Minister of Water and Sanitation is the custodian of all water resources in the country, acting on behalf of the people of South Africa.

Under the NWA, it is an offence to pollute any water resource or render it unfit for use, including rainwater, seawater and groundwater. Additionally, all water uses identified under Section 21 must be authorised in accordance with Section 40 of the Act. Details of the applicable water use requiring authorisation are provided in Table 3-1.

Table 3-1: Water Use being Applied For

The Block Meat Company - Water Uses					
Water uses	**Description**	**Coordinates**		**Property Details**	**Volume/Capacity Applied (m^3/a)**
		Latitude	**Longitude**		
Section 21 (a): Taking water from a water resource					
1	Abstraction of groundwater from a borehole	26° 12' 36.64" S	28° 19' 28.38" E	Town Apex Ext 4, Erf 451, Ptn 0	5000 m^3/a

3.2 Existing Lawful Water Uses

Existing Lawful Water Use (ELWU) is defined in Section 32 of the NWA as any water use that occurred during the two years immediately preceding the commencement of the Act (1 October 1998), or which has subsequently been declared lawful under Section 33 and which was authorised by or under any previous legislation.

The water use associated with Block Meat does not constitute an ELWU in terms of Section 32. Accordingly, Block Meat Company is applying for a new WUL to authorise water use that supplements the municipal supply. This is critical to ensuring a reliable supply of water for food processing, sanitation and hygiene particularly in light of increasing municipal service delivery challenges leading to regular water supply disruptions

3.3 Relevant Exemptions

No exemptions are applicable to this application.

3.4 Generally Authorised Water Uses

General Authorisations (GAs) permit certain low impact water uses to be undertaken without a licence, provided all specified conditions are met. These serve as conditional exemptions from licensing. The water uses associated with the borehole do not meet the requirements of any applicable GA and, as such, will require a WUL.

3.5 New Water Uses to be Licenced

The water use triggered for the Block Meat Company require authorisation in terms of Section 21 (a) of the NWA. The following water use has been identified for authorisation:

- Section 21(a) – Taking water from a water resource:
    - Abstraction of water from a borehole. The total abstraction from the borehole is 5,000 m^3/a.

3.6 Other Authorisations

No other environmental authorisations are currently held by the Block Meat Company apart from those specified within this application.

4 PRESENT ENVIRONMENTAL SITUATION

This information is sourced from the Geohydrological Assessment compiled by GCS (GCS, 2023), attached in Appendix B.

4.1 Climate

The Köppen Climate classification suggests the project site is situated in an oceanic subtropical highland climate (Cwb) area that receives rainfall in the summer months (December until March). The site falls within rainfall area C2A, which has a Mean Annual Precipitation (MAP) of 697.98 millimetres per annum (mm/a). Precipitation is the lowest in July with an average of 2 mm, with the highest rainfall occurring during the summer months peaking at 142 mm during December. At a mean daily maximum temperature of 27 °C, November, December, January and February are the hottest months of the year. June and July are the coldest months of the year with a mean daily maximum temperature of 18 °C. The Mean Annual Evaporation (MAE) is in the order of 1,625 mm/a(S-Pan) for the catchment. Temperature and rainfall distribution for the area is shown in Figure 4-1.

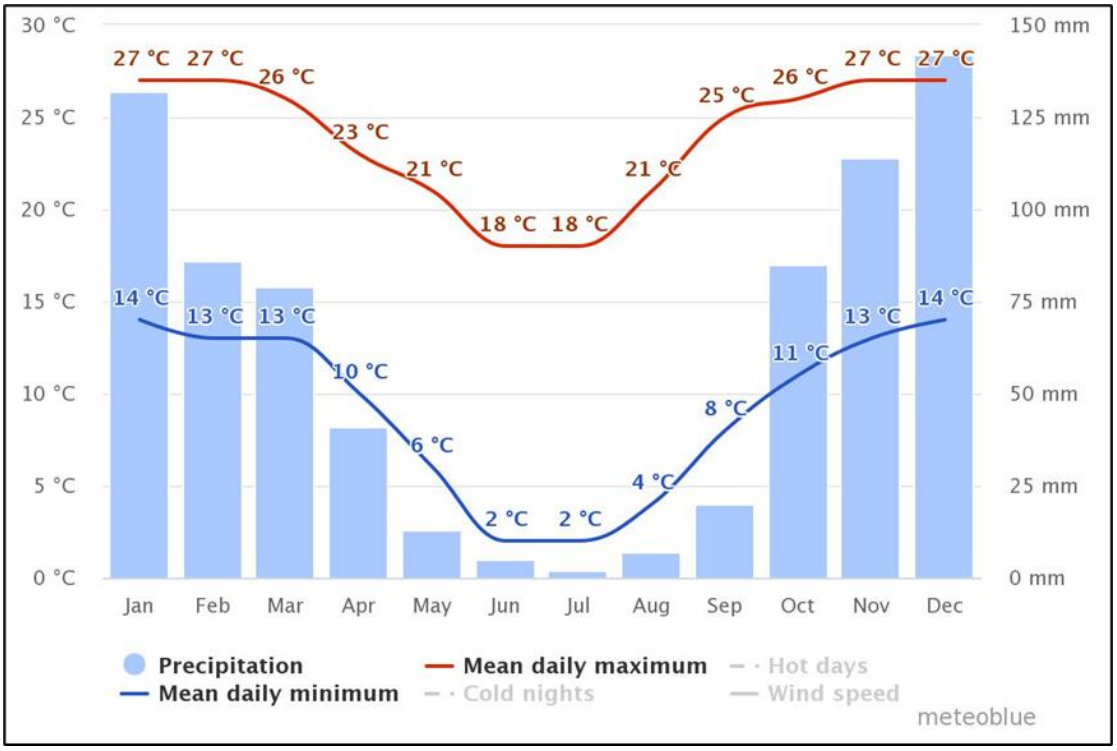

Figure 4-1: Rainfall and Temperatures (source www.meteoblue.com) (GCS, 2023)

4.2 Topography

The site is located along the eastern boundary of quaternary catchment C21D within the Upper Vaal Water Management Area. The surface topography indicates slightly undulating plains that drain towards the east. The regional surface elevation ranges from 1,760 metres above mean sea level (mamsl) in the west to 1,561 mamsl in the east, while locally it ranges

from 1,656 and 1,655 mamsl.

Surface drainage from the site is towards the Blesbokspruit in the east, which drains south until it joins with the Suikerbosrand River, a tributary of the Vaal River. The Block Meat site falls well outside of any 500 m buffers around surface water bodies.

4.3 Local Geology

The 2628 East Rand – 1:250 000 Geological map series (Department of Mineral and Environmental Affairs [DMEA], 1998) and the 2628AB Benoni – 1:50 000 Geological Series (Council for Geoscience, 2007) indicate the local geology is characterised by fine- to coarse-grained sandstone and shale of the Vryheid Formation in the Ecca Group of the Karoo Sequence (refer Figure 4-2). The geophysical surveys and hydrogeological drilling confirmed that at the Block Meat Company, the sandstones are overlain by ~100 m thick Quartzite.

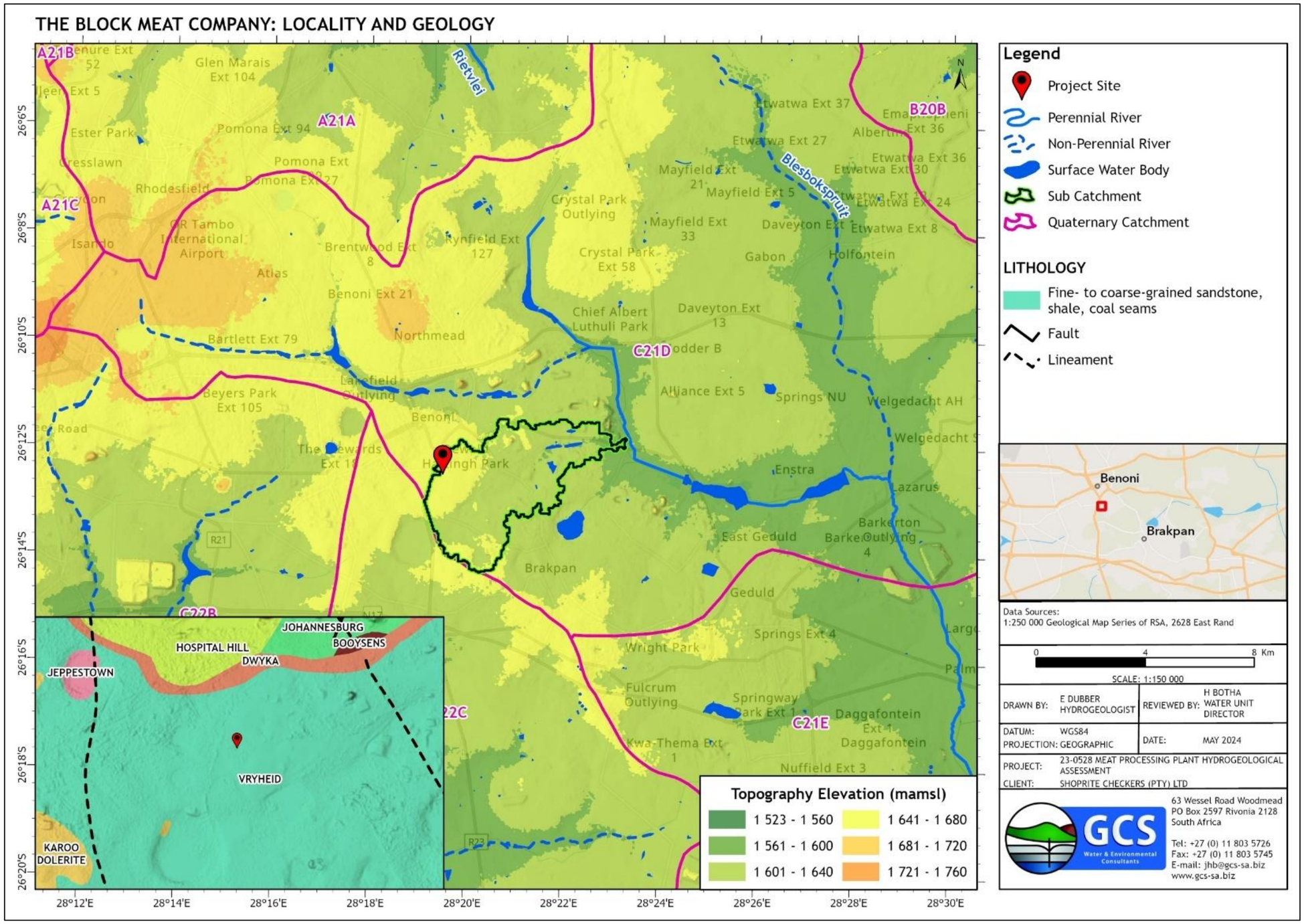

Figure 4-2: Regional Setting and Local Geology (GCS, 2023)

5 SPECIALIST FINDINGS

5.1 Groundwater Assessment

This information is sourced from the Geohydrological Assessment compiled by GCS (GCS, 2023), attached in Appendix B.

5.1.1 Aquifer Characteristics, Classification and Groundwater Recharge

The 1:500,000 Hydrogeological map series 2526 Johannesburg (Figure 5-2) was reviewed to present the hydrogeological characterisation of the project area. The map indicates that the aquifer underlying the Block Meat site can be regarded as a low to moderate-yielding intergranular and fractured aquifer, with reported yields ranging from 0.1 to 0.5 l/sec - Class D2 aquifer. Groundwater occurrence is typically associated with weathered and fractured sedimentary rocks (Vegter, J.R., Ward, S. & Winter, P.R, 1968).

Recharge to the underlying aquifer is estimated to be in the order of 2.8% of the mean annual precipitation (698 mm) that falls within quaternary catchment C21D (DWS, 2020). The aquifer is considered an important contributor to groundwater baseflow to streams and rivers (Barnard H.C, 2000).

5.1.2 Depth to Groundwater

A field hydrocensus was conducted within 2.5 km of the project site and no boreholes were located on site. This is because most households and industries around this area are dependent on municipal water supply. A review of the National Groundwater Archive (NGA) database indicated that 10 registered boreholes are situated within a 5 km radius of the project site, of which six are located within quaternary catchment C21D (Figure 5-2). Only four of the available 10 boreholes have water level information and Table 5-1 lists the available information on the boreholes in the area according to the NGA.

Table 5-1: Boreholes within a 5 km Radius of the Project Site (GCS, 2023)

Borehole ID	Latitude	Longitude	Farm Name	Water Level (mbgl)	Quaternary Catchment
2628AB00038	-26.19027	28.30803	Benoni	-	C21D
2628AB00040	-26.19028	28.30803	Benoni	-	C21D
2628AB00041	-26.19027	28.30805	Moreshoff School	18.28	C21D
2628AB00480	-26.18138	28.36108	New Modder Ptn Benoni	-	C21D
2628AB00484	-26.19499	28.32914	Van Ryn Landbouhoewes.Ptn Benoni	-	C21D
2628AB00039	-26.19027	28.30804	Benoni	18.28	C21D
2628AB00094	-26.21027	28.28581	Boksburg Ptn Dunswart Wasery	3.6	C22B
2628AB00442	-26.22757	28.28311	Boksburg	10	C22B
2628AB00439	-26.2286	28.29997	Wattville Ptn Ethomeleng	-	C22C
2628AB00440	-26.22138	28.29942	Wattville Ptn Bopanang	-	C22C

The regional groundwater levels range from 3.6 metres below ground level (mbgl) and 18.28 mbgl (average 12.54 mbgl). These shallow groundwater levels indicate the NGA boreholes are drilled into the regional weathered aquifer. Whereas the deep-water level of BH2 on site (120 mbgl) indicates BH2 is drilled into a confined, fractured aquifer (Figure 5-2).

The spatial distribution of the existing boreholes as well as the estimated groundwater elevation in the weathered aquifer around the site is shown in Figure 5-3.Figure 5-1 plots available groundwater elevation data for the area. There is a good relationship (R = 85 %), between groundwater level and surface elevation which suggests that the regional groundwater table mimics the topography. The data suggest that groundwater levels are shallower close to non-perennial and perennial streams, where groundwater contributes to streamflow as baseflow seepage. These areas are typically prominent groundwater-surface water interaction areas. Bayesian interpolation of available groundwater level data was applied to the area to conceptualise the groundwater flow (Figure 5-3).

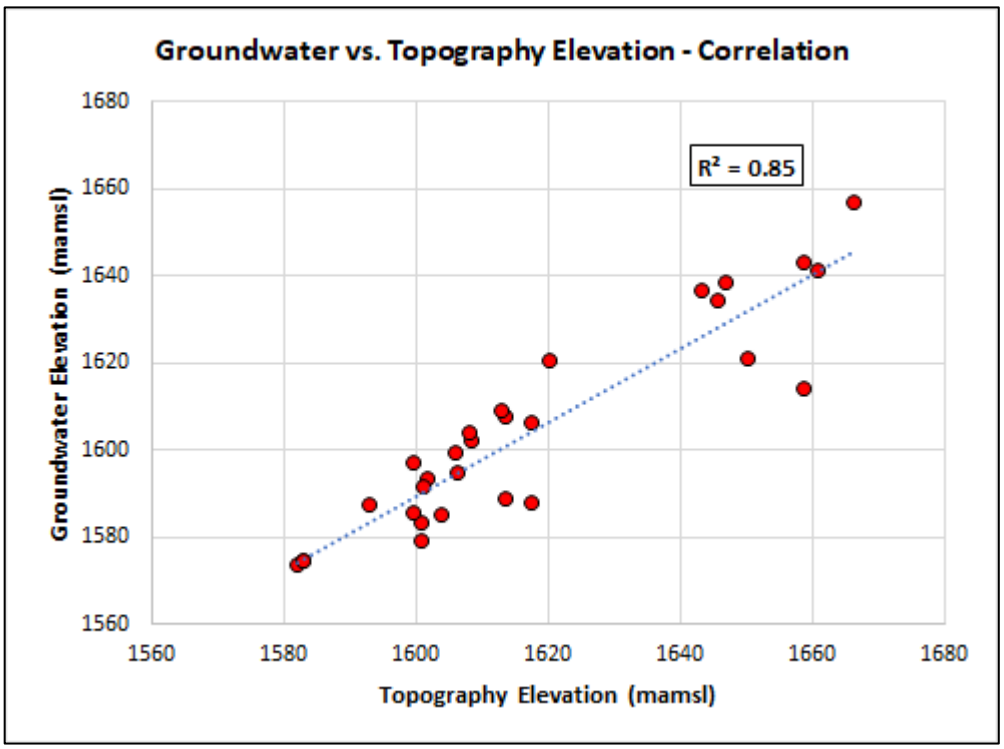

Figure 5-1: Groundwater Elevation: Surface Elevation Correlation (GCS, 2023)

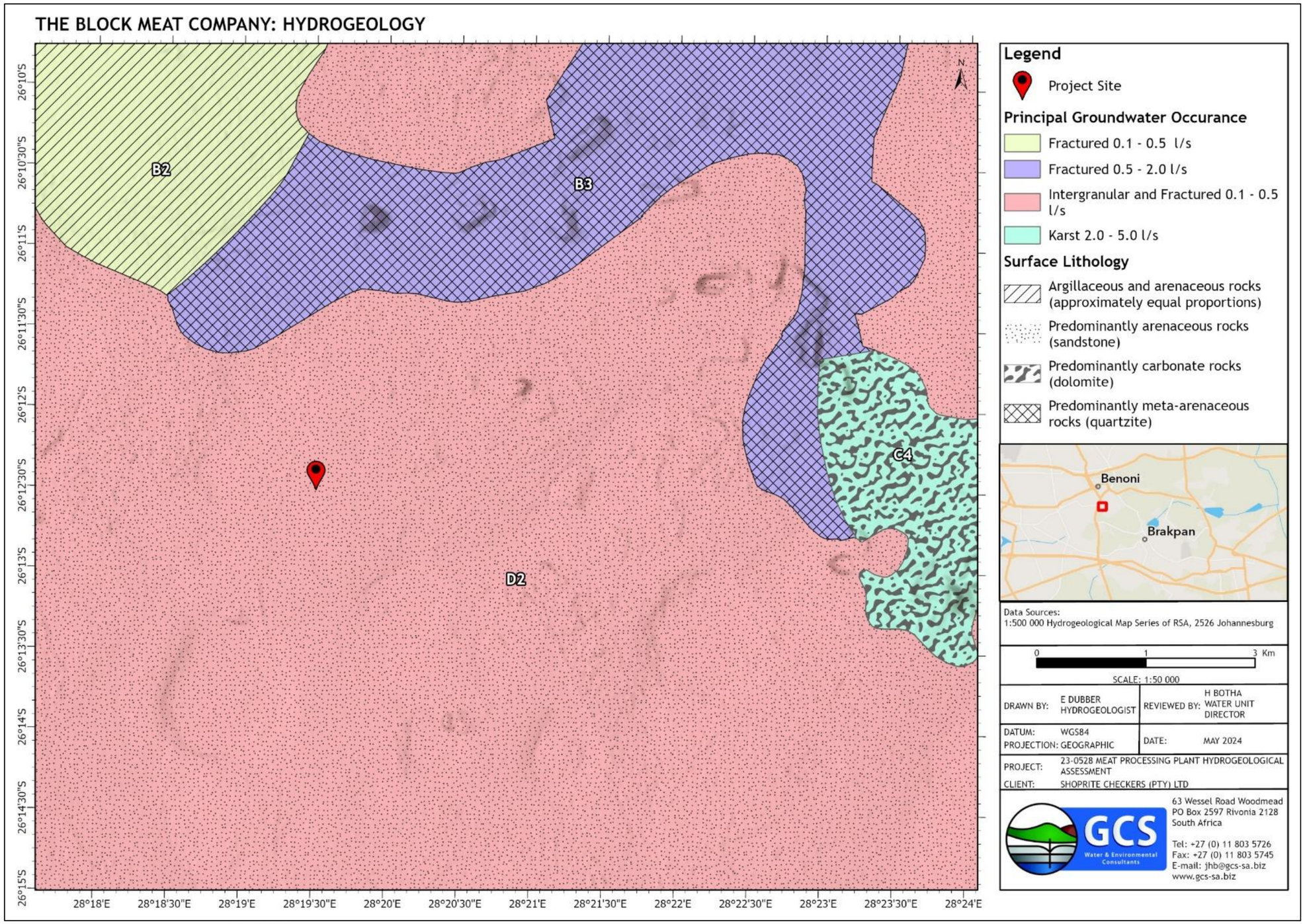

Figure 5-2: Local Hydrogeology (GCS, 2023)

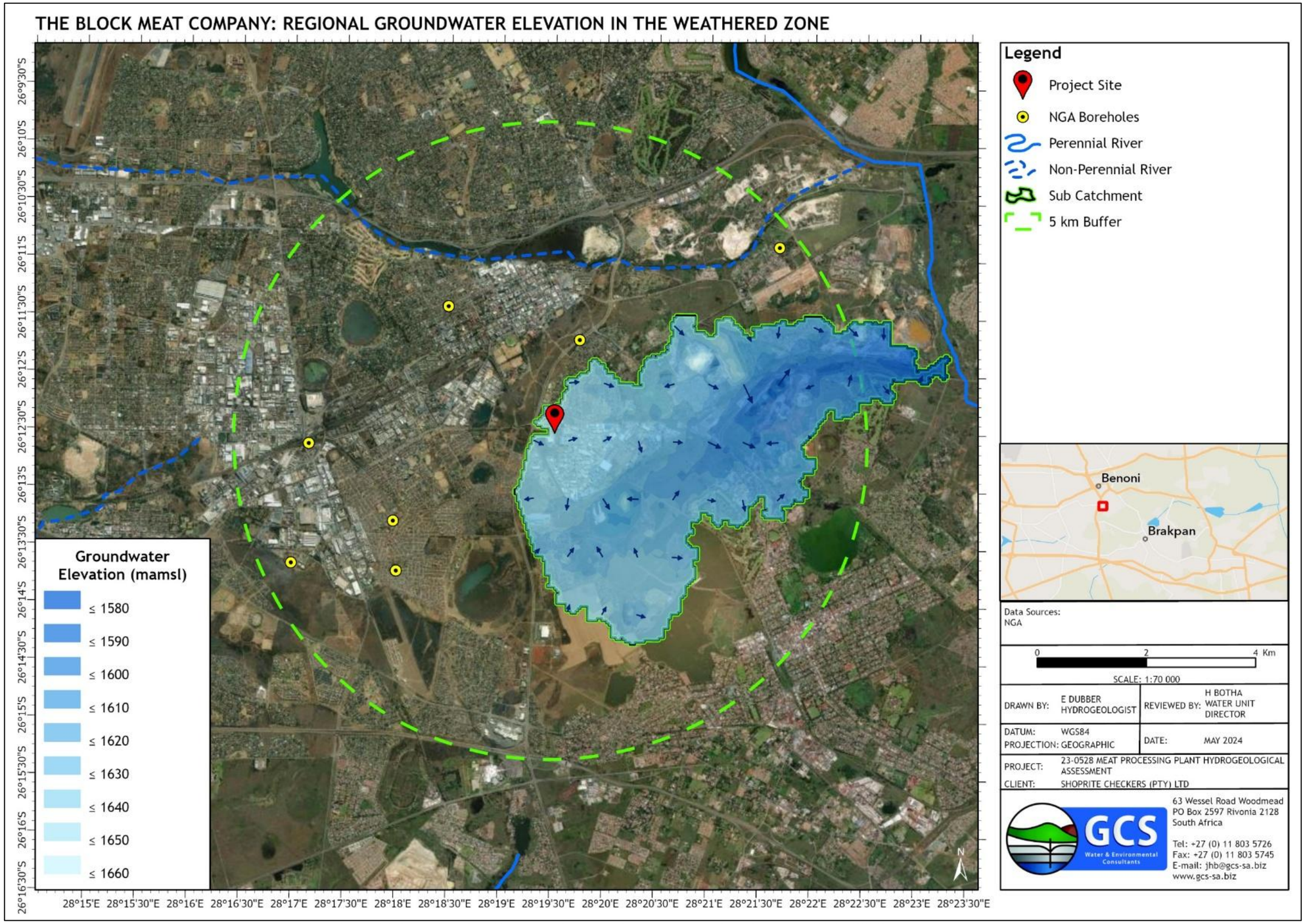

Figure 5-3: Boreholes within a 5 km radius of the Project Site, Estimated Groundwater Elevation and Flow Direction Map (GCS, 2023)

5.1.3 Groundwater Quantity

The DWS conducted a reserve determination for the water resources of the Vaal Water Management Area in terms of Section 16(1) of the NWA (DWS, 2020). The proposed groundwater reserve for quaternary C21D is summarised in Table 5-2. The groundwater reserve for quaternary catchment C21D consists of the volume of groundwater required to satisfy basic human needs and to meet the ecological water requirements through groundwater contribution to baseflow.

Table 5-2: Quaternary Catchment C21D Groundwater Reserve (GCS, 2023)

Quaternary Catchment	Area (km^2)	Mean Annual Precipitation (mm)	Recharge (m^3/a)	Population (minimum level)	Basic Human Needs (m^3/a)	Groundwater Component of Baseflow (m^3/a)	Total Reserve (m^3/a)	Groundwater Use (WARMS, 2024) (m^3/a)	Allocable Groundwater Total (m^3/a)
C21D	446	698	8,560,000	180,660	1,650,000	4,200,000	5,850,000	1,005,735	1,704,265

5.1.3.1 Sub-catchment Delineation

A sub-catchment was delineated with Global Mapper. A 3 Arc Second Resolution Shutter Radar Topography Mission (SRTM) Digital Elevation Model (DTM) was used as input and the drainage systems were delineated for the local area (1:10,000 stream count, with 30 m DEM fill).

The delineated sub-catchment is indicated in Figure 4-2. The total sub-catchment area is 17.91 km^2.

The groundwater reserve determination calculation, scale of abstraction and stress index will focus on the delineated sub-catchment. Table 5-3 presents a summary of the hydrogeological information for the delineated sub-catchment.

Table 5-3: Delineated Sub-catchment Information Summary (GCS, 2023)

Description	Delineated Sub-Catchment	
Surface Area	17.91	[km^2]
Recharge	343,743.50	[m^3/a]
Population	7,254.75	people
Basic Human Need	66,258.97	[m^3/a]
Baseflow	168,659.19	[m^3/a]
Groundwater Use	40,387.25	[m^3/a]
Reserve	234,918.16	[m^3/a]
Reserve as % of Recharge	68%	[%]

Note/s:

[km^2] - squared kilometres

[m^3/a] - cubic metres per annum

[%] – percentage

5.1.3.2 Groundwater Recharge

The effective groundwater recharge from precipitation is the portion of precipitation that reaches the groundwater. The remainder of the precipitation comprises surface water runoff, evapotranspiration and soil moisture. The effective recharge is dependent on the geology, soils, surface runoff and stream morphology but, most importantly for the study area, the effective storage.

Based on values sourced from the Vaal Water Management Area groundwater reserve determination (DWS, 2020), a recharge of 2.8% (8,560,000 m^3/a) of the annual precipitation is estimated. Higher recharge is however expected along geological structural features due to their increased permeability and associated storage. Recharge data used in this study is potential direct recharge only and significant lateral or indirect recharge may occur. The precipitation recharge for the delineated sub-catchment area is described below and is summarised in Table 5-4.

$$\mathbf{Re}_{Catchment\ Area} = \mathbf{Re}_{\%MAP} \times \mathbf{Area}_{Catchment\ Area}$$

Where:

- $Re_{\%MAP}$ = Recharge (2.8 % of MAP) [mm/a] for the delineated catchment area
- $Area_{Catchment\ Area}$ = Area [m^2]

Table 5-4: Delineated Sub-catchment Recharge Summary (GCS, 2023)

Description	Delineated Sub-Catchment	
Total Recharge (~2.8% of MAP)	8,560,000	[m^3/a]
Delineated Catchment Area	17,910,000	[m^2]
Delineated Catchment Recharge	343,743.50	[m^3/a]

Note/s:

MAP - Mean Annual Precipitation

[m^2] - squared metres

[m^3/a] - cubic metres per annum

5.1.3.3 Existing Groundwater Usage

According to the latest available information from the Water Authorisation Registration and Management System (WARMS) database (May 2024), the volume of groundwater allocated within quaternary catchment C21D is in the order of 1,005,735 m^3/a (NIWIS, 2024). This equates to a calculated 40,387.25 m^3/a existing groundwater usage within the delineated sub-catchment.

5.1.3.4 Basic Human Needs

According to the Government Gazette no 46798 of 26 August 2022, the Basic Human Needs (BHN) reserve provides for the essential needs of individuals served by the water resource in question and includes water for drinking, food preparation and personal hygiene. BHN is set by the Water Service Act (Act No. 108 of 1997) at 25 l per person per day (l/d). The reserve

is calculated by multiplying the number of people living within the confines of a source unit by 25 l/d. The estimated BHN of quaternary catchment C21D is 1 650 000 m^3/a, which equates to 66,258.97 m^3/a for the delineated sub-catchment.

5.1.3.5 Proposed Groundwater Usage

Based on the recommended abstraction time of 8 hours, a sustainable yield of 33 408 l/d (12,193.92 m^3/a) for borehole BH2 is recommended to meet the water demand for the meat processing plant.

5.1.3.6 Groundwater Contribution to Baseflow

Baseflow is the low flow in a river during dry or fair-weather conditions, but not necessarily all contributed by groundwater, baseflow includes contributions from delayed interflow and groundwater discharge. Because of the contribution of groundwater to surface water flow in certain circumstances, the volume of groundwater that could be abstracted without impacting the ability of the groundwater to sustain or contribute to the surface water reserve has to be taken into account.

The baseflow of groundwater into surface water bodies in the quaternary catchment is 4,200,000 m^3/a (DWS, 2020). The groundwater contribution to baseflow of the delineated sub-catchment is described below and summarised in Table 5-5.

$$\mathbf{Baseflow}_{Catchment\ Area} = \mathbf{Baseflow}_{\ Catchment\ Area}\ \mathbf{x\ Area}_{\ Catchment}$$

Where:

- $Baseflow_{Catchment\ Area}$ = value for baseflow in quaternary catchment C21D (DWS, 2020) [m^3/a]
- $Area_{Catchment\ Area}$ - Delineated catchment area [m^2]

Table 5-5: Delineated Sub-catchment Groundwater Contribution to Baseflow Summary

Description	Delineated Sub-Catchment	
Baseflow for Quaternary Catchment	4,200,000	[m^3/a]
Delineated Catchment Area	17,910,000	[m^2]
Delineated Catchment Areas Baseflow	168,659.19	[m^3/a]

Note/s:

[m^3/a] - cubic metres per annum

[m^2] - squared metres

5.1.3.7 Groundwater Balance

The groundwater balance and the reserve determination on a sub-catchment scale are presented in Table 5-6 and summarised below:

- $GW_{available}$ = (Re) - (EU + BHN + BF + PU)

Where:

- $Gw_{available}$ = Available groundwater for use.
- Re = Effective recharge to the aquifer.
- BF = Baseflow to surface water streams.
- EU = Existing GW abstraction/use (identified on sub-catchment, excluding applicant).
- BHN = Basic Human Needs.
- PU = Proposed Use.

Table 5-6: Delineated Sub-catchment Groundwater Balance and Reserve Determination

Description	Delineated Sub-Catchment	
Recharge through Precipitation	343,743.50	[m^3/a]
Groundwater Reserve	234,918.16	[m^3/a]
Total Available Groundwater	108,825	[m^3/a]
Existing GW Use (WARMS, 2024)	40,387.25	[m^3/a]
Remaining Available Groundwater	68,438.09	[m^3/a]
Proposed Abstraction	12,193.92	[m^3/a]
Surplus Groundwater Available	56,244.17	[m^3/a]

Note/s:

[m^3/a] - cubic metres per annum

The groundwater balance indicates there's approximately 68,438.09 m^3/a groundwater available for abstraction on a sub-catchment scale and a surplus value of approximately 56,244.17 m^3/a will be available after the proposed abstraction of 12,193.92 m^3/a.

5.1.4 Groundwater Quality

Groundwater sampling was undertaken from BH2 by the client and the results were provided to GCS. The analysis of the laboratory results is shown in Table 5-7 below and the laboratory certificate of the results can be seen in the Geohydrological Assessment report (GCS, 2023), attached in Appendix B.

The results showed that all chemical parameters fall within the SANS241:2015 water standards for domestic use, except for turbidity and manganese. Manganese is naturally abundant in rocks, soil and groundwater. The elevated manganese concentration in BH2 is potentially sourced from the sedimentary host rock and is therefore naturally occurring. Manganese supports the growth of certain nuisance organisms in water distribution systems, giving rise to taste, odour and turbidity problems.

Turbidity in water is caused by the presence of suspended matter which usually consists of a mixture of inorganic matter, such as clay and soil particles and organic matter. The elevated turbidity in the water pumped from BH2 is most likely associated with the elevated manganese concentration as well as suspended soil particles.

Table 5-7: Groundwater Quality Results

Parameter	Risk	Unit	Standard Limit	BH2
Physical and aesthetic determinants				
Colour	Aesthetic	mg/L Pt-Co	≤ 15	<5.00
Conductivity at 25 °C	Aesthetic	mS/m	≤ 170	97.5
pH at 25 °C	Operational	pH units	≥ 5 to ≤ 9.7	6.93
Total dissolved solids	Aesthetic	mg/l	≤ 1 200	846
Turbidity	Operational	NTU	≤ 1	**20.5**
Turbidity	Aesthetic	NTU	≤ 5	**20.5**
Chemical determinants – macro-determinants				
Ammonia as N	Aesthetic	mg/l	≤ 1.5	<0.005
Chloride as Cl-	Aesthetic	mg/l	≤ 300	119
Combined nitrate plus nitrite	Acute health	mg/l	≤1	<1.00
Fluoride as F-	Chronic health	mg/l	≤ 1.5	0.32
Free chlorine as Cl_2	Chronic health	mg/l	≤ 5	0.11
Monochloramine	Chronic health	mg/l	≤ 3	0.12
Nitrate as N	Acute health	mg/l	≤ 11	0.571
Nitrite as N	Acute health	mg/l	≤ 0.9	<0.06S
Sodium as Na	Aesthetic	mg/l	≤ 200	27.9
Sulphate as SO_4^{2-}	Acute health	mg/l	≤ 500	174
Sulphate as SO_4^{2-}	Aesthetic	mg/l	≤ 250	174
Zinc as Zn	Aesthetic	mg/l	≤ 5	<0.002
Chemical determinants – micro-determinants				
Aluminium as Al	Operational	mg/l	≤ 0.3	<0.002
Antimony as Sb	Chronic health	mg/l	≤ 0.02	<0.001
Arsenic as As	Chronic health	mg/l	≤ 0.01	<0.006
Barium as Ba	Chronic health	mg/l	≤ 0.7	0.04
Boron as B	Chronic health	mg/l	≤ 2.4	<0.013
Cadmium as Cd	Chronic health	mg/l	≤ 0.003	<0.002
Copper as Cu	Chronic health	mg/l	≤ 2	0.012
Cyanide (recoverable) as CN-	Acute health	mg/l	≤ 0.2	<0.005
Iron as Fe	Chronic health	mg/l	≤ 2	1.9
Iron as Fe	Aesthetic	mg/l	≤ 0.3	1.9
Lead as Pb	Chronic health	mg/l	≤ 0.01	<0.004
Manganese as Mn	Chronic health	mg/l	≤ 0.4	**1.07**
Manganese as Mn	Aesthetic	mg/l	≤ 0.1	**1.07**
Mercury as Hg	Chronic health	mg/l	≤ 0.006	<0.005
Nickel as Ni	Chronic health	mg/l	≤ 0.07	0.011
Selenium Se	Chronic health	mg/l	≤ 0.04	<0.002
Total chromium as Cr	Chronic health	mg/l	≤ 0.05	<0.010
Uranium as U	Chronic health	mg/l	≤ 0.03	<0.015
Chemical determinants – organic determinants				
Bromodichloromethane	Chronic health	mg/l	≤ 0.06	<0.002
Bromoform	Chronic health	mg/l	≤ 0.1	<0.020
Dibromochloromethane	Chronic health	mg/l	≤ 0.1	<0.002
Phenols	Aesthetic	mg/l	≤ 0.01	<0.01
Total microcystin	Chronic health	mg/l	≤ 0.001	<0.0005
Total organic carbon as C	Chronic health	mg/l	≤ 10	1.75
Trihalomethanes Chloroform	Chronic health	mg/l	≤ 0.3	<0.002

Note:

Red and Bold exceed the SANS 241:2015 Standard

5.2 Site Conceptual Model

The conceptual model for the Block Meat site comprises the following:

- Two aquifer systems: A regional upper weathered aquifer and a deeper confined fractured aquifer.
- The weathered aquifer has a low yield potential and the solid rock is not fissured to the extent to promote water movement.
- The production borehole (BH2) on site draws from the deeper fractured aquifer (>150 mbgl), with a static water level recorded at 120 mbgl and a yield of 1.16 l/s.

Due to the depth of the aquifer zone (>150 mbgl) the potential for pollution is low, except if poor quality runoff directly into or along the borehole casing takes place (i.e. from the site down via the weathered zone to the water table). Recharge in the confined zone will be subjected to transboundary inflows as well as recharge via the vadose and weathered zones. The extent of the fractured aquifer is however uncertain.

During the field hydrocensus, no groundwater users could be identified within a 2.5 km radius of BH2. The risk of having a potential impact on surrounding groundwater users is therefore also considered low to insignificant.

6 RISK ASSESSMENT/BEST PRACTICE ASSESSMENT

6.1 Impact / Risk Assessment Methodology

Possible impacts are identified through comments from Interested and Affected Parties (I&APs), specialist reports and from water use consultants experience. The assessment process followed a structured approach comprising four key activities:

- Identification and assessment of potential impacts likely to result from the project activities.
- Prediction of the nature, magnitude, extent and duration of these impacts, with specific focus on those that may be significant.
- Identification of appropriate mitigation measures to reduce, avoid, or manage the severity or significance of the potential impacts.
- Evaluation of residual impacts to determine the significance of the impact after implementation of mitigation measures.

The assessment of significance was guided by a set of criteria, including:

- Cumulative impacts in the broader environmental and social context.

- Nature of the impact, i.e., whether it is positive, negative, direct, or indirect.
- Extent of the impact, ranging from localised to regional or national scale.
- Probability of occurrence of the impact.
- Reversibility of the impact, i.e., whether it can be restored to pre-impact conditions.
- Irreplaceability of affected resources, considering whether resources lost can be substituted or recovered.
- Potential for mitigation, i.e., the extent to which the impact can be avoided, minimised, or offset.

The evaluation of significance followed a consequence–probability approach:

$$\textit{Consequence} = (\textit{Duration} + \textit{Extent} + \textit{Irreplaceability of resource}) \times \textit{Severity}$$

The overall significance of an impact was then determined using the formula:

$$\textit{Significance} = \textit{Consequence} \times \textit{Probability}$$

A summary of the criteria used to assess the significance of impacts is provided in Table 6-1, with detailed explanations presented in Table 6-2.

Table 6-1: Proposed Criteria and Rating Scales to be used in the Assessment of the Potential Impacts

Criteria	Rating Scales	Notes
Nature	Positive (+)	An evaluation of the effect of the impact related to the proposed development.
	Negative (-)	
Duration	Temporary (1)	The duration of the activity associated with the impact will last 0 - 6 months.
	Short-term (2)	The duration of the activity associated with the impact will last 6-18 months.
	Medium-term (3)	The duration of the activity associated with the impact will last 18 months - 5 years.
	Long-term (4)	The duration of the activity associated with the impact will last more than 5 years.
Extent	Footprint (1)	The impact only affects the area in which the proposed activity will occur.
	Site (2)	The impact will affect only the development area.
	Local (3)	The impact affects the development area and adjacent properties.
	Regional (4)	The effect of the impact extends beyond municipal boundaries.
	National (5)	The effect of the impact extends beyond more than 2 regional/ provincial boundaries.
	International (6)	The effect of the impact extends beyond country borders.
Severity	Low (1)	Where the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected.
	Moderate (2)	Where the affected environment is altered but natural, cultural and social functions and processes continue albeit, in a modified way and valued, important, sensitive, or vulnerable systems or communities are negatively affected.
	High (3)	Where natural, cultural, or social functions and processes

Criteria	Rating Scales	Notes
		are altered to the extent that the natural process will temporarily or permanently cease and valued, important, sensitive, or vulnerable systems or communities are substantially affected.
Potential for impact on irreplaceable resources	No (0)	No irreplaceable resources will be impacted.
	Yes (1)	Irreplaceable resources will be impacted.
Consequence	Extremely detrimental (-25 to -33)	A combination of extent, duration, intensity and the potential for impact on irreplaceable resources.
	Highly detrimental (-19 to -24)	
	Moderately detrimental (-13 to -18)	
	Slightly detrimental (-7 to -12)	
	Negligible (-6 to 0)	
	Slightly beneficial (0 to 6)	
	Moderately beneficial (13 to 18)	
	Highly beneficial (19 to 24)	
	Extremely beneficial (25 to 33)	
Probability (the likelihood of the impact occurring)	Improbable (0)	It is highly unlikely or less than 50% likely that an impact will occur.
	Probable (1)	It is between 50 and 70% certain that the impact will occur.
	Definite (2)	It is more than 75% certain that the impact will occur or the impact will occur.
Significance	Very high – negative (-49 to -66)	A function of Consequence and Probability.
	High – negative (-37 to -48)	
	Moderate – negative (-25 to -36)	
	Low – negative (-13 to -24)	
	Neutral - Very low (0 to -12)	
	Low positive (0 to 12)	
	Moderate–positive (13 to 24)	
	High–positive (37 to 48)	
	Very high – positive (49 to 66)	

Table 6-2: Explanation of Assessment Criteria

Criteria	Explanation
Nature	This is an evaluation of the type of effect the construction, operation and management of the proposed development would have on the affected environment. Will the impact of change on the environment be positive, negative, or neutral?
Extent or Scale	This refers to the spatial scale at which the impact will occur. The extent of the impact is described as footprint (affecting only the footprint of the development), site (limited to the site) and regional (limited to the immediate surroundings and closest towns to the site). The extent of scale refers to the actual physical footprint of the impact, not to the spatial significance. It is acknowledged that some impacts, even though they may be of a small extent, are of very high

Criteria	Explanation
	importance, e.g., impacts on species of very restricted range. To avoid "double counting," specialists have been requested to indicate spatial significance under "intensity" or "impact on irreplaceable resources" but not under "extent" as well.
Duration	The lifespan of the impact is indicated as temporary, short, medium and long-term.
Severity	This is a relative evaluation within the context of all the activities and the other impacts within the framework of the project. Does the activity destroy the impacted environment, alter its functioning, or render it slightly altered?
Impact on irreplaceable resources	This refers to the potential for an environmental resource to be replaced should it be impacted. A resource could be replaced by natural processes (e.g., by natural colonisation from surrounding areas), through artificial means (e.g., by reseeding disturbed areas or replanting rescued species) or by providing a substitute resource, in certain cases. In natural systems, providing substitute resources is usually not possible, but in social systems, substitutes are often possible (e.g., by constructing new social facilities for those who are lost). Should it not be possible to replace a resource, the resource is essentially irreplaceable, e.g., red data species that are restricted to a particular site or habitat to a very limited extent.
Consequence	The consequence of the potential impacts is a summation of the above criteria, namely the extent, duration, intensity and impact on irreplaceable resources.
Probability of occurrence	The probability of the impact occurring is based on the professional experience of the specialist with environments of a similar nature to the site and/or with similar projects. It is important to distinguish between the probability of the impact occurring and the probability that the activity causing a potential impact will occur. Probability is defined as the probability of the impact occurring, not as the probability of the activities that may result in the impact.
Significance	Impact significance is defined to be a combination of the consequence (as described below) and the probability of the impact occurring. The relationship between consequence and probability highlights that the impact (or impact significance) must be evaluated in terms of the seriousness (consequence) of the impact, weighted by the probability of the impact occurring. In simple terms, if the consequence and probability of an impact are high, then the impact will have a high significance. The significance defines the level to which the impact will influence the proposed development and/or environment. It determines whether mitigation measures need to be identified and implemented and whether the impact is important for decision-making.
Degree of confidence in predictions	Specialists and the environmental team were required to indicate the degree of confidence (low, medium, or high) that there is in the predictions made for each impact based on the available information and their level of knowledge and expertise. The degree of confidence is not considered in the determination of consequence or probability.
Mitigation measures	Mitigation measures are designed to reduce the consequence or probability of an impact or to reduce both consequence and probability. The significance of impacts has been assessed both with mitigation and without mitigation.

6.2 Impact/ Risk Assessment Outcomes

Information in the section below was taken from the Geohydrological Assessment (GCS, 2023) attached as Appendix B. The impact/risk assessment ratings are listed in Table 6-5.

6.2.1 Impacts on the Groundwater Reserve

The potential radius of influence of pumping for borehole BH2 (identified for groundwater use during the assessment study) was determined by applying the Cooper-Jacob equation (1):

$$\textbf{Radius of Influence } (r_e) = 1.5\sqrt{\frac{Tt}{S}} \qquad \textbf{Equation 1}$$

Where:

T = aquifer transmissivity (m^2/day)

t = exploitation time/pumping time (days); and

S = aquifer storativity (no unit).

The estimated radius of influence for the borehole is listed in Table 6-3. The predicated pumping radius of influence for BH2 is of the order of 8.58 m. During pumping, no interference with BH1 was noted. It is therefore anticipated that BH2 is drawing from the fractured aquifer network or contact zone which are not connected.

Table 6-3: Summary of the radius of influence for borehole BH2 (GCS, 2023)

Parameter	Units	BH 13 (PV1)
T	m^2/day	2.35
t	days	121.67
s		8.71
Txt		285.32
Txt/s		32.75
Square Root (Tt)	m	5.72
The Radius of Influence	m	8.58

6.2.1.1 Scale of Abstraction

Based on the DWS Requirements for WULA: Groundwater Abstraction (S21(a)), the licence application must be evaluated in terms of three possible categories. Categories A, B and C, each have an applicable list of information requirements for the licence application. The categories are as follows:

- Small-scale abstractions (<60% recharge) Category A
- Medium scale abstractions (60-100% recharge) Category B
- Large-scale abstractions (>100% of recharge) Category C

Concerning the DWS scale of abstraction categories, the scale of abstraction after the proposed abstraction from the groundwater unit, relative to recharge across the delineated sub-catchment area, is 77% and is classified as Category B “Medium Scale” abstraction.

6.2.1.2 Water Quantity Stress Index

The status of a groundwater resource unit can be assessed in terms of sustainable use,

observed ecological impacts, or water stress. As no ecological reserve is available for the affected catchment, the impact of the proposed abstraction on the ecological reserve cannot be determined.

The concept of stressed water resources is addressed by the NWA but is not defined. Part 8 of the Act gives some guidance by providing the following qualitative examples of water stress:

- Where water demands are approaching or exceed the available supply.
- Where water quality problems are imminent or already exist.
- Where water resource quality is under threat.

To provide a quantitative means of defining stress, a groundwater stress index was developed by dividing the volume of groundwater abstracted from a groundwater unit by the estimated recharge to that unit (Parsons & Wentzel, 2007). However, this concept does not take cognisance of the impact of other land use practices on groundwater and surface water resources. GCS therefore proposes to modify the stress index by taking the groundwater contribution to baseflow into account.

The modified stress index is as follows:

Stress Index = Proposed Abstraction / (Recharge – Baseflow)

= 52 581.17 m^3/a / (343 743.50 m^3/a – 168 659.19 m^3/a)

= 0.3

The stress index and classes described in Table 6-4 are a guide for determining the level of stress of a groundwater resource unit, based on abstraction, baseflow and recharge (modified after) (Parsons & Wentzel, 2007).

Table 6-4: Guide for Determining the Level of Stress of a Groundwater Resource Unit (GCS, 2023)

Present Status Category	Description	Stress Index
A	Unstressed or low level of stress	<0.05
B		0.05 - 0.2
C	Moderate levels of stress	0.2 – 0.5
D		0.5 – 0.75
E	Stressed	0.75 – 0.95
F	Critically stressed	>0.95

Based on the guide for determining the level of stress of the groundwater resource unit, the

abstraction of 52,581.17 m^3/a across the delineated sub-catchment area is classified as status Category C. The aquifer unit will thus have a moderate level of stress after the proposed abstraction.

6.3 Impact/ Risk Assessment Matrix

The impact/risk assessment details are listed in Table 6-5.

Table 6-5: Potential Impacts in the Operational Phase and Proposed Mitigation Measures

Component Being Impacted On	Activity Which May Cause the Impact	Activity	Pre- Mitigation							Recommended Mitigation Measures	Post Mitigation						
			Duration	Extent	Severity	Potential for Impact on Irreplaceable Resources	Consequence	Probability	Significance		Duration	Extent	Severity	Potential for Impact on Irreplaceable Resources	Consequence	Probability	Significance
Groundwater																	
Regional water table/ Groundwater aquifer.	Due to the depth of the aquifer zone (>150 mbgl) the potential for pollution is low, except if poor quality runoff directly into or along the borehole casing takes place (i.e. from the site down via the weathered zone to the water table).	Site activities.	4	2	-1	1	-16	1	Neutral – Very low (0 to -12) (-7)	• Visual soil assessments for signs of contamination. • Ensure adequate stormwater systems to manage runoff.	4	1	-1	1	-6	0	Neutral – Very low (0 to -6) 0
	Over abstraction and impact on the sub-catchment.	Abstracting groundwater from BH2.	4	3	2	1	-16	1	Low - negative (-13 to -24) -16	• Do not overproduce from borehole BH2. 8 hours of pumping per day is recommended. • Ensure routine water quality monitoring is undertaken.	2	1	4	1	12	2	Neutral – Very low (0 to -6) -6
Local Aquifer.	Vehicle Park area and driveway.	Oil and fuel spills and leakages at vehicle park areas and at the site may cause poor quality seepage and runoff.	4	3	3	1	-24	1	Low-negative (-13 to -24) -24	• Ensure that the borehole is properly cased and sealed. • Implement a quarterly monitoring programme to track changes in water levels and quality.	4	3	1	0	-7	0	Neutral – Very Low (0 to -12)
Socio-Economic																	
Economic Setting.	Continued operation of the Block Meat facility supports employment, local procurement and resilience of the agri-processing and food supply sector.	Block Meat Company.	4	3	3	0	21	2	High-positive (37 to 48) +42	• Maintain B-BBEE-compliant procurement to support local enterprises. • Prioritise local suppliers and service providers where feasible. • Ensure operational continuity to support food system resilience.	4	3	3	0	21	2	High-positive (37 to 48) +42
Social Setting.	Water security enables uninterrupted production, sustaining employment, skills development and community upliftment initiatives.	Block Meat Company.	4	5	2	0	16	2	Moderate-positive (13 to 24) +18	• Sustain and expand Corporate Social Investment programmes focused on food security and youth development. • Support skills transfer and on-the-job training for local employees. • Maintain engagement with surrounding communities to align support initiatives.	4	5	2	0	16	2	Moderate-positive (13 to 24) +18

6.4 Assessment of Level and Confidence of Information

All information contained in this Technical Report was sourced from the specialist study conducted for the project area. The specialist appointed to undertake the various investigations are considered to be competent in their particular fields. The level of confidence within the information and report used to compile this document is therefore high.

7 WATER MANAGEMENT PLAN

7.1 Organisational Structure

The Block Meat Company bears ultimate responsibility for the implementation of the Water Management Plan and for ensuring compliance with all conditions set out in the WUL. Within this framework, Block Meat has established a clear operational management structure to ensure accountability, efficiency and effective communication across all functional areas.

7.2 Resources and Competence

Block Meat ensures that individuals appointed to key roles hold the appropriate qualifications, professional registrations and relevant experience required to fulfil their responsibilities effectively. The company is committed to maintaining a skilled and competent workforce by providing ongoing training and development opportunities tailored to the needs of each role. Training covers both regulatory requirements and site-specific procedures to ensure compliance, operational efficiency and continuous improvement in environmental and water management practices. Competence is reviewed regularly to confirm that employees remain suitably equipped to perform their duties to the required standard.

7.3 Education and Training

Block Meat places strong emphasis on education and training as part of its commitment to responsible water use, environmental stewardship and regulatory compliance. Employees are provided with ongoing training relevant to their roles, including water conservation practices, hygiene and sanitation requirements, spill prevention and emergency response procedures. This training is aligned with Shoprite Group’s broader skills development strategy, which prioritises capacity building, scarce and critical skills development and compliance with environmental and food safety standards. Through structured on-the-job training, induction programmes and refresher sessions, staff are equipped to understand the importance of sustainable water management and their responsibilities in protecting groundwater resources, thereby supporting long-term operational resilience and compliance with the NWA.

7.4 Internal and External Communication

Effective internal and external communication forms an integral part of the facility's environmental and water management approach. Internally, water use procedures, conservation measures and compliance requirements are communicated to employees through operational protocols, toolbox talks, training sessions and management briefings. This ensures that all staff are aware of water use controls, reporting obligations and emergency response measures. Externally, the Block Meat Company engages with relevant authorities, including the DWS, through statutory reporting, licence compliance submissions and monitoring reports as required under the WUL. Where necessary, communication with stakeholders and service providers is maintained to ensure transparency, accountability and alignment with catchment-level water resource management objectives.

7.5 Awareness Raising

Awareness raising is embedded within daily operations to foster a culture of responsible water use and environmental accountability at the facility. Employees are regularly reminded of the importance of water conservation, pollution prevention and adherence to operational controls designed to protect groundwater quality. Visual reminders, standard operating procedures and management oversight reinforce awareness of good water stewardship practices. In addition, the facility's alignment with the Shoprite Group's sustainability commitments and corporate social responsibility initiatives strengthens awareness of the broader socio-economic and environmental value of sustainable water management. This approach ensures that water use is not only legally compliant but also socially and environmentally responsible, in line with national development priorities and integrated water resource management principles.

7.6 Water Balance

The facility is supplied by two water sources, namely municipal water and groundwater abstracted from a borehole:

- The municipal water supply provides an average of 1,936 kl/month, equivalent to 23,232 kl/year.
- The borehole supply contributes approximately 350 kl/month, or 4,200 kl/year.
- Both water sources feed into a 100 000 l storage tank, providing operational buffering and supply security.
- Water from the storage tank is treated via an UV treatment plant before being distributed to the processing plant.
- The processing plant is the primary consumer of water, using approximately 1,737 kl/month (20,844 kl/year).

- Approximately 40% of the processing plant water use (about 695 kl/month or 8,340 kl/year) is incorporated into the product recipe and is therefore consumptively lost.
- The evaporator towers consume approximately 199 kl/month, equivalent to 2,388 kl/year, representing evaporative losses.
- Process wastewater is routed through fat traps, which are cleaned weekly, removing approximately 8,500 l of solids per week.
- Following treatment, approximately 1,008 kl/month of water is discharged to the municipal sewer system.
- Borehole water is stored in borehole tanks and treated via a water softening plant, with softening effluent directed to the municipal effluent system.

The water balance indicates a combination of consumptive use (product and evaporation) and controlled discharge to sewer, demonstrating structured water management at the facility. Figure 7-1 presents the site water balance, illustrating the sources of water supply, internal water use within the processing plant, treatment and storage infrastructure, consumptive losses and the discharge of treated effluent to the municipal sewer system.

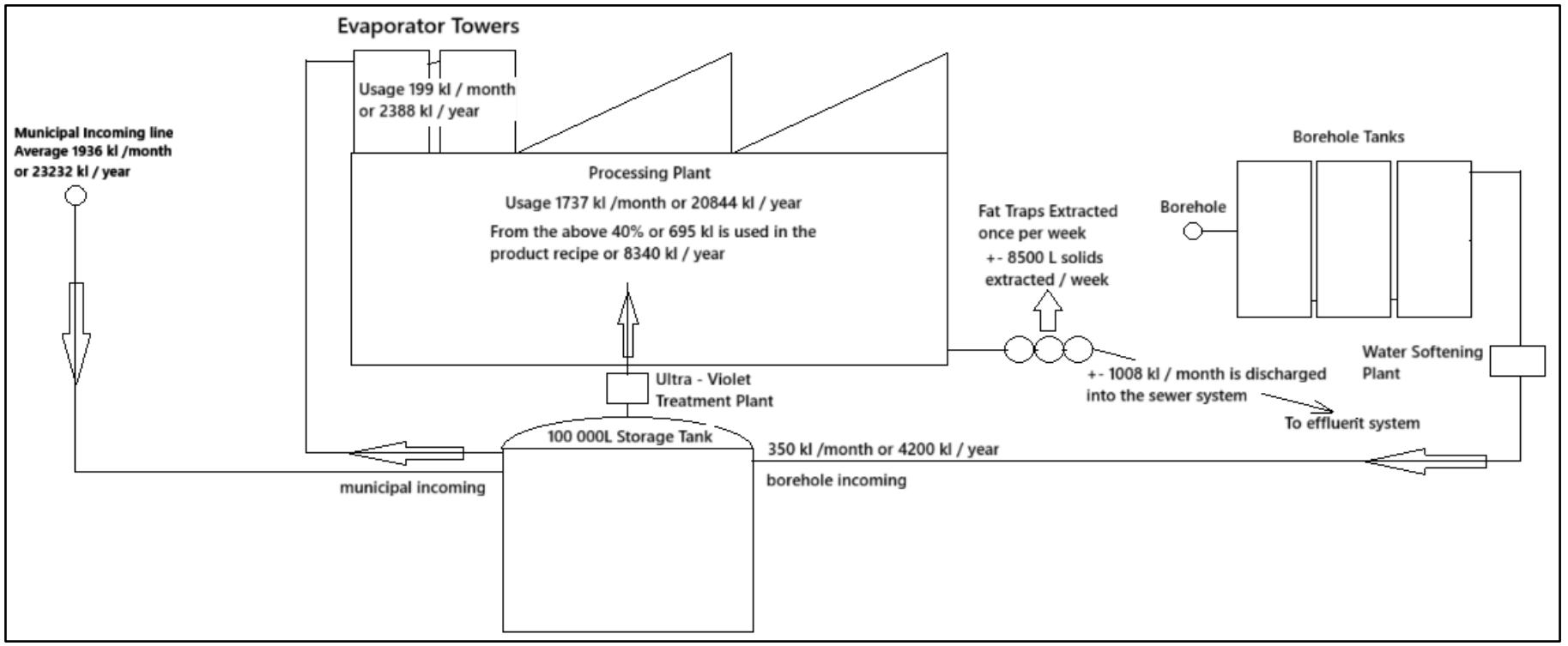

Figure 7-1: Site Water Balance Diagram illustrating Water Inputs, Usage, Treatment and Discharge

7.7 Water Use and Environmental Management Plan

The operation of the facility has the potential to impact groundwater resources, as well as the surrounding socio-economic and social environment. To ensure compliance with the NWA and to promote sustainable operations, a comprehensive management plan has been developed. This plan identifies potential impacts, the activities that may give rise to them and the recommended mitigation measures to avoid, minimise, or manage risks. The management plan integrates surface water, groundwater, ecological, socio-economic and community aspects into a single framework, thereby ensuring that water use remains within authorised limits and supports both environmental integrity and social well-being.

The table below outlines the Environmental Management Plan, providing a consolidated overview of potential impacts and the corresponding measures required to mitigate or manage these impacts.

Table 7-1: Water Use and Environmental Management Plan

Environmental Component	Activity Causing Impact	Detailed Management and Mitigation Measures	Rationale / Expected Outcome
Groundwater	Abstraction from borehole for operational water supply	• Install and maintain calibrated flow meters on borehole abstraction points. • Record abstraction volumes monthly and compare against authorised limits. Implement routine groundwater level monitoring using dipper tubes. • Conduct annual groundwater quality monitoring (EC, pH, nitrates, chlorides, microbiological indicators). • Implement abstraction reduction measures if declining trends are observed. • Ensure borehole headworks are sealed and protected against surface contamination.	Prevents over abstraction, protects aquifer sustainability and safeguards groundwater quality.
Municipal Water Supply	Use of potable municipal water for processing and domestic purposes	• Monitor municipal water consumption through monthly metre readings. • Implement water efficiency measures (leak detection, low flow fixtures). • Optimise operational water use to minimise reliance on municipal supply. • Maintain adequate storage capacity to manage peak demand without excessive abstraction.	Promotes efficient water use, reduces pressure on municipal supply and supports water conservation objectives.
Process Water Use	Water consumption within processing plant	• Monitor process water consumption at key use points. • Optimise production processes to minimise water losses. • Reuse water where feasible and compliant with hygiene standards. • Regular inspection and maintenance of pipelines and valves to prevent leaks.	Reduces overall water demand, improves operational efficiency and limits unnecessary abstraction.
Consumptive Water Losses	Product formulation and evaporative losses from evaporator towers	• Quantify consumptive water use as part of the site water balance. • Optimise evaporator efficiency to reduce unnecessary losses. • Regular maintenance of cooling and evaporator systems. • Incorporate consumptive losses into water use reporting and licence compliance.	Ensures transparent accounting of water losses and supports realistic water balance management.

Environmental Component	Activity Causing Impact	Detailed Management and Mitigation Measures	Rationale / Expected Outcome
Wastewater and Effluent	Generation of process wastewater and domestic effluent	• Route all wastewater through fat traps prior to discharge. • Implement weekly fat trap inspections and scheduled cleaning by licenced contractors. • Maintain records of waste removal and disposal certificates. • Discharge treated effluent to municipal sewer in accordance with municipal by-laws and licence conditions.	Prevents sewer blockages, limits organic loading and protects downstream wastewater infrastructure.
Stormwater Management	Runoff from roofs, paved areas and operational surfaces	• Maintain separation of clean and dirty stormwater systems. • Direct clean stormwater away from contaminated areas. • Inspect and clean stormwater drains regularly. • Implement erosion protection at discharge points. • Prevent stormwater contact with waste, chemicals or effluent systems.	Reduces pollution risk, erosion and sediment transport to surrounding environments.
Chemical and Hydrocarbon Management	Storage and handling of fuels, oils and cleaning chemicals	• Store chemicals and hydrocarbons in bunded areas with impermeable floors. • Maintain spill kits at all storage and handling areas. • Train staff in spill prevention and emergency response. • Immediately clean and remediate spills and contaminated areas.	Prevents contamination of soil, groundwater and stormwater systems.
Solid Waste and Sludge	Removal of fats, oils, grease and sludge from fat traps	• Remove solids routinely by licenced waste contractors. • Store waste temporarily in sealed containers. • Dispose of waste at authorised disposal facilities only. • Maintain waste manifests and contractor records.	Prevents secondary pollution and ensures legal waste disposal.
Monitoring and Reporting	Compliance with water use authorisation and reporting requirements	• Maintain water use records for abstraction, consumption and discharge. • Compile annual water balance updates.• Submit monitoring results and compliance reports to DWS as required. • Undertake internal audits to verify compliance with	Ensures regulatory compliance, transparency and early identification of risks.

Environmental Component	Activity Causing Impact	Detailed Management and Mitigation Measures	Rationale / Expected Outcome
		licence conditions.	

7.8 Monitoring and Control

7.8.1 Groundwater Monitoring

BH2 is equipped with a flow meter that will be used to monitor the meat processing plant's daily groundwater abstraction. Regular visual assessments of sewer infrastructure (i.e., hydraulic monitoring), parking and service areas should be adequate to monitor for obvious signs of pollution in the environment.

Monitoring the groundwater quality and quantity at BH2 should be sufficient to determine the impact on the local aquifer system. No other monitoring boreholes are proposed at this stage, but can be considered if there are noted operational issues associated with the existing borehole.

7.8.1.1 Monitoring Parameters and Frequency

The groundwater quality and quantity monitoring frequency are summarised in Table 7-2 and should include the following for the abstraction borehole BH2:

- Monitoring of abstraction volumes from the borehole, with an installed automated flow meter.
- Monitoring of water level responses (use and/or rest periods) in the production borehole (water level devices or permanently installed data loggers).
- Water quality analysis once a year.

Table 7-2: Proposed Monitoring Frequency (GCS, 2023)

Monitoring Point	Interval	Purpose
BH2	Monthly	Abstraction volumes – flow meter readings
	Monthly	Water level measurement
	Annual	Sampling for water quality analysis

It is recommended that a qualified hydrogeologist evaluate the data and make the necessary adjustments to the monitoring programme after the first year's monitoring data is available.

7.8.2 Waste Monitoring

Waste monitoring associated with site activities is informed by the organisation's broader environmental management and sustainability framework, as described in the Sustainability Report 2025 (Shoprite Holdings Ltd, 2025c). Although waste generation associated with borehole abstraction activities is limited in nature and volume, monitoring measures are applied to ensure that waste is managed responsibly and does not pose a risk to soil or groundwater resources.

7.8.2.1 Waste Streams Associated with Borehole Operations

Waste streams potentially associated with the borehole operation include general operational waste, hydrocarbon-related waste from equipment maintenance, empty chemical or lubricant containers and domestic waste generated during routine site activities. These waste streams are managed in line with the organisation's standard environmental management practices and sustainability commitments (Shoprite Holdings Ltd, 2025c).

7.8.2.2 Monitoring Measures

In line with the environmental monitoring and reporting practices outlined in the Sustainability Report (2025c), waste monitoring focuses on compliance, risk prevention and accountability rather than intensive sampling or testing. Monitoring measures include:

- Routine inspection of waste storage areas to prevent leaks, spills, or uncontrolled disposal.
- Verification that waste is segregated and stored appropriately prior to removal.
- Monitoring of contractor compliance where third-party service providers are used for waste collection and disposal.
- Record-keeping of waste disposal activities, including the use of licensed waste service providers where applicable.

7.8.2.3 Environmental Compliance and Risk-Based Approach

Waste monitoring is implemented using a risk-based approach consistent with the organisation's sustainability and environmental governance framework. Greater attention is given to waste streams that may pose a potential risk to groundwater quality, particularly hydrocarbons or hazardous substances. Any non-compliance or identified risk is addressed through corrective actions to prevent recurrence (Shoprite Holdings Ltd, 2025c).

7.8.2.4 Incident Reporting and Corrective Action

The Sustainability Report (2025c) confirms that environmental incidents, including those related to waste management, are subject to internal reporting, investigation and corrective action processes. In the context of the borehole operation, any waste-related incidents such as spills, improper disposal, or containment failures will be recorded, investigated and remediated promptly to prevent contamination of soil and groundwater resources (Shoprite Holdings Ltd, 2025c).

7.8.2.5 Reporting and Continuous Improvement

Waste monitoring outcomes are incorporated into the organisation's broader environmental performance reporting and continuous improvement processes. This approach supports ongoing improvement in waste management practices (Shoprite Holdings Ltd, 2025c).

7.9 Auditing and Reporting

Annual review and auditing are essential to ensure that management systems remain current, effective and relevant to prevailing conditions. These processes verify the appropriateness and suitability of the systems by measuring actual performance against the objectives set.

Where reviews or audits identify shortcomings or gaps, changes or adjustments to the systems will be implemented to address these issues. Performance will consistently be assessed in relation to the established objectives.

Auditing will be undertaken as follows:

- Internal audits: Annually.
- External audits: Annually.
- Reporting to the DWS: Annually.

8 PUBLIC PARTICIPATION

The sections below provide a summary of the stakeholder consultation activities that have been and will be undertaken for the project.

8.1 Stakeholder Engagement Undertaken

8.1.1 Authority Pre-Application Consultation

A pre-application meeting with DWS was held on 19 February 2025. The purpose of the meeting was to engage with the relevant DWS officials to discuss the water uses and to determine the appropriate type of water use authorisation required for the project. In addition, the meeting served to clarify the information requirements, outline the application process and ensure alignment with the regulatory expectations prior to the formal submission of the WULA.

8.1.2 Stakeholder Database

A project-specific stakeholder database was compiled for the purposes of this application. The following sectors of society are included within the database which will be used to notify stakeholders of this application:

- National, provincial and local government and tribal authorities.
- Landowners and neighbouring landowners.
- Agriculture, water bodies and farmers' organisations.
- National and local media.
- Neighbouring industry and mining, business and commerce.
- Conservation and environmental bodies, both as authorities and Non-Governmental

Organisations.

- Community representatives, Community-Based Organisation, development bodies.
- Representatives for disadvantaged people, women and youth.

8.1.3 Distribution of Notification Letters and Background Information Document

A notification letter and Background Information Document containing information about the project, its location, activities to be undertaken and the regulatory processes will be sent by email correspondence using database.

8.1.4 Site Notice Placements

Site notices will be erected in public places near the project area, to inform and encourage I&APs to register and comment on the Draft Technical Report.

8.1.5 Newspaper Advertisements

Newspaper advertisement was published in the Benoni City Times Newspaper in English. The advertisement aimed to notify I&APs of the project and comment on the Draft WULA Technical Report.

8.1.6 Public Comment Period on the Draft WULA Technical Report

The WULA Technical Report will be made available for a 60-day public review and commenting period from 09 February 2026 to 13 April 2026 at the following places:

- Benoni City Centre Library: Elston Ave, Benoni, 1500
- GCS Website: https://www.gcs-sa.biz/public-documents/

8.2 Issues and Responses from Public Consultation Process

A Comment and Response Report will be compiled capturing all stakeholder comments obtained during the public commenting period.

9 MOTIVATION IN TERMS OF SECTION 27(1) OF THE NATIONAL WATER ACT, 1998

In terms of Section 27 of the NWA, a responsible authority must take into account all the relevant factors including:

9.1 Section 27 (a): Existing Lawful Water Use

ELWU is defined in Section 32 of the NWA as any water use that occurred during the two years immediately preceding the commencement of the Act (1 October 1998), or which has subsequently been declared lawful under Section 33 and which was authorised by or under any previous legislation.

The water use associated with the Block Meat Company does not constitute an ELWU in terms of Section 32. Accordingly, Block Meat Company is applying for a new WUL to authorise water use that supplements the municipal supply. This is critical to ensuring a reliable supply of water for food processing, sanitation and hygiene particularly in light of increasing municipal service delivery challenges and intermittent water supply disruptions

9.2 Section 27 (b): The Need to Redress the Results of Past Racial and Gender Discrimination

Broad-Based Black Economic Empowerment (B-BBEE) is a key driver of inclusive growth and socio-economic transformation in South Africa. Block Meat Company, a subsidiary of the South African-based retail company Shoprite and the largest supermarket retailer in Africa. Block Meat Company demonstrates its commitment to South Africa's transformation objectives through tangible empowerment practices and strategic alignment with national policies (DTIC, 2015).

9.2.1 Broad-Based Black Economic Empowerment Status

The Block Meat Company currently holds a Level 6 B-BBEE contributor status, enabling its clients and supply chain partners to claim up to 100% procurement recognition (AQRate, 2023). This rating confirms Shoprite's compliance with the Codes of Good Practice and enhances its eligibility for public procurement and private sector opportunities where transformation credentials are a key consideration.

9.2.1.1 Shoprite's Contribution to Socio-Economic Transformation

Shoprite demonstrates a strong commitment to transformation and inclusive development through a wide range of initiatives across four core focus areas:

- Community Development:
    - Shoprite supported Suikerbossie Park in Cape Town, managed by the non-profit Apple Tree, where community gardens with a mushroom farm and medicinal garden (Shoprite, 2024).
- Skills Development
    - Shoprite prioritises the training and upskilling of South African employees, particularly from historically disadvantaged backgrounds, through on-the-job learning and mentorship. The focus areas include business critical skills, scarce and critical roles, economic empowerment, building leadership capabilities, business growth and continuity.
- Enterprise and Supplier Development
    - The company is committed to sourcing from local, black-owned and small-, medium- and micro-enterprise suppliers, thereby promoting local economic development. The Shoprite enterprise and supplier development programme,

Shoprite Next Capital, is dedicated to nurturing small business growth. This programme focuses on empowering black- and women-owned businesses and supporting small and emerging suppliers with financial support (Shoprite, 2024).

- Socio-Economic Developments
    - Shoprite has committee focuses on the Group's delivery of its societal responsibilities, including overseeing CSI programmes that focus on hunger relief, food security, youth unemployment and enterprise and supplier development. Shoprite reviews CSI spending and progress to ensure that the Group's efforts address immediate needs while fostering long-term socio-economic growth and community resilience (Shoprite, 2024).

9.3 Section 27 (c): Efficient and Beneficial Use of Water in the Public Interest

The water uses associated with the development and operation of the Block Meat factory are aligned with the principles of efficiency, sustainability and public benefit as required in terms of Section 27(1)(c) of the NWA.

9.3.1 Water Use Efficiency

Recognising water as a finite and strategic national resource, particularly within the water-scarce Gauteng region, Block Meat Company has committed to responsible water use practices that prioritise efficiency and demand management.

Water will be abstracted solely from an existing on site borehole, with volumes strictly managed to meet essential domestic and operational requirements, namely:

- Hygienic water supply for processing and sanitation.
- Supplementing municipal supply to ensure business continuity during water outages.

Importantly, no groundwater will be allocated for high-consumption activities such as dust suppression or vehicle washing underscoring Block Meat Company's conservation ethos. Water-saving fixtures, leak detection systems and routine consumption monitoring will further reduce unnecessary usage and wastage.

9.3.2 Public Benefit of the Water Use

The groundwater use provides clear public benefits and is in alignment with both South Africa's development priorities and global sustainability frameworks such as the United Nations SDGs, specifically SDG 6 (Clean Water and Sanitation) and SDG 8 (Decent Work and Economic Growth).

Key benefits include:

- Operational Resilience: Ensuring the facility can continue operations during municipal supply interruptions supports national water security objectives and

reduces dependency on already strained public infrastructure (DWS, 2013).

- Infrastructure Relief: By responsibly utilising a private borehole, the facility decreases demand on local municipal water networks, which is critical in high-demand, low-supply areas such as Gauteng.
- Socio-Economic Contribution: Reliable water access enables uninterrupted operations, thereby safeguarding jobs, supporting local suppliers and advancing B-BBEE transformation goals (Shoprite, 2024).

These outcomes contribute to the broader public interest by promoting economic continuity while ensuring responsible water use.

9.3.3 Sustainable Resource Management

The Block Meat Company's approach is underpinned by a broader commitment to environmental stewardship and the sustainable management of shared water resources. This is consistent with the objectives of the National Water Act and the integrated water resource management principles embedded in the National Water Resource Strategy, Second Edition (NWRS II).

To ensure the long-term viability of the borehole and surrounding aquifer, the following sustainability measures will be implemented:

- Controlled abstraction volumes, guided by hydrogeological assessments, to prevent over-extraction and preserve aquifer integrity.
- Ongoing groundwater monitoring, including periodic assessment of water levels and quality, to ensure the water use remains within environmentally sustainable limits.
- Maintenance of borehole infrastructure, to prevent contamination and promote operational efficiency.
- Implementation of water conservation technologies, such as low flow fixtures, to minimise consumption and wastage.

Compliance with licence conditions and reporting requirements, as determined by the DWS, to ensure full transparency and regulatory oversight.

9.4 Section 27 (d): The Socio-Economic Impact of the Water Use or Uses if Authorised

9.4.1 Of The Water Use or Uses if Authorised

9.4.1.1 Economic Impact

Authorisation of the water use will enable the continued operation and resilience of a key facility within South Africa's agri-processing and food production sector. Located in Benoni, 40 km east of Johannesburg, the facility contributes to local and regional economic development through employment, procurement and long-term investment in the food value

chain.

As part of the Shoprite Group, Africa's largest supermarket retailer and South Africa's largest private sector employer, the Block Meat facility benefits from the Group's robust socio-economic footprint. Shoprite employs over 163,000 people across the continent and is committed to upskilling and retaining its workforce as a core part of its values and operating model (Shoprite, 2024).

The facility contributes to food system resilience and business continuity in a critical supply sector. In doing so, it supports downstream industries, supplier networks, transport logistics and food retail, particularly in times of municipal infrastructure strain or service delivery interruptions.

9.4.1.2 The Social Impact

The continued operation of the Block Meat Company also enables the Shoprite Group to maintain and expand its CSI programmes, which target vulnerable and underserved communities. These initiatives focus on:

- Hunger relief and food security;
- Youth employment and skills development;
- Promotion of local entrepreneurship through supplier development.

By supporting water security at the facility, the licence will help ensure uninterrupted production, which directly sustains employment and indirectly strengthens livelihoods in surrounding communities. Skills transfer and on-the-job training also enhance long-term employability for local staff, aligning with national development priorities and labour equity objectives (Shoprite, 2024).

9.4.2 Or the Failure to Authorise the Water Use or Uses

Failure to authorise the water use would significantly undermine the viability of the Block Meat Company. Operational disruptions resulting from unreliable water supply would threaten business continuity, compromising food safety, hygiene and production schedules.

The broader impacts of non-authorisation would include:

- Loss of employment and income for workers, many of whom are from historically disadvantaged communities.
- Missed opportunities for local procurement, supplier growth and skills development.
- Reduced investment attractiveness of the region for agri-industrial facilities.
- Inability to implement CSI programmes that address hunger, food insecurity and unemployment.

This outcome would also directly hinder South Africa's progress toward several of the United Nations SDGs to which Shoprite contributes through its operations, including:

- SDG 2: Zero Hunger.
- SDG 8: Decent Work and Economic Growth.
- SDG 12: Responsible Consumption and Production (Shoprite, 2024).

The cumulative socio-economic cost of non-authorisation would therefore be material, both for the business and for the communities that benefit from its activities.

9.5 Section 27 (e): Any Catchment Management Strategy Applicable to the Relevant Water Resource

Block Meat Company's operations in Benoni, Gauteng, fall within quaternary catchment C21D, part of the Upper Vaal sub-catchment, which is nested within the broader Vaal-Orange Water Management Area (WMA). This locates the operations within the jurisdiction of the Vaal-Orange Catchment Management Agency (VOCMA); a statutory body responsible for implementing integrated water resource management in line with Chapter 7 of the NWA.

According to the VOCMA Annual Performance Plan 2025–2028 (VOCMA, 2025), a Catchment Management Strategy (CMS) is currently under development. This strategy will serve as the primary planning and implementation framework for water resource protection, use, development, conservation and management across the Vaal-Orange WMA. Key objectives of the CMS include:

- Reducing pollution from industrial, mining, urban and agricultural sources through coordinated water quality management;
- Strengthening water use authorisation by improving the validation, registration and enforcement processes;
- Promoting infrastructure alignment with national projects such as Phase II of the Lesotho Highlands Water Project;
- Enhancing climate resilience via water conservation and demand-side interventions.

A central tenet of the CMS is stakeholder participation, with efforts underway to establish inclusive catchment forums that promote transparency, trust and participatory governance. This aligns with the principles outlined in the National Water Resource Strategy, 2nd Edition (DWS, 2013).

Key Targets for the 2025–2028 Implementation Period:

- Finalisation of a draft CMS by the 2025/26 financial year;
- Rollout of the River Eco-status Monitoring Programme across 11 rivers in the

catchment;

- Registration of 75% of authorised waste-related discharges on the WARMS by 2025/26, increasing to 85% by 2027/28;
- Response to at least 80% of reported pollution incidents within 78 hours;
- Annual verification and validation of existing water users across the WMA.

To mitigate risks such as unlawful water abstraction, return flow contamination and institutional capacity constraints, VOCMA is prioritising:

- Capacity building and institutional development;
- Improved intergovernmental coordination mechanisms;
- Deployment of robust Information and Communication Technology systems for real-time monitoring and improved data integrity.

The CMS is further designed to support South Africa's transboundary water obligations and reinforces VOCMA's statutory mandate to manage water equitably, sustainably and resiliently in accordance with the NWA and international agreements such as the Southern African Development Community Revised Protocol on Shared Watercourses.

9.6 Section 27 (f): The Likely Effect of the Water Use to be authorised on the Water Resource and on Other Water Users

9.6.1 Groundwater

The water use entails the abstraction of groundwater from an existing borehole located on site at the Block Meat Company facility. To support this application, a detailed hydrogeological assessment was undertaken by GCS Water and Environment Consultants (Pty) Ltd in August 2023. This assessment evaluated the sustainability of groundwater abstraction and the potential impact on local water resources and lawful water users.

The groundwater reserve analysis was based on a delineated sub-catchment area of 17.91 km^2, with the following key findings:

- Estimated groundwater recharge: 343,743.50 m^3/a.
- Current abstraction within sub-catchment: 40,387.25 m^3/a.
- Remaining water availability: 68,438.09 m^3/a.
- Proposed annual abstraction (Block Meat): 12,193.92 m^3/a.
- Resulting surplus after proposed use: ±56,244.17 m^3/a.

The DWS conducted a reserve determination for the water resources of the Vaal Water Management Area in terms of section 16(1) of the NWA (DWS, 2020). The proposed GRD for

quaternary C21D is summarized in Table 9-1.

Table 9-1: Quaternary catchment C21D groundwater reserve (GCS, 2023)

Parameter	Value
Quaternary Catchment	C21D
Area (km^2)	446
Mean Annual Precipitation (mm)	698
Recharge (m^3/a)	8,560,000
Population (minimum level)	180,660
Basic Human Needs (m^3/a)	1,650,000
Groundwater Component of Baseflow (m^3/a)	4,200,000
Total Reserve (m^3/a)	5,850,000
Groundwater Use (WARMS, 2024) (m^3/a)	1,005,735
Allocable Groundwater Total (m^3/a)	1,704,265

Despite the broader catchment experiencing some water resource constraints, the localised reserve determination supports the viability of the proposed abstraction volume. The low impact risk rating is conditional on implementation of appropriate risk mitigation and groundwater management strategies.

9.6.2 Risk Mitigation Measures

To ensure the sustainable use of groundwater resources and to mitigate potential environmental and operational risks, the following precautionary measures are recommended:

9.6.2.1 Groundwater Management

- Regular monitoring of groundwater levels in the abstraction borehole and surrounding observation boreholes to detect any trends indicating over abstraction.
- Implementation of a strict abstraction schedule, aligned with hydrogeological recommendations, to ensure that pumping rates remain within the sustainable yield of the aquifer.
- Annual reporting of abstraction volumes and water level trends to the DWS as part of compliance obligations.

9.6.2.2 Site Design and Borehole Protection

- Surface grading around the borehole head to direct stormwater and runoff away from the casing and wellhead area, thereby preventing infiltration of contaminants and physical damage to infrastructure.
- Securing of borehole infrastructure to prevent unauthorised access and potential misuse.

9.6.2.3 Spill Response and Hazardous Material Management

Development and implementation of a site-specific Spill Response Plan, including:

- Routine training for all operational staff on spill response protocols.

- Provision of readily accessible spill kits near storage and handling areas.
- Clear labelling and storage of hazardous materials in compliance with relevant health, safety and environmental legislation.

Procedures for immediate containment, clean-up and disposal of any spilled substances to avoid groundwater contamination.

9.7 Section 27 (g): The Class and the Resource Quality Objectives of the Water Resource

Impact of groundwater abstraction on surface water is moderate protection and moderate utilisation, indicating groundwater water quality reserve specification Class II (GCS, 2023).

Table 9-2: Groundwater sampling was undertaken from BH2 (GCS, 2023)

Parameter	Risk	Unit	Standard Limit	BH2
Physical and aesthetic determinants				
Colour	Aesthetic	mg/L Pt-Co	≤ 15	<5.00
Conductivity at 25 °C	Aesthetic	mS/m	≤ 170	97.5
pH at 25 °C	Operational	pH units	≥ 5 to ≤ 9.7	6.93
Total dissolved solids	Aesthetic	mg/l	≤ 1 200	846
Turbidity	Operational	NTU	≤ 1	**20.5**
Turbidity	Aesthetic	NTU	≤ 5	**20.5**
Chemical determinants – macro-determinants				
Ammonia as N	Aesthetic	mg/l	≤ 1.5	<0.005
Chloride as Cl^-	Aesthetic	mg/l	≤ 300	119
Combined nitrate plus nitrite	Acute health	mg/l	≤1	<1.00
Fluoride as F^-	Chronic health	mg/l	≤ 1.5	0.32
Free chlorine as Cl_2	Chronic health	mg/l	≤ 5	0.11
Monochloramine	Chronic health	mg/l	≤ 3	0.12
Nitrate as N	Acute health	mg/l	≤ 11	0.571
Nitrite as N	Acute health	mg/l	≤ 0.9	<0.06S
Sodium as Na	Aesthetic	mg/l	≤ 200	27.9
Sulphate as SO_4^{2-}	Acute health	mg/l	≤ 500	174
Sulphate as SO_4^{2-}	Aesthetic	mg/l	≤ 250	174
Zinc as Zn	Aesthetic	mg/l	≤ 5	<0.002
Chemical determinants – micro-determinants				
Aluminium as Al	Operational	mg/l	≤ 0.3	<0.002
Antimony as Sb	Chronic health	mg/l	≤ 0.02	<0.001
Arsenic as As	Chronic health	mg/l	≤ 0.01	<0.006
Barium as Ba	Chronic health	mg/l	≤ 0.7	0.04
Boron as B	Chronic health	mg/l	≤ 2.4	<0.013
Cadmium as Cd	Chronic health	mg/l	≤ 0.003	<0.002
Copper as Cu	Chronic health	mg/l	≤ 2	0.012
Cyanide (recoverable) as CN^-	Acute health	mg/l	≤ 0.2	<0.005
Iron as Fe	Chronic health	mg/l	≤ 2	1.9
Iron as Fe	Aesthetic	mg/l	≤ 0.3	1.9
Lead as Pb	Chronic health	mg/l	≤ 0.01	<0.004
Manganese as Mn	Chronic health	mg/l	≤ 0.4	**1.07**
Manganese as Mn	Aesthetic	mg/l	≤ 0.1	**1.07**
Mercury as Hg	Chronic health	mg/l	≤ 0.006	<0.005
Nickel as Ni	Chronic health	mg/l	≤ 0.07	0.011
Selenium Se	Chronic health	mg/l	≤ 0.04	<0.002
Total chromium as Cr	Chronic health	mg/l	≤ 0.05	<0.010
Uranium as U	Chronic health	mg/l	≤ 0.03	<0.015
Chemical determinants – organic determinants				
Bromodichloromethane	Chronic health	mg/l	≤ 0.06	<0.002
Bromoform	Chronic health	mg/l	≤ 0.1	<0.020
Dibromochloromethane	Chronic health	mg/l	≤ 0.1	<0.002
Phenols	Aesthetic	mg/l	≤ 0.01	<0.01
Total microcystin	Chronic health	mg/l	≤ 0.001	<0.0005
Total organic carbon as C	Chronic health	mg/l	≤ 10	1.75
Trihalomethanes Chloroform	Chronic health	mg/l	≤ 0.3	<0.002

Note:

Red and Bold exceed the SANS 241:2015 Standard

9.8 Section 27 (h): Investments Already made and to be made by the Water User in Respect to the Water Use in Question

To date, substantial investments have already been made by the applicant to support the proposed water use. These include the completion of all required environmental and technical studies, such as the hydrogeological assessment and associated impact evaluations, as well as engagement with relevant regulatory authorities to facilitate compliance with the NWA and associated licensing requirements.

In addition, the necessary water-related infrastructure has been installed on site, including the borehole development, pump installation and reticulation systems, thereby enabling operational readiness in accordance with engineering specifications and environmental authorisations.

Future investments will focus on:

- The operation of the installed infrastructure.
- Ongoing monitoring, reporting and compliance aligned with the approved WUL conditions.
- Maintenance and optimisation of water use systems to ensure continued efficiency and alignment with sustainability goals.
- These past and future investments demonstrate the applicant's commitment to responsible water use, legal compliance and the long-term viability of operations.

9.9 Section 27 (i): The Strategic Importance of the Water Uses to Be Authorised

The groundwater use is of strategic importance to the continued operation and long-term viability of the Block Meat Company facility in Benoni, Gauteng. As part of the Shoprite Group (Africa's largest supermarket retailer and South Africa's largest private sector employer) this facility plays a critical role in supporting the Group's food processing and distribution network. Ensuring a reliable and sustainable water supply is essential for maintaining hygiene standards, food safety and uninterrupted production, particularly in a region prone to municipal water supply challenges.

The water use directly supports Shoprite's sustainability strategy, which integrates resource efficiency, risk mitigation and operational resilience across its business activities. By abstracting groundwater from an authorised on site borehole, the facility reduces its dependence on municipal supply, alleviating pressure on public infrastructure while safeguarding its own operational continuity. This approach is consistent with Shoprite's broader adoption of water-efficient processes, energy-saving technologies and environmentally responsible practices that collectively enhance sustainability and reduce resource consumption.

Economically, the water use enables the facility to retain jobs, support local procurement and contribute to regional economic development. Continued operations strengthen the food value chain, ensuring supply stability and market responsiveness, particularly during times of infrastructure failure or service interruption. The licence also supports the Group's commitment to transformation and inclusive growth through supplier development and B-BBEE targets.

In addition to these operational and economic benefits, the authorised water use underpins Shoprite's CSI initiatives, which focus on hunger relief, youth employment and small business support. These programmes, which depend on the uninterrupted functioning of the facility, contribute directly to national development priorities and align with several of the United Nations SDG, including SDG 2 (Zero Hunger), SDG 6 (Clean Water and Sanitation) and SDG 8 (Decent Work and Economic Growth). Failure to authorise the water use would undermine these benefits, posing risks to jobs, livelihoods, food security and sustainability outcomes.

Accordingly, the water use is not only a legal and operational necessity but also a strategic enabler of Shoprite's environmental, social and economic commitments and is therefore clearly in the public interest.

9.10 Section 27 (j): The Quality of Water in the Water Resource Which May Be Required for the Reserve and for Meeting International Agreements

The water quality of the borehole presented above displays generally excellent water quality that would in no way present any threats to the groundwater reserve in the quaternary sub-catchment and beyond.

However, the decline in general water quality within the Vaal-Orange River WMA is largely due to irrigation runoff, industrial and urban development and the effects of mining (VOCMA, 2025). To tackle these issues, the VOCMA must formulate and execute a comprehensive Integrated Water Quality Plan. This plan will engage a broad range of stakeholders such as local communities, affected entities and industry to ensure that the water discharged back into the system by industrial users aligns with future water supply needs. VOCMA's strategy will address all stages of the water cycle, including drinking water safety, quality monitoring, groundwater, rural land use, stormwater, sewage infrastructure, wastewater treatment returns and industrial effluent regulation, all underpinned by a strong communication and stakeholder engagement framework (VOCMA, 2025).

While the Vaal River catchment is itself fully contained within South Africa, it is a major tributary of the Orange River that forms the border between South Africa and Namibia. However, the minor extraction that this project represents will have no impact on any international commitments South Africa might have concerning the Orange River basin.

9.11 Section 27 (k): The Probable Duration of Any Undertaking or which a Water Use is to be Authorised

The water use for which authorisation is sought is intended to support Block Meat Company's ongoing operational activities in Benoni for the full remaining life of the undertaking. At present, there is no defined end date for Block Meat's operations in the region and activities are expected to continue for the foreseeable future in line with long-term business strategies and sustained demand in the food production sectors.

Accordingly, the water use authorisation is expected to remain valid until such time as Block Meat Company ceases its operations at the Benoni operations.

10 CONCLUSION

The Block Meat Company facility located in Apex, Benoni requires authorisation for water use in terms of Section 21(a) of the NWA, relating to the abstraction of groundwater from an existing on site borehole (BH2) to supplement municipal water supply and ensure operational continuity during periods of municipal service interruption. The applied-for abstraction volume of 5000 m^3/a is conservative and well below the hydrogeologically determined sustainable yield of the borehole.

The hydrogeological assessment confirms that groundwater abstraction occurs from a deep, confined fractured aquifer, with a calculated radius of influence of approximately 8.6 m. No neighbouring groundwater users were identified within a 2.5 km radius of the borehole and no hydraulic interference with other boreholes was observed during testing. When managed within the proposed abstraction limits, the potential impact on the groundwater resource and any hydraulically connected surface water systems is considered negligible.

Potential water-related risks associated with the operation are limited to groundwater abstraction management, process water use and effluent discharge to the municipal sewer system. These risks are adequately addressed through the Environmental Management Plan, which prescribes abstraction controls, preventative maintenance of water infrastructure, separation of clean and dirty water systems and routine fat trap management prior to sewer discharge. The proposed monitoring programme includes continuous abstraction monitoring via installed flow meters, routine groundwater level measurements and annual groundwater quality analysis, providing an effective early warning mechanism and enabling adaptive management should any adverse trends be detected.

From a socio-economic perspective, the facility forms an integral component of the Shoprite Group's food processing and distribution network, supporting employment, local procurement and regional economic activity. A reliable and resilient water supply is essential to maintaining food safety standards, safeguarding jobs and ensuring uninterrupted operations in a context of increasing municipal water supply challenges. Authorisation of the

proposed water use will therefore support economic stability, food security and responsible industrial development within the region.

On the basis of the specialist investigations, risk assessments, and the integrated mitigation measures proposed, authorisation of the groundwater abstraction is recommended, subject to the following key conditions:

- Groundwater abstraction shall be limited to the licenced volume of 5,000 m^3/a and used solely for authorised operational purposes.
- Continuous abstraction monitoring shall be maintained through calibrated flow meters, with records retained for compliance auditing and reporting to the DWS.
- Groundwater level and quality monitoring shall be undertaken in accordance with the approved monitoring programme, with results reviewed annually to confirm the absence of adverse trends.
- Water use efficiency and preventative maintenance measures shall be implemented to minimise unnecessary water losses.
- Effluent and wastewater management measures, including routine fat trap maintenance and compliance with municipal sewer discharge requirements, shall be strictly adhered to.
- An adaptive management approach shall be applied, with operational controls reviewed and adjusted if monitoring results indicate potential risks to the groundwater resource.

With these conditions in place, the proposed water use is considered environmentally acceptable, technically sound and socio-economically beneficial, and it can proceed in a manner that protects groundwater resources while supporting sustainable industrial activity and inclusive economic growth in the local area.

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APPENDIX A: CURRICULUM VITAE AND QUALIFICATIONS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

APPENDIX B: HYDROGEOLOGICAL ASSESSMENT REPORT