

WATER USE LICENSE MONITORING REPORT

WATER USE LICENCE (02/G40G/AGIAE/10115). APPENDIX III, CONDITION 5.2. ANNUAL 2023 MONITORING REPORT JARRANHUP PIGGERY

JULY 2024 TO JUNE 2025

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ABBREVIATIONS

mS/m	milliSiemens per metre
mg/l	milligrams per litre
WUL	Water Use Licence
BOCMA	Breede Olifants Catchment Management Agency
BMP	Biomonitoring Plan

1. INTRODUCTION

A Water Use Licence (02/G40G/AGIAE/10115), authorizes Jarrahnup Piggery for the water use in terms of section 21 (a),(e),(g), (c) and (i) of the National Water Act, 1998 (Act 36 of 1998). The water use activities include: the abstraction of 56 000m³/a groundwater from three boreholes, irrigation of 19 924m³/a of treated wastewater, storing of wastewater in effluent dams, the operation of a wastewater treatment facility and the location of buildings and associated infrastructure within the regulated area.

2. SITE DESCRIPTION

The site falls within the Breede-Olifants Water Management Area, where the Bot River flows adjacent to the farm portion, where no water abstraction for agricultural activities occur. The site falls within the water management area, within quaternary catchment G40G and G40F (Figure 1). Quaternary catchments are further subdivided into sub-quaternary reaches (or SQRs). The SQR in closest proximity to the site is G40E-09370. The most significant and on-going cause of biodiversity loss and deteriorating ecosystem health in the Western Cape and throughout South Africa is the conversion of the natural environment to artificial, manmade landscapes (DWAF, 2005). Such modification occurs through activities such as agriculture, forestry plantations, mining, infrastructure development and urban expansion (DWA, 2005). Agriculture is particularly intense in the Western Cape, covering 13 million hectares (ha), and producing approximately 45% of South Africa's agricultural exports (DWA,

2005). Land transformation effectively alters natural environments, resulting in the elimination, degradation and fragmentation of the remaining viable habitats (DWA, 2005).

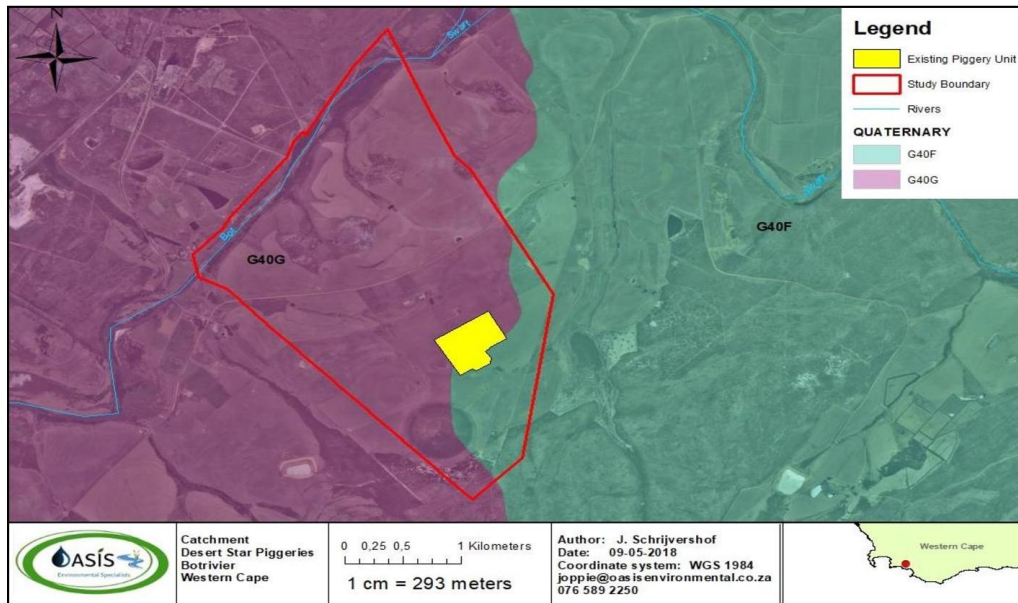


Figure 1: Farm 781 Caledon - Catchment map.

Climate

Climate Altitude ranges between 60 – 450 m and MAP 360 –700 mm (mean: 490 mm), with winter rains from May to August. Mean daily maximum and minimum temperatures varies between 26.9°C and 6.1°C for February and July, respectively. Frost incidence about 3 days per year (Mucina & Rutherford, 2006; Scott-Shaw & Escott, 2011).

Geology and Soils

Clays and loams derived from Bokkeveld Group shales, particularly the Ceres Subgroup. Glenrosa and Mispah forms are dominant. Land types mainly Fb and Fa. (Mucina & Rutherford, 2006).

Topography

The topography of an area is generally a good practical indicator for identifying those parts in the landscape where wetlands are likely to occur. In order to classify a watercourse, the localised landscape setting must be taken into consideration through ground-truthing of the study site after initial desktop investigations (Ollis et al., 2014). The study site can be characterised as having rolling hills with relatively steep sloping topography on the southern portion of the study area. A Digital Elevation Model (DEM) of the aerial photography of the site revealed drainage channels associated with the Bot River. The two main drainage channels within the 500 m buffer of the proposed activities were identified during the desktop assessment, where they were assessed in more detail during the field investigation and confirmed to be 'B' Section channels

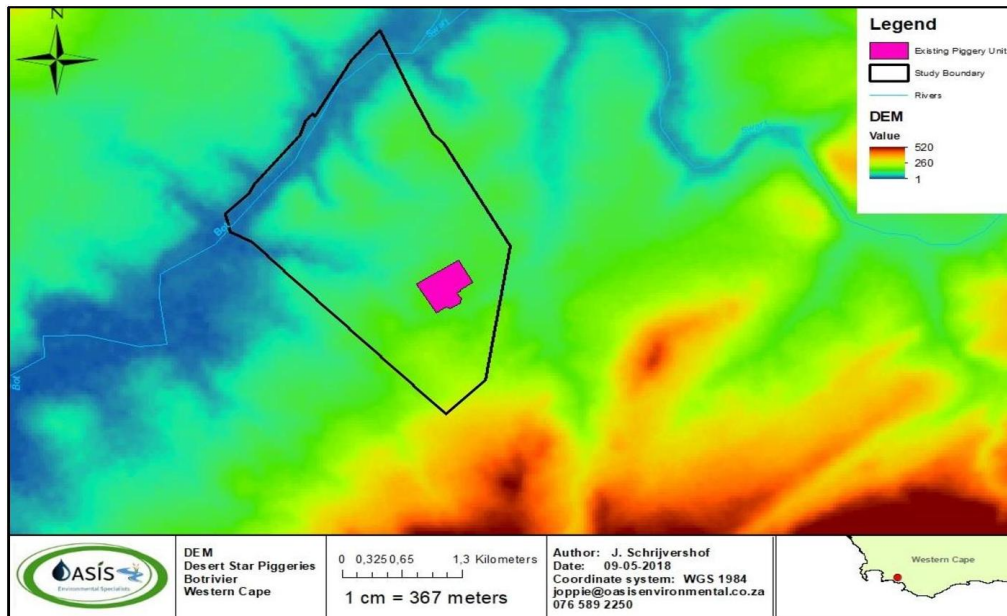


Figure 2: Farm 781 Caledon – Digital Elevation Model map.

Terrestrial Vegetation and Aquatic Biodiversity Features.

Western Ruens Shale Renosterveld

Western Ruens Shale Renosterveld is classified as 'Critically Endangered', where a conservation target of 27% of the original area has been set, but is unattainable due to the fact that $\pm 86\%$ has already been transformed, mostly by cultivation (Mucina & Rutherford, 2006). None of the area is conserved statutorily and only small portion (about 1%) enjoys protection in the Witdraai Private Nature Reserve. Only the steepest slopes carry remnants of this natural vegetation (Mucina & Rutherford, 2006). Vegetation and landscape features are described as moderately undulating plains, today mostly stripped of natural vegetation and where preserved, supporting an open to medium dense, cupressoid and small-leaved, low to moderately tall grassy shrubland dominated by renosterbos (Mucina & Rutherford, 2006). This unit is distinguished from other Ruens renosterveld types by the absence of *Hermannia flammea* and rare occurrence of *Aloe ferox* and *Acacia karroo* complex. Shrubby Asteraceae (e.g. *Elytropappus rhinocerotis*) increase as grazing reduces the palatable grass component (mostly *Hyparrhenia hirta*), resulting in subsequent erosion.

Elim Ferricrete Fynbos

Extensive areas between the Bot River Valley, Hemel en Aarde Valley, Stanford environs, Salmonsdam and Baardskeerdersbos, with the most extensive parts around Elim on the Agulhas Plain spanning the area from Soetmuisberg in the north to Buffeljags and the Soetanytsberg in the south Undulating hills and plains covered with open to closed dwarf shrubland with occasional scattered tall shrubs (Mucina & Rutherford, 2006). It is a diverse unit, with all structural fynbos types. present, but with extensive areas of asteraceous fynbos dominated by low proteoid elements (Mucina & Rutherford, 2006). To differentiate mesotrophic asteraceous from mesotrophic proteoid fynbos the following proteoid types are recognised: *Leucadendron elimense*, *L. laxum*, *L. modestum*, *L. stelligerum* and *L. teretifolium* (Mucina & Rutherford, 2006). When degraded, this vegetation type becomes

dominated by *Elytropappus rhinocerotis* (Mucina & Rutherford, 2006). On transitions to deep sandy soils, *Protea repens* may be dominant, and these transitional communities are often much richer in species than associated Overberg Sandstone Fynbos (Mucina & Rutherford, 2006).

Overberg Sandstone Fynbos

Spread irregularly from Bot River and Hawston in the northwest to the Soetanytsberg and Bredasdorp in the southeast, including the Caledon Swartberg, Babilonstoring, Kleinrivier and Bredasdorp Mountains and Agulhas hills such as Franskraal se Berge and Buffeljachtsberg Low Mountains, undulating hills and moderately undulating plains supporting moderately tall, dense restioid, ericoid-leaved and proteoid shrublands (Mucina & Rutherford, 2006). Structurally these are mainly proteoid and ericaceous fynbos, with restioid fynbos also occurring locally (Mucina & Rutherford, 2006).

From the NFEPA database, valley bottom wetlands were identified within the project boundary. Based on the site delineation, these valley bottom wetlands were found to be the farm dams identified onsite and was characterised with the presence of two 'B' section channels within the 500 m buffer of the proposed activity. 'B' section channels are a subject to intermittent base flows and are considered hydrologically sensitive as they are associated with riparian habitats. These channels were found to be in a seriously modified (Category E) state due to the extensive landscape transformation with crop farming. A buffer of 25 m is recommended around the channels to ensure that the functioning is not further disturbed.

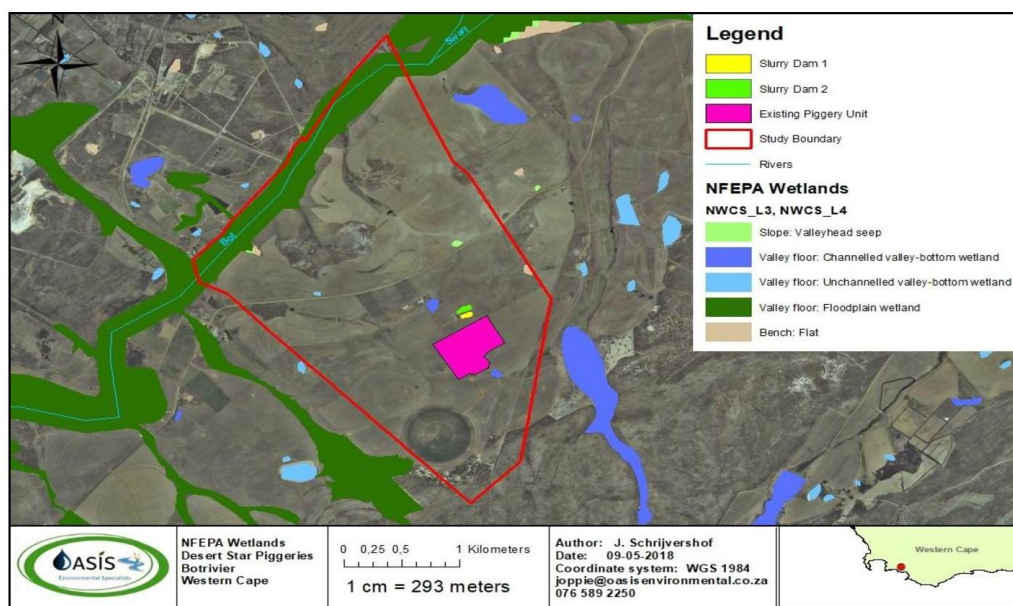


Figure 3: Farm 781 Caledon – NFEPA Wetlands map.

Disturbances included the presence of minor alien invasive species, minor erosion, extensive grazing and crops within the area. Two hydrophytic species were identified within one of the 'B' section, these hydrophytic riparian vegetation consisted of mainly of *Phragmites australis* (Common Reed) and *Juncus spp.* in the lower part of Channel 2 close to the Bot River confluence, outside of the 500 m buffer of the proposed activities.

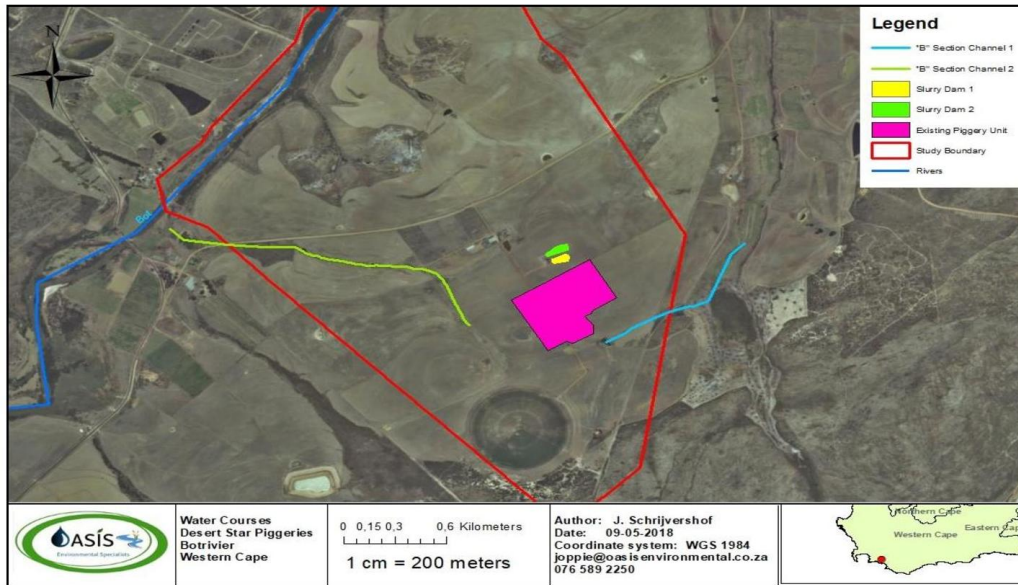


Figure 4: Farm 781 Caledon – Channels within 500 m.

3. WATER QUALITY ANALYTICAL PARAMETERS & FIELD MEASUREMENTS

3.1. Boreholes – Groundwater Abstraction

This licence authorises Jarrahnup Piggery to abstract a maximum volume of 56 000 m³/a of water on for on Remainder of Farm 781, Caledon.

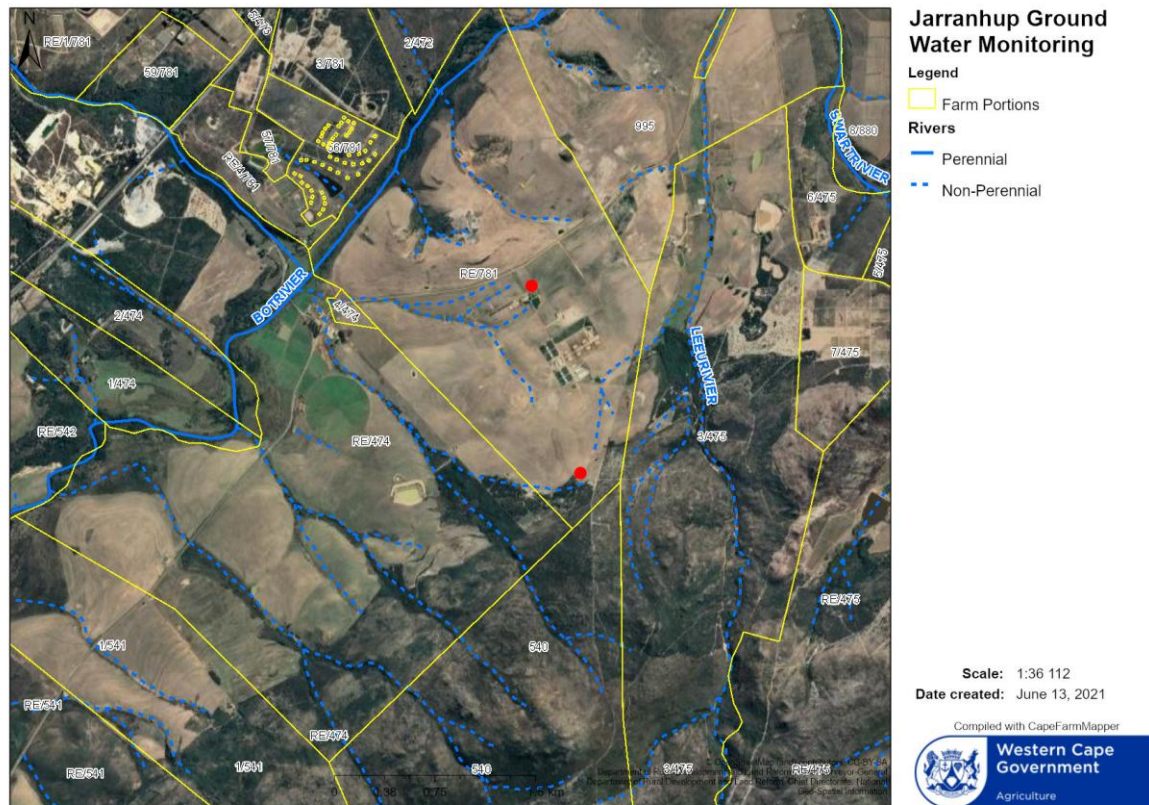
Water use activities

Activity	Purpose / Description	Properties	Volume	Co-ordinates
Borehole Abstraction BH1	Water Use as part of piggery operations: drinking and wash	Remainder of Farm 781,	41 272m ³ /a	Lat: -34.29349 Lon: 19.20765
Borehole Abstraction BH2	Water Use as part of piggery operations: drinking and wash	Remainder of Farm 781, Caledon	4 704m ³ /a	Lat: -34.29420 Lon: 19.20361
Borehole Abstraction BH3	Water Use as part of piggery operations: drinking and wash water	Remainder of Farm 781, Caledon	10 024m ³ /a	Lat: -34.29390 Lon: 19.20393

During summer, the water level should be measured daily (towards the end of the 12-hour pumping cycle) and recorded in a database. Note this is a conservative safe yield (for use throughout the year). It is feasible that more groundwater can be abstracted and to accurately determine how much more water can be abstracted the borehole should be equipped with a continuous water level data logger.

The Licensee must submit a full pump tests report of all the boreholes they are abstracting within one year of licence being issued.

Groundwater model must be calibrated to quantify the pollution plume migration rate and direction annually. The model must determine the cone of depression radius, and the private groundwater users potentially impacted. Groundwater will be sampled as per the map below. The existing boreholes upstream will be used to sample the upstream sample, and a 10m deep borehole will be installed downstream as per the map below to sample down stream ground water for analyses.



thirty (30) days after the results of each sampling event is received. Monitoring must continue for three (3) years. A photographic record must be recorded and included in the report of each sample and at the different points.

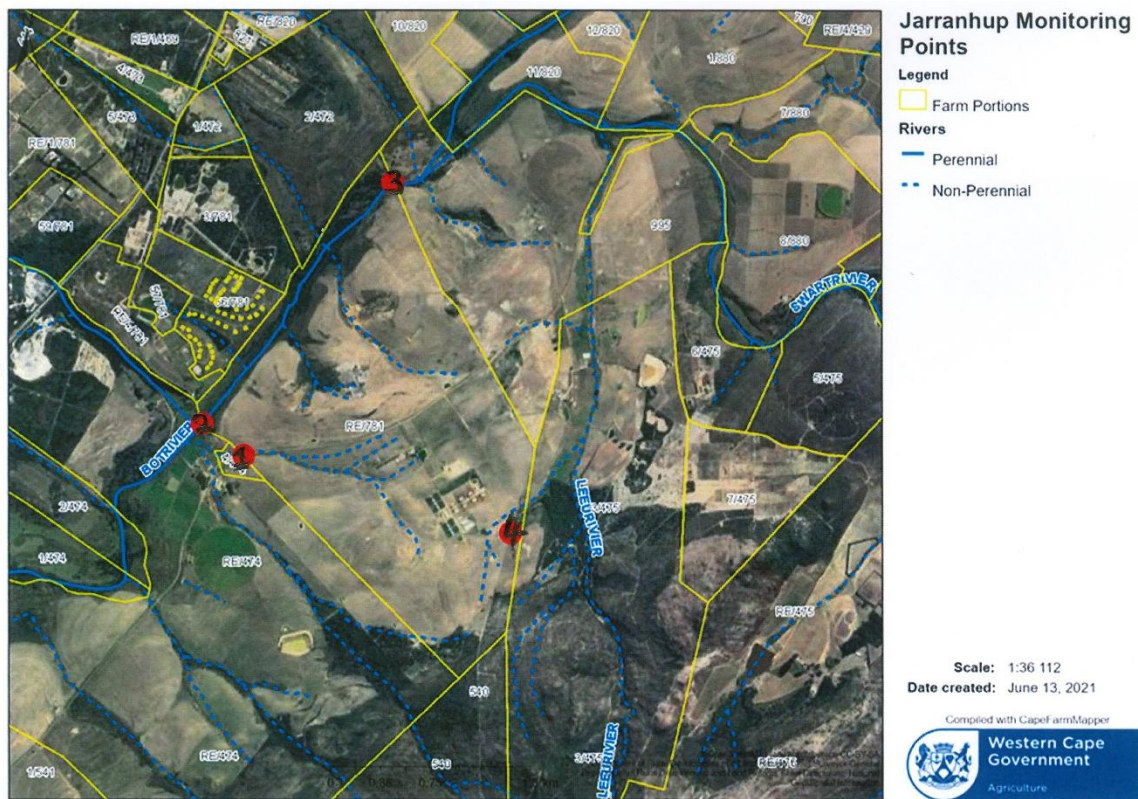


Figure 6: River monitoring points. Red dots indicate sample points.

Six monthly monitoring reports (Twice a year) of the service and ground water monitoring must be submitted to BOCMA.

3.3. SECTION 21 (E) OF THE ACT: ENGAGING IN A CONTROLLED ACTIVITY; IRRIGATION OF ANY LAND WITH WASTE OR WATER CONTAINING WASTE

Quantity of Water Containing Waste for Irrigation

This licence authorises Jarrahnup Piggery to irrigate as per details below.

Activity	Purpose / Description	Properties	Volume	Co-ordinates
Irrigation with biodegradable industrial wastewater	Water Use as part of piggery operations: Wastewater Management	Remainder of Farm 781, Caledon	19 924m ³ /a	Lat : -34.28673 Lon : 19.19847

This licence authorises to irrigate a total surface area of 230.2 hectares (ha) of pastures / grazing.

The quality of the wastewater to irrigate with must not exceed special effluent standard (GNR 1091) detailed in table below.

Table 1: Irrigation water standards

Parameter	Limits
pH	5.5-9.5 pH
Electrical Conductivity	70 mS/m
Suspended solids	25 mg/l
Chemical oxygen demand (COD)	75 mg/l
Orthophosphates (as Ortho-P)	10 mg/l
Nitrate (as N)	15 mg/l
Ammonia (as N)	6 mg/l
E.coli(counts/100ml)	150 mg/l
Chloride as Free Chlorine does not exceed	0,25 mg/l
Fluoride	1 mg/l
Soap, Oil and Grease	2.5mg/1
Faecalcoliforms	1000 per 100ml

The quantity of water containing waste irrigated must be metered and recorded daily.

Monitoring for the quantity of the water containing waste for irrigation must be done at the point where the effluent is piped into the irrigation dam.

Water quantity measuring, recording and integrating devices must be maintained in a sound state of repair and calibrated by a competent person at intervals of not less than two years. Calibration certificates must be available for inspection by the Provincial Head or his/her representative upon request.

The date, time and monitoring point in respect of each sample taken must be recorded together with the results of the analysis.

Monitoring points must not be changed prior to notification to and written approval by the Head of Provincial Operation.

The samples taken at outlet point of the irrigation dam shall be analysed for the variables at the following required frequencies:

Table 2: Monitoring variables and frequency

Variable	Frequency
pH	Monthly
Electrical Conductivity (EC) (ms/m)	Monthly
Chemical oxygen demand (COD) (mg/l)	Monthly

Faecal Coliforms (as FCU) (count/100ml)	Monthly
Ammonia (as N) (mg/l)	Monthly
Nitrate (as N)(mg/l)	Monthly
Ortho-Phosphate (as P) (mg/l)	Monthly
Suspended solids (mg/l)	Monthly

3.4. Section 21(G) Of The Act: Disposing Of Waste In A Manner Which May Detrimentially Impact On A Water Resource

This Licensee is authorised to dispose treated wastewater into oxidation dam, manure dams, French drains and stockpiles in terms of water uses activities detailed in below.

Groundwater Monitoring

The Licensee shall conduct ground water monitoring on a quarterly basis for the variables shown in Table below.

Variables	Frequency
Electrical Conductivity (mS/m)	Quarterly
Sodium (mg/l)	Quarterly
Magnesium (mg/l)	Quarterly
Calcium (mg/l)	Quarterly
Chloride (mg/l)	Quarterly
Sulphate (mg/l)	Quarterly
Nitrate (mg/l)	Quarterly
Fluoride (mg/l)	Quarterly
pH	Quarterly
Ecoli	Count/100ml
Ortho-Phosphate (as P) mg/l)	Monthly
Ammonia (as N) (mg/l)	Monthly

4. MONITORING RESULTS

Water Quality Monitoring results (Rivers)

Hard copy of laboratories results and sampling records and photographs is on file on the farm and available on request. Please refer to excel spreadsheet attached for summaries.

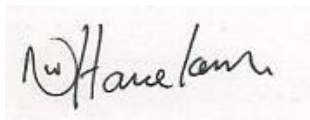
5. CONCLUSION

Since no conclusive proof could be find during the site inspection and impact assessment and no rehabilitation actions identified during the site visit, no rehabilitation plan is required.

The Jarranhup piggery must continue to implement the management plan, irrigation plan, site management in terms of the water use license and monitoring as per the plan. Should any rehabilitation actions be recorded during the monitoring, the BOCMA will be informed of this, and a rehabilitation plan submitted for approval.

Water sampling and monitoring was done in July 2024 to June 2025 results submitted to BOCMA. Some of the parameters were out of the license specification, but monitoring is continued with to determine natural conditions. At this stage it is difficult to determine if the quality had decreased since the monitoring must determine the natural conditions of the river. However, some of the crucial parameters indicating possible pollution from the piggery (such as Ammonia, Nitrate, Nitrite and Orthophosphate) operations parameters came down and is within the license specifications.

The water quality monitoring and sampling in the rivers needs to be consistently sampled. Some of the parameters analyzed differ between months and the Leeu River Border and Ampies House Botriver Border was not sampled. It is crucial and important that all four points water samples be collected and analysed when it has water in it to sample. The non-sampling and analyses of some of the points has an impact on the monitoring program.

A handwritten signature in black ink, appearing to read 'N. Hanekom', is written on a light-colored rectangular background.

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