

Case Study: Zebediela Mall

Serving a rural community with supply of water and sanitation services.

Overview

Calcamite in partnership with Waterwise Services is proud to showcase our work at Zebediela Mall.

With our advanced wastewater treatment facility, we successfully recycle 80,000 liters of wastewater daily, repurposing it for non-potable applications, and supplying water and sanitation services to the mall.

Requirements/On-site challenges

The Zebediela Mall treatment facility aims to recycle sewage for non-potable uses. Given that the mall houses a butchery and multiple fast-food outlets, there's a significant disposal of fats. High concentrations of fats, oils, and grease can disrupt the breakdown of organic materials in the anaerobic chamber. These concentrations can also limit oxygen transfer, meaning aerobic organisms might not get sufficient oxygen to treat the wastewater effectively, resulting in decreased COD reduction. If not properly designed, operated and managed, these fats could lead to the facility's failure.

Solution

We developed a hybrid wastewater treatment system. This system combines underground septic tanks with an above-ground Bio-reactor and tertiary purification plant, ensuring the water is of a quality fit for recycling. To handle the excess fats, we've incorporated fat traps, provided user training, and established regular maintenance schedules.



Client information

Zebediela Mall is a shopping centre with no access to municipal sewerage or potable water networks.



Location

South of Polokwane in Limpopo



Industry

Shopping Centre



Plant size

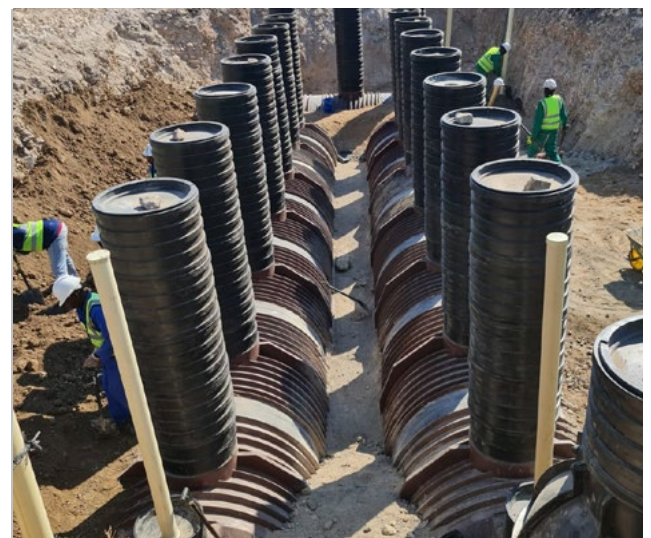
80kL per day



Project date

Phase 1: May 2021

Phase 2: November 2022



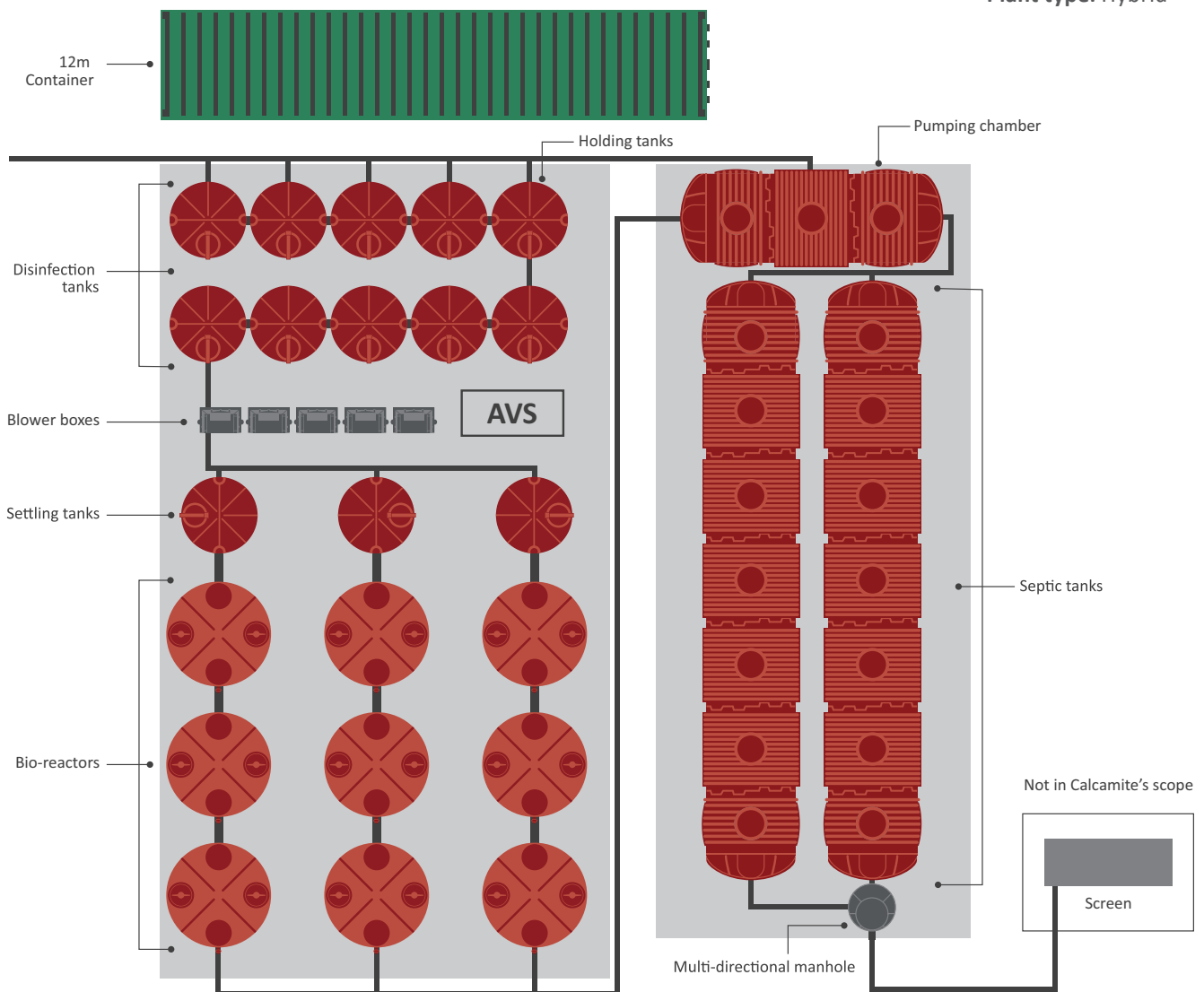
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Plant specifications

Top view

ADWF: 80m³/day
Plant type: Hybrid



"It is with much enthusiasm that I am writing to recommend the services of Calcamite Sanitation and Wastewater (Pty) Ltd...We are extremely satisfied with the services that Bennie from Calcamite has offered us, they offer the most competitive rates and have great after sales service for their products. We will definitely use their services again in the future..."

- Pieter Richter, Waterwise Services

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Results

Apart from the elevated nitrate levels due to incomplete denitrification, the wastewater treatment plant's final effluent results fall within the acceptable General Standards, demonstrating a 95% organic load reduction. The overall performance of the plant is very good.





Test Report
Page 1 of 1

Client: Waterwise Services Pty Ltd	Date of report: 01 February 2023
Address: 66 Oukraal Blvd, Tygervalley, Pta	Date accepted: 25 January 2023
Report no: 144502	Date completed: 01 February 2023
Project: Waterwise Services Pty Ltd	Date received: 25 January 2023

Lab no:	226402	226403	226404	226405		
Date sampled:	19-Jan-23	19-Jan-23	19-Jan-23	19-Jan-23		
Aquatico sampled:	No	No	No	No		
Sample type:	Water	Water	Water	Water		
Locality description:	SP4	Effluent	Septic tank	Manhole		
Analyses	Unit	Method				
A AQL pH @ 25°C	pH	ALM 20	NR	7.83	7.15	6.46
A AQL Electrical conductivity(EC) @ 25°C	mS/m	ALM 20	NR	272	327	408
A AQL Nitrate (NO ₃) as N	mg/l	ALM 06	NR	32.0	0.233	0.209
A AQL Ammonium (NH ₄) as N	mg/l	ALM 05	NR	3.01	36.7	96.3
A AQL Orthophosphate (PO ₄) as P	mg/l	ALM 04	NR	6.22	6.54	33.5
A AQL E.coli	CFU/100ml	ALM 40	<1	<1	NR	NR
N AQL Faecal coliform	CFU/100ml	ALM 42	<1	<1	NR	NR
A AQL Total coliform	CFU/100ml	ALM 40	<1	<1	NR	NR
A AQL TotalViableCount	CFU/ml	ALM 43	36000	>50000	NR	NR
A AQL Turbidity	NTU	ALM 21	0.549	1.09	NR	NR
A AQL Chemical oxygen demand (COD)	mg/l	ALM 10	21.8	57.1	608	1538
A AQL Total suspended solids (TSS)	mg/l	ALM 25	NR	11	59	146
A AQL Oil and grease (SOG)	mg/l	ALM 29	<0.100	<0.100	<0.100	<0.100
A AQL Total organic carbon (TOC)	mg/l	ALM 63	8.00	8.60	NR	NR
A AQL Total oxidised nitrogen as N	mg/l	ALM 06	NR	32.0	0.233	0.209
N AQL Biological oxygen demand	mg/l	ALM 62	NR	<5	331	861
N AQL Free and Saline Ammonia as N	mg/l	ALM 26	NR	3.01	36.7	96.3

A = Accredited N = Non accredited Sub = Sub-contracted NR = Not requested RTF = Results to follow NATD = Not able to determine ATR = Alternative test report ; Results relate only to the items sampled and tested ; Results reported against the limit of detection; Results marked 'Non SANAS Accredited' in this report are not included in the SANAS Schedule of Accreditation for this laboratory; Uncertainty of measurement available on request for all methods included in the SANAS Schedule of Accreditation; The report shall not be reproduced except in full without approval of the laboratory

M. Swanepoel
Technical Signatory

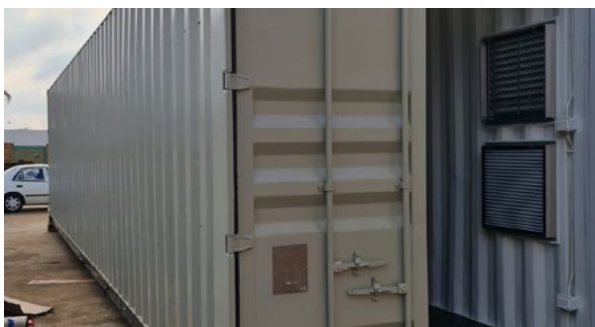
AQL = Aquatico Laboratories ; AQK = Aquatico Laboratories based in Kathu

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AQK	28 Karee ave, Kathu, Northern Cape, South Africa	Tel: +27 53 880 0208	www.aquatico.co.za

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Photographs



Conclusion

In regions where access to municipal or potable water networks is limited, innovative solutions are paramount. This initiative not only addresses immediate needs but also paves the way for sustainable water management practices.