Caring
Innovative
Focussed

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and Associates (RF) (Pty) Ltd

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Our reference : C20087/COR/RS/rs/03

Your reference :

12 August 2020

Boschendal (Pty) Ltd
PO Box 25
GROOT DRAKENSTEIN
7680

ATTENTION: Mr William George

Sir,

PROPOSED DEVELOPMENT OF THE RETREAT ON THE FARM BOSCHENDAL, FRANSCHHOEK: AVAILABILITY OF ENGINEERING SERVICES (Rev 2)

Your request for an engineering report on the availability of engineering services for the proposed development of The Retreat on the farm Boschendal, Paarl Division, refers:

1. BACKGROUND

The Retreat is situated on the farm Boschendal between Franschhoek and Stellenbosch. There are eight (8) existing structures on the site, and the intention is to refurbish/upgrade the dilapidated structures as a retreat for the Bertha Foundation comprising overnight guest accommodation, a conference facility and dining facilities. The proposed layout and accommodation schedule are shown in Annexure A

The following development is earmarked:

- Reception area;
- Communal area (library and ablution facility;
- Accommodation units;
- Conference facilities;
- Dining facilities;
- Operation facilities.

2. ROAD INFRASTRUCTURE

ITS Engineers had been appointed as the traffic engineers for the proposed development and will prepare a traffic impact study to determine the effect of the development on the proposed road network.

3. WATER RETICULATION

3.1 Water Demand

The water demand for the proposed development is shown in the table below using the guidelines for each facility.

	Unit Demand	Number of Units	Total AADD (L/day)
School	60 L / student	40	2 400
Guest House	0.6 kL / double room	17	10 200
Conference Facilities	20 L / seat	16	320
Security Booth	0.3 kL / unit	1	300
Private Open Space	12 kL / ha	0.015	180
TOTAL			**13 400**

The average daily flow is 0.16L/s. With a peak factor of 2.4, the network should be designed for a flow of 0.38 L/s.

This development is classified as a medium risk in terms of fire, and provision must be made for a flow of 15L/s at the fire hydrant at a minimum head of 15m

The abovementioned water demand does not include irrigation water. Irrigation water supply for this development will be from the irrigation network on the farm.

There are no water networks in the vicinity of the development, and the following options for water supply are under investigation:

3.2 Municipal Supply Options

3.2.1 Connection to rising main to Pniel reservoir

There is an existing municipal water booster pump station near Thembalethu on the Boschendal farm that pumps water from the Wemmershoek water main to the municipal reservoir in Pniel. This water main is located between the proposed development and the existing gravel road ("Ou Wapad") An application will be made at Stellenbosch Municipality for a metered water connection from this pump main to a higher lying reservoir on the farm. The estimated position of this reservoir is further south of the development towards the mountain to ensure that sufficient pressure will be available for a gravity main to The Retreat. Storage capacity of at least twice the Average Annual Daily Demand (AADM) is required at the reservoir. It is envisaged that 3 x 10 000 L storage tanks will be required to comply with storage and fire requirements.

3.2.2 Supply from Lanquedoc

The Retreat is located approximately 1.25km from Lanquedoc and the possibility exists to get a connection from the internal reticulation network in the town. An application for this option will also be made with Stellenbosch Municipality. A bulk water meter will be installed at the municipal connection.

Available flows and pressure, as well as costs will determine which of the municipal supply options, if approved, will be implemented.

3.2.3 Borehole Supply

The possibility exists to drill a borehole in the vicinity of The Retreat that can be used for the water supply of the development. This supply option forms part of the larger water supply strategy for the Boschendal farm and is under investigation.

The supply from a borehole will depend on the following:

- Drilling a borehole with sufficient supply/yield for the development
- Testing quality of ground water to establish whether any treatment is required to achieve potable water standard
- Registration of borehole for domestic use

3.2.4 Supply from dam on farm

There is a large dam to the south of The Retreat. Discussions with the management of the farm revealed that this dam has a reliable inflow to ensure constant supply to the development but will need treatment to potable standard. Application must be made to use the dam water for domestic use and the necessary permits obtained.

If this option is selected, water will be pumped to a higher lying reservoir (as described in paragraph 3.2.1), treated, and feed The Retreat by means of a gravity main

3.3 Recommended Supply

The recommended water supply will depend on whether a supply from either of the municipal networks can be made available and the capital costs of the supply. The advantage of the municipal supply is that water of a potable quality will be available and will not require any treatment or operation and maintenance from the farm management.

3.4 Internal Water Network

The internal network will connect to the external supply after the bulk water meter. A ring main will be provided around the buildings with a connection to each building. It is envisaged that one fire hydrant will be required for the development and will be provided in the domestic water network.

The internal reticulation network consisting of a 110 mm dia reticulation main around the buildings with valves and a fire hydrant is shown on drawing no 20087-C-Figure A rev D in Annexure B

4. SEWER RETICULATION

4.1 Sewer Flows

Sewer flows are normally calculated at 75% of water demands to make provision for irrigation and other uses. As irrigation water for the development will most probably be supplied from other sources, it is recommended that sewer flows be calculated as 90% of water demands.

Based on the water demand calculations in paragraph 3.1, the Peak Day Dry Weather Flow (PDDWF) is calculated at 12,1kℓ/day.

4.2 Sewer Drainage and Treatment Options

There is no formal sewer reticulation network or treatment facility in the proximity of The Retreat. The pumping of effluent to the Lanquedoc municipal network is not considered to be an economical option.

It is recommended that an on site treatment package plant be installed at the development. HWT is extensively involved in the investigation of the treatment of effluent on the greater Boschendal farm and will also provide inputs for The Retreat. A low energy biological treatment process will most probably be recommended, comprising of a solids interceptor, flow balancing and a multi-media biological (SOG) filter. Typical details of the SOG trickling filter are shown in Annexure C.

It is recommended that effluent gravitate to the solids separator outside the ecological buffer zone of the river on the northern side of the development as shown on drawing no 20087-C-Figure A rev D in Annexure B. A two track environmentally sensitive road will be provided to the solids separator for maintenance purposes. The effluent will be pumped from the solids separator to the SOG trickling filter located south of the access road to the development (see drawing no 20087-C-Figure A rev D in Annexure B).

The standard to which the effluent is treated and where it is irrigated must be in accordance with national standards and legislation. Irrigation close to boreholes, streams or wetlands will not be allowed. The treated effluent can then be used in a sustainable manner, i.e. to supplement irrigation water.

5. STORMWATER MANAGEMENT

The site drains in a northerly direction towards the Dwars River. The increase of stormwater run-off is minimal as the footprint of the overnight guest accommodation being upgraded is the same. Downpipes from the buildings will discharge on surface and dissipate into the ground

Flood lines of the Dwars River were obtained from a drawing by Kwezi V3 Engineers dated September 2005, The 1:50 and 1:100 flood lines are indicated on the services layout drawing no 20087-C-Figure A rev D in Annexure C

A marginal increase in run-off is expected from the new road and parking area surface. It is recommended that stormwater be accommodated in a sustainable manner and to the landscape architect's landscape plan.

6. TELECOMMUNICATION

Ducts will be placed at road crossings for a future telecommunication network. The selected service provider will install further ducts and manholes as per their design.

7. REFUSE REMOVAL

Refuse will be collected at the development by the management of the farm and disposed of with the refuse generated on the farm. Collection of refuse is done by a private company and dumped at a registered site.

8. ELECTRICITY SERVICES

8.1 External Electrical Services

8.1.1 Supply Area

The area of the proposed development falls within the Eskom area of supply.

Eskom supplies the surrounding customers and it is therefore logical, technically feasible and economically advantageous to supply the development from the nearest Eskom electricity network with adequate capacity.

8.1.2 Maximum Demand

The intention is that a rooftop PV system will be implemented to reduce the energy consumption (kWh) of the development.

Based on the accommodation schedule provided by the Architect and limited capacity allowance for street/area lighting and other amenities the maximum demand of the development is estimated at 100Kva.

It is therefore proposed that application for a 100Kva (150 Amp three phase) low voltage connection is submitted to Eskom.

8.1.3 Supply Point

The development will be supplied from the existing Eskom overhead line running next to the gravel farm road as shown on Figure E1 below.

Figure E1: Route of Existing Eskom Overhead Line

Eskom confirmed that sufficient capacity is available on the 11Kv overhead line to supply the development (Eskom capacity letter to follow).

A new low voltage bulk supply point will be taken off the 11Kv overhead line to supply the development.

8.1.4 Scope of Work

To supply the development with adequate and reliable bulk electricity supply, the following preliminary scope of work is proposed:

i) Installation of a new 11Kv T-off overhead line across the road from the existing Eskom 11Kv overhead line.
ii) Installation of a new 11Kv/420Volt 100Kva pole mounted transformer at the development.
iii) Installation of a new 150Amp (100Kva) three phase low voltage Eskom bulk supply point at the development.

Shared Network Costs (SNC's) will be payable to Eskom based on the size of the electricity supply applied for.

8.2 Internal Electrical Services

8.2.1 Low Voltage Internal Network

The reticulation network within the development boundaries will be a private network and will be designed to comply with the standards and requirements of SANS 10142.

An underground internal low voltage network will be installed from the Eskom bulk supply point to each of the refurbish/upgrade cottages, conference facility and dining facilities.

The operation and maintenance of the private internal reticulation services will be the responsibility of the Retreat Management. The Retreat will receive a monthly bulk account for the electricity consumption of the retreat.

8.2.2 Street and Area Lighting Network

Street and area lighting of internal private roads, private open spaces and parking bays and the lighting of features, walls, entrances, water features etc will be provided to the Architect's requirements.

Energy efficient lighting technology will be used as far as possible to reduce the energy requirements of the development.

9. DEVELOPMENT CONTRIBUTIONS

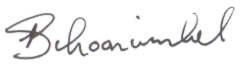
Development Contributions (DC's) and Eskom Shared Network Costs (SNC) will be payable for the development. The levies/contributions will be based on the applicable rates of the year in which clearance of the erven are requested. If no bulk services are obtained from municipal sources, DC's should not be payable.

10. CONCLUSION

Although the proposed development is situated outside the normal municipal supply area. Preliminary discussions with Stellenbosch Municipality indicated that they will consider a municipal water connection from their bulk supply to Pniel, but an official application with water demands must be lodged.

Wastewater treatment will be on site with the construction of a package plant that will treat effluent to the applicable standard that can be used for irrigation.

Please do not hesitate to contact us should you require any additional information.



Rudolph Schoonwinkel Pr Eng
For Lyners

ANNEXURE A

DRAWING NO	DESCRIPTION
C1-100 REV A	Site Development Plan

	Existing Footprint	Area Inside Footprint	Area Outside Footprint	Total Area	Area Change	External Covered Area
Admin/Reception	146.8 m²	146,8 m²		146.8 m²		45.2 m²
Lalela	146.8 m²	146.8 m²		146.8 m²		45.2 m²
Accommodation Cottage 1	147.5 m²	147.5 m²		147.5 m²		23.9 m²
Accommodation Cottage 2	146.5 m²	146.5 m²	48 m²	194.5 m²	48 m²	24.0 m²
Accommodation Cottage 3	145.5 m²	145.5 m²		145.5 m²		24.7 m²
Conference	147.2 m²	147.2 m²	14.7 m²	161.9 m²	14.7 m²	
Dinining & Lounge	147.1 m²	147.1 m²	47.9 m²	195 m²	47.9 m²	163.3 m²
Kitchen and Staff	146.6 m²	146.6 m²	48 m²	194.5 m²	48 m²	58.1 m²
Total	1173.9 m²	1173.9 m²	158.6 m²	1332.5 m²	158.6 m²	384.5 m²

Key	
	Existing Building Footprint
	Paving
	Main Road (Ou Wapad)
	Footpath
	Parking/ New Access
	New Landscape
	Existing Landscape

GENERAL NOTES

1.0 DO NOT SCALE DRAWINGS. FIGURED DIMENSIONS ONLY TO BE ACCEPTED. OVERALL DIMENSION TO TAKE PREFERNCE.

2.0 ALL LEVELS AND DIMENSIONS TO BE CHECKED ON SITE BEFORE ANY WORKS ARE INDERTAKEN WHICH IS DEPENDANT ON THESE SIZES.

3.0 CONSULT ARCHITECT IN CONNECTION WITH ANYTHING INDETRACT OR OBSCURE ON

THESE DRAWINGS AND REPORT ANY ERRORS, DISCREPANCIES OR OMISSIONS IMMEDIATELY.

4.0 ALL WORKS TO COMPLY WITH THE NATIONAL BUILDING REGULATIONS AND LOCAL AUTHORITY REQUIREMENTS.

5.0 COPYRIGHT OVER ALL DESIGNS AND DRAWINGS SHALL REMAIN THE PROPERTY OF

THE ARCHITECTS AND ANY PROVISION TO THE CONTRARY IN TERMS OF THE COPYRIGHT ACT No. 63 OF 1965 IS HEREBY SPECIFICALLY EXCLUDED.

6.0 THE ARCHITECT ACCEPTS NO RESPONSIBILITY FOR ERRORS RESULTING FROM THE MISINTERPRETATION OF THE DRAWINGS.

7.0 ALL DIMENSIONS ARE GIVEN IN MILLIMETRES.

1 C1-100 **SITE DEVELOPMENT PLAN**
SCALE - 1 : 200

N

NO.	DATE	DESCRIPTION
	13.06.20	ISSUED FOR INFORMATION

DESIGNSCAPE architects
1st Floor 105 Loop Street, Cape Town,South Africa 8001
t. 021 422 5041 | 0860 117 466 | f. 021 426 0272
info@dslcape.co.za | www.dslcape.co.za

PROJECT
BERTHA RETREAT
BOSCHENDAL FARM 1674/11
PAARL

DRAWING TITLE:
SITE DEVELOPMENT PLAN

SCALE:	DRAWN BY:
1 : 200	G. KEET
DATE:	CHECKED BY:
17/06/20	D. MARRIOTT

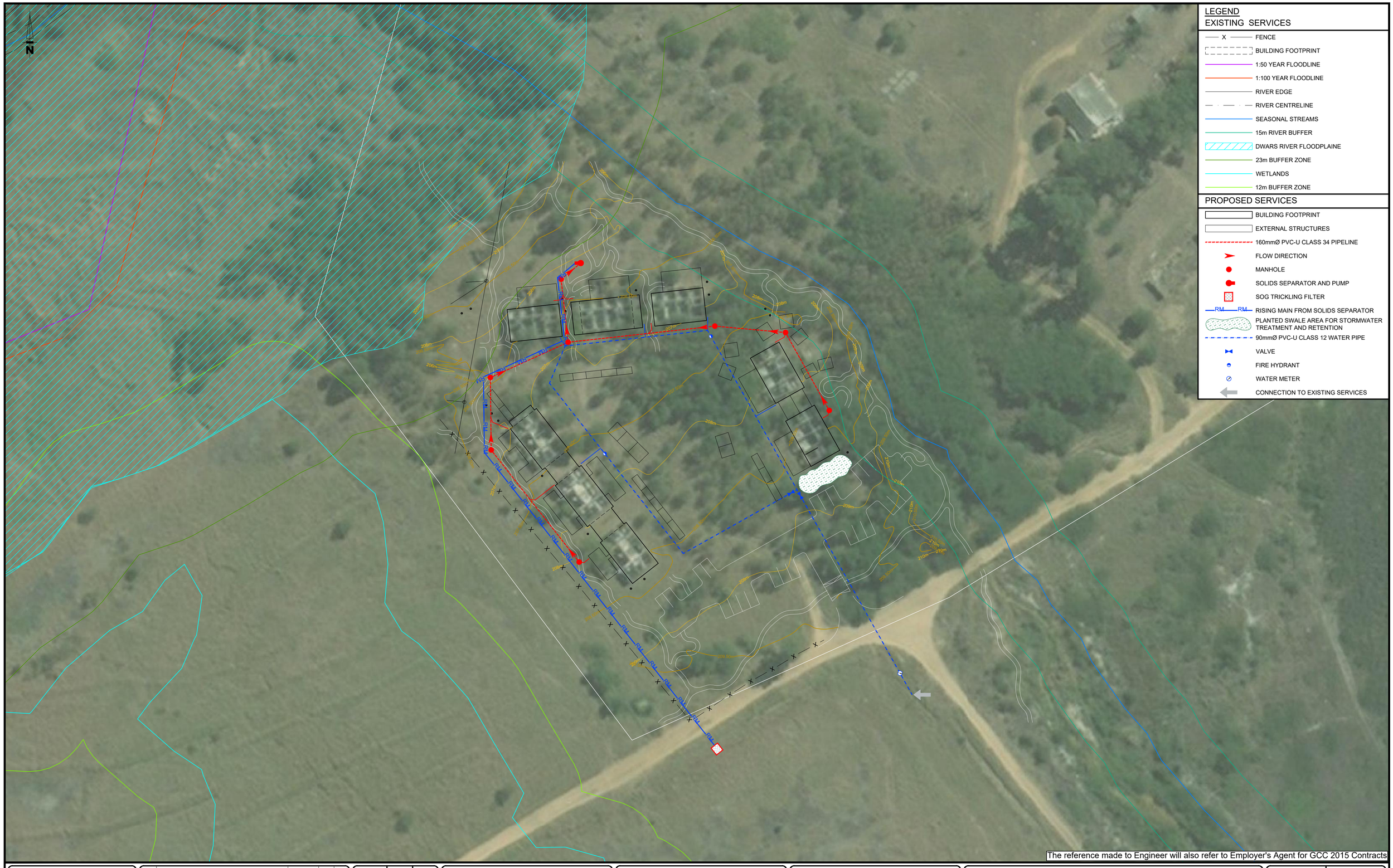
COMPUTER FILE NAME:

JOB No.	DRAWING NUMBER	REVISION No.
BTH10	C1-100	A

Z:\PROJECTS CURRENT\BTH10 - Bertha Retreat\C - Drawings\C1 - Design Drawings\C1 - 102 Revit drawings\Local Files\BTH10 - Bertha Retreat.rvt

ANNEXURE B

DRAWING NO	DESCRIPTION
20087-C-Figure A Rev D	Proposed Civil Engineering Services Layout



LEGEND

EXISTING SERVICES

- FENCE
- BUILDING FOOTPRINT
- 1:50 YEAR FLOODLINE
- 1:100 YEAR FLOODLINE
- RIVER EDGE
- RIVER CENTRELINE
- SEASONAL STREAMS
- 15m RIVER BUFFER
- DWARS RIVER FLOODPLAINE
- 23m BUFFER ZONE
- WETLANDS
- 12m BUFFER ZONE

PROPOSED SERVICES

- BUILDING FOOTPRINT
- EXTERNAL STRUCTURES
- 160mmØ PVC-U CLASS 34 PIPELINE
- FLOW DIRECTION
- MANHOLE
- SOLIDS SEPARATOR AND PUMP
- SOG TRICKLING FILTER
- RISING MAIN FROM SOLIDS SEPARATOR
- PLANTED SWALE AREA FOR STORMWATER TREATMENT AND RETENTION
- 90mmØ PVC-U CLASS 12 WATER PIPE
- VALVE
- FIRE HYDRANT
- WATER METER
- CONNECTION TO EXISTING SERVICES

The reference made to Engineer will also refer to Employer's Agent for GCC 2015 Contracts

SCALEBAR

0 15 30

Meters 1:500

REV	DESCRIPTION	DATE	REV BY	CHKD
D	ARTIFIACIAL ZONES REMOVED	'20-08-05	NL	RS
C	BUFFER ZONES INDICATED	'20-08-05	NL	RS
B	SERVICES ADDED AND AMENDED	'20-07-30	NL	RS
A	FOR INFORMATION	'20-07-16	NL	RS

REVISIONS

DESIGNED	AP	'20-07
DRAWN	NL	'20-07
CHECKED	RS	'20-07

CONSULTING ENGINEERS

LYNERS

PO Box 4901
TYGERVALLEY
7530

Tel: 021 914 0300/Fax: 021 914 0437
email: bellville@lyners.co.za

APPROVED

ENGINEERS: _____

DATE: 2020-08-05

APPROVED

CLIENT: _____

DATE: _____

CLIENT

BOSCHENDAL (PTY) LTD

PNIEL ROAD
GROOT DRAKENSTEIN
7680

PROJECT

THE NEW RETREAT, BOSCHENDAL

TITLE

PROPOSED CIVIL ENGINEERING SERVICES LAYOUT

SCALE	SHEET
1:500 on A1	1 OF 1
CONTRACT No.	PROJECT No. 20087

DRAWING No. 20087-C-FigureA REV D

COORDINATE SYSTEM: WGS84 / Lo19°

ANNEXURE C

SOG Trickling Filter

SOG Trickling Filter™

Saving the world,
one trickle at a time.

IDEAL FOR EFFLUENT AND SEWAGE TREATMENT

Sewage treatment has never been easier. And not just sewage treatment. **The SOG Trickling Filter™** can also purify biodegradable industrial effluents.

The SOG Trickling Filter™ is a South African innovation, developed to suit the needs and budgets of any serious environmentalist. Not so long ago, the DWS (Department Water & Sanitation) made a plea to Sanitation Engineers; *"Please make sewage treatment easy"*.

The SOG Trickling Filter™ is a waste water treatment process that makes sewage treatment easier, especially if you are off-the-grid. Unlike most conventional sewage treatment plants, **The SOG Trickling Filter™** makes use of a multitude of organisms - **THE FIVE KINGDOMS**. By spreading the type of organism activity, a larger range of variable flow and load is possible.

The range in size of treatment organism also facilitates the conversion of sewage to heat and gas as opposed to mere biomass. In the **The SOG Trickling Filter™** there are pockets of aerobic, anoxic and anaerobic zones. Organisms live in the various zones performing selective functions including dissolved organic material degradation (COD reduction), conversion of ammonia to nitrate (nitrification) and removal of nitrate

In conjunction with the presence of various habitats, the **The SOG Trickling Filter™** makes use of media that has absorptive properties. Portions of dissolved organic material are trapped in the media. In times of low or no flow, the trapped material becomes available as a food source (substrate) for organisms that thrive on sewage. If no flow conditions persist, the organisms will consume all available and trapped substrate.

When flow recommences, the media will absorb the substrate and allow the concomitant regrowth of organisms.
Sewage treatment using **The SOG Trickling Filter™** is a passive process. Raw sewage is collected in a septic tank / solids separation arrangement. The settled sewage is collected in a pump sump and simply discharged to the top of **The SOG Trickling Filter™**. Sewage works its way through the filter media, which is housed in layers, and is collected at the base of the filter. From this point, the treated water can be directed to a re-use option such as irrigation pump or gravity discharge arrangement.

360 SOG FILTRATION SYSTEM BACK TO POTABLE WATER

Solid Separation

↓

The SOG Trickling Filter™

↓ → Irrigation Water

Ozonization

↓ → Can be used for flushing toilets, steam water chillers etc.

Ultra Filtration

↓

Reverse Osmosis

↓

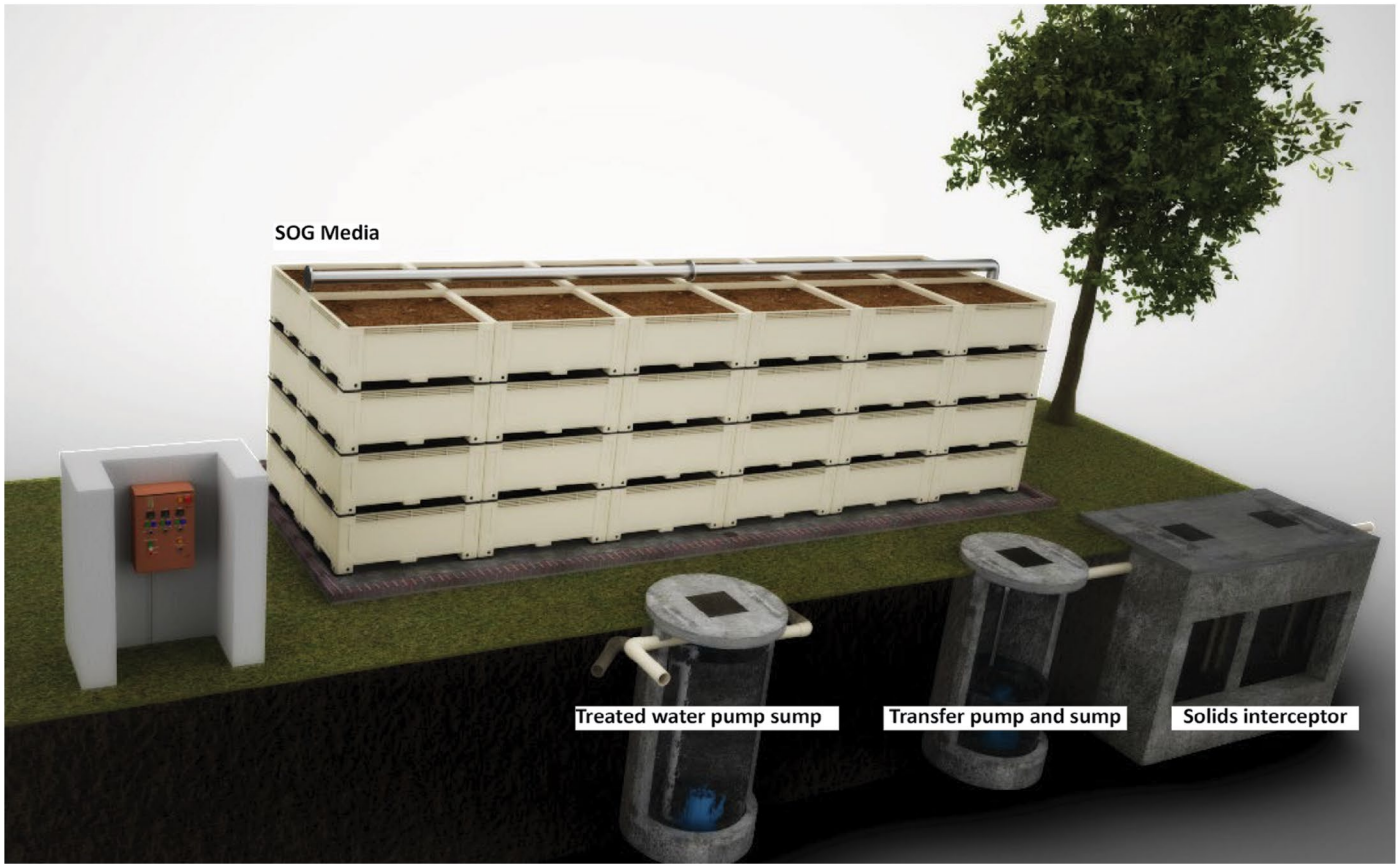
Remineralisation

↓

Potable Drinking Water →

TYPICAL INSTALLATION OF THE SOG TRICKLING FILTER™

INSTALLED POST SOLIDS INTERCEPTOR



BENEFITS

Proven Technology

SOG trickling filtration and treatment of sewage has been used for many years in various parts of the world.

Low Energy

If the site allows, gravity can transfer the water or only one pump is required to transfer water **The SOG Trickling Filter™**.

Low Visual Impact

The SOG Trickling Filter™ is tastefully covered with shrubbery. Fencing is an option as is a ventilated

Low Maintenance

The treatment plant design centres on ease of use and simplicity.

Upgrade Considerations

A key feature of the design is the provision for upgrade in the event of future growth. **The SOG Trickling Filter™** geometry is chosen to allow for simple increase in size.

Minimal Solids Handling

Inert solid material in the wastewater is collected in a solids interceptor. This is a robust and hygienic solids material collection device. Actual design is site dependent.

HWT

The company was founded in 1994 and has successfully designed, built, commissioned and services in excess of 100 treatment plants.

BIOLOGICAL WASTE WATER TREATMENT

WASTE WATER DESCRIPTION

Domestic sewage tends to have a variable flow and organic load. The organic content is similar to sugar in coffee, which cannot be filtered out with conventional filtration. Like sugar it is biodegradable and can be easily removed in a carefully designed biological environment.

The South African National Water Act of 1999 (Currently under review) currently makes distinction between discharge to a water resource and disposal via kikuyu irrigation. For both disposal routes emphasis is placed on sustainable reuse of the water. Irrigation is therefore a primary objective in the treatment of waste water.

TREATMENT PROCESS

Waste water is collected at a sump positioned downstream of a solids separation tank. Solids free effluent is pumped to a distribution manifold attached to the top of the SOG trickling filter. The distribution manifold is designed to ensure even hydraulic loading of the **The SOG Trickling Filter™** which comprises multiple stacked SOG layers.

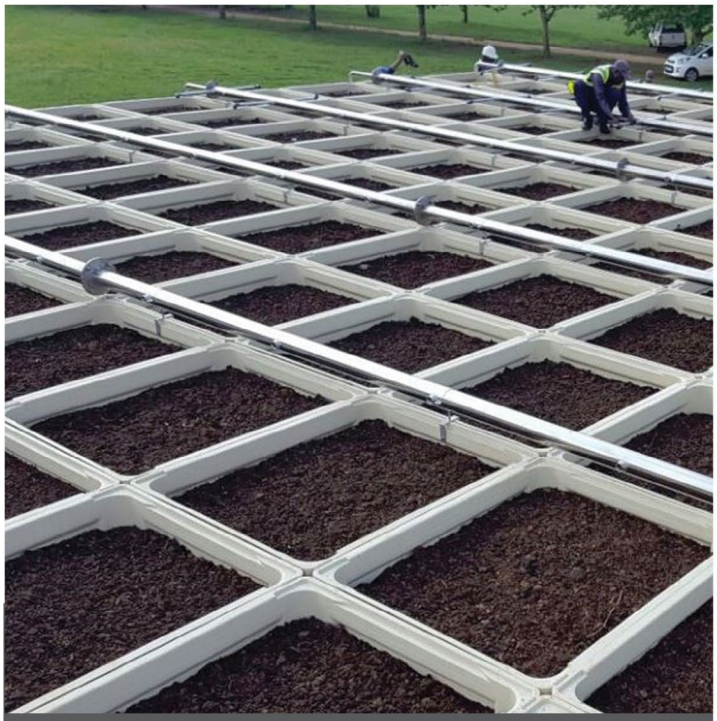
Organic treatment of the solids free waste water takes place in a mixed media biological filter. The size of the SOG filter is determined by the hydraulic and organic loading rate. Waste water percolates through the media and takes approximately 48 hours to flow from top to base.

This type of waste water treatment has been widely used by numerous blue chip clients and local authorities.

Samples. After inert solids interceptor on left and after **The SOG Trickling Filter™** on the right.

The SOG Trickling Filter™ - low energy and highly effective. This unit treats up to 1000 litres per day.

Uva Mira Mountain Vineyards, Stellenbosch
Domestic sewage and wine cellar effluent treatment
Treated water used for irrigation

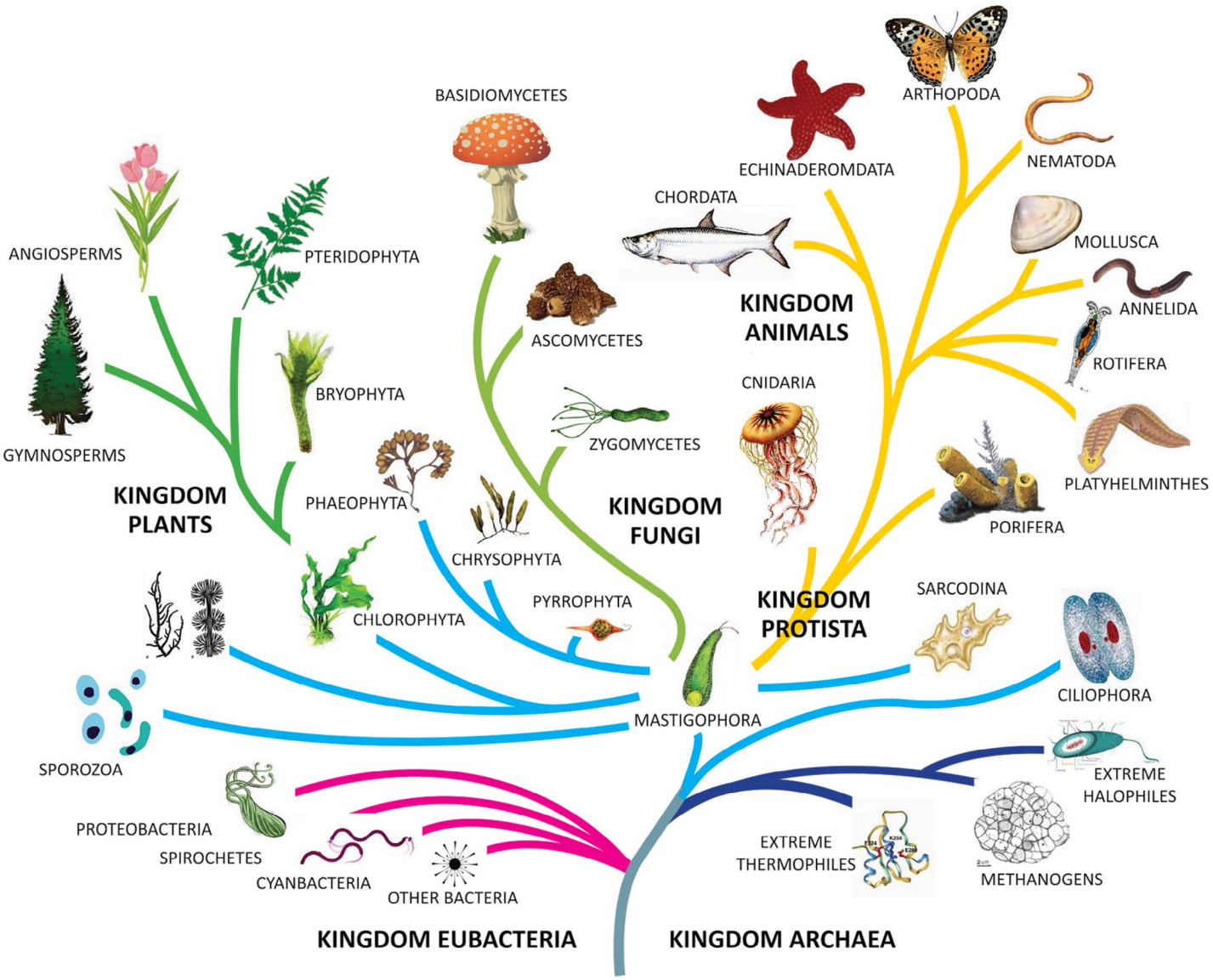


Clover Production Facility, Gauteng
Treated water used for irrigation

Old Mutual, The Estuaries, Century City, Cape Town
Office block waste water recycled via **The SOG Trickling Filter™**.
Additional RO reverse osmosis ensures potable water quality.

Coffee Shop & Brewery, Contermanskloof
Domestic sewage and wine cellar effluent treatment
Treated water used for irrigation

THE 5 KINGDOMS APPROACH



THE WHOLE IS GREATER THAN THE SUM OF IT'S PARTS

ARISTOTLE

In **The SOG Trickling Filter™** there is diversity, spanning 5 of the known kingdoms of life.

The SOG Trickling Filter™ mimics a mountain seep or bog. It is exposed on the upper layer, shady and moist in the lower layers. The media is never completely water logged and for this reason a range of organisms are attracted to **The SOG Trickling Filter™**.

Biodegradable waste water is trickled over the top layers of **The SOG Trickling Filter™** and percolates through several layers of media. Waste water is the energy that drives life in **The SOG Trickling Filter™**.

A host of organisms interact with one another, their synergy, symbiosis and biodiversity maintaining an energetic and biomass equilibrium.

TECHNICAL SPECIFICATIONS

Waste water types	Sewage Industrial	Domestic, small communities, catering Food processing Beverage production
Treatment capacity	Minimum flow rate Maximum	1000 litres per day Fully scalable, no limit
Treated effluent quality	Legislative compliance	DWS general standard DWS irrigation standard
Dimensions	Solids interceptor and sumps **The SOG Trickling Filter™**	Below ground, variable in volume Height: 2100mm, above ground Width and Length varies
Materials of construction	Solids interceptor and sumps SOG filter Foundation	HDPE, concrete, composite materials UV resistant, polypropylene Reinforced concrete 25 MPa Brick on edge perimeter wall with epoxy sealant
Pumps	Untreated feed pump Treated effluent	Submersible vortex Submersible vortex
Control panel	HWT standard	Control circuit protection Thermal overload protection Hour and ammeter on motors

SOG Trickling Filter™

PO Box 28, Lynedoch,
Stellenbosch, 7603,

+27 (0)21 881 3014

info@hwt.co.za

www.hwt.co.za

HWT
WATER TREATMENT