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Breathes life back into water

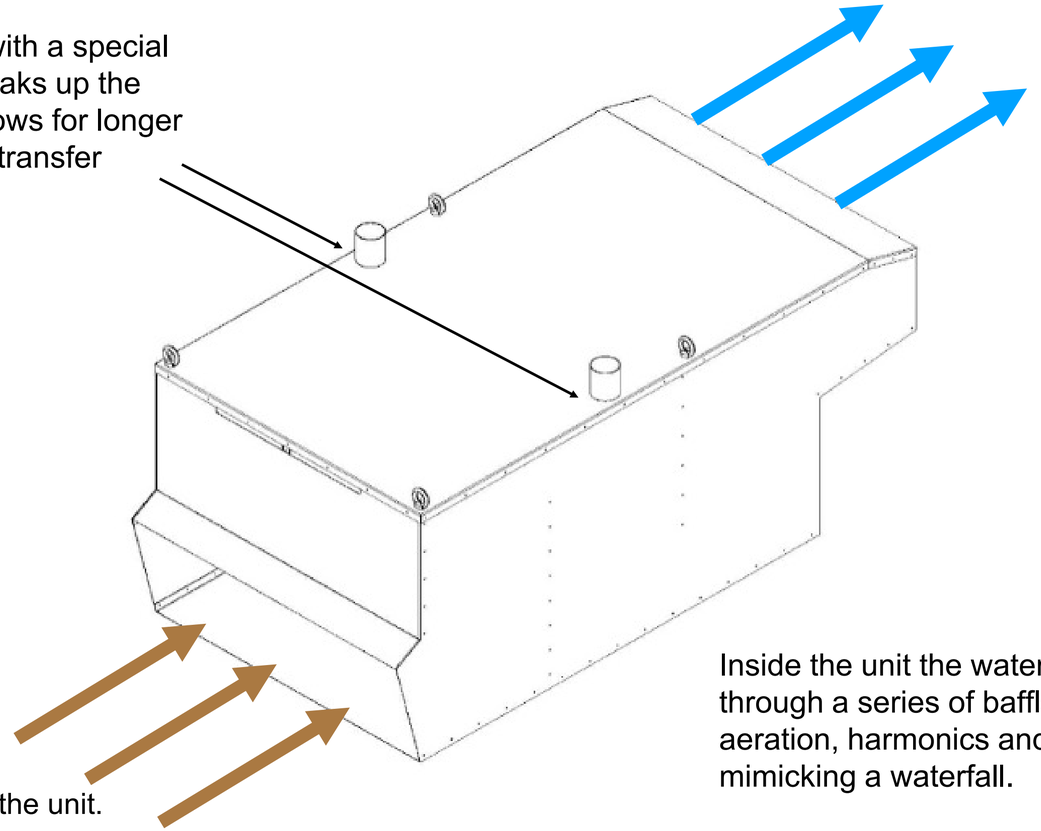
Technology & Cases

Bio-Aire™ Technology

Proprietary technology

BIO-AIRE's patented design mimics a river’s natural aeration, moving and cleaning ability.

The air supply is oscillated with a special harmonic oscillator. This breaks up the bubbles in the water and allows for longer retention and better oxygen transfer efficiency.



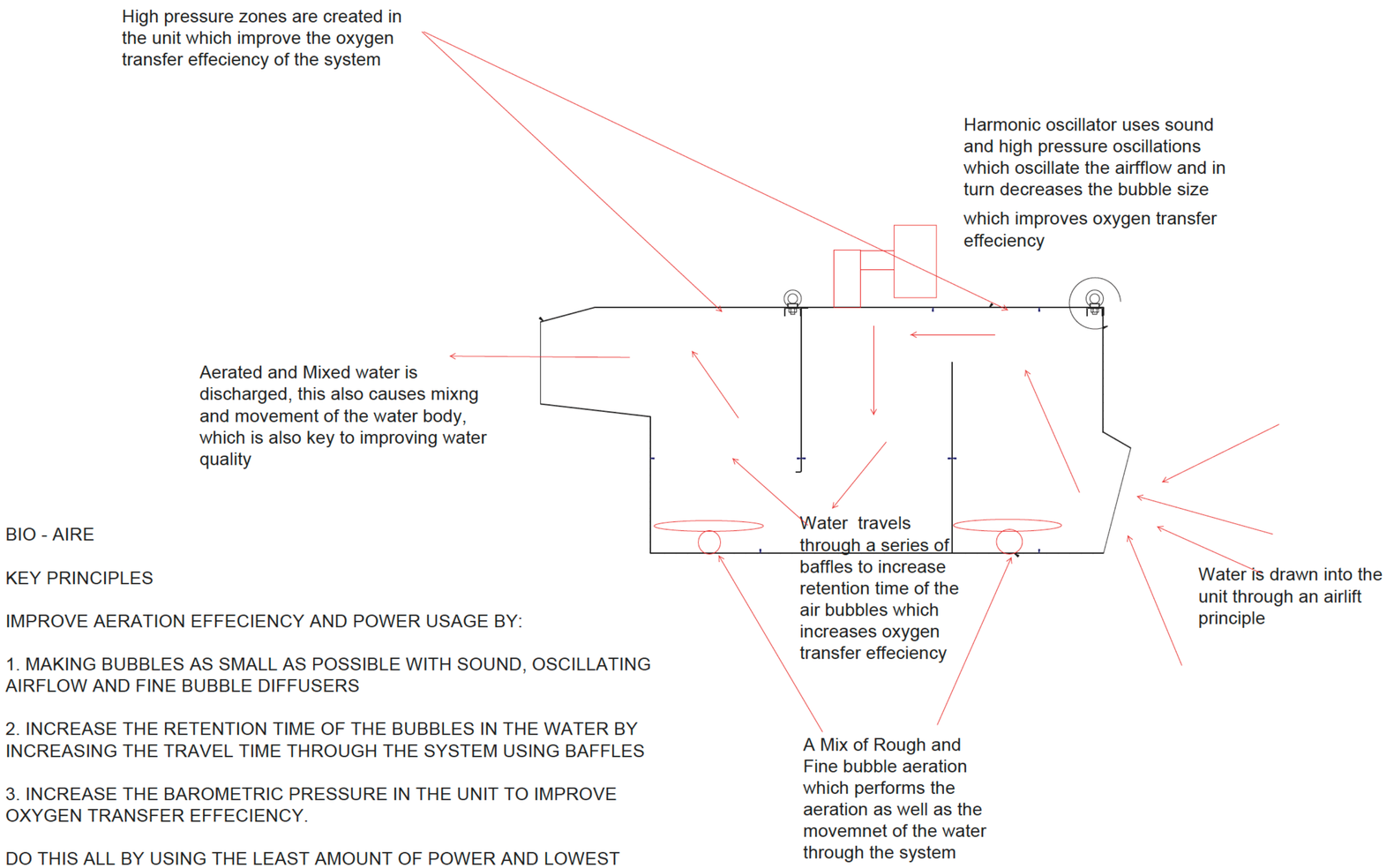
High volumes of aerated water are discharged and create flow similar to a river, which naturally enhances biological action to clean and treat the polluted water source.

Inside the unit the water is mixed and aerated through a series of baffles, fine bubble aeration, harmonics and high pressure, mimicking a waterfall.

Water is drawn into the unit.

Proprietary technology

BIO-AIRE's patented design mimics a river’s natural aeration, moving and cleaning ability.



BIO - AIRE

KEY PRINCIPLES

IMPROVE AERATION EFFECIENCY AND POWER USAGE BY:

1. MAKING BUBBLES AS SMALL AS POSSIBLE WITH SOUND, OSCILLATING AIRFLOW AND FINE BUBBLE DIFFUSERS

2. INCREASE THE RETENTION TIME OF THE BUBBLES IN THE WATER BY INCREASING THE TRAVEL TIME THROUGH THE SYSTEM USING BAFFLES

3. INCREASE THE BAROMETRIC PRESSURE IN THE UNIT TO IMPROVE OXYGEN TRANSFER EFFECIENCY.

DO THIS ALL BY USING THE LEAST AMOUNT OF POWER AND LOWEST MAINTENANCE AND OPERATIONS COST.

Validation

Ammonia -94%

16.6 mg/l

0.985 mg/l

Below the 6 mg/l discharge limit

Phosphates -81%

12.7 mg/l

2.41 mg/l

Below the 10 mg/l discharge limit

Suspended Solids -99%

152 mg/l

1 mg/l

Below the 25 mg/l discharge limit

Chemical Oxygen Demand -94%

293 mg/l

17 mg/l

Below the 75 mg/l discharge limit

Bio-Aire™ Technical Specifications

Technical Specifications

	3kW unit	6kW unit	kW
POWER CONSUMPTION			
AIR SUPPLIED TO AERATOR	**250**	**500**	**M3/Hr**
SOTR (kg of O^2/hr/unit)	**13,74**	**27,47**	**Kg/Hr**
Kg of O^2 / 24 Hr Cycle	**329,66**	**659,31**	**Kg/Day**
SAE (aeration efficiency) - (kg O^2 /kW h)	**4,58**	**4,58**	**Kg O^2 / kW h**
MIXING EFFICIENCY			
Litres of Water Mixed/ kW			
Litres Moved/ Hour	**950 400**	**1 425 600**	**Litres/ Hr**
Litres/ kW	**316 800**	**237 600**	**Litres/ kW h**
INSTALLATION LIMITS			
Recommended Max Distance Blower Can Be From Aerator	**50**	**50**	**Metres**
Recommended Max Distance Blower Can Be From Power Supply	**30**	**30**	**Metres**
Recommended Power Supply	**3**	**3**	**Phase**

Technical Specifications cont.

	3kW unit	6kW unit	kW
DIMENSIONS			
Length	**205**	**205**	**cm**
Width	**110**	**110**	**cm**
Height	**90**	**90**	**cm**
Weight	**250**	**250**	**Kg**
ADVANTAGES			
Low power usage			
Low maintenance			
High oxygen transfer efficiency			
Mixes and aerates simultaneously			
Easy installation			
Easily deployed			
No clogging			
High reliability			
Cost efficient			
No retrofitting of existing infrastructure			

Products & Parts Price List

PART NO	DESCRIPTION	UNIT	QTY	RATE
1	**BIO AIRE UNIT PRICE**			
1.01	BIO AIRE 3 KW UNIT INCLUDING BLOWER	NO	1	$10 800,00
1.02	BIO AIRE 6KW UNIT INCLUDING BLOWERS	NO	1	$12 500,00
2	**INSTALLATION PARTS**			
	MOORING		1	
2.01	MOORING SPIKE STAINLESS STEEL 800MM LONG 16MM DIAMETER	NO		$30,00
2.02	MOORING CABLE	METERS	1	$3,00
	AIR SUPPLY FROM SHORELINE TO BIO AIRE UNIT			
2.03	90MM KANNAFLEX AIR SUPPLY LINE - 6KW UNIT (FROM SHORE TO UNIT)	METERS	1	$23,20
2.04	60MM KANNAFLEX AIR SUPPLY LINE - 3KW UNIT (FROM SHORE TO UNIT)	METERS	1	$21,00
	AIR SUPPLY FROM BLOWERS TO SHORELINE			
2.05	110MM UPVC CLASS 6 AIR SUPPLY PIPING (FROM BLOWER TO SHORE)	METER	1	$7,00
2.06	110MM 90 DEGREE BENDS	NO	1	$18,00
2.07	110MM 45 DEGREE BEND	NO	1	$18,00
2.08	PVC WELD GLUE	500ML	1	$25,00
	ELECTRICAL SUPPLY			
2.09	ELECTRICAL SUPPLY CABLE	METERS	1	$7,30
2.10	PRE BUILT ELECTRICAL CONTROL PANEL 3KW	NO	1	$330,00
2.11	PRE BUILT ELECTRICAL CONTROL PANEL 6KW	NO	1	$330,00

Products & Parts Price List cont.

PART NO	DESCRIPTION	UNIT	QTY	RATE
	SOUND			
2.12	BLOWER SOUND ATTENUATED ENCLOSURE - FOR NOISE SENSITIVE AREAS - PER BLOWER	NO	1	$415,00
3	**SPARE PARTS**			
3.01	90MM OSCILLATION PART - 6KW UNIT	NO	1	$350,00
3.02	60MM OSCILLATION PART - 3KW UNIT	NO	1	$350,00
3.03	ACTIVATED CARBON FIXED FILM MEDIA	NO	1	$520,00
3.04	DISC DIFFUSER	NO	1	$75,00
4	**OPTIONAL EXTRAS - PAINT COLOURS**			
4.01	STANDARD - JEEP GREEN	SUM	1	INCLUDED
4.02	SEA BLUE	SUM	1	$150,00
4.03	PASTEL GREEN	SUM	1	$15,00
	SOLAR			
4.04	SOLAR POWERED SYSTEM - 3KW EXCLUDES INSTALLATION	SUM	1	$11 120,00
4.05	SOLAR POWERED SYSTEM - 6KW EXCLUDES INSTALLATION	SUM	1	$15 150,00

Note:
All prices are Ex Works
All Prices Exclude Sales Tax

Bio-Aire™ cases

Aquaculture

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Aquaculture

Aeration Technology Comparison for Shrimp Aquaculture

Average Shrimp Crop Yield

14,82 tons
3 crops harvested / year

Aeration requirement measured in oxygen consumed per year to produce shrimp crops
351 031kg

Aeration technologies cost comparison

	6kw Bio-Aire ™	15kw Surface aerator
Aerators required to deliver oxygen requirements per day	2	1
Oxygen delivered per kgo2/kwhr	4,58	2,00
Total 5-year life cycle cost	$35 286	$51 493

Total savings using Bio-Aire **$16 207**

25% Cost Savings over 5-year life cycle + Greater Safety & Productivity

Agriculture

Agriculture

Aeration Technology Comparison for Dairy Farm Manure Run-Off

Dairy Herd Size 800 cattle

Average washdown water used per day 101 376 litres/day

Oxygen requirements/day to treat washdown water in a liquid manure storage lagoon
332,64 kg

Aeration technologies cost comparison

	6kw Bio-Aire ™	15kw Surface aerator	7,5kw Fuchs Self aspirating aerator	6kw Xyleme Jet aeration	15kw Landustrie Brush aerators
Aerators required to deliver oxygen requirements per day	2	1	2	3	1
Oxygen delivered per kgo2/kwhr	4,58	2,00	0,95	0.83	2,00
Total 5-year life cycle cost	$35 286	$51 493	$47 309	$51 129	$65 379
Total savings using Bio-Aire		$16 207	$12 203	$15 843	$30 093

34% - 85% Cost Savings over 5-year life cycle + Greater Safety

Industry

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Industry

Aeration Technology Comparison for Pulp and Paper Manufacturing

Average daily wastewater volume of a large factory producing 3 tons of paper pulp/day
750 000 litres

Average COD demand
2 800 mg per litre

O_2

Oxygen requirements to treat wastewater
2 625 kg

Aeration technologies cost comparison

	6kw Bio-Aire ™	15kw Surface aerator	7,5kw Fuchs Self aspirating aerator	6kw Xyleme Jet aeration	15kw Landustrie Brush aerators
Aerators required to deliver oxygen requirements per day	4	4	15	22	4
Oxygen delivered per kgo2/kwhr	4,58	2,00	0,95	0.83	2,00
Total 5-year life cycle cost	$67 883	$155 482	$269 512	$291 945	$211 026
Total savings using Bio-Aire		$87 599	$201 629	$224 062	$143 143

100% - 300% Cost Savings over 5-year life cycle + Greater Safety

Case study: Langebaan WWTW

Before

After

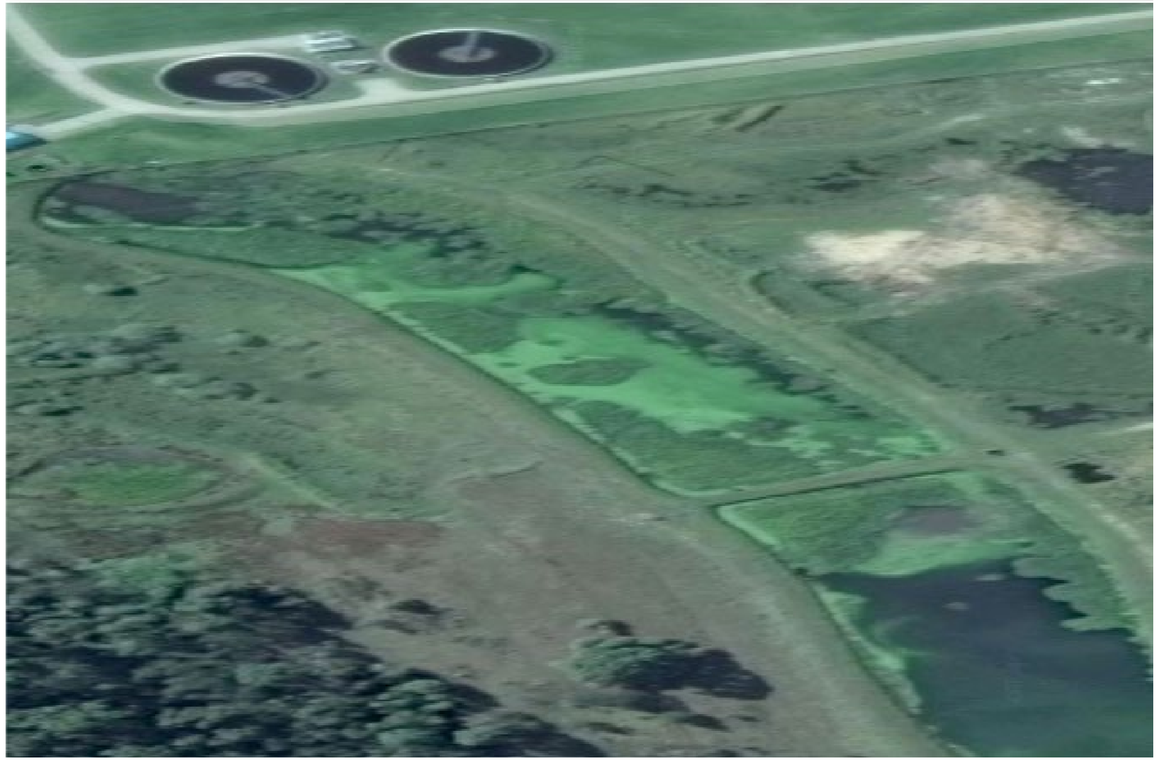
Case study: Eagle Canyon Golf Estate

Before

After

Case study: Gwaing WWTW

Before



After

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Are you with us?

To achieve this bold goal we need partners to join us.

We are part of the ecosystem that caused the problem, we need an ecosystem to fix it.

We want to work with those who share our vision and want to show that a solution is possible.

You may want to sponsor a specific river clean-up in exchange for carbon credits or as part of your commitment to your community.

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We also need technology companies that work together with us, such as sanitation companies or different treatment solutions that complement ours.

We are also an ideal solution for municipalities and industries that are looking for an easier and more cost-effective way to treat toxic waste.

This is a bold task but we believe it’s possible. The world is renewable. Nature has self-cleaning and replenishing systems that can support all life.

About us

Khubeka Construction is a Civil & Building Company established in June 2001. We specialise in construction of water retaining structures, sewage and water treatment works. During 2016 while constructing a waste treatment works, we saw a need for a cost effective and efficient water aeration system, from 2016 to 2019 we developed our unique water treatment system and in 2020 began commercialising and selling the units.

Bio Aire was borne out of seeing an inherent need to develop a water treatment system for the South African environment, although we designed our system for the harsh South African conditions it is also well suited for use worldwide.

Many of the current treatment systems are too complicated to operate, are power intensive and are prone to costly breakdowns and maintenance, which in most instances leads to water treatment systems not being used correctly or not being used at all.

Bio – Aire is unique in that it is cost effective, efficient, easy to operate and deploy and can be maintained and operatedat an 80% reduced cost versus similar systems.

We are currently a Level One BBBEE Contributor.

Mark Rennie
- Designer of Bio Aire
- Contracts Manager

Irwin Ross
- Water Retaining Structures, Wastewater Works Specialist
- Contracts Manager

Gareth Rennie
- Water Retaining Structures, Wastewater and Water Works Specialist
- Contracts Manager

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Thank You