



AEROFLOAT SEWAGE TREATMENT PLANTS



INTRODUCTION

Aerofloat offers low maintenance, cost effective, sewage treatment solutions for remote establishments of up to 5000 people. Aerofloat has extensive experience designing sewage treatment plants with either conventional equipment or using Aerofloat proprietary technology to provide a more mechanically simple, robust design.

Aerofloat can deliver a sewage treatment solution uniquely tailored to your site and surrounding environment. Its engineers specialise in highly tailored solutions that meet unique challenges; from remote, and temporary mine sites to island resorts, estates, and other regional businesses.

SERVICEABLE MARKETS

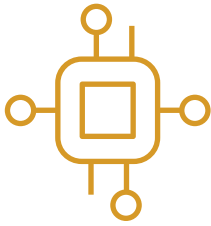
Small towns
Remote communities
Residential Developments
Mine sites
Remote accommodation
Caravan/Mobile home parks
Tourist developments
Island resorts
Sport & recreation camps
Hotels & function centres
Portable sewage treatment plant



WHY AEROFLOAT ?

Sewage treatment requires in-depth knowledge of chemical engineering and biological processes. As experts in the field, Aerofloat's engineers have a thorough understanding of the variables that can impact the success of any sewage treatment plant design.

Aerofloat works collaboratively with each of its clients to create the best sewage treatment plant solution. By combining in-house 3D modelling and CAD work, Aerofloat engineers allow clients to visualise the solution prior to transport and installation. Aerofloat can install traditional sewage treatment plant systems or offer its own patented technologies to create a bespoke solution.



Proprietary Technology

Wastewater treatment company Aerofloat has several patents for its innovative technology and products. Aerofloat has developed clever adaptations of proven techniques and processes to provide you with unique and maintenance friendly product options. Thoughtful design and modern thinking are always at the forefront of Aerofloat designs.



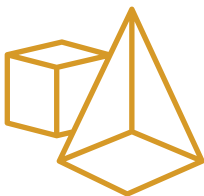
Design Expertise

Aerofloat prides itself in being able to tackle complex wastewater problems. Working in the wastewater industry since 1973, Aerofloat's staff skills include electrical, chemical, mechanical, process control and environmental engineering. This gives you peace of mind that all your design requirements will be covered.



ISO Certified

Aerofloat is ISO certified for its integrated management systems. The certification demonstrates Aerofloat's innovative and systematic approach to developing world class solutions to wastewater problems globally. It confirms the quality of work in the sector and highlights Aerofloat's commitment to providing the highest standard of work practices to its clients



3D CAD Modelling

Aerofloat uses 3D CAD modelling to design your system and help you to visualise the solution prior to manufacturing. Any site challenges are addressed at the design stage, assuring you no surprises at the time of installation.



In-House Capabilities

Aerofloat manages the entire process in-house. From 3D CAD modelling and design, to manufacturing, installation, commissioning and ongoing support and maintenance. This provides you with the confidence your wastewater treatment company is in control for the entire project life cycle.



Australian Support Guarantee

As an Aerofloat client, you will have guaranteed access to Aerofloat engineers for ongoing advice and support, ensuring your system will run efficiently long after installation. Aerofloat is an Australian, family-owned wastewater treatment company with local manufacturing and engineering.

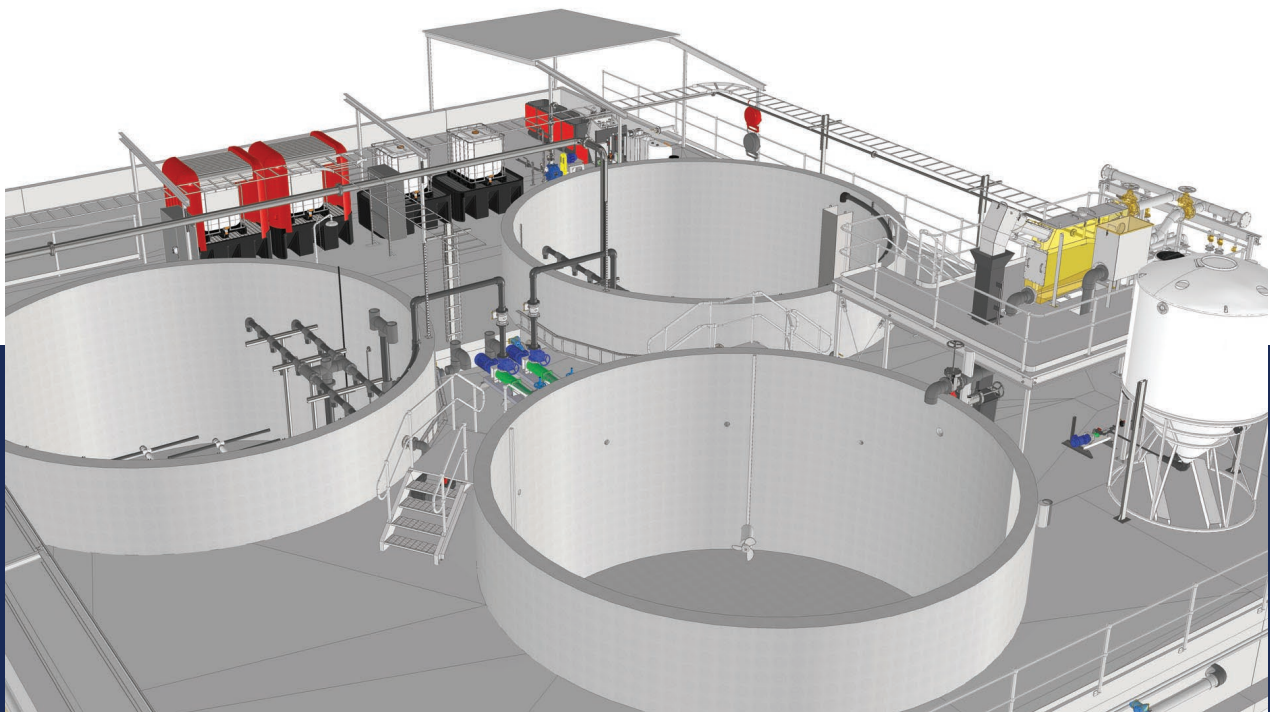
AEROFLOAT'S HYBRID SBR

Understanding Aerofloat's Sewage Treatment Process

Aerofloat's Hybrid SBR process is a unique method for sewage treatment that combines a hybrid anoxic/flow balance reactor (Anoxic/FBR) with two parallel Sequence Batch Reactors (SBRs). Raw sewage that is pumped to the sewage treatment plant (STP) via a rising main is screened at the inlet to the STP. In the Hybrid SBR process, screened sewage flows into the Anoxic/FBR, where it is mixed continuously with a submersible mixer. Additional storage is provided in the Anoxic/FBR to assist in hydraulic balancing of variable incoming sewage flows throughout the day.

The mixed liquor in the Anoxic/FBR is pumped to two SBRs in parallel for treatment. Mixed liquor is dosed with Aluminium Chloro Hydrate (ACH) inline to precipitate out Phosphorus. ACH addition also improves the settling characteristics of the mixed liquor suspended solids (MLSS) in the SBRs.

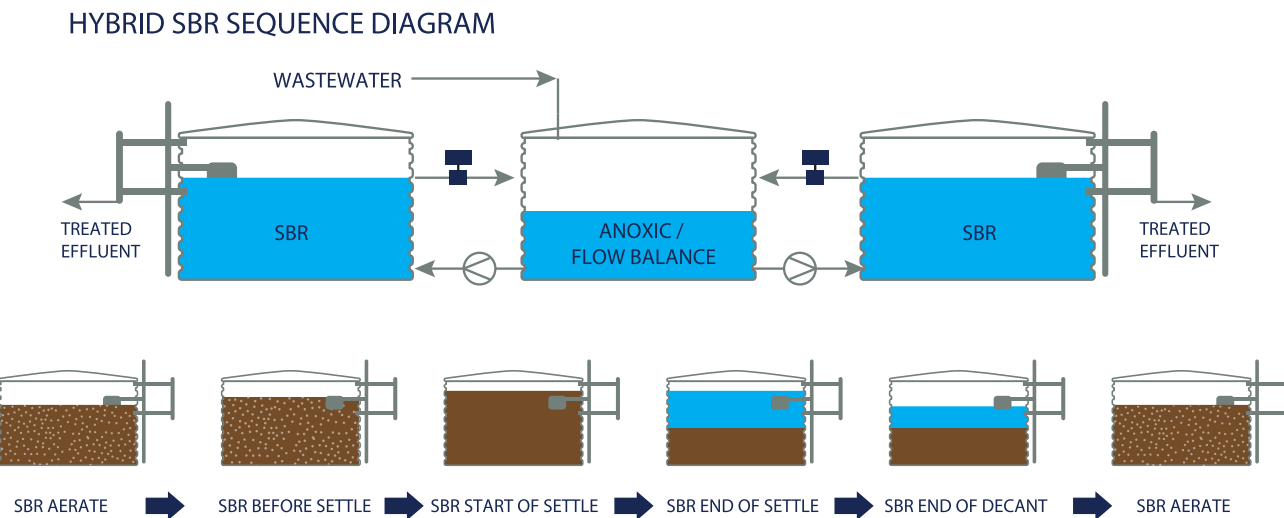
The SBRs are fed continuously with a "pump and return" arrangement between the Anoxic/FBR and the SBRs during the aeration period in the SBRs. This assists in carbonaceous BOD removal, nitrification, and denitrification of the effluent, ensuring it complies with stringent effluent standards and also provides additional process stability in the SBRs.



In most conventional activated sludge plants, mixed liquor is continuously pumped back to the anoxic reactor and then recycles back to the activated sludge reactor. In Aerofloat's Hybrid SBR process, the mixed liquor is pumped forward from the Anoxic/FBR to the SBRs at flow rates of approximately 4 times the average daily flow (ADWF) during the aeration and mix phase in the SBRs, and mixed liquor recycles back to the Anoxic/FBR.

Actuated valves are used to control the water levels in the reactors. The water level in the Anoxic/FBR a minimum low level plus an emergency overflow pipe to the SBRs. Aerofloat's control system automates the process by monitoring the incoming sewage flowrate and the level in the reactors.

Each SBR works on an aerate/mix/aerate/settle/decant cycle. During the settle and decant phase, mixed liquor feed to the SBRs is inhibited. After the settle phase, treated effluent is decanted from the top of the tank using Aerofloat's proprietary Air Locked Syphon (ALS) decanter. The treated effluent is normally disinfected by automatically dosing liquid chlorine into the effluent during the decant period. The effluent flows to the Chlorine contact/ Effluent storage tank to provide contact time for the liquid chlorine.



The aeration process in the SBRs is regulated by an automatic dissolved oxygen (DO) control system, as well as a timed control mechanism. After the settling period, which is usually about an hour, the treated effluent is decanted from the top of the SBRs using Aerofloat's unique ALS decanter. Aeration in the SBRs is achieved using coarse or fine bubble diffusers, surface aerators or submersible jet aerators.

AEROFLOAT'S HYBRID SBR

KEY BENEFITS



Process Simplicity

Aerofloat's Hybrid SBR is a simple yet effective process, producing exceptional results. In contrast, conventional STPs are more complex and have limitations in removing nitrogen from sewage through the nitrification and denitrification process.



More Robust

Integrating the anoxic process into the flow balance tank allows for high levels of Nitrogen removal without the need for supplementary carbon addition. It also provides a greater degree of flexibility under highly variable flow conditions and provides stability to the overall process.



Low Maintenance

The ALS Decanter requires no maintenance due to no moving parts. Removable diffuser grids in concrete tanks or Aerofloat's patented removable aeration lances in Polyethylene (PE) tanks allow cleaning to take place without the need to drain the tank.



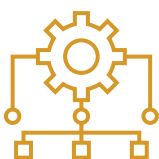
Budget Friendly Options

Aerofloat can customise technology options to suit different budgets and requirements. For long term Municipal STPs, concrete tanks are normally used. Lower cost options for shorter term STPs can be provided using Polyethylenelined steel tanks with floating surface aerators, or polyethylene tanks with Aerofloat's removable lances.



Scalable & Modular

The Aerofloat Hybrid SBR design is modular and suitable for populations between 100 and 5000 persons.



Automated

Aerofloat sewage treatment plants are fully automated systems for process control with the capability to remotely monitor the plant.



Remote Monitoring

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Chemicals & Servicing

Aerofloat's Aftercare business offers ongoing servicing and chemical supply to keep sewage treatment plants working optimally.



Air Locked Syphon Decanter

Unlike conventional SBR units with lowering decanting weirs, the AeroALS decanter can be installed in covered tanks, enabling the AeroSBR to be sealed and vented, preventing any unpleasant odours from escaping.



Clarification in Same Reactor

Aerating, settling and decanting in the same reactor overcomes the need for a separate clarifier, and in the case of MBRs, overcomes the need for membrane fouling and the associated membrane cleaning or replacement.





SPOTLIGHT ON AEROFLOAT'S UNIQUE PROPRIETARY ALS DECANTER

Aerofloat's air lock syphon (ALS) decanter offers a more reliable and cost-effective option for the decanting phase of a Sequence Batch Reactor (SBR) cycle. It is made up of several short vertical pipes manifolded together with a horizontal pipe and a U-shaped pipe that creates an air lock in the weir. During the aeration and settling phases of the AeroSBR, trapped air is vented and clear supernatant is removed through the weir at the top of the tank.

Aerofloat's ALS decanter has no moving parts or risk of seal failure and can be serviced while the AeroSBR remains in service. It also has conservative weir loading rates, resulting in slower surface velocities during the decant, reducing the risk of sludge blanket scouring."

CUSTOMISATION OPTIONS

There are many construction techniques to choose from depending on the budget and specific requirements. Aerofloat offers long-term solutions for municipal sites and more portable, short-term solutions for locations like mine sites.

Construction Techniques

- Reinforced concrete tanks
- Transportable polyethylene tanks
- Steel panel tanks
- Steel panel tanks with polyethylene lining
- Containerised plants

Aeration Techniques

- Coarse or fine bubble diffused air systems
- Surface aerators
- Submersible jet aerators

RELATED PRODUCTS

There are many construction techniques to choose from depending on the budget and specific requirements. Aerofloat offers long-term solutions for municipal sites and more portable, short-term solutions for locations like mine sites.



Inlet Screening

Inclined screw screens and rotary drum screens are two main screening options for screening at the inlet to the STP. Both effectively remove debris and protect downstream equipment, resulting in improved treatment efficiency.



Biosolids Dewatering

The Screw Press has a compact design, low energy consumption, and high solids output. The Belt Press is ideal for large volumes of sludge and has low noise levels.



Aeration Options

Surface Aerators offer simple operation and maintenance, Fine Bubble Diffusers provide energy efficiency and high oxygen transfer, and Coarse Bubble Diffusers are rugged and can handle harsh conditions. Aerofloat has fixed and removable designs for all aeration options.



MBBR

Moving Bed Biofilm Reactors (MBBR) are a compact and efficient solution for biological wastewater treatment including STPs. MBBR technology is flexible, requires minimal maintenance, and produces less sludge than activated sludge plants. However, clarification is required after the MBBR process.



Secondary Clarifiers

Clarifiers are essential for settling suspended solids and removing them from the effluent before discharge. They are available in various designs and offer excellent solids removal, making them an important component of the treatment process.



Chlorine Disinfection

Chlorine disinfection is a process that uses chlorine to kill or inactivate bacteria, viruses, and other microorganisms in wastewater. Chlorine reacts with the microbial cell walls, disrupting their structure and preventing them from reproducing or causing disease. This process helps to make the wastewater safe for discharge or reuse.



Shipping Containers

Shipping containers can be used as water retaining structures and can be fitted with mechanical and electrical components for easy and quick installation of STPs. This solution offers a compact and mobile design, making it ideal for remote areas or temporary facilities. The pre-fabricated modules can be assembled off-site, reducing installation time and costs. Additionally, containerized plants can be easily transported, making them a flexible option for STPs.



AFTERCARE

The Aerofloat after care team provides a range of services to ensure your wastewater treatment system will run efficiently long after installation.

Chemical Supply

Having the correct chemistry in your wastewater treatment system is critical to achieving the required effluent quality. Aerofloat's experienced engineers hand-pick the best chemicals for use in your wastewater system to ensure optimal running results, while minimising long-term costs with competitive chemical rates.

Servicing & Maintenance

A wastewater treatment system should be regularly maintained and serviced to minimise downtime, maximise efficiency and ensure it complies with effluent discharge standards. By engaging the Aerofloat servicing team you can prevent system outages and ensure your wastewater treatment system is working well.

Parts & Consumables

It's easy to order parts and consumables for your wastewater treatment system through Aerofloat. Our servicing team will identify any wear and tear, and organise replacement parts when required. This will minimise any down time of your wastewater treatment system and ensure your system is running smoothly

Remote Monitoring & Upgrades

Ageing wastewater systems are often inefficient and incompliant. Aerofloat can assess your wastewater treatment system and identify areas that would benefit from an upgrade – whether this is a full upgrade or partial upgrade that utilises existing parts.

CASE STUDY

SEWAGE TREATMENT PLANT FOR A QUEENSLAND COUNCIL

BACKGROUND

Australian wastewater and sewage treatment company, Aerofloat, recently worked with a Queensland Council to upgrade its sewage treatment plant (STP) to ensure compliant effluent.

Banana Shire Council called on Aerofloat's innovative technology to ensure a system at its Taroom waste facility that was robust enough to withstand the harsh Queensland weather whilst also being simple to maintain.

The site required an upgrade to ensure ongoing compliancy and a low environmental footprint.

THE AEROFLOAT SOLUTION

Aerofloat designed and constructed a packaged MBBR sewage treatment plant which included an anoxic MBBR fitted with an agitator, three aerobic MBBRs in parallel receiving diffused air through Aerofloat's proprietary removable diffusers, two secondary clarifiers, a sludge storage and dewatering system, an anoxic recycle pump station and caustic and ACH dosing. Flow was evenly split to the three aerobic MBBRs through a static weir box.

"The static weir box was custom-designed by our engineers for the Taroom site", said Michael Anderson, General Manager at Aerofloat.

"Future growth can be accommodated by simply adding more tanks," he said.

Aerofloat installed a robust chemical dosing system to condition sludge and assist in sludge dewatering. The entire system was also fitted with HMI and remote monitoring capabilities so that operators can check the plant even when offsite.

"The team at Taroom can call on Aerofloat's engineers to give advice or make adjustments if required via the remote system," said Anderson.

RESULTS

The plant was installed despite the difficulties raised by pandemic travel restrictions and Queensland floods and became fully operational in early 2023.

Effluent quality results have been well below the levels required by the Great Barrier Reef 2050 Water Quality Improvement Plan. The Water Quality Plan aims to reduce the amount of nutrients being discharged into the reef from the mainland, to protect and restore the Great Barrier Reef.

Aerofloat has ensured six months of remote support to ensure operators have access to Aerofloat's expert advice following commissioning of the site.



CASE STUDY

SEWAGE TREATMENT FOR UNIVERSITY OF QUEENSLAND

BACKGROUND

The University of Queensland (UQ) recently worked with Aerofloat to create a wastewater treatment design that was sensitive to the historical significance of its Gatton site. The US Army had constructed the existing wastewater treatment plant at the Gatton campus in the early 1940s, so the site had heritage listing.

The plant predominantly managed sewage from the regional campus, but also from nearby research facilities and restaurants.

Due to fluctuations in population relative to semester dates, as well as variable high rainfall periods, allowances for changes in peak flows needed to be accommodated in the design.

The University's Associate Director of Civil Infrastructure Engineering, Brad Taylor, found working with Aerofloat a rewarding experience.

"I have enjoyed working with Aerofloat. Aerofloat have a strong background in process engineering, and as someone with a background in process engineering, I could see they were very experienced and contemporary process engineers."

THE AEROFLOAT SOLUTION

Aerofloat’s experience in sewage treatment plant design and construction, in particular its expertise and innovative work in Hybrid SBRs ensured a robust design for UQ.

Aerofloat’s design included a fine screen to remove larger particles up front, followed by an anoxic flow balancing tank. This balance tank was used for the denitrification process and to also manage peak flows.

The air lock syphon decanter in Aerofloat’s two Sequence Batch Reactors (AeroSBRs) provided UQ with a cost effective alternative to other technologies on the market.

Chemical dosing systems to manage pH correction, control precipitating Phosphorus and condition the sludge, as well as systems to manage dewatering were included in the design.

RESULTS

Aerofloat’s sewage treatment plant was designed to be robust enough to endure the variable rainfall periods in Queensland whilst being aesthetically sensitive to the historical significance of the site.

“We were able to build adjacent to the historical site and ensure it retained its heritage listing,” said Anderson.

The completed works ensured environmental compliance for UQ and allowed for a higher treatment load capacity in the future. The system has been operational since March 2023 and the results have been outstanding.

“We’re seeing 2mg/L BOD which is well below the required levels and seeing 8mg/L of suspended solids, also excellent,” said Taylor.

The system is also completely removing ammonia and has very low nitrate and phosphorus.

“It’s doing even better than we expected and we haven’t required nutrient removal so that’s an added benefit. Being able to nitrify all the ammonia is always good for a treatment plant and this is achieving that,” said Taylor.

“I would definitely recommend working with Aerofloat.”

“Aerofloat has a strong background in process engineering, and as someone with a background in process engineering, I could see they were very experienced and contemporary process engineers.”

“We’ve found Aerofloat to be available either on-site or in the background and able to assist when needed.”

“I found them to be very good communicators, they shoot straight. They worked on fact, not fiction.”

- Brad Taylor, University of Queensland -



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