## LAKE COCHRAN WATER TREATMENT PLANT





## STATISTICS



**100%** SUCCESS RATE CONTRACTUAL CRITERIA UP TO **70 LITRES** PER SECOND FLOW RATE > 7 BILLION MICROGRAMS PFAS REMOVED



## **PROJECT SCOPE**

Synergy developed a large-scale multi-barrier water treatment plant to treat the overflow of Lake Cochran where a large volume of PFAS contaminated surface and ground water flows into prior leaving the RAAF Base Williamtown.

Synergy's bespoke WTP has been operational on the Lake Cochran (LC) project since December 2016 and has successfully treated over 1.2 billion litres of PFAS impacted water.

The WTP is achieving significant removal of PFAS contaminants to less than 0.01  $\mu$ g/L, using a 3-stage multi-barrier process. The WTP consists of two systems in parallel to allow uninterrupted operation during maintenance with a flow range of 15 to 70 litres per second. After full treatment 99.83% of PFAS was removed

The WTP has reduced PFAS contamination to achieve NSW EPA, Department of Health and Department of Defence approved criteria for 100% of results. 99% of results were below detection limits (<0.01  $\mu$ g/L) for Total PFAS (455 samples).



## INNOVATIONS

Synergy have treated over 1.2 Billion litres of PFAS contaminated water with the LCWTP without disposal of any ion exchange resin by using robust pretreatment to extend filtration media lifespan and various regeneration techniques.

Pretreatment and effective primary treatment reduce the concentration of PFAS and other contaminants during the early stages of treatment allowing the resin to reduce PFAS concentrations to extremely low levels consistently for long durations of time. This also lengthens the resin lifespan which is important due to the high cost of replacement. AIX resin filtration is a highly successful method for PFAS removal, however it is known that after a resin becomes loaded with PFAS, regeneration is required to restore its functionality and anion exchange properties. Synergy and associated partners have developed regeneration methods to avoid damaging the structure, and subsequently reducing the lifespan, of the resin. Regeneration of AIX resin may be done in a number of ways however some regeneration techniques are better suited to different scenarios.

Development and optimisation of these resin techniques has allowed Synergy to maximise the lifespan of media within the WTP resulting in economic benefit to the client and environmental benefit through waste reduction.

Synergy are mitigating the migration of PFAS offsite through treating high volumes of water. From April 2018, Synergy began treating over 40 million litres of water per month through the LC WTP.





tion of PFAS-related impacts ongoing scrutiny and review Submission 16 - Supplementary Submission

LAKE COCHRAN WTP NOVEMBER 2016 - CURRENT

Analytical Data Current to: 17/08/2020	ical Data Current to: 17/08/2020 Volume Data Current to: 17/08/2020	
Dates of operation		
Date commissioned	30th November 2016	
Date operation ceased	17th August 2020	
Number of days operational	1357 days	
Flowrates (L/s)		
Average flowrate to Dawsons Drain	13.93 L/s	
Maximum flowrate to Dawsons Drain	24.9 L/s	
Volumes		
Average treatment volume per month	6,056,026 L	
Total volume water treated	1,173,137,000 L	
PFAS removal (micrograms μg)		
Influent (untreated) maximum total PFAS	958 µg/L	
Influent (untreated) mean total PFAS	6.60 µg/L	
Effluent (treated) maximum total PFAS	0.08 µg/L	
Effluent (treated) mean total PFAS	< 0.01 μg/L	
Estimated total PFAS removed	6,963,874,289 μg	

1. Department of Health (DoH) 2016 Health Based Guidance Values for PFAS Food Standards Australia New Zealand 2. AIX regeneration fluid reprocessed through WTP and converted to solid waste

Discharge Criteria	
Number of samples	455 samples
% Passed contractual criteria	
DoH Health Based Guideline Values	100% pass
(Sum of PFOS + PFHxS 0.07 μg/L, PFOA 0.56 μg/L) <sup>1</sup>	
% Passed target criteria	
(PFOS < 0.02 µg/L, PFOA <0.02 µg/L, PFHxS <0.02 µg/L, 6:2 FTS <0.05	99.83% pass
μg/L)	
PFAS recovery through multi barrier WTP (%)	
Pretreatment adsorption to Powdered Activated Carbon (PAC)	82.94%
Settlement & clarification (pH correction, coagulation flocculation)	5.19%
Deep bed media filtration with Gravel and Sand	0%
Deep bed media filtration with Anion Exchange Resin (AIX)	11.71%
Deep bed media filtration with Granular Activated Carbon (GAC)	0.04%
PFAS removal after full treatment	99.88%
PFAS removal after full treatment Waste generated (tonnes) - Current to 18th February 2020	99.88%
PFAS removal after full treatment Waste generated (tonnes) - Current to 18th February 2020 Liquid Waste (AIX regeneration fluid) <sup>2</sup>	<b>99.88%</b> 0 L
PFAS removal after full treatment Waste generated (tonnes) - Current to 18th February 2020 Liquid Waste (AIX regeneration fluid) <sup>2</sup> General Solid Waste (GSW) Landfill Disposal	<b>99.88%</b> 0 L
PFAS removal after full treatment Waste generated (tonnes) - Current to 18th February 2020 Liquid Waste (AIX regeneration fluid) <sup>2</sup> General Solid Waste (GSW) Landfill Disposal (Suez Raymond Terrace NSW) <sup>3</sup>	<b>99.88%</b> 0 L 78.4 t
PFAS removal after full treatment Waste generated (tonnes) - Current to 18th February 2020 Liquid Waste (AIX regeneration fluid) <sup>2</sup> General Solid Waste (GSW) Landfill Disposal (Suez Raymond Terrace NSW) <sup>3</sup> Gravel and Sand	<b>99.88%</b> 0 L 78.4 t
PFAS removal after full treatment Waste generated (tonnes) - Current to 18th February 2020 Liquid Waste (AIX regeneration fluid) <sup>2</sup> General Solid Waste (GSW) Landfill Disposal (Suez Raymond Terrace NSW) <sup>3</sup> Gravel and Sand Restricted Solid Waste (RSW) Landfill Disposal	<b>99.88%</b> 0 L 78.4 t
PFAS removal after full treatment Waste generated (tonnes) - Current to 18th February 2020 Liquid Waste (AIX regeneration fluid) <sup>2</sup> General Solid Waste (GSW) Landfill Disposal (Suez Raymond Terrace NSW) <sup>3</sup> Gravel and Sand Restricted Solid Waste (RSW) Landfill Disposal (Suez Kemps Creek NSW) <sup>3</sup>	99.88% 0 L 78.4 t 0 t
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PFAS removal after full treatment Waste generated (tonnes) - Current to 18th February 2020 Liquid Waste (AIX regeneration fluid) <sup>2</sup> General Solid Waste (GSW) Landfill Disposal (Suez Raymond Terrace NSW) <sup>3</sup> Gravel and Sand Restricted Solid Waste (RSW) Landfill Disposal (Suez Kemps Creek NSW) <sup>3</sup> Granular Activated Carbon (GAC) Hazardous Solid Waste (HSW) Beneficially reused after thermal treatment (Renex Dandenong VIC) <sup>4</sup>	99.88% 0 L 78.4 t 0 t 751.04 t
PFAS removal after full treatment Waste generated (tonnes) - Current to 18th February 2020 Liquid Waste (AIX regeneration fluid) <sup>2</sup> General Solid Waste (GSW) Landfill Disposal (Suez Raymond Terrace NSW) <sup>3</sup> Gravel and Sand Restricted Solid Waste (RSW) Landfill Disposal (Suez Kemps Creek NSW) <sup>3</sup> Granular Activated Carbon (GAC) Hazardous Solid Waste (HSW) Beneficially reused after thermal treatment (Renex Dandenong VIC) <sup>4</sup> Powdered Activated Carbon (PAC)	99.88% 0 L 78.4 t 0 t 751.04 t
PFAS removal after full treatment Waste generated (tonnes) - Current to 18th February 2020 Liquid Waste (AIX regeneration fluid) <sup>2</sup> General Solid Waste (GSW) Landfill Disposal (Suez Raymond Terrace NSW) <sup>3</sup> Gravel and Sand Restricted Solid Waste (RSW) Landfill Disposal (Suez Kemps Creek NSW) <sup>3</sup> Granular Activated Carbon (GAC) Hazardous Solid Waste (HSW) Beneficially reused after thermal treatment (Renex Dandenong VIC) <sup>4</sup> Powdered Activated Carbon (PAC) Total Waste (tonnes)	99.88% 0 L 78.4 t 0 t 751.04 t 829.44 t
PFAS removal after full treatment Waste generated (tonnes) - Current to 18th February 2020 Liquid Waste (AIX regeneration fluid) <sup>2</sup> General Solid Waste (GSW) Landfill Disposal (Suez Raymond Terrace NSW) <sup>3</sup> Gravel and Sand Restricted Solid Waste (RSW) Landfill Disposal (Suez Kemps Creek NSW) <sup>3</sup> Granular Activated Carbon (GAC) Hazardous Solid Waste (HSW) Beneficially reused after thermal treatment (Renex Dandenong VIC) <sup>4</sup> Powdered Activated Carbon (PAC) Total Waste (tonnes) Total waste vs total volume water treated %	99.88% 0 L 0 L 78.4 t 0 t 751.04 t 829.44 t 0.074%

3. Waste classified using NSW EPA 2016 Addendum to the Waste Classification Guidelines (2014) Part 1

4. Thermally destructed at Renex Dandenong VIC in accordance with the HEPA 2018 PFAS National Environmental Management Plan (NEMP)