Sonac Australia Pty Ltd

DEVELOPMENT LICENCE APPLICATION

Application ID: APP002180

Attachment 14

Installation of a Wastewater Treatment Plant

Report describing the proposed installation and performance criteria of a wastewater treatment plant at Sonac Australia for Stage 1 of the Sonac expansion project.

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1. Introduction

Sonac Australia Pty Ltd is applying to the EPA for a Development Licence to develop its production site at 281 Maryborough - Dunolly Rd, Maryborough, VIC.

The development is a plant expansion to enable greater production capacity and is planned to occur in two stages.

Stage 1, as described in this report, is the proposed construction of:

- a new wastewater treatment plant (WWTP) to enable future expansion for processing animal blood from 30,000T to 55,000T,
- construction of a building enclosure for dewatering waste activated sludge, and
- installation of a sludge dewatering press.

The stage 1 expansion also includes construction and installation of a new powder drying system (box dryer) and associated equipment in a fully enclosed building and

Stage 2 development to the north of the existing buildings, which this proposed expansion is consistent with. The development is also consistent with the purposes of the Industrial 1 Zone. Provided the offset is met and other delegated authority planning requirements are met, the proposal is sound.

2. Scope

The scope of this applies to the current operating site located at 281 Maryborough - Dunolly Rd, Maryborough, VIC.

This report provides additional details for the for the construction and installation of a new wastewater treatment plant.

The primary objectives for the planned WWTP expansion are:

- increase wastewater treatment capacity to enable increased production capacity
- produce recycled water (permeate) quality suitable to be reused for non-critical in plant purposes CIP (Cleaning in Place)
- dewater biological activated sludge to achieve 15% min. dry matter content
- increase pre-treatment and balancing to manage load variability and increased loads.
- increase hydraulic capacity and tertiary treatment process.
- expand process capacity and redundancy to manage high-inflow events, process upsets and maintenance events.
- align process technology and monitoring / management to best industry practice to reduce environmental and public health risks

Secondary expansion objectives are:

- cease practice of onsite irrigation
- dispatch recycled water for offsite irrigation as an emergency option
- connection to CHW trade waste system for disposal of permeate
- process bloody wastes into influent in order to reduce disposal volume (OPEX) and or dewater with waste activated sludge

3. Site and Project Descriptions

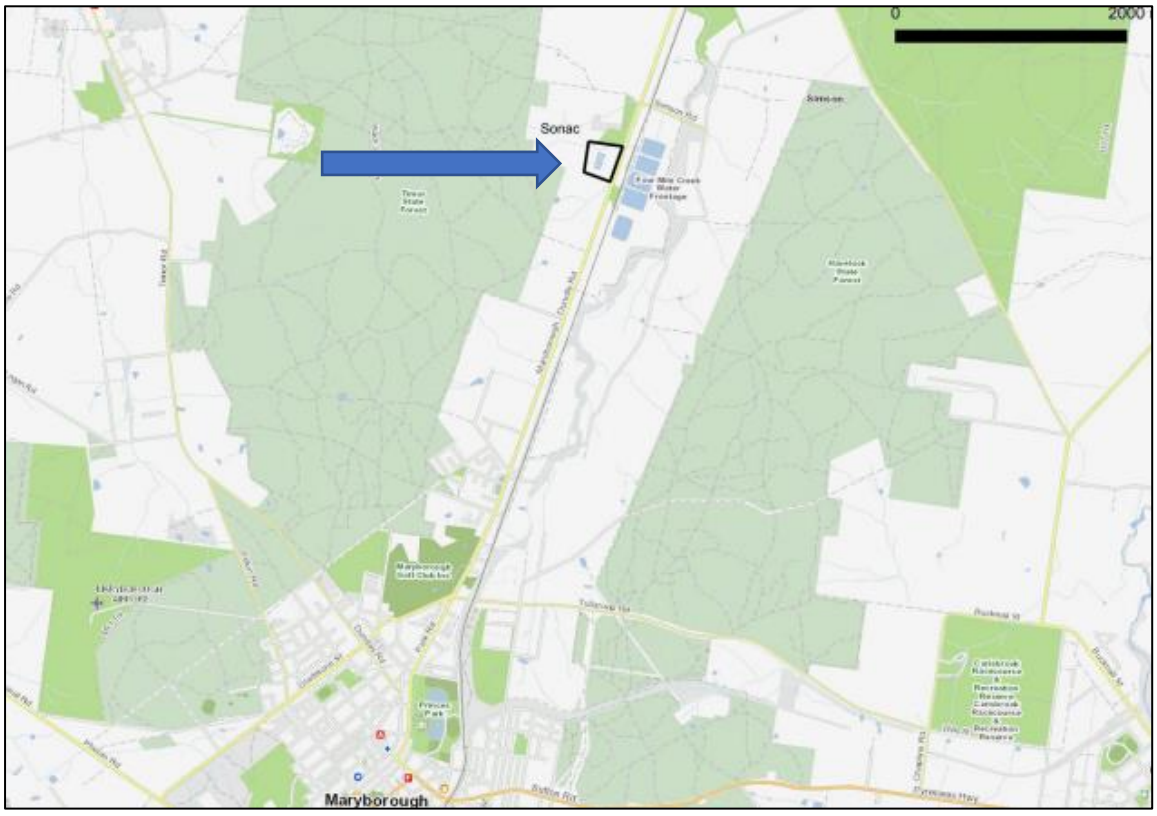
The Sonac site is located approximately 5 km north of Maryborough in Northern Victoria and is located on Industrial 1 Zone in the Central Goldfields Shire planning scheme.

Sonac has operated the site continuously since April 2012.

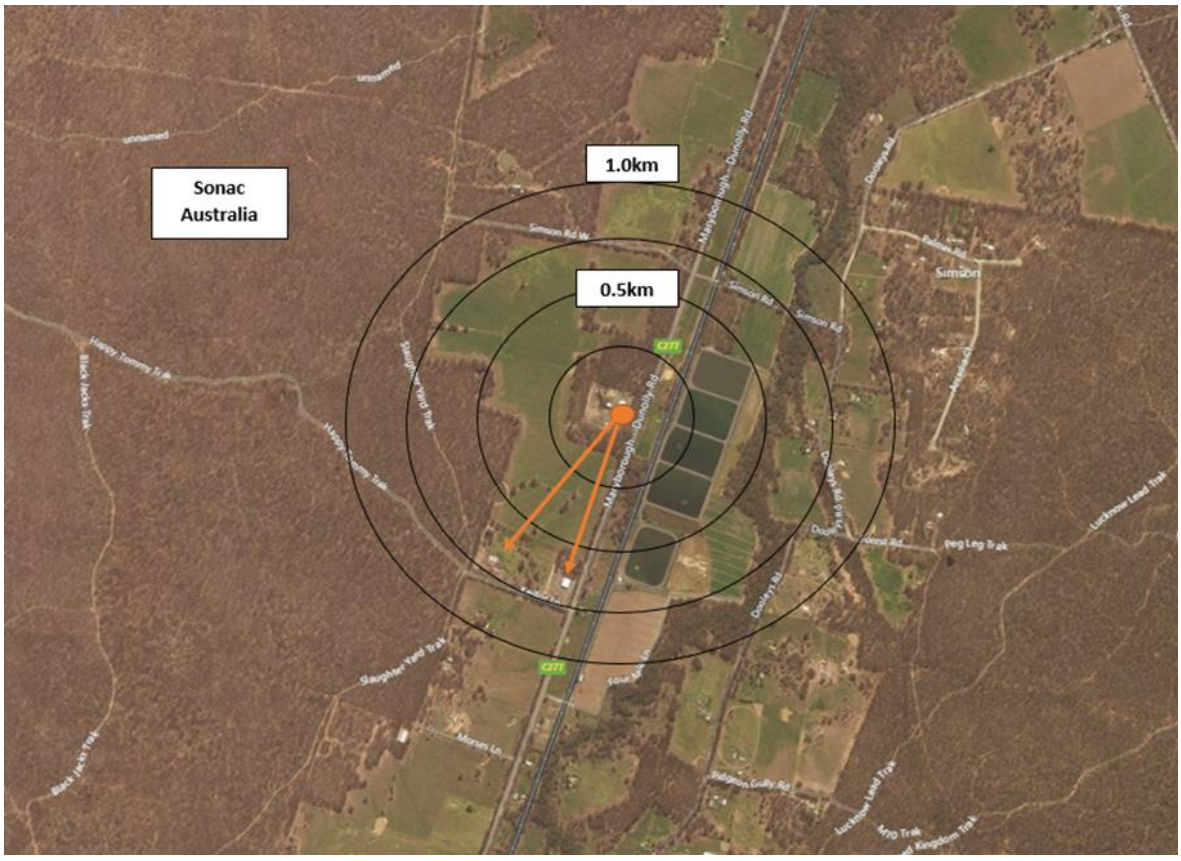
The key features external to the site are:

- Road access (VicRoads C277 Maryborough-Dunolly Road) and railway line to the east of the site
- Wastewater treatment lagoons (Central Highlands Water) located east of the road and railway.
- Farmland to the west, south and northwest.
- Public land to the northeast.

3.1 Site Location



Cartographic map showing the Sonac Australia site relative to Maryborough



Aerial image showing 1km radius of the Sonac site and nearest sensitive receptors

Aerial image showing the Sonac site and evaporation lagoons on the left and CHW treatment ponds on the right.

3.2 Project Description

The WWTP project is part of Stage 1 of the expansion project and is being managed and constructed by Waterform who is applying best practice for WWT.

Waterform are consulting to the company on construction, installation, commissioning, and final performance outcomes.

The scope of the WWTP project is designed to increase treatment capacity and improve activated sludge handling detailed as follows:

- Replacement of current WWTP with new Reverse Osmosis system with higher efficiency will minimise the increase of brine volume discharged to evaporation ponds

- Install larger, more stable and streamlined activated sludge process for processing bloody wastes that previously had to be disposed off-site. This will significantly reduce volume of bloody waste disposal

- Installation and commissioning of a dewatering screw press for dewatering waste activated sludge. Its design is to reduce waste disposal quantities per tonne of raw material processed

  Details of the dewatering press installation:
  - Novotec SQEEZ-R screw press SQR F02 Plus
  - https://novotec.be/en/products/squeez-r
  - +/- 120kg DS/hr bio sludge capacity
  - 24 hrs/day operational availability
  - AISI 304L SS construction, AISI31L rings, auger, and blades
  - Outlet pre-thickening module flocculator tank (3/4” polymer inlet)
  - Integral values, flow meter, nozzles, level control and E-panel as part of complete system
  - Customer sludge conveyor system with dual chutes and high-level sensor

- Construction of a building to house the dewatering press and associated control equipment

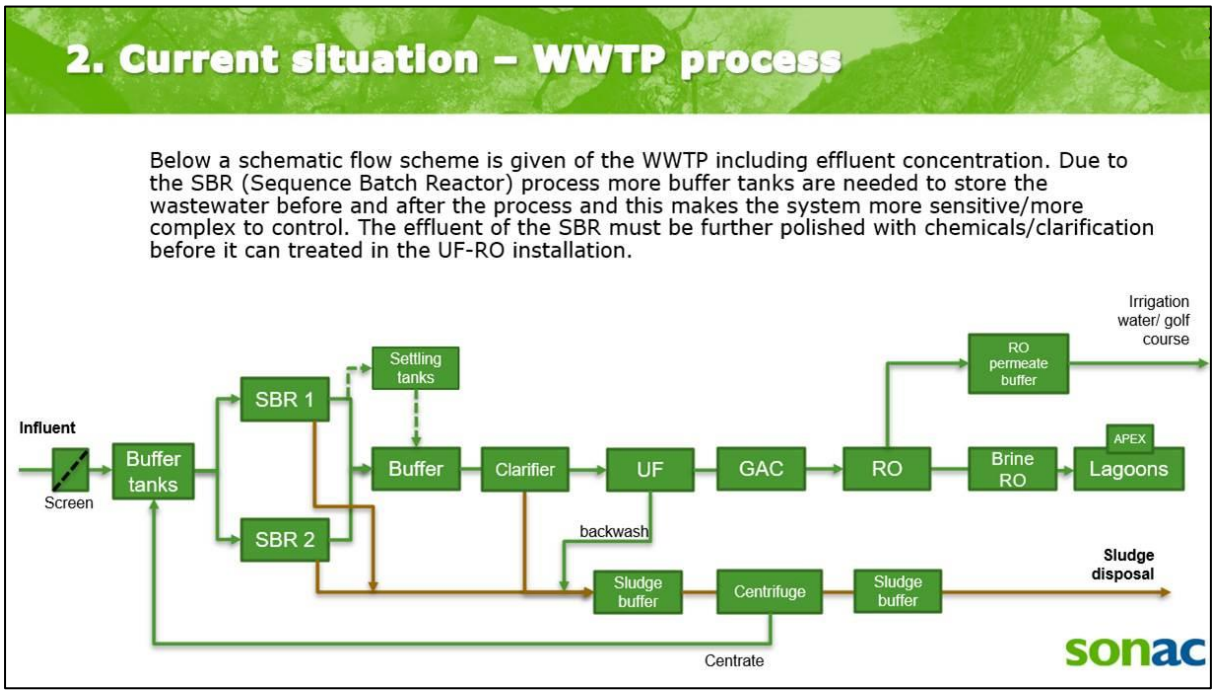
- Installation of electrical, instrumentation and control work to incorporate new works and enhancement of plant monitoring

- reuse of recycled water RO permeate into plant CIP systems

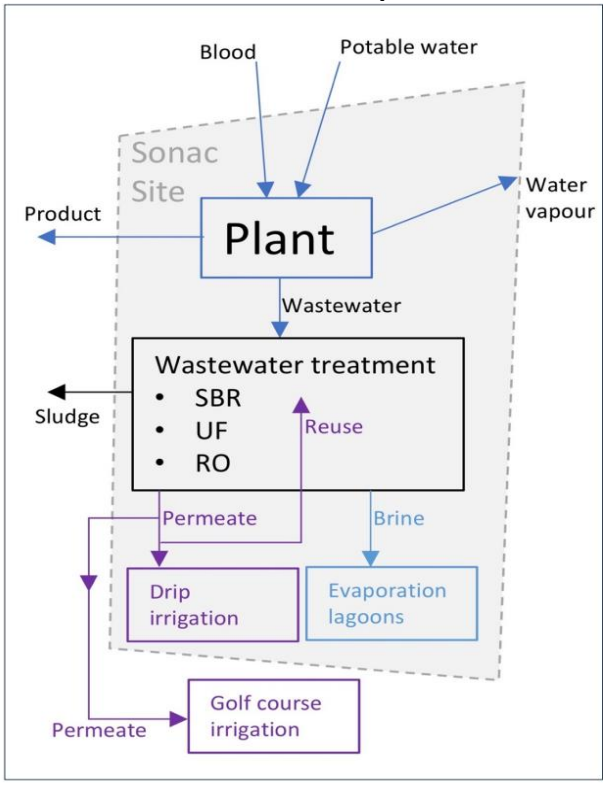
- Direct excess RO permeate to Trade Waste in accordance with a Trade Waste Agreement with Central Highlands Water

Proposed new waste activated sludge dewatering equipment will enable improved dewatering of waste activated sludge and reduce, as a percentage, the quantity of waste disposed.

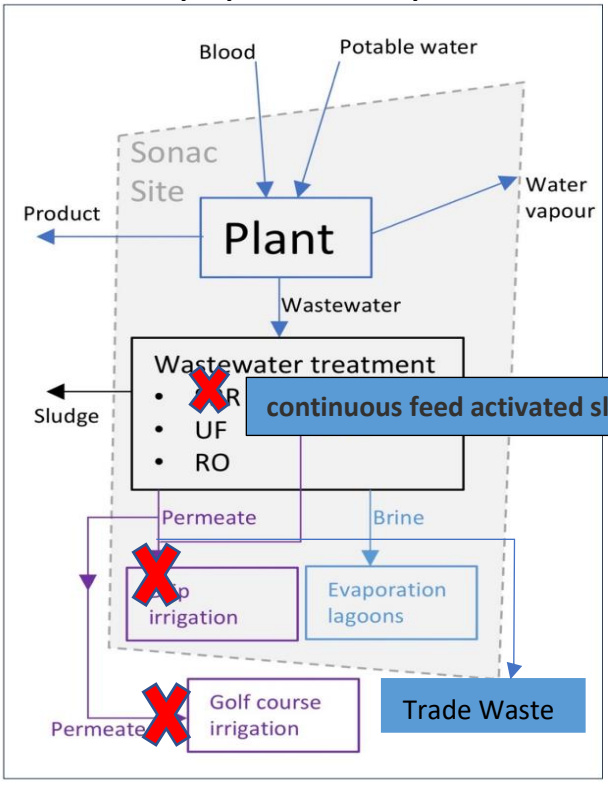
4. Wastewater Treatment Data Basis



Schematic of current WWTP processes



Schematic of proposed WWTP processes



4.1 Process Wastewater Characteristics

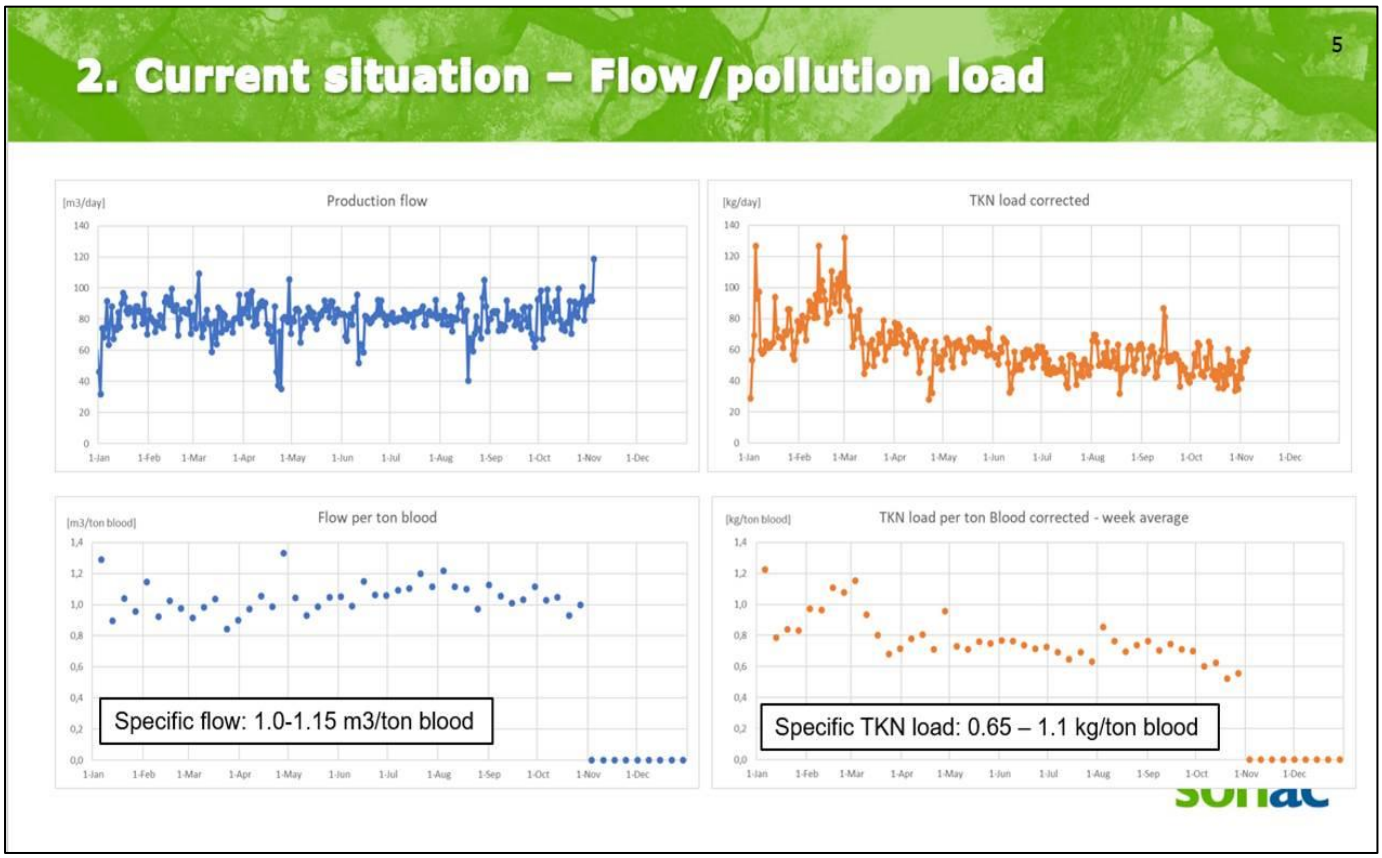
The hours of operation for the processing facility and the upgraded facility will be the same to the existing plant operation, 24 hours a day, 7 days a week.

The plant upgrade is unlikely to change current operational arrangements, however the upgrades to the sludge handling system are aiming to provide more optimum sludge transportation arrangements.

The wastewater treatment plant inflows consist of generally high strength (BOD/TKN/SS/TDS) process effluent streams and as an increase in production is planned, improved capacity is required to process the following waste steams:

- Bloody liquid waste waters
- Tank washouts & CIP waters
- Tanker truck washouts & CIP waters
- Bloody sludges and waters expelled from separator machines
- Separator machine CIP waters
- Permeate from nano filtered plasmas
- Nano machine CIP waters

4.2 Existing WWTP Assessment



2. Current situation – Flow/pollution load

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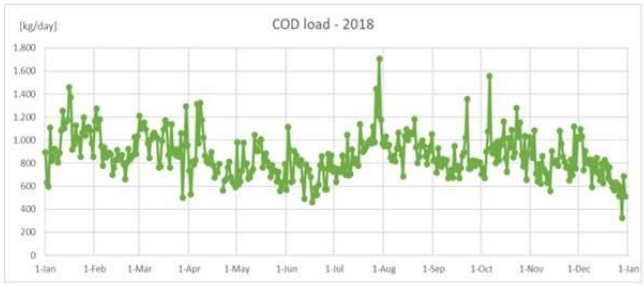
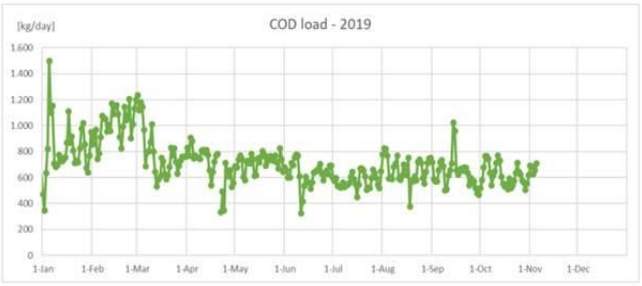
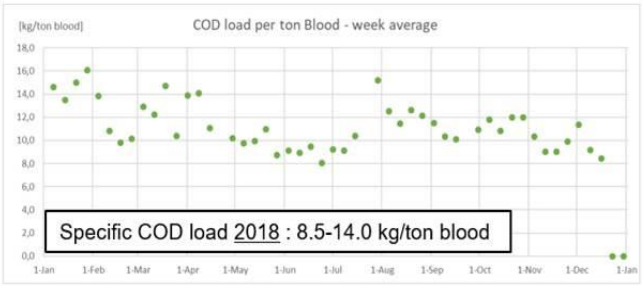
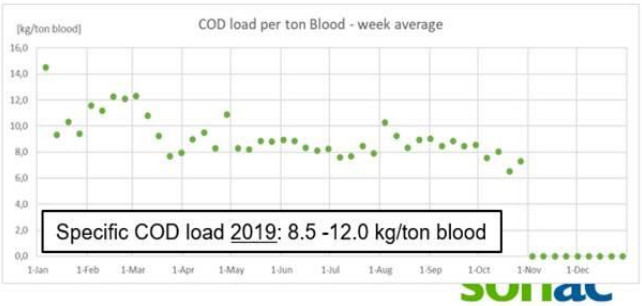


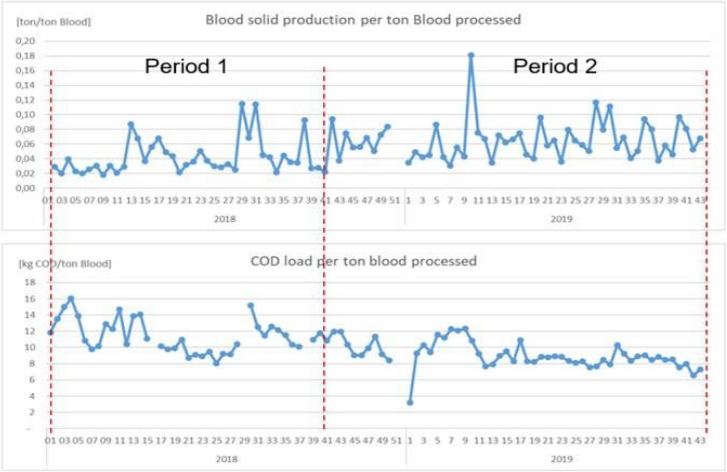






2. Current situation – Blood solids disposal

7



Due to the increased production capacity over the years more pollution load was sent to the WWTP. To prevent over loading of the WWTP more blood solids were separated and disposed. In the table below the difference between the two periods can be defined.

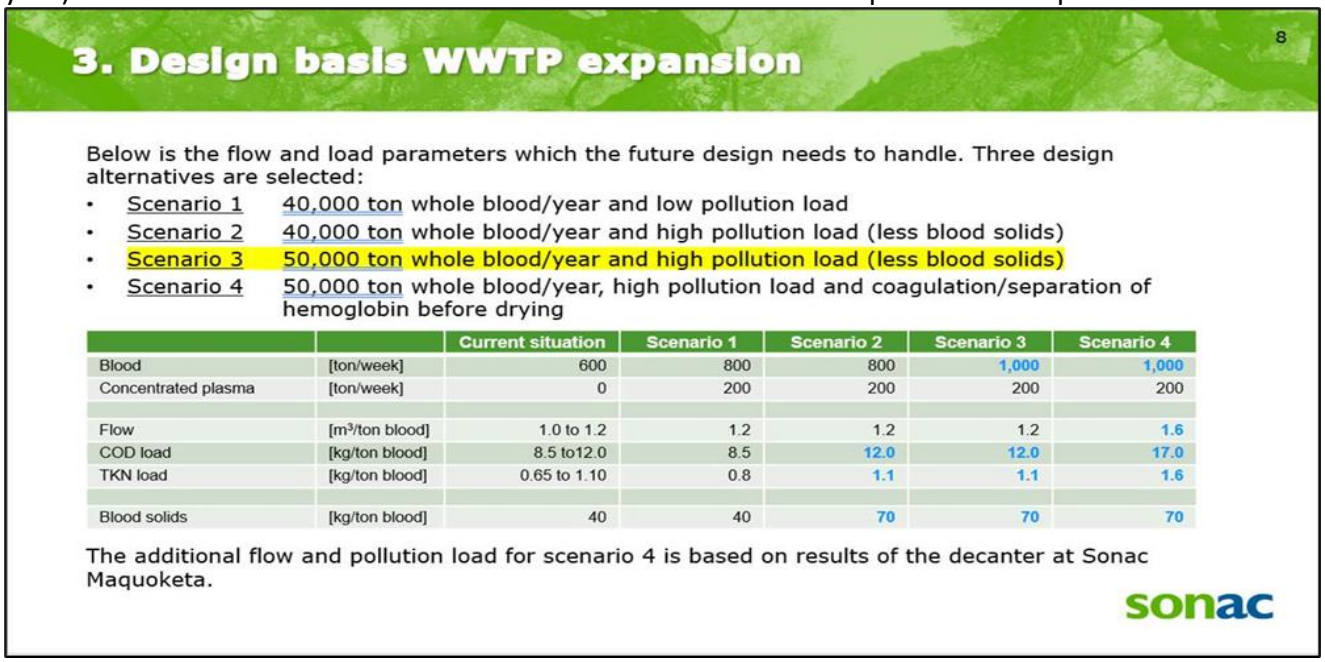
		Period 1	Period 2
Blood solids	[kg/ton blood]	40	75
COD load	[kg/ton blood]	11.4	9.1

Based on all data it can be concluded that there is a significant difference between both periods.

5. WWTP Concept Construction Arrangements

Waterform Technologies are consulting experts to Sonac on design, construction, installation, commissioning, and final performance outcomes. Waterform is the current service and technical resource provider to Sonac on its existing WWTP.

The WWTP design concept for construction was determined after analysing future whole blood intake quantities and Scenario 3 highlighted in yellow (50,000 tonne whole blood per year) was determined to be the most accurate estimate for future production requirements.



3. Design basis WWTP expansion

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Below is the flow and load parameters which the future design needs to handle. Three design alternatives are selected:

- Scenario 1 40,000 ton whole blood/year and low pollution load
- Scenario 2 40,000 ton whole blood/year and high pollution load (less blood solids)
- Scenario 3 50,000 ton whole blood/year and high pollution load (less blood solids)
- Scenario 4 50,000 ton whole blood/year, high pollution load and coagulation/separation of hemoglobin before drying

		Current situation	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Blood	[ton/week]	600	800	800	1,000	1,000
Concentrated plasma	[ton/week]	0	200	200	200	200
Flow	[m³/ton blood]	1.0 to 1.2	1.2	1.2	1.2	1.6
COD load	[kg/ton blood]	8.5 to12.0	8.5	12.0	12.0	17.0
TKN load	[kg/ton blood]	0.65 to 1.10	0.8	1.1	1.1	1.6
Blood solids	[kg/ton blood]	40	40	70	70	70

The additional flow and pollution load for scenario 4 is based on results of the decanter at Sonac Maquoketa.

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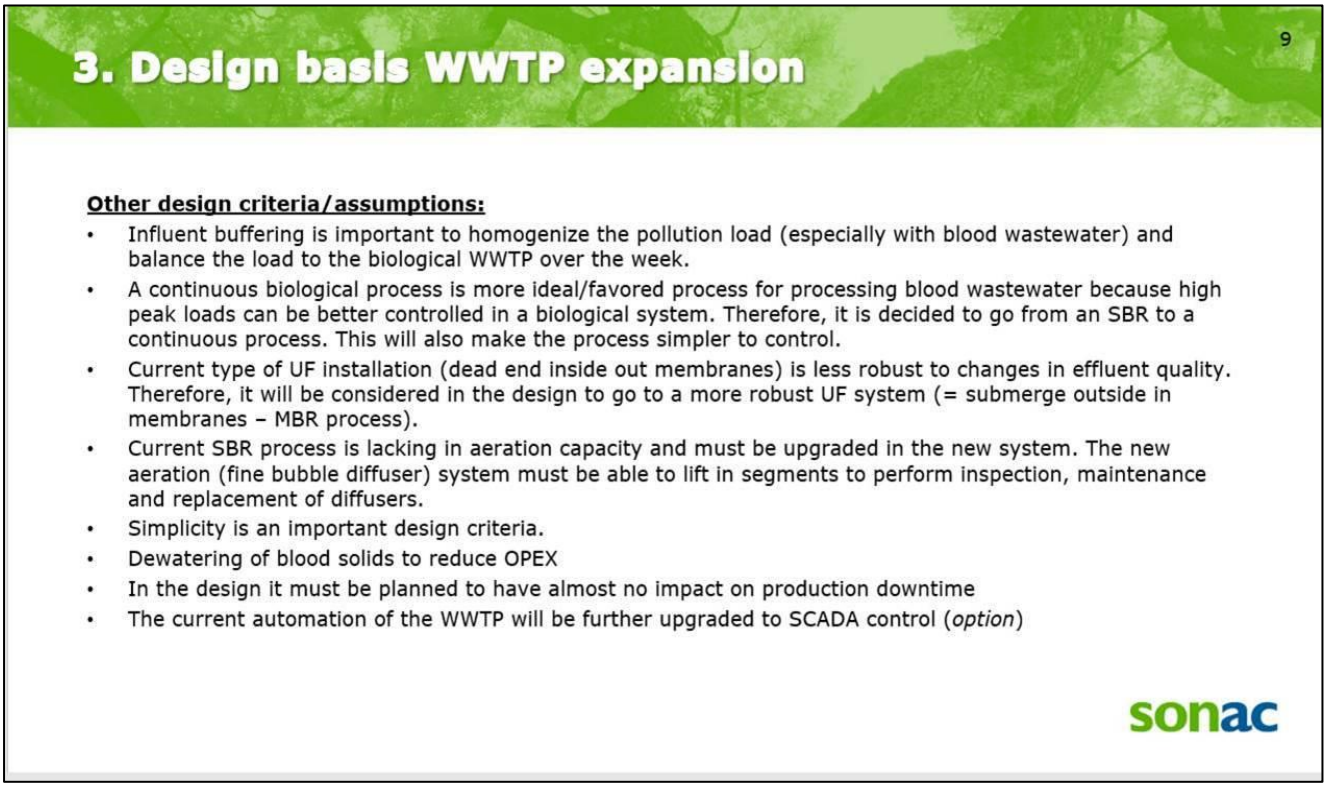

3. Design basis WWTP expansion

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Other design criteria/assumptions:

- Influent buffering is important to homogenize the pollution load (especially with blood wastewater) and balance the load to the biological WWTP over the week.
- A continuous biological process is more ideal/favored process for processing blood wastewater because high peak loads can be better controlled in a biological system. Therefore, it is decided to go from an SBR to a continuous process. This will also make the process simpler to control.
- Current type of UF installation (dead end inside out membranes) is less robust to changes in effluent quality. Therefore, it will be considered in the design to go to a more robust UF system (= submerge outside in membranes – MBR process).
- Current SBR process is lacking in aeration capacity and must be upgraded in the new system. The new aeration (fine bubble diffuser) system must be able to lift in segments to perform inspection, maintenance and replacement of diffusers.
- Simplicity is an important design criteria.
- Dewatering of blood solids to reduce OPEX
- In the design it must be planned to have almost no impact on production downtime
- The current automation of the WWTP will be further upgraded to SCADA control (*option*)

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4. Design

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Based on the production capacity and specific flow and pollution load, the daily flow and pollution load is calculated for each scenario.

		Current situation		Scenario 1		Scenario 2		Scenario 3		Scenario 4	
		average	peak	average	peak	average	peak	average	peak	average	peak
Flow	[m³/day]	95	115	140	165	140	165	170	210	230	370
COD load	[kg/day]	730	1,100	1,000	1457	1,400	2,100	1,700	2,600	2,500	3,700
TKN load	[kg/day]	65	95	90	130	125	190	156	234	220	335

It must be noted that the flow only represents the production wastewater flow and not internal recirculation water from sludge decanter and UF backwashes. In the current situation the internal recirculation is approx. 40 m³/day.

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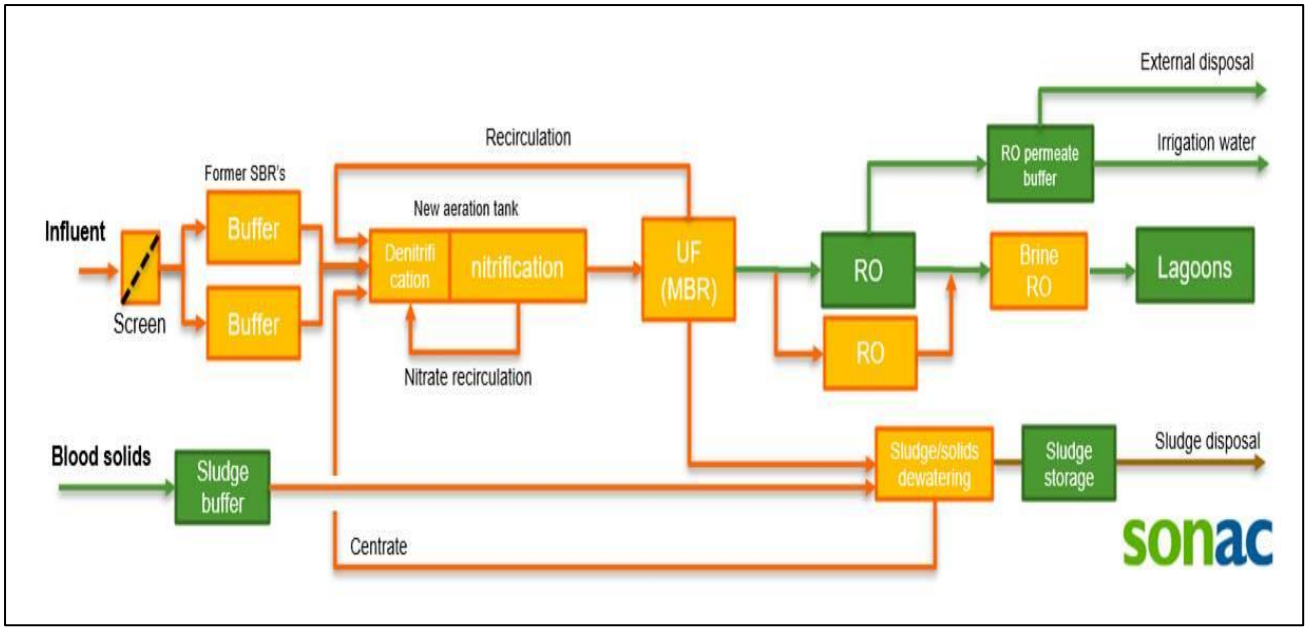
Biological Treatment m3	0.1-0.15 kg COD/kg MLSS.d	MLSS 10g/L = 2000m3



6. Proposed Operating Arrangements

The existing plant will operate during construction of the new plant.

The following provides a summary of the key risks and mitigation measures during commissioning. Sonac staff are familiar with commissioning of these assets and will be involved in this process and hand over (including requirements from vendors to provide maintenance plans, training, and spare parts).

6.1 Priority Risks and Proposed Management Arrangements

The construction and installation of the new wastewater treatment plant and its operation will be conducted with the current WWTP facility in operation.

Interruption to wastewater treatment capability or capacity due to the construction of the new plant is not expected.

The following are the priority risks identified and proposed management arrangements:

Potential Harm	Wastewater treatment plant unable to operate to design criteria and recycled water quality non-compliant to design requirements (E)
Consequence	Moderate
Likelihood	Rare
Risk rating	Low
Existing controls	Wastewater treatment plant manufacturer has designed and make operational the new treatment plant Start-up Waterform
Potential Harm	Wastewater treatment plant commissioning operation unable to comply with design requirements (E)
Consequence	Moderate
Likelihood	Rare
Risk rating	Low
Existing controls	Existing wastewater treatment plant will be operated in conjunction with new install plant to ensure recycled water quality is achieved Start-up Environmental Manager

The overall process philosophy is to increase resilience from industrial inputs, enable greater production capacity, increase peak flow throughput, improve the discharge quality, enhance monitoring, and improve risk management outcomes.

6.2 Operating Arrangements

Wastewater Treatment Plant Upgrade	
Project Manager	Sonac Environmental Manager
Project design team	Waterform/Brad Morris/ A. Vlaardingerbroek
Purpose / Design	**Installation of wastewater treatment plant**
Construction	Waterform
Connection/Installation/Report	Installation Waterform
Date	
Authority	
Specifications	1,720-2570 kg COD per day

Dewatering Activated Sludge	
Project Manager	Sonac Environmental Manager
Purpose / Design	**Screw press SQRF02**
Construction	Novotec
Connection/Installation/Report	Installation Waterform
Date	TBA
Authority	N/A
Specifications	120kg DS/hour sludge capacity

7. Start Up Considerations

- The existing plant will be in operation during start-up of the new plant
- Plant production is not expected to be interrupted. Disposal or stop processing
- New tank will be filled with effluent from existing process
- Existing bio sludge will be used to seed new tank
- New RO plant will be commissioned with filtrate from existing UF
- Permanent covers to be built on old SBR tanks

8. Water Quality Outcomes

The WWTP will produce three effluent treatment process steams:

- RO permeate Class B quality, for on-site reuse as a recycled water and discharge to Trade Waste or another reuse (refer to Attachments 1, 2 & 3 for current quality assessment)
- Brine, to be discharged to evaporation ponds
- Activated sludge solids, to be collected and dispatched as K100 for composting or other suitable determined use such as biosolids for biogas generation

Design water quality outcome has been designed with the following parameters:

- RO permeate water quality:
  - Sodium <50mg/L 100th %ile
  - Sodium <35mg/L 95th %ile
  - Chloride <200mg/L 100th %ile
- RO recovery rate: >86.5% average
- RO feed flow rate: maximum 15m3/hr
- Sludge dewatering
  - >15% DS

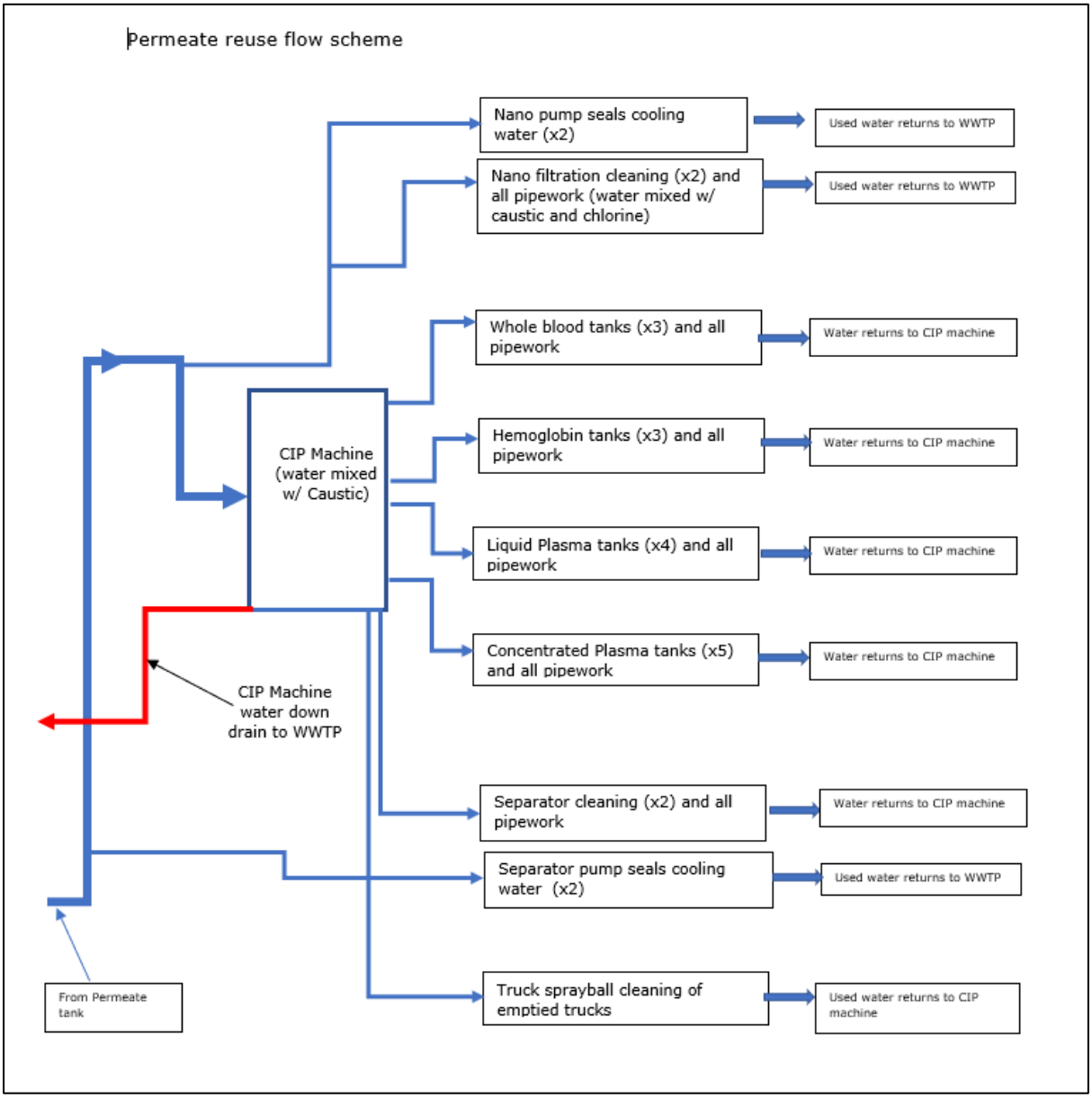
The management of permeate production will be through reuse on site and discharge to Trade Waste according to TWA with CHW. The TWA has been negotiated and an agreed schedule of operational limits has been determined and detailed below:

	Parameter	CHW Schedule of Operational Limits
Trade Waste Agreement CHW Discharge Limits - Schedule 2	Operating Times	24hrs 7 days
	Volume rate per day	75kL max.
	Volume rate per hour	6.25kL max.
	Volume rate per second	1.75L max
	Temperature	38C max
	Suspended solids	500 mg/L max
	TDS	1500 mg/L max
	EC	1500uS max
	Sodium	50 mg/L max
	Chloride	250 mg/L max
	Fibrous material	Nil
	Oil and grease	Nil floating
	Oil and grease	100 mg/L max
	pH	5.5 min 10 max
	BOD	500 mg/L max
	BOD soluble component	250 mg/L max
	COD	1500 mg/L max
	Total Nitrogen	150 mg/L max
	Ammonia (NH3 & NH4+)	50 mg/L max
	Metals	Not to exceed Table 1 Schedule 2.5
	CHW review TWA	Monitor over 12 - 18 months (for discharge volume increase to 128kL/day)

Reuse table for RO permeate

PERMEATE SOURCE	PERMEATE CIP USE	WASTE WATER DISCHARGE
From Permeate tank	Nano pump seals cooling water (x2)	Used water returns to Waste Water Treatment Plant (WWTP)
	Nano filtration cleaning (x2) and all pipework (water mixed w/ caustic and chlorine)	
	Separator pump seals cooling water (x2)	
	Truck sprayball cleaning of emptied trucks	
CIP Machine (water mixed with Caustic)	Whole blood tanks (x3) and all pipework	Used CIP wastewater returns to CIP machine
	Hemoglobin tanks (x3) and all pipework	
	Liquid Plasma tanks (x4) and all pipework	
	Concentrated Plasma tanks (x5) and all pipework	
	Separator cleaning (x2) and all pipework	

Flow diagram of permeate wastewater generation and proposed reuse for in plant uses



Attachment 1: Permeate water quality test results report #881146 extract

Page:	**Page 2 of 2**
Batch No:	**21-11770**
Report Number:	**881146**
Client:	**Sonac Australia Pty Ltd**
ALS Program Ref:	**SONAC**
Program Description:	**Miscellaneous Analysis for Sonac Australia**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
6904670		Permeate	WATER	25/02/21 09:00

Analysis - Analyte	*Sample No. Site Code Units*	6904670
pH - pH, units	Units	6.8
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	<2
COD - Chemical Oxygen Demand	mg/L	<5
TKN/TP (HL) - Phosphorus, total as P	mg P / L	0.05
SS at 104+/- 2°C - Suspended Solids	mg/L	<2
TDS at 180°C +/- 5°C - Total Dissolved Solids	mg/L	230
Chloride - Chloride, as Cl	mg/L	110
TOS - Total oxidised sulphur	mg/L	<10
Sulphide - Sulphide, total	mg/L	<0.1
Oil & Grease - Oil and Grease	mg/L	<5
SAR - Sodium Adsorption Ratio (no units)		34
TCN - Total Nitrogen as N (Calc)	mg/L	0.2
NH3 as N (DA) - Ammonia, as N	mg N / L	<0.1
MS Total Metals - Aluminium	mg/L	<0.1
MS Total Metals - Beryllium	mg/L	<0.01
MS Total Metals - Boron	mg/L	<0.2
MS Total Metals - Cadmium	mg/L	<0.002
MS Total Metals - Chromium	mg/L	<0.01
MS Total Metals - Cobalt	mg/L	<0.01
MS Total Metals - Copper	mg/L	<0.01
MS Total Metals - Iron	mg/L	<0.2
MS Total Metals - Lead	mg/L	<0.01
MS Total Metals - Manganese	mg/L	<0.01
MS Total Metals - Mercury	mg/L	<0.001
MS Total Metals - Molybdenum	mg/L	<0.01
MS Total Metals - Nickel	mg/L	<0.01
MS Total Metals - Selenium	mg/L	<0.01
MS Total Metals - Silver	mg/L	<0.01
MS Total Metals - Tin	mg/L	<0.01
MS Total Metals - Zinc	mg/L	<0.01
OES Scan - Calcium	mg/L	0.3
OES Scan - Magnesium	mg/L	<0.1
OES Scan - Sodium	mg/L	80

Attachment 2: Permeate water quality test results report #895357 extract

Page:	**Page 2 of 2**
Batch No:	**21-24525**
Report Number:	**895357**
Client:	**Sonac Australia Pty Ltd**
ALS Program Ref:	**SONAC**
Program Description:	**Miscellaneous Analysis for Sonac Australia**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
6999636		Permeate	WATER	11/05/21 09:00

Analysis - Analyte	*Sample No. Site Code Units*	6999636
pH - pH, units	Units	6.3
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	<2
TKN/TP (HL) - Phosphorus, total as P	mg P / L	<0.05
SS at 104+/- 2°C - Suspended Solids	mg/L	<2
TDS at 180°C +/- 5°C - Total Dissolved Solids	mg/L	100
SAR - Sodium Adsorption Ratio (no units)		39
TCN - Total Nitrogen as N (Calc)	mg/L	<0.1
OES Scan - Calcium Hardness, as CaCO3	mg/L	<0.5
OES Scan - Magnesium Hardness, as CaCO3	mg/L	<0.5
OES Scan - Hardness, as CaCO3	mg/L	<1
OES Scan - Calcium	mg/L	<0.1
OES Scan - Magnesium	mg/L	<0.1
OES Scan - Potassium	mg/L	1.5
OES Scan - Sodium	mg/L	36
OES Scan - Phosphorus	mg P / L	<0.1
OES Scan - Aluminium	mg/L	<0.1
OES Scan - Antimony	mg/L	<0.5
OES Scan - Arsenic	mg/L	<0.1
OES Scan - Barium	mg/L	<0.01
OES Scan - Beryllium	mg/L	<0.01
OES Scan - Boron	mg/L	<0.05
OES Scan - Cadmium	mg/L	<0.01
OES Scan - Chromium	mg/L	<0.01
OES Scan - Cobalt	mg/L	<0.1
OES Scan - Copper	mg/L	<0.01
OES Scan - Iron	mg/L	<0.05
OES Scan - Lead	mg/L	<0.05
OES Scan - Manganese	mg/L	<0.01
OES Scan - Mercury	mg/L	<0.1
OES Scan - Molybdenum	mg/L	<0.1
OES Scan - Nickel	mg/L	<0.01
OES Scan - Selenium	mg/L	<0.1
OES Scan - Silver	mg/L	<0.01
OES Scan - Strontium	mg/L	<0.01
OES Scan - Thallium	mg/L	<0.1
OES Scan - Tin	mg/L	<0.1
OES Scan - Titanium	mg/L	<0.01
OES Scan - Vanadium	mg/L	<0.1
OES Scan - Zinc	mg/L	<0.01
OES Scan - Lithium	mg/L	<0.02
OES Scan - Silicon	mg/L	<0.1
OES Scan - Acid soluble Si, as SiO2	mg/L	<0.5
OES Scan - Sulphur	mg/L	2.4
OES Scan - Sulphur, as Sulphate	mg/L	7.3
Colilert (2000) - E.coli MPN Colilert	orgs/100mL	0

Attachment 3: Permeate water quality test results report #928182 extract

Page:	**Page 2 of 2**
Batch No:	**21-55219**
Report Number:	**928182**
Client:	**Sonac Australia Pty Ltd**
ALS Program Ref:	**SONAC**
Program Description:	**Miscellaneous Analysis for Sonac Australia**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
7237520		Permeate 3	WATER	16/11/21 09:30

Analysis - Analyte	*Sample No. Site Code Units*	7237520
pH - pH, units	Units	6.6
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	<2
TKN/TP (HL) - Phosphorus, total as P	mg P / L	0.12
SS at 104+/- 2°C - Suspended Solids	mg/L	<2
TDS at 180°C +/- 5°C - Total Dissolved Solids	mg/L	140
SAR - Sodium Adsorption Ratio (no units)		140
TCN - Total Nitrogen as N (Calc)	mg/L	0.3
Colilert (2000) - E.coli MPN Colilert	orgs/100mL	0