

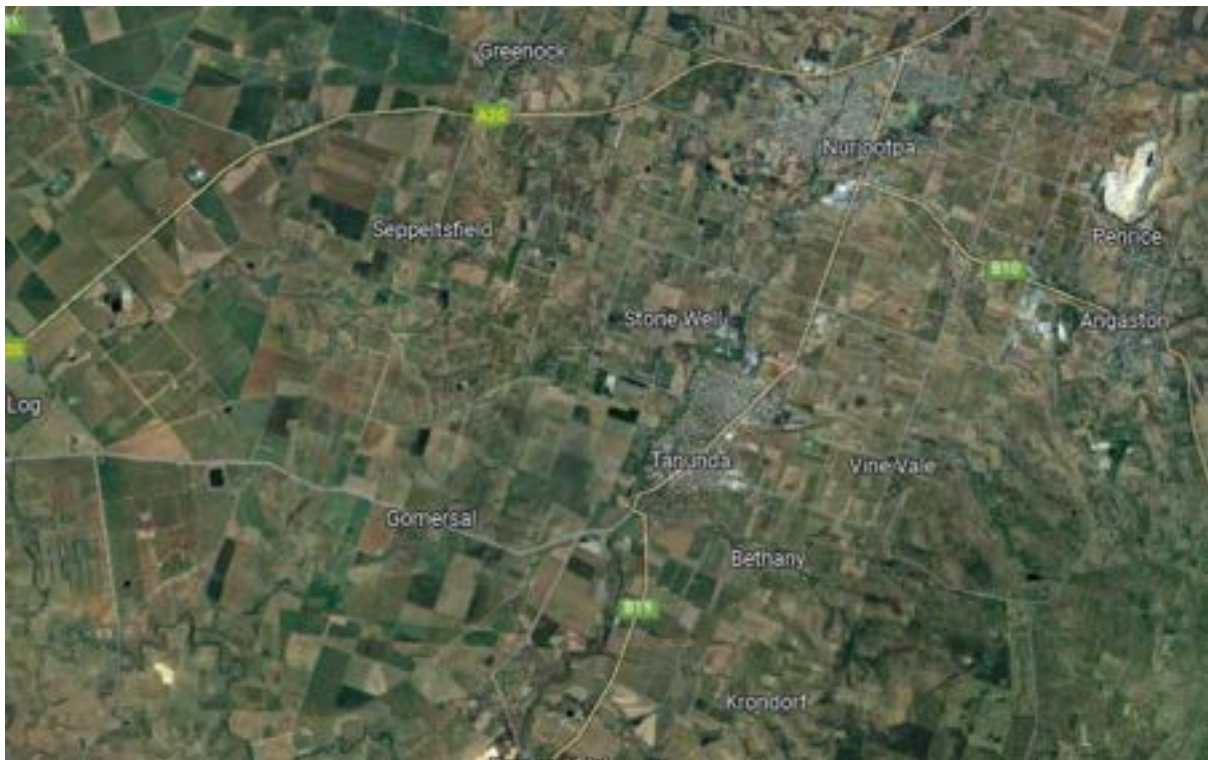
# **Kamran Mangi Consulting Engineer**

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## **REPORT ABOUT THE BAROSSA INFRASTRUCTURE LIMITED'S RECYCLED WATER SCHEME**



CLIENT: BAROSSA INFRASTRUCTURE LIMITED

REFERENCE NUMBER: BIL200923

DATE: 20 SEPTEMBER 2023

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## INTRODUCTION

Barossa Infrastructure Limited (BIL) is a privately owned entity which provides water to a number of vineyard irrigators located throughout the Barossa Valley.

Mostly the water supply is raw River Murray water supplied from the Warren dam, while a limited section of the network receives a blend of this raw river Murray water mixed with the recycled water coming from the Nuriootpa and/or Tanunda Wastewater Treatment Plants which are owned and operated by the Barossa Council.

This scheme was first granted an approval by the Department for Health and Wellbeing (DHW) in 2009. This approval was replaced by the current one in 2022 (**Annexure 1**).

Following is the condition regarding the monitoring and reporting about the recycled water quality of the DHW's current approval:

### *5. In regard to monitoring and reporting:*

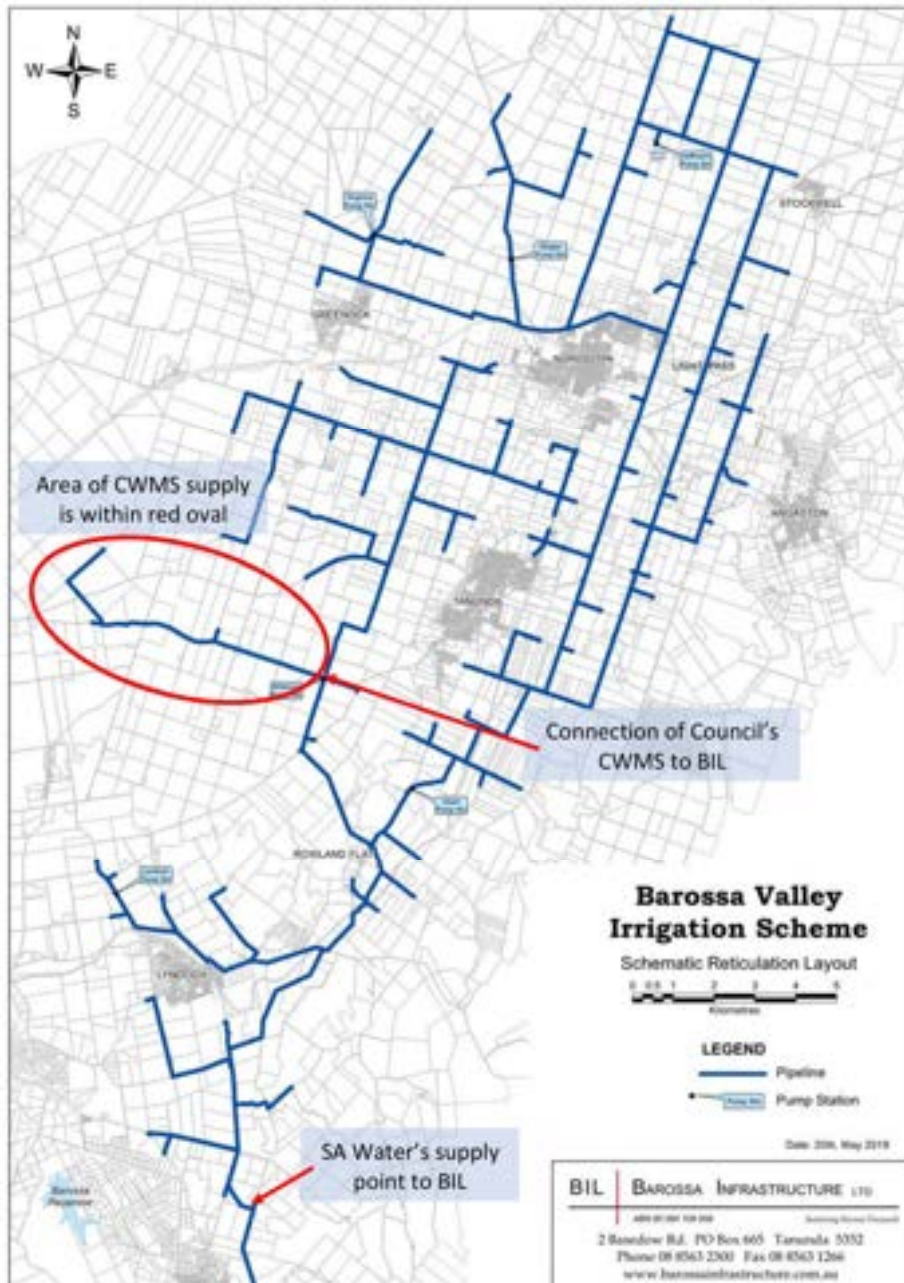
- 5.1. The recycled water is to be sampled quarterly for the parameters listed in Condition 5.*
- 5.2. Samples are to be taken of source water supplied to BIL customers*
- 5.3. Sample points are to be signed and easily accessible*
- 5.4. Analysis of samples is to be carried out by a laboratory registered by NATA for these parameters, except for chlorine which can be tested in the field.*
- 5.5. Results are to be submitted in the form of an Annual Recycled Water Quality Monitoring Report by 30 September each year, for the prior financial year period from 1 July to 30 June, to the Minister for Health (c/o Wastewater Management Section, Department for Health and Wellbeing) and must include descriptions of malfunctions and the corrective actions taken to rectify any noncompliance.*
- 5.6. If the recycled water quality does not comply with above criteria, the recycled water supply to the scheme must be stopped immediately. The Minister for Health (C/- Wastewater Management Section, DH)*

*must be informed about all such malfunctions and the measures taken to rectify the problem(s).*

Historically the above mentioned Annual Recycled Water Quality Monitoring Reports were prepared by external consultants but in 2021, DHW allowed BIL to prepare its own reports. Nevertheless, BIL's Board desires an independent review every third year. Hence, the undersigned has been engaged by BIL to prepare this report on its behalf.

## BIL'S PIPELINE NETWORK

The following Figure 1 shows BIL's pipeline network:



## RECYCLED WATER SAMPLING

The Barossa Council owns and operates the Nuriootpa and Tanunda wastewater treatment plants and is therefore responsible for sampling of the recycled water.

Monthly samples of the recycled water supply to BIL are taken by the Council just upstream of the interface point at the corner of Gomersal Rd and Fromm Rd, Tanunda.

BIL on its own also carries out sampling annually.

## MEETING WITH BIL

Undersigned sat down with the BIL officials to find out the current status of the scheme from their perspective.

Following are the salient points of this discussion:

1. In general, the scheme is operating well.
2. There is an ongoing challenge of managing flows in winter when there is minimal demand by growers. This issue becomes further complicated as the most of the water received is recycled water with very little dilution by River Murray water. This has led to a few discharges over the time. During these periods Barossa Council works with BIL to schedule supply to other customers, where possible. On its own end, BIL currently manages this by negotiating with existing customer(s) to take water at a reduced price.

Two potential solutions to the issue being considered at a high level by BIL are:

- a. Engineering solution - build a large storage
- b. Operational solution - add more customers

Option 'a' is quite expensive and may not be achievable in near future.

BIL and the Barossa Council have considered seeking additional customers, but this has not progressed to water supply contracts as yet.

3. There has been a complaint of smell and water quality degradation especially at the start of the irrigation season. This particularly happens at a point where the topography of the area forms a gully and water sits there in the pipe for a long time during off season.

A flushing regime has been adopted to take care of this issue. The line is flushed a few times at the start of the season with River Murray water and this has solved the problem to a large extent. A close eye is kept on this issue throughout the watering season to avoid any complaints.

4. There is sufficient annual customer demand for the CWMS water. The issue is in instantaneous demand i.e., the need for Council to discharge circa 10L/s to BIL 24/7/365. Previously there was one or more private large water storages along this pipeline that allowed BIL to manage their winter fill. However, all of those private water storages are now owned by Seppeltsfield and Seppeltsfield now has its Bunyip scheme which it uses in winter in preference to BIL water.
5. BIL has a good working relationship with the Barossa Council.

## DISCUSSIONS WITH THE BAROSSA COUNCIL

Detailed discussion was held with the Barossa Council to get their point of view about this scheme.

Following are the main points of this discussion:

1. There were no substantial wastewater treatment plant failures in the last 12 months.
2. There is a very significant ongoing issue with the water supply to BIL. Council produces water all year round but BIL does not have the capacity

to take this water 12 months of the year and this problem exacerbates especially during wetter months. At times, BIL has not accepted water for almost two months. This is due to the fact that BIL has not locked in enough customers to take the water plus one of the bigger growers, Seppeltsfield now has the ability to get water from other sources as well which further reduces their water intake from BIL.

The above issue resulted in council discharging 75 ML of recycled water recently to the nearby river. Though advance approvals were obtained from the DHW and the Environment Protection Authority for this activity, measures need to be taken to avoid it in the future.

3. Council is aware of high BOD<sub>5</sub> values in recycled water. This is a water balance issue and the storage lagoon from where water is supplied to BIL, might also be a contributing factor.

Council has allocated \$1.8 million to upgrade the wastewater treatment process, especially buffering high inflows, which hopefully would resolve this issue. The construction for the new works is expected to commence sometime next year. Council also intends to clean out the storage lagoon as part of these works.



## SITE VISITS AND MEETINGS WITH GROWERS

As part of this exercise, undersigned visited randomly picked vineyards and met the growers. A number of same questions were asked from each grower to have their input.

The following Table 1 lists the questions and their answers by the growers:

Site	Corner of Gomersal Road and Gerald Roberts Road	875 Gomersal Road	203 Lyndoch Road	371 Gomersal Road
Any on-site storage?	No	A 250-kL tank	A few small tanks	A large tank and a 2 ML lined dam
Any issues with water supply pressure?	No	No	No	No
Any issues with the quality of water?	No	No	No	A few years ago, there were bad smells and the water seemed slightly dirty. This year has been good and BIL's preventative measure of periodically flushing the pipe seems to have fixed the problem. Grower himself has installed a new filtration system to further improve the water quality.
Any overflows?	No	No	No	No
Any difficulties in dealing with BIL?	No	No	No	No
Any suggestions for improvement?	No	No	No	BIL should regularly coordinate with the Barossa Council to maintain/improve the water quality.

## PERSONAL OBSERVATIONS DURING THE SITE VISITS

No significant anomaly was noted during the site visits.

The growers seemed to be aware of their responsibilities regarding the use of recycled water.

The connection points with valves and other related equipment were found to be properly colour coded and signed.

Vineyards use drip irrigation to irrigate the vines.

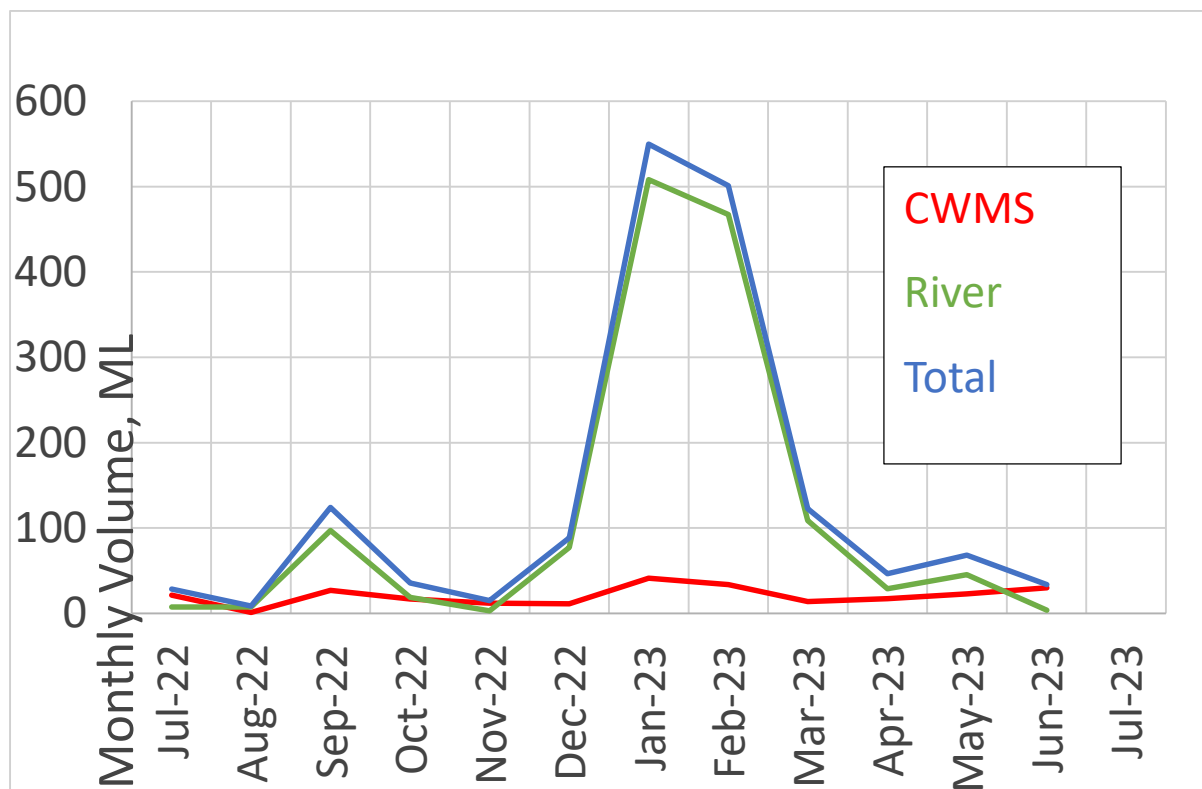
Please refer to the **Annexure 4** for the pictures of the properties taken on the day of site visits.

## DATA ABOUT THE WATER USAGE

Following Table 1 shows monthly volume of source water into BIL's Gomersal Road Pipeline

<b>Table 1 - Monthly Volume of Source Water into BIL's Gomersal Rd Pipeline</b>					
	<b>CWMS Source</b>		<b>River Murray Source</b>		<b>Total</b>
	(ML)	(%)	(ML)	(%)	(ML)
Jul-22	21.2	74%	7.3	26%	28.5
Aug-22	1.1	13%	7.6	87%	8.7
Sep-22	27.1	22%	97.1	78%	124.2
Oct-22	16.8	47%	18.7	53%	35.5
Nov-22	11.8	78%	3.2	22%	15.0
Dec-22	11.2	13%	77.2	87%	88.4
Jan-23	41.5	8%	508.4	92%	549.9
Feb-23	33.8	7%	467.3	93%	501.1
Mar-23	14	11%	108.7	89%	122.7
Apr-23	17.3	37%	29.0	63%	46.3
May-23	23	34%	45.4	66%	68.4
Jun-23	30.1	89%	3.7	11%	33.8
<b>TOTAL VOLUME</b>	<b>248.9</b>	<b>15%</b>	<b>1373.787</b>	<b>85%</b>	<b>1622.7</b>

Following Figure 2 shows monthly volume of source water into BIL's Gomersal Road pipeline.



## ANALYSIS OF RECYCLED WATER QUALITY MONITORING RESULTS

The recycled water quality results have been carefully analysed to see if there is any deviation from the DHW'S nominated parameters in the condition 4 of the approval letter dated 20 June 2022 (*there is a typo in the Department for Health and Wellbeing's approval letter as it says in condition 5.1 that the parameters are listed in condition 5 whereas they are actually mentioned in the condition 4*).

## MONITORING RESULTS FROM THE BAROSSA COUNCIL

Following Table 3 shows the annual recycled water monitoring results from the council. The council has followed a monthly testing regime.

TABLE 3

Date	Ammonia as N	BOD	Ca	COD	Conductivity	E. coli	Grease & Oil	Mg	N+N as N	Nitrate as N	Nitrite as N	pH	Phos. Total	Sodium	Sodium AR	Suspended S	Temp for pH	TKN as N	Total DS	
	mg/L	mg/L	mg/L	mg/L	uScm	100mL	mg/L	mg/L	mg/L	mg/L	mg/L	Units	mg/L	mg/L	mg/L	mg/L	Deg C	mg/L	mg/L	
19/07/2022	18.7	28	26.3	60	901	0	2	10.8	10.93	10.34	0.59	7.1	10.1	92	3.82	32	20.1	27.4	500	
17/08/2022	Offline																			
13/09/2022	23.1	26	29.2	140	1130	0	4	14.5	11.54	5.06	6.48	7.1	9.13	105	3.97	38	21.1	29	627	
19/10/2022	32.4	50	34.8	122	1520	0	7	22.5	2.31	1.61	0.7	7.3	8.94	157	5.1	41	21.7	41.6	846	
22/11/2022	Offline																			
20/12/2022	Offline																			
17/01/2023	44.4	10	43.3	102	1870	1	2	29.9	<0.06	<0.06	<0.06	7.7	8.45	207	5.92	20	21	46.8	1040	
15/02/2023	19	34	40.8	134	1580	5	1	24.5	<0.06	<0.06	<0.06	7.7	7.16	167	5.1	27	21.6	24.6	879	
14/03/2023	20	78	42.1	149	1550	7	4	25.6	<0.06	<0.06	<0.06	7.4	10	186	5.58	32	22.3	26.1	862	
12/04/2023	Offline																			
9/05/2023	0.5	14	34.5	146	1320	180	2	20.9	5.63	5.33	0.3	9.1	4.84	188	6.23	76	20.3	9.44	733	
13/06/2023	34.4	8	32.1	94	1520	0	2	23.3	3.69	0.72	2.97	7.3	8.12	159	5.21	20	20.6	43.7	846	

## ANALYSIS OF THE COUNCIL'S MONITORING RESULTS

Out of the ten samples, the **BOD<sub>5</sub>** is above the prescribed limit on six occasions which means there is a problem with the council's wastewater treatment plant.

Out of the ten samples, the **suspended solids** have exceeded the prescribed limit on four occasions which again means that the wastewater treatment plant's performance needs to be improved.

For **E.coli**, only one sample went above the prescribed limit which is a good sign and shows that in general, the disinfection system is working well.

No results have been provided for the **total chlorine** which must be measured as per the approval of the Department for Health and Wellbeing.

## MONITORING RESULTS FROM BIL

Following Table 4 shows recycled water monitoring results from BIL for the previous years. BIL has followed an annual testing regime.

	Arsenic - Total	Biochemical Oxygen Demand	Boron - Soluble	Cadmium - Total	Calcium	Chloride	Chlorine - Free	Chlorine - Total	Chromium - Total	Conductivity	E.coli	Iron - Total	Lead - Total	Magnesium	Manganese - Total	Monochloramine
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm	cfu/100mL	mg/L	mg/L	mg/L	mg/L	mg/L
14/07/2017	0.0004		0.141	<0.0001	33	252			0.0004	1410	0	0.0658	0.0011	23.7	0.0283	
?2018?																
28/06/2019	0.0007		0.264	<0.0001	21	107	<0.1	<0.1	0.0011	848	0	0.3311	0.0022	8.04	0.0485	<0.1
8/05/2020	0.0007		0.088	<0.0001	20.3	103	<0.1	<0.1	0.0011	709	1	0.1128	0.0015	7.65	0.0317	<0.1
26/07/2021	0.0006		0.073	<0.0001	19.9	111	<0.1	<0.1	0.0009	910	0	0.1677	0.0007	8.03	0.0376	<0.1
22/07/2022	0.0006	7	0.083	<0.0001	24.5	91	<0.1	<0.1	0.0009	897	11	0.1356	0.0008	9.1	0.0313	<0.1
14/07/2023	0.00073	18	0.149	<0.0001	37.8	253	<0.1	<0.1	0.0003	1680	0	0.1277	0.0005	31	0.0329	<0.1

	Nitrate + Nitrite as N	Nitrogen - Total	pH	Phosphorus - Total	Potassium	Sodium	Sodium Adsorption Ratio - Calculation	Sulphate	Sulphur	Suspended Solids	Temperature at which pH is measured	Thermotolerant Coliforms	TKN as Nitrogen	Total Dissolved Solids (by EC)	Total Hardness as CaCO3	Turbidity	Zinc - Total
	mg/L	mg/L	pH units	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	°C	cfu/100mL	mg/L	mg/L	mg/L	NTU	mg/L
14/07/2017	3.84	16.9	7.2	9.32	27.4	184	5.97	81.3				16	13.1	780	180	7.2	0.0532
?2018?																	
28/06/2019	2.61	26.71	7.3	10.4	25.5	88.1	4.15	50.1	16.7		22.6	0	24.1	470	86	23	0.0867
8/05/2020	10.9	32.7	6.6	10.2	23.5	85	4.08	45.3	15.1		22.5	22	21.8	393	82	12	0.085
26/07/2021	11	31.8	7.2	11.1	28.4	99.5	4.76	44.4	14.8		22.3	10000	20.8	505	83	20	0.062
22/07/2022	3.21	30.21	7.4	9.57	26.6	88.4	3.87	65.4	21.8	13	22.1	11	27	497	99	4.4	0.0696
14/07/2023	4.32	39.62	7.3	7.46	29.3	197	5.75	108	35.9	32	21.9	0	35.3	935	222	14	0.0728



## ANALYSIS OF BIL'S MONITORING RESULTS

**BOD<sub>5</sub>** is within the prescribed limit on both the occasions which is satisfactory.

**Suspended solids** have exceeded the prescribed limit on one occasion though very slightly i.e., 32 mg/L which means in general the water quality is acceptable.

For **E.coli**, both the samples are below the prescribed limit which is a good sign and shows that the disinfection system is working well.

**Total chlorine** is less than 0.1 mg/L which is not surprising as it takes considerable time for the water to reach BIL's connection point and by then all the residual Chlorine is expected to be consumed. Total Chlorine must be measured at the wastewater treatment plant within the stipulated time to get an accurate figure.

**Total Dissolved Solids** had values of 497mg/L and 935 mg/L which are below the trigger value for further testing of 1450 mg/L.

The AWQC's water quality reports are attached at **Annexure 2**.

## TRENDS FROM THE COUNCIL'S SAMPLING REGIME

Monitoring results from the previous years have been carefully analysed to see if any worrying trend is building up and following is the outcome:

**BOD<sub>5</sub>** values sometimes go above the prescribed limit but there is no specific pattern.

**Suspended Solids** also sometimes exceed the prescribed limits but there is no unique pattern to it.

**E coli** are always significantly below the prescribed limit other than one occasion in May 2023 when the value was 180 per 100 mL. This is an isolated incident and doesn't show any specific trend.

**Total Chlorine** values have not been provided. Total Chlorine must be measured at the wastewater treatment plant and results provided.

## TRENDS FROM THE BIL'S SAMPLING REGIME

Monitoring results from the previous years have been thoroughly analysed to see if any troublesome trend is growing and following is the outcome:

**BOD<sub>5</sub>** is well within the prescribed limit. No specific trend has been noticed.

**Suspended Solids** are well within the prescribed limit. No unique trend has been noticed.

**E coli** are also not exceeding the prescribed limit. There is no worrying trend forming.

**Total Chlorine** values don't give any credible information as it needs to be measured at the wastewater treatment plant.

## RECOMMENDATIONS

Following steps should be taken to keep BIL scheme running to a high standard:

1. BIL and Council should continue working together on a long-term solution to managing CWMS flow during winter.
2. Maintain a close liaison with the growers with frequent site visits to avoid/solve any problems.
3. Keep a close eye on the recycled water monitoring results to note any worrisome values/trends and take measures accordingly to efficiently deal with them which include raising them with the Barossa Council, promptly informing the BIL's customers, etc.

4. Keep a close liaison with the Barossa Council to be aware of any issues with the wastewater treatment plant supplying recycled water to BIL. ***Since the council will be carrying out upgrades to the wastewater treatment plant in near future, this point becomes even more important as there could be a host of issues affecting BIL.***

## CONCLUSION

The BIL scheme is being run to a very high standard especially from BIL's own end; however, lately there have been problems in accepting recycled water during the winter season. BIL and Barossa Council are working together on a long-term solution for this issue.

There have been a few issues in the past which were dealt with efficiently.

BIL needs to constantly monitor the recycled water quality monitoring results for which a close liaison with the Barossa Council is required.

# ANNEXURE 1: The Department for Health and Wellbeing's approval letter dated 20 June 2022



Government of South Australia  
SA Health

Contact: Josh Hopkins  
Telephone: (08) 8226 7100  
Email: [healthwastewatermanagement@sa.gov.au](mailto:healthwastewatermanagement@sa.gov.au)

Health Protection and  
Licensing Services  
City Centre Building  
11 Hindmarsh Square  
Adelaide SA 5000  
PO Box 6  
Rundle Mall SA 5000  
DX 243  
Tel 08 8226 7100  
Fax 08 8226 7102  
ABN 97 643 306 590  
[www.health.sa.gov.au](http://www.health.sa.gov.au)

Approval Number: WWI-11052

Attn: Simon Schutz  
Barossa Infrastructure Limited  
2 Basedow Rd,  
TANUNDA SA 5352

To Mr Schutz,

**RE: Variation to approval - Barossa Infrastructure Limited (BIL) Recycled Water Irrigation Scheme Barossa**

Pursuant to the South Australian Public Health (Wastewater) Regulations 2013, approval is issued to Barossa Infrastructure Limited to supply recycled water to the Barossa Infrastructure Limited Recycled Water Scheme for the purpose of drip irrigation of vineyards.

The approval 2009-7292 dated 27 August 2009 is revoked and replaced with this approval.

The approval is subject to the following conditions:

1. The approved system incorporates:
  - 1.1. Supply of recycled water from the Nuriootpa Wastewater Treatment Plant, mixed with water sourced from the Warren Reservoir for the purpose of drip irrigation of vineyards.
2. The system is to be installed, commissioned, operated and maintained in accordance with:
  - 2.1. The plans, specifications and reports referenced in this approval.
  - 2.2. Designers, manufacturers, installers and equipment suppliers' instructions and recommendations.
  - 2.3. Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1).
  - 2.4. Recycled Water Risk Management Plan dated July 2009 for the Scheme
  - 2.5. All other relevant standards and codes.
  - 2.6. Conditions of this approval.

WWI-11052  
Barossa Infrastructure Limited Recycled Water Irrigation Scheme Barossa

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3. The irrigation system is to be operated in accordance with this approval and the *Recycled Water Risk Management Plan*, dated July 2009 and is subject to the following conditions;
  - 3.1. There is no pooling or runoff of recycled water from the irrigation site.
  - 3.2. Prominent warning signs will be erected stating "RECLAIMED WATER BEING USED – DO NOT DRINK".
  - 3.3. The irrigation areas are to be monitored to ensure runoff is not occurring.
  - 3.4. All the exposed irrigation pipework and valves will be of lilac colour and/or labelled to indicate recycled water.
4. The recycled water is to meet the following water quality criteria:
  - 4.1. BOD<sub>5</sub> not greater than 20 mg/L
  - 4.2. Suspended solids not greater than 30 mg/L
  - 4.3. *E.coli* count not greater than 100/100 mL
  - 4.4. Total chlorine >1 mg/L
5. In regard to monitoring and reporting:
  - 5.1. The recycled water is to be sampled quarterly for the parameters listed in Condition 5.
  - 5.2. Samples are to be taken of source water supplied to BIL customers
  - 5.3. Sample points are to be signed and easily accessible
  - 5.4. Analysis of samples is to be carried out by a laboratory registered by NATA for these parameters, except for chlorine which can be tested in the field.
  - 5.5. Results are to be submitted in the form of an **Annual Recycled Water Quality Monitoring Report** by **30 September** each year, for the prior financial year period from 1 July to 30 June, to the Minister for Health (c/o Wastewater Management Section, Department for Health and Wellbeing) and must include descriptions of malfunctions and the corrective actions taken to rectify any non-compliances.
  - 5.6. If the recycled water quality does not comply with above criteria, the recycled water supply to the scheme must be stopped immediately. The Minister for Health (C/- Wastewater Management Section, DH) must be informed about all such malfunctions and the measures taken to rectify the problem(s).
6. The system design, installation and operation must prevent contamination of water supplies with wastewater at all times. Backflow prevention devices must be fitted as per AS/NZS 3500.1 and the requirements of the Water Industry Entity and the Office of the Technical Regulator (OTR) by personnel holding appropriate qualifications to ensure all water supplies are protected from cross contamination and must be maintained as per the recommendation of the OTR.
7. The Recycled Water Risk Management Plan may be amended from time to time, subject to agreement from the Department for Health and Wellbeing.

8. With regard to signage:
  - 8.1. The irrigated areas are to be signposted to indicate recycled water is being used for irrigation and it is not suitable for drinking
  - 8.2. Accessible taps, valves and fittings are to be painted purple and/or marked to indicate recycled water - do not drink.
  - 8.3. The recycled water tank must have signage that is visible on all sides using the wording WARNING RECYCLED WATER – NOT FOR DRINKING
9. All employees and others who could potentially be exposed to recycled water are to be instructed in appropriate personal hygiene measures or health and safety procedures pursuant to the *Work Health and Safety Act*.
10. Incidents and emergencies such as flooding and accidental or intentional misuse of recycled water are to be managed by a contingency plan and reported to the relevant authority as necessary.
11. In regards to compliance and inspection:
  - 11.1. Non-compliance with any of the conditions of approval is to be rectified immediately and must be reported as soon as practicable but within one business day by email to the Minister for Health and Wellbeing (c/o Wastewater Management Section, Department for Health and Wellbeing).
  - 11.2. The Department for Health and Wellbeing reserves the right to inspect the system at any time.
12. All extensions, upgrades or modifications to the recycled water system will be subject to a separate application and approval from the Minister for Health and Wellbeing (C/- Wastewater Management Section, DHW).
13. Pursuant to the South Australian Public Health (Wastewater) Regulations 2013, the DHW reserves the right to vary any or all of the approval conditions, and require the repair, replacement, rectification, or alteration of the system or any part thereof should at any time:
  - 13.1. At any time should the supply from the system not comply to the approval conditions listed above; or
  - 13.2. At any time the system is defective and not able to perform the function for which the approval is issued; or
  - 13.3. The system is operated in a manner that is prejudicial to public and environmental health, or causes environmental nuisance

Approved by:

Date: 20 June 2022



Karen Bennink  
Manager, Wastewater Management Section  
Delegate of the Minister for Health and Wellbeing

**References:**

- Nuriootpa Community Waste Water Management Scheme – Recycled Water Reuse Risk Management Plan dated 14 July 2009 by Green Ochre Pty Ltd.
- Information provided by Barossa Infrastructure Limited
- Information provided by the Barossa Council

**Note 1.** The approval does not abrogate responsibilities under other Acts or Regulations to obtain the necessary approvals, permits or licences from other agencies, including but not limited to:

- Environment Protection Authority
- Water Industry Entity
- Department for Environment and Water
- Office of the Technical Regulator
- Department of Primary Industries and Regions SA
- State Planning Commission
- Local Council

**Note 2:** This approval is issued on the basis of information provided by the applicant and Green Ochre Pty Ltd and that operation and maintenance of the scheme once constructed will be carried out by the owner or its agents.

## ANNEXURE 2: AWQC monitoring reports

PO Box 1751      250 Victoria Square  
Adelaide SA 5001      Adelaide SA 5000

Tel: 1300 653 366  
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Barossa Infrastructure Ltd  
ATTN: Simon Schutz  
PO Box 665  
TANUNDA  
SA 5352 AUSTRALIA

28/07/2023

Dear Simon

Please find attached the Final Analytical Report for

**Customer Service Request:** 122622-2023-CSR-2  
**Account:** 122622  
**Project:** AWQC-184092 Barossa Infrastructure Ltd - Routine 23/24

**AWQC Sample Receipt hours are Monday and Tuesday 8:30am to 8pm and Wednesday, Thursday and Friday 8:30am to 4:30pm.**

Yours sincerely,

Corina Smith  
Customer Service Officer  
[Corina.Smith@sawater.com.au](mailto:Corina.Smith@sawater.com.au)



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**FINAL REPORT: 366918**

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This report supersedes the following issued reports: 366804

**Analytical Results**

Sampling Point	92112-Barossa Infrastructure
Sampled Date	14/07/2023 8:07:06AM
Sample Received Date	14/07/2023 8:07:06AM
Sample Analysis Completed	26/07/2023 8:27:31AM
Sample ID	*2023-004-9454
Status	Endorsed
Collection Type	AWQC Collected

Bacteriology	LOR	Result	Test Start Date
<i>Sample temperature at time of receipt NA</i>			
<b>E.coli &amp; Thermotolerant Coliforms T0081-01 WMZ-500(ADEL)</b>			14/07/2023
E.coli		0 cfu/100mL	
Thermotolerant Coliforms		0 cfu/100mL	

Inorganic Chemistry - Metals	LOR	Result	Test Start Date
<i>Sample temperature at time of receipt NA</i>			
<b>Arsenic - Total TIC-006 W09-023(ADEL)</b>			17/07/2023
Arsenic - Total	0.00006	0.00073 mg/L	
<b>Boron - Soluble TIC-006 W09-023(ADEL)</b>			17/07/2023
Boron - Soluble	0.020	0.149 mg/L	
<b>Cadmium - Total TIC-006 W09-023(ADEL)</b>			17/07/2023
Cadmium - Total	0.0001	<0.0001 mg/L	
<b>Calcium TIC-006 W09-023(ADEL)</b>			17/07/2023
Calcium	0.05	37.8 mg/L	
<b>Chromium - Total TIC-006 W09-023(ADEL)</b>			17/07/2023
Chromium - Total	0.0001	0.0003 mg/L	
<b>Iron - Total TIC-006 W09-023(ADEL)</b>			17/07/2023
Iron - Total	0.0005	0.1277 mg/L	
<b>Lead - Total TIC-006 W09-023(ADEL)</b>			17/07/2023
Lead - Total	0.0001	0.0005 mg/L	
<b>Magnesium TIC-006 W09-023(ADEL)</b>			17/07/2023
Magnesium	0.05	31.0 mg/L	
<b>Manganese - Total TIC-006 W09-023(ADEL)</b>			17/07/2023
Manganese - Total	0.0001	0.0329 mg/L	
<b>Potassium TIC-006 W09-023(ADEL)</b>			17/07/2023
Potassium	0.05	29.3 mg/L	
<b>Sodium Adsorption Ratio TMZ-M06 W09-023(ADEL)</b>			14/07/2023
Sodium Adsorption Ratio - Calculation		5.75	



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**Analytical Results**

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Status	Endorsed		
Collection Type	AWQC Collected		

<b>Sodium TIC-006 W09-023(ADEL)</b>			17/07/2023
Sodium	0.1	197 mg/L	
<b>Sulphur TIC-006 W09-023(ADEL)</b>			17/07/2023
Sulphate	0.6	108 mg/L	
Sulphur	0.2	35.9 mg/L	
<b>Total Hardness as CaCO3 TMZ-M06 W09-023(ADEL)</b>			14/07/2023
Total Hardness as CaCO3	2.0	222 mg/L	
<b>Zinc - Total TIC-006 W09-023(ADEL)</b>			17/07/2023
Zinc - Total	0.0003	0.0728 mg/L	

**Inorganic Chemistry - Nutrients**      LOR      **Result**      **Test Start Date**

<i>Sample temperature at time of receipt NA</i>			
<b>Chloride T0104-02 W09-023(ADEL)</b>			20/07/2023
Chloride	4.0	253 mg/L	
<b>Nitrate + Nitrite as N T0161-01 W09-023(ADEL)</b>			25/07/2023
Nitrate + Nitrite as N	0.003	4.32 mg/L	
<b>Nitrogen - Total TMZ-M06 W09-023(ADEL)</b>			14/07/2023
Nitrogen - Total		39.62 mg/L	
<b>Phosphorus - Total T0109-01 W09-023(ADEL)</b>			20/07/2023
Phosphorus - Total	0.005	7.46 mg/L	
<b>TKN as N T0112-01 W09-023(ADEL)</b>			20/07/2023
TKN as Nitrogen	0.05	35.3 mg/L	

**Inorganic Chemistry - Physical**      LOR      **Result**      **Test Start Date**

<i>Sample temperature at time of receipt NA</i>			
<b>Conductivity &amp; Total Dissolved Solids T0016-01 W09-023(ADEL)</b>			18/07/2023
Conductivity	2	1680 µS/cm	
Note		Conductivity measurement is corrected to 25°C	
Total Dissolved Solids (by EC)	1	605 mg/L	
<b>pH T0010-01 W09-023(ADEL)</b>			18/07/2023



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Status	Endorsed
Collection Type	AWQC Collected

pH T0010-01 W09-023(ADEL)			16/07/2023
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pH		7.3 pH units	
Temperature at which pH is measured		21.9 °C	

Turbidity T0018-01 W09-023(ADEL)			17/07/2023
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Turbidity	0.1	14 NTU	
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Sampling	LOR	Result	Test Start Date
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Sample temperature at time of receipt NA

Chlorine T0012-01 W09-023(ADEL)			14/07/2023
---------------------------------	--	--	------------

Chlorine - Free	0.1	<0.1 mg/L	
Chlorine - Total	0.1	<0.1 mg/L	
Monochloramine	0.1	<0.1 mg/L	

Inorganic Chemistry - Waste Water	LOR	Result	Test Start Date
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Sample temperature at time of receipt NA

Biochemical Oxygen Demand - Total T0153-01 W09-023(ADEL)			14/07/2023
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Biochemical Oxygen Demand	2	18 mg/L	
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Suspended Solids T0160-01 W09-023(ADEL)			17/07/2023
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Suspended Solids	1.0	32 mg/L	
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**AWQC Signatories**

Dzung Bui - Supervisor Metals and Physical  
Ivana Cech - Technical Officer Chemistry  
Thuy Diep - Technical Officer Chemistry  
Andrew Ford - Acting Method Development Specialist  
Kerrie Jooste - Manager Chemistry Services  
John Martini - Method Development Specialist  
Chad Major - Supervisor Field Services  
Melissa Phillips - Technical Officer Chemistry  
Gayle Polley - Supervisor Nutrients and Waste  
Saiful Talukder - Technical Officer Chemistry  
Lisa Teakle - Senior Technical Officer Bacteriology & Molecular Testing



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**Incidents**

Sample ID	S.Point	Description	Sampled Date	Analysis (where Applicable)	Incident Description
2023-004-9454	92112	Barossa Infrastructure	14/07/2023	Turbidity	Test not processed within holding time
2023-004-9454	92112	Barossa Infrastructure	14/07/2023	pH	Test not processed within holding time
2023-004-9455	84513	Barossa Infrastructure Ltd - Fromms Square Williamstown	14/07/2023	Turbidity	Test not processed within holding time
2023-004-9455	84513	Barossa Infrastructure Ltd - Fromms Square Williamstown	14/07/2023	pH	Test not processed within holding time
2023-004-9455	84513	Barossa Infrastructure Ltd - Fromms Square Williamstown	14/07/2023	Ammonia as N	Dependent results are within acceptable analytical uncertainty

**Analytical Method**

Analytical Method Code	Description	Reference Method
T0010-01	Determination of pH	AP4500HB
T0012-01	Chlorine by classical and portable meter (field test)	AP4500CLF
T0016-01	Determination of Conductivity - Corrected to 25C	AP2510B
T0018-01	Turbidity - Nephelometric Measurement	APAWWA-WEF
T0050-01	Trihalomethanes	IH
T0081-01	E. coli - Membrane filtration	USEPA1604_1H
T0100-01	Ammonia/Ammonium - Automated Flow Colorimetry	AP4500NH3G
T0101-01	Alkalinity - Automated Acidimetric Titration	AP2320B
T0104-02	Chloride - Discrete Analyser	AP4500CLE
T0109-01	Phosphorus - total by discrete analyser	AP4500PF
T0112-01	Nitrogen- Total Kjeldahl by discrete analyser	AP4500NORGA
T0153-01	Biochemical Oxygen Demand	AP5210B
T0160-01	Suspended Solids 103C to 105C	AP4500
T0161-01	Nitrate + Nitrite (NOx) - Automated Flow Colorimetry	AP4500NO3I
T0800-01	Nitrogen and Phosphorous Containing Pesticides	USEPA507
TIC-006	Elemental Analysis By ICP- MS	EPA200.8
TMZ-M06	Derived Results and Data Checks	
TMZ-M06	Derived Results and Data Checks	AP4500NORGA
TMZ-M06	Derived Results and Data Checks	APHA2340B
W-052	Preparation of Samples for Metal Analysis	AP3030AD



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**Sampling Method**

Sampling Method Code	Description
W09-023	Sampling Method for Chemical Analyses
WMZ-500	Sampling Method for Microbiological Analyses

**Sampling point and date sampled are provided when collected by customers. Validity of results are based on information and samples supplied by customers. Unless it is reported that sampling has been performed by AWQC, the samples have been analysed as received.**

**Laboratory Information**

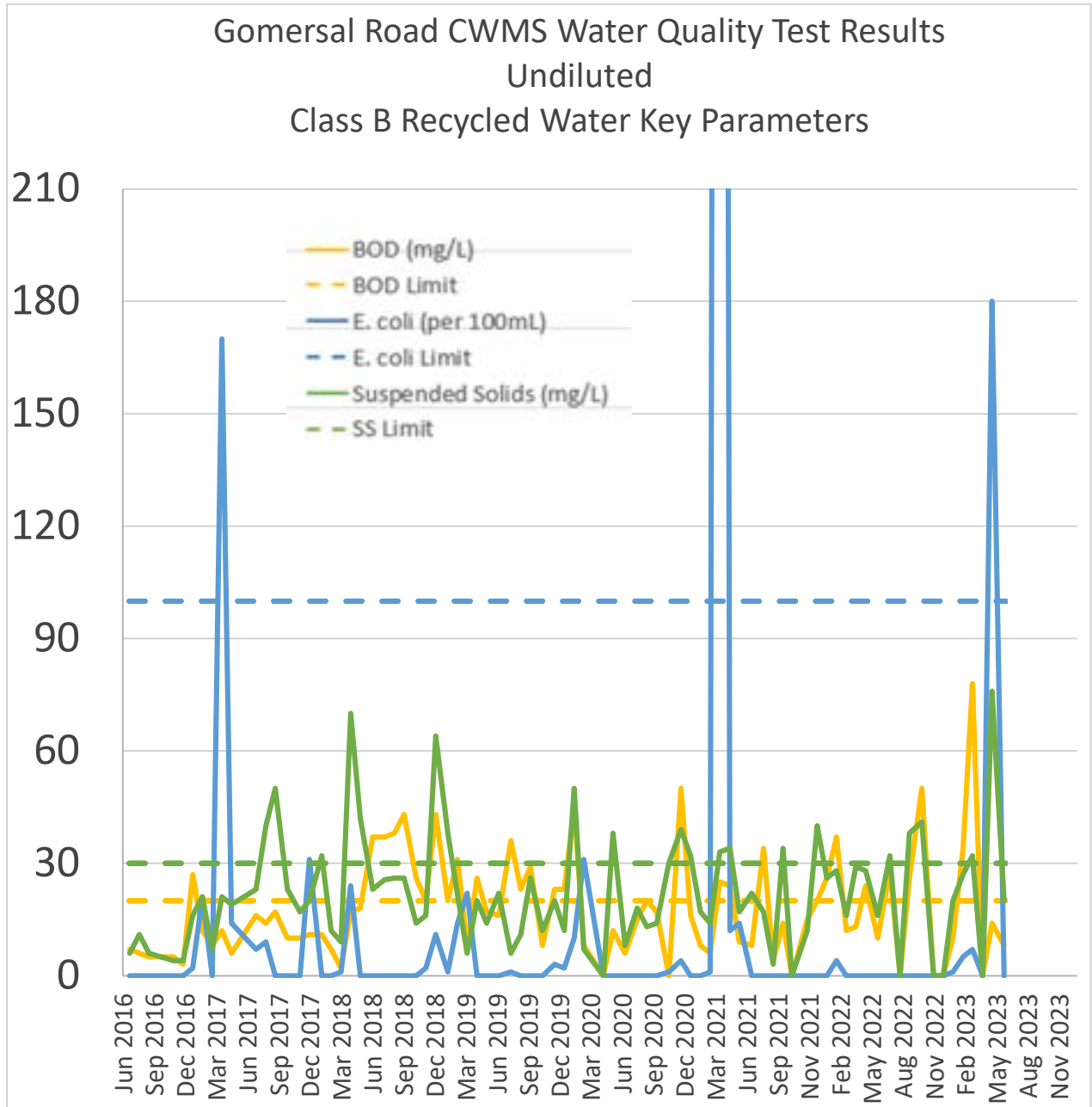
Laboratory	NATA accreditation ID
Inorganic Chemistry - Physical	1115
Inorganic Chemistry - Waste Water	1115
Sampling	1115
Inorganic Chemistry - Nutrients	1115
Organic Chemistry	1115
Bacteriology	1115
Inorganic Chemistry - Metals	1115

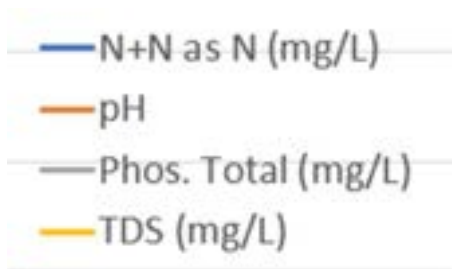
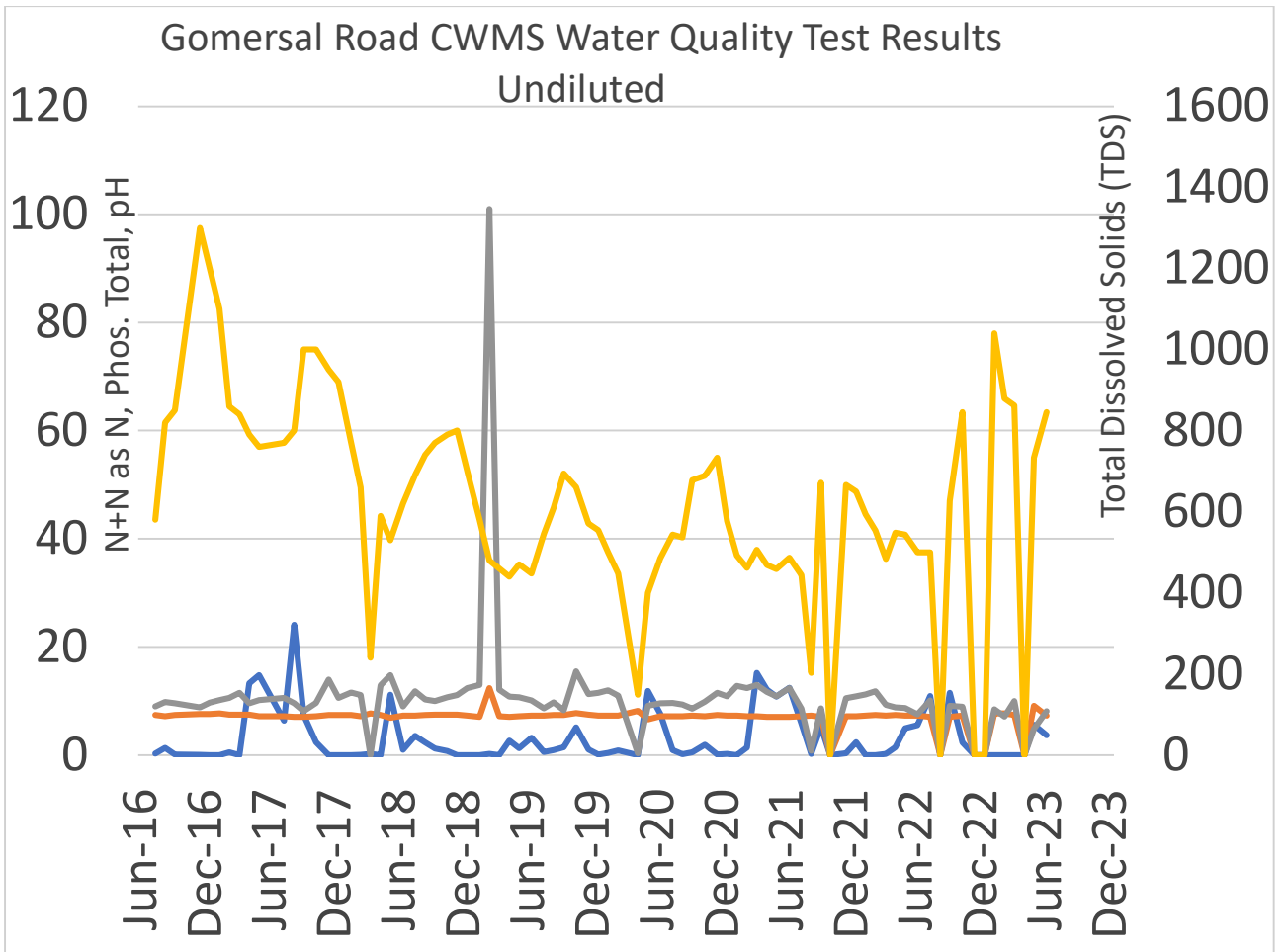


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- Notes**
1. The last figure of the result value is a significant figure.
  2. If determination of the component is not covered by NATA Accreditation.
  3. \* indicates result is out of specification according to the reference guideline. Refer to report footer.
  4. † indicates an incident has been recorded against the sample. Refer to report footer.
  5. & indicates the results have changed since the last issued report.
  6. Where a result is required to meet compliance limits the associated measurement uncertainty must be considered. Measurement uncertainty is guideline at [www.awqc.com.au/our-services/field-labouratory-services-and-analysis/measurements-uncertainty](http://www.awqc.com.au/our-services/field-labouratory-services-and-analysis/measurements-uncertainty).
  7. Uncertainty of Measurement is reported with a coverage factor of 2 providing approximately 95% confidence interval.
  8. The Limit of Reporting (LOR) is the lowest concentration of analyte which is reported at the AWQC and is based on the LOQ rounded up to a more readily used value. The Limit of Quantitation (LOQ) is the lowest concentration of analyte for which quantitative results may be obtained within a specified degree of confidence.
  9. Where collection type is AWQC Collect, NATA has confirmed that due to a robust system in place for maintaining the temperature integrity for samples collected by AWQC's Field Laboratory Services, the recording of temperature when samples arrive at the AWQC is out of scope.
  10. If pH has been tested then the pH will be outside of its holding time unless measured in the field.
  11. (ADEL) indicates analysed in Adelaide, (MELB) indicates analysed in Melbourne.
  12. AWQC Melbourne Laboratory are only NATA accredited for sampling of potable waters by inhouse method W09-023.

ANNEXURE 3: Some charts showing the water quality test results







ANNEXURE 4: Pictures of the properties taken on the day of site visits













