

# Barossa Infrastructure Limited

## Gomersal Recycled Water Reuse Scheme

### Audit Report (2014/15)

23 September 2015

Produced for Barossa Infrastructure Limited  
By Seed Consulting Services Pty Ltd

***Commercial in Confidence***

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## Document Control

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# 1. Introduction & Background

Seed Consulting Services (Seed) was engaged to undertake an independent review (audit) of the management of the Barossa Infrastructure Limited (BIL) Wastewater Reuse Scheme for the 2014/15 year.

The operation of the wastewater reuse scheme was approved by Department of Health in August 2009 (approval number 2009-7292).

The approval was subject to 8 conditions of operation, including that:

- The Risk Management Plan and operating procedures are maintained onsite for use by the system operator/maintenance personnel,
- Irrigation is by 'drip' irrigation only, and that properties using the recycled water display appropriate signage, ensure there is no runoff, fence dams and paint exposed pipework lilac, and
- Water quality parameters must not exceed certain criteria, including limits set for BOD, suspended solids, coliforms, and chlorine content.

These conditions have been considered in the audit, however it should be noted that a thorough inspection and assessment for each private user of the wastewater has not been carried out; only general consultation and observations has been undertaken.

This report provides a summary of volumes of wastewater supplied under the Wastewater Reuse Scheme and water quality parameters for the operational period of the 2014/15 financial year.

## 2. Recycled Water Supplied to Users

BIL customers generally are supplied with water transported from the River Murray via the Warren Reservoir by SA Water (raw water). BIL customers in the Gomersal area received a total of approximately 2,109.2 ML of irrigation water made up of 1,838.4 ML of raw water and 270.8 ML of treated effluent water from the Nuriootpa Wastewater Treatment Plant. Therefore treated water made up on average 14.7% of all irrigation water delivered to BIL Gomersal Road customers.

A comparison of the total volume of water supplied versus the volume of treated effluent is provided in Table 1.

**Table 1:** Monthly Supply of Water to Gomersal Road BIL Customers

Month	Total BIL (ML)	Treated Effluent Volume (ML)	% of Treated Effluent
July 2014	5.03	22.2	81.5
August	4.51	24.1	84.2
September	91.0	24.0	20.9
October	288.0	22.0	7.1
November	240.0	19.6	7.6
December	389.0	22.9	5.6
January 2015	286.0	21.4	7.0
February	321.0	21.7	6.3
March	77.9	18.4	19.1
April	14.0	19.0	57.6
May	33.0	19.0	36.5
June 2015	44.0	16.5	27.3
<b>Total</b>	<b>1793.44</b>	<b>250.80</b>	

During 2014 a change in property management occurred with one key BIL customer. BIL and its operator (Infrastructure Maintenance Services) worked with the customer to ensure that managers were fully aware of the operational requirements of the BIL scheme during recycled water delivery periods, including on-site storage and management of recycled water.

## 3. Water Quality Parameters

The following section provides a summary of the water quality parameters considered in our review and is sourced from data provided by Barossa Council and BIL. All analysis was conducted at the Australian Water Quality Centre (NATA certified).

Table 2 provides a summary of the water quality parameters for the Wastewater Reuse Scheme for the 2014/15 financial year.

No odour or algae issues were reported in the 2014/15 year.

BIL can supply irrigation water in the Gomersal area so long as the water quality limits, detailed in Department of Health approval number 2009-7292 are met. These are summarised below:

- A mean BOD not greater than 20 mg/L
- A mean suspended solids not greater than 30 mg/L
- A median E. coli not greater than 100/100 mL
- A mean total Chlorine not less than 1 mg/L

### 3.1 Water Quality Results Collected by Barossa Council

The Barossa Council collects water samples for analysis from the Nuriootpa Community Wastewater Treatment Plant final lagoon, prior to the connection point to the BIL scheme.

Given there is additional dilution of the treated wastewater once connected into the Gomersal main, the Barossa Council test results are considered the worst case scenario for water quality.

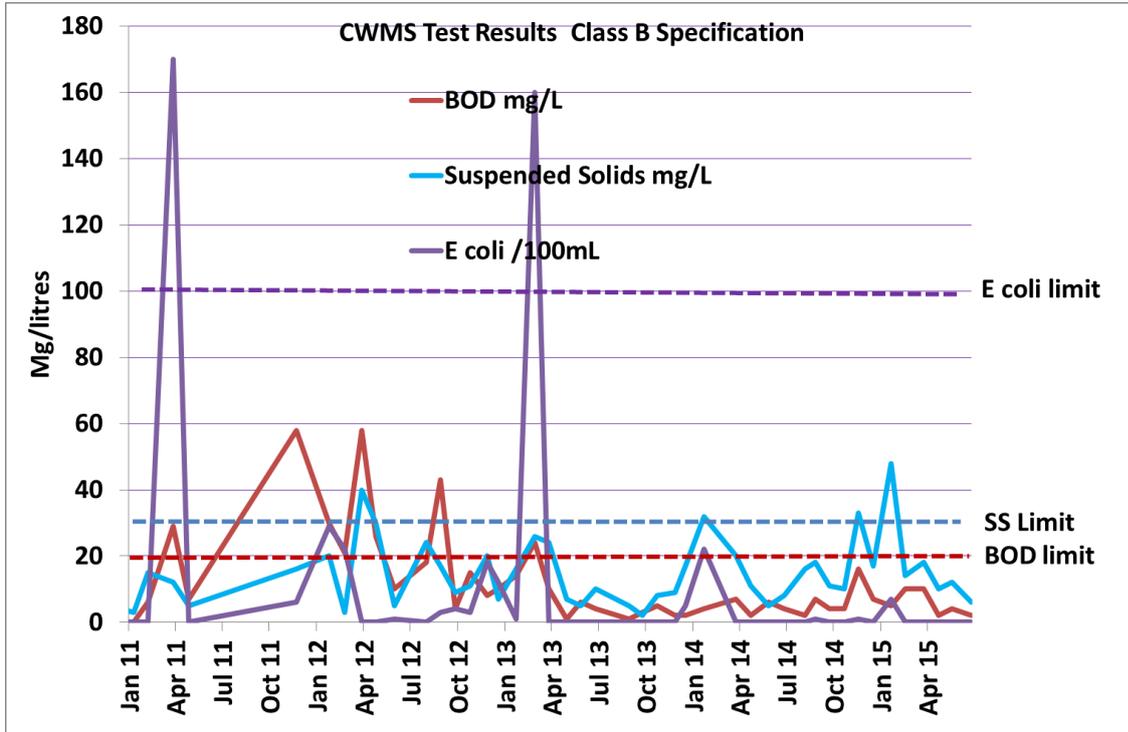
The Barossa Council took samples on a monthly basis. A summary of the test results for water quality parameters required to be met under the SA Health approval is provided in Table 2. Several parameters and associated limits are also illustrated in figure 1 and figure 2.

Full laboratory test results were not provided but a detailed summary spreadsheet of the test results is provided in Appendix A. Barossa Council also tested other parameters (i.e. metals), which are provided in Appendix A.

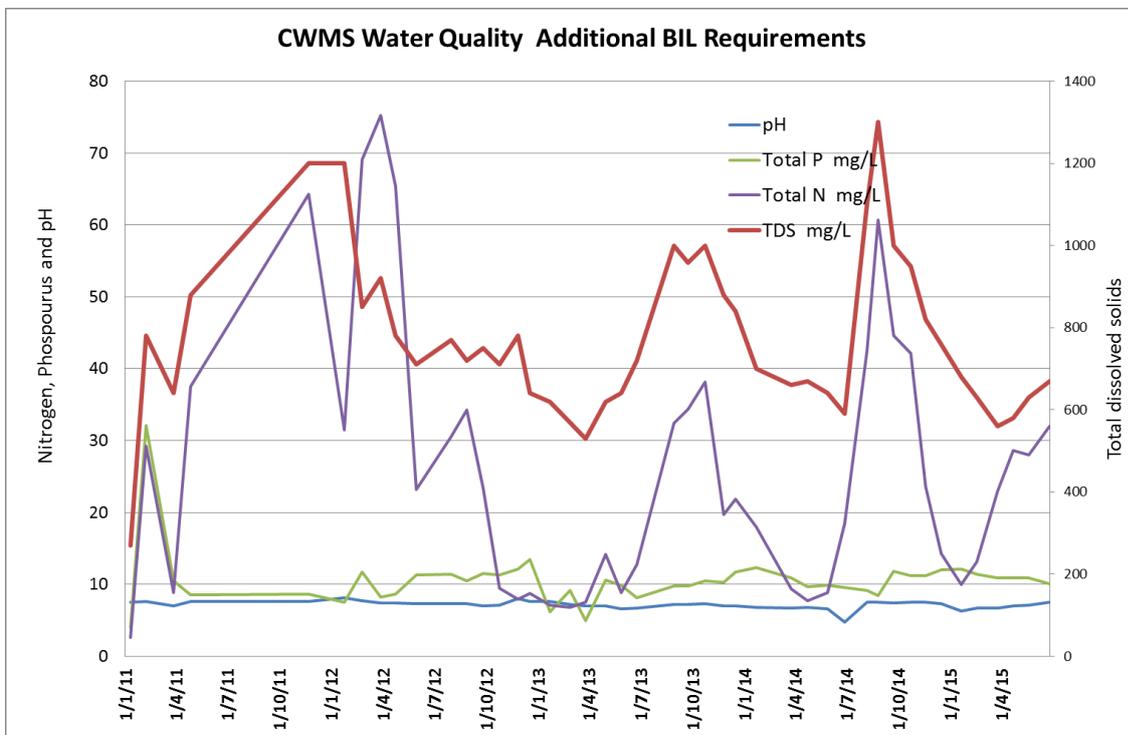
**Table 2:** Summary Water Quality Test Results applicable to SA Health approval (Nuriootpa Wastewater Treatment Plant, Final lagoon)

<b>Water Quality Parameters</b>							
<b>Testing date</b>	<b>BOD (mg/L)</b>	<b>Suspended Solids (mg/L)</b>	<b>E. coli (count per 100mL)</b>	<b>Free Chlorine (mg/L)<sup>1</sup></b>	<b>TDS (mg/L)</b>	<b>Total N (mg/L)</b>	<b>Total P (mg/L)</b>
June 2014	4	8	0	1	590	40.7	9.6
July	NA	NA	NA	NA	NA	NA	NA
August	2	16	0	<1	1100	37.1	9.2
August	7	18	1	<1	1300	54.1	8.4
September	4	11	0	<1	1000	44.6	11.8
October	4	10	0	<1	950	40.7	11.2
November	16	33	1	1	820	28.0	11.2
December	7	17	0	1	760	25.4	12
January 2015	5	48	7	<1	680	45.1	12.1
February	10	14	0	<1	630	38.5	11.4
March	10	18	0	<1	560	48.6	10.9
April	2	10	0	<1	580	25.7	10.9
May	4	12	0	<1	630	41.9	10.9
June	2	6	0	<1	670	40.3	10.1
<b>Mean / Median</b>	5.9	17	0				
<b>Limits and Trigger Values</b>	<b>20 mg/L</b> (SA Health Limit)	<b>30 mg/L</b> (SA Health Limit)	<b>100</b> (SA Health Limit)	<b>1.0 mg/L</b> (SA Health Limit)	<b>1,450 mg/L</b> (Risk Plan Trigger)		

<sup>1</sup> Free chlorine average unable to be determined as data only provided in 1 or >1 format



**Figure 1.** CWMS BOD, Suspended Solids, and E coli test results and limits



**Figure 2.** CWMS pH, Total P, Total N, and TDS test results

## 3.2 Summary of Water Quality Analysis

### 3.2.1. BOD, Suspended Solids and E. coli

*The mean BOD and suspended solids and median E. coli levels did not exceed the SA Health approval limits.*

The BOD water quality parameter supplied by Barossa Council did not exceed the SA Health approval limit of 20 mg/L for this reporting period.

The suspended solids count did exceed the SA Health approval limit in November 2014 and January 2015 with measurements of 33 and 48 mg/L respectively. However, after dilution with BIL raw water (the major component of water in the system at this time of the year – see Table 1) is not likely to present any risk in relation to the water reuse scheme. On average the water quality parameter was not exceeded for this reporting period (SA Health limit 30 mg/L).

The E. coli count did not exceed the SA Health approval limits at any time during the reporting period.

### 3.2.2. Chlorine

*Higher chlorination levels would be required to satisfy the SA Health approval criteria.*

Barossa Council operated a chlorine dose trimming system throughout the last financial year. As shown in Table 2, SA Health's minimum level of free chlorine (1.0mg/L) was only achieved in three of the 14 months measured. This is an ongoing variance to the SA Health approved criteria. However, considering the E. coli count is well below SA Health's limits, and the costs to Barossa Council in increasing chlorination rates to satisfy this approval criteria, it is considered that this variance does not present a significant risk and should be reviewed in future approvals.

### 3.2.3 Salinity

*The salinity trigger point specified in the Risk Plan was not reached.*

The Risk Management Plan operated by BIL specifies that salinity testing will be required downstream of the point of injection if salinity in the Council operated final lagoon exceeds 1,450 mg/L. The test results supplied by Barossa Council indicate that the trigger point of 1,450 mg/L was not reached during the assessment period (see Table 2).

### 3.2.3. Heavy Metals

*Future reporting of Heavy Metals may assist some growers with company and/or product reporting.*

Future commentary on the analysis of heavy metals testing (included in The Barossa Council test results, see Appendix) may assist BIL customers in reporting on use of recycled water, with within their own companies or to external consumers. It is intended that this approach be recommended for future audit reports.

## 4. Recommendations

The independent review of the management of the Barossa Infrastructure Limited (BIL) Wastewater Reuse Scheme for the 2014/15 year, has identified that on average all water quality parameters and requirements are within the required limits.

In order to ensure ongoing compliance with the Department of Health and Barossa Infrastructure Limited (BIL) Wastewater Reuse Scheme requirements and conditions, the following is recommended:

- Review the Wastewater Irrigation Management Plan(s) to ensure their currency and applicability is maintained. There was a requirement of the RMP and WIMP to undertake a review after 5 years of program implementation (2009).
- Review and confirm the currency of the Risk Management Plan, in association with the WIMP(s), in order to ensure operating procedures are maintained and being used onsite by the system operator/maintenance personnel.
- Review wastewater scheme operations and related landownership to ensure the requirements of the WIMP and RMP are met, including consultation and communication as appropriate.
- Ongoing water quality monitoring to ensure the SA Health criteria are not exceeded, including limits set for BOD, suspended solids, coliforms, and chlorine content.
- That BIL report review and report heavy metals as part of the annual audit such that BIL customers can satisfy company and industry requirements regarding use of recycled water.

We recommend that the review period actions be implemented within six months of this report to enable any changes to the RMP and WIMP's to be adopted prior to 2015/16 audit reporting.

# Appendix

## Barossa Council Monthly Water Quality Test Results

APPENDIX A. Summary of Barossa Council water quality testing results 2014/15.

CWMS Test Results

Date	pH Units	TDS mg/L	BOD mg/L	Conductivity uScm <1000 after dilution with BIL	SS mg/L	Ca mg/L	Mg mg/L	SAR mg/L	Date	Sodium mg/L	N + N as N mg/L	Nitrate as N mg/L	Nitrite as N mg/L	Ammonia as N mg/L	COD mg/L	Oil & Grease mg/L	Total P mg/L	Date	TKN as N mg/L	E.coli 100ml	
BIL Spec and Class B									BIL Spec and Class B									BIL Spec and Class B		Total <15 average	
6.5-8.5																		<15 average		<100	
6/08/14	7.5	1100	2	2070	16	40.5	35.8	7.07	6/08/14	256	4.34	4.02	0.318	32.8	139	1	9.2	6/08/14	42.5	0	
26/08/14	7.5	1300	7	2340	18	39.7	37.1	6.69	26/08/14	244	0.75	0.62	0.135	53.3	85	1	8.4	26/08/14	60.7	1	
23/09/14	7.4	1000	4	1890	11	33.3	30.5	6.69	23/09/14	222	8.62	8.51	0.111	36	96	1	11.8	23/09/14	44.6	0	
22/10/14	7.5	950	4	1720	10	35.4	28.8	6.5	22/10/14	215	5.79	5.58	0.214	34.9	68	<1	11.2	22/10/14	42.1	0	
18/11/14	7.5	820	16	1490	33	33.3	24.7	6.11	18/11/14	191	9.68	9.48	0.196	18.3	70	3	11.2	18/11/14	23.6	1	
16/12/14	7.3	760	7	1380	17	32.9	23.1	5.82	16/12/14	178	15.6	15.4	0.218	9.83	86	1	12	16/12/14	14.3	0	
20/01/15	6.3	680	5	1230	48	31.5	19.3	5.23	20/01/15	151	39.4	39.4	0.1	5.59	107	1	12.1	20/01/15	9.99	7	
17/02/15	6.7	630	10	1140	14	27.5	15.5	5.33	17/02/15	141	28.1	28.1	0.1	10.3	56	1	11.4	17/02/15	13.2	0	
25/03/15	6.7	560	10	1020	18	23.6	12	5.06	25/03/15	121	33	33	0.1	15.5	123	1	10.9	25/03/15	23	0	
22/04/15	7	580	2	1050	10	21.8	11.3	4.63	22/04/15	107	3.17	2.95	0.217	22.5	83	1	10.9	22/04/15	28.6	0	
19/05/15	7.1	630	4	1140	12	23.8	13.9	5.12	19/05/15	127	17.8	17.8	0.1	24	171	2	10.9	19/05/15	28	0	
25/06/15	7.5	670	2	1210	6	23.9	15.9	5.41	25/06/15	139	11.7	11.6	0.142	28.6	61	2	10.1	25/06/15	32	0	