Coleambally IRRIGATION

Annual Compliance Report 2019

CONTENTS

Statement of Compliance

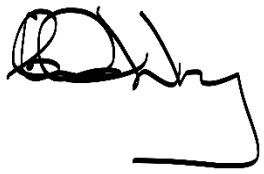
The Annual Compliance Report 2018/19 is provided to meet the reporting requirements of Coleambally Irrigation Co-operative Limited (CICL) against operating licences–

1. Combined Water Supply Work Approval and Water Use Approval 40CA401473 (Murrumbidgee regulated river water source) and Combined Water Supply Work Approval and Water Use Approvals for Groundwater extraction 40CA403808 and 40WA404593; and
2. Environment Protection Licence No 4652.

I am pleased to advise that from 1st July 2018 to 30th June 2019, CICL has complied with all monitoring and reporting requirements of the:

- Combined Water Supply Work Approval and Water Use Approval 40CA401473, including the CICL Monitoring and Reporting Plan dated 16th March 2018
- Groundwater Works Approvals 40CA403808 and 40WA404593; and
- Environment Protection Licence EPL 4652.

To the best of my knowledge the information presented in this report is certified as being complete, true and accurate.



Clifford Ashby

Chief Executive Officer

Compliance Conditions

Groundwater Approval 40CA403808 & 40WA404593				
Condition	**Condition No**	**Compliant**	**ACR Reference**	**Comment**
Measurement & reporting of annual volume and water quality	10 &11	✓	Section 4 & Appendix 2, 4	WaterNSW owned compliant meters. Water quality measured periodically with a hand held meter.
Measure Volume extracted and not to exceed extraction limit	18		Section 3.6.1.1 & Section 3.3.3	Compliant meters and extraction volumes within limits
Notification and reporting of non-compliant events	NS07184		Section 3.3.3	Exceedance of Hort Bore Extraction limit
Regulated River Works and Water Use Approval No 40CA401473				
Install, maintain and operate an approved metering device at licenced extraction point	5	✓	Appendix 5	CICL operate a high accuracy meter with a secondary meter as a backup, meeting the requirements of clause 237 (3) of the WM (General) Regulation 2018 requirements
Demonstrate that the meter is accurate to NSW Standards and validated by a certified person	6	✓	Appendix 5	Validated monthly by a Certified Practising Hydrographer
Advise WaterNSW if meter fails	7	✓	Section 3.6.1	Meter remained functional and accurate
Provide details of – ▪ Quantity of water extracted ▪ Water delivery infrastructure ▪ Cropping details	8	✓	Section 3.3.3 & Appendix 2 and 3 Crop areas and water use – Table 3.14 & 3.15	Volume extracted measured with accurate meter. Crop areas are estimates provided by farmers at commencement of irrigation season
Modification or construction of works for discharge of water	9	✓	n/a	No modification or construction of works
Notification of reportable event	10	✓	Table 7.4	Reported to WaterNSW and downstream users
Submission of Annual Compliance Report	11	✓	As submitted	As submitted
CICL Monitoring and Reporting Plan for Combined Approval 40CA401473				
Plan of operations and works	2.1 & 2.2	✓	Figure 2.2	CICL Works have remained unchanged for 2018/19
Statement of compliance	2.3	✓	Page 3	Monitoring and Reporting Plan dated 16th March 2018

Condition	Condition No	Compliant	ACR Reference	Comment
Presentation of data and analysis	2.4 – 2.8	✓	Section 3	Printed summary of all data provided in Appendices and a digital copy emailed
Advise of any new measure implemented to limit groundwater recharge and salt discharge	2.9	✓	Section 3.6.6	No new measures implemented
Reporting on works	2.10 – 2.13	✓	Section 3 & 4	ACR reports – Volume extracted, all water discharges and deliveries, water balance and cropping areas
Reporting on salinity and salt load	2.14 – 2.16	✓	Section 5	Report covers salinity and salt load.
Reporting on groundwater conditions	2.17	✓	Section 6 & Appendix 3	Annual September measurement included in report
QA of monitoring and reporting	3	✓	n/a	QA standards applied through calibration and validation
Reporting of noxious aquatic weeds and blue green algae	5 & 6	✓	n/a	There were no noxious aquatic weeds or blue green algae events
Monitoring and reporting of all discharge points	Attachment	✓	Section 3 & Appendix 2	Report covers flow and salinity from all licence points
Monitoring and reporting of groundwater	Attachment	✓	Section 6 & Appendix 1	Report & Attachments cover all piezometer levels and reports changes and trends.

EPA Operating and Reporting Requirements				
Condition	**Section**	**Compliant**	**ACR Reference**	**Comment**
Report on licenced discharge points flow	Sect 2 P1.1 – P1.2	✓	Section 3 and Appendix 2	CODW, DC800A, CCD, CODO, Continuous Flow
Monitoring & Recording Conditions				
Monitor concentrations of pollutants & EC discharged	M2.1 – 2.5	✓	Section 3 & Appendix 4	Routine and event sampling undertaken to meet licence requirements
Environmental Monitoring	M4	✓	Section 7.2	Completed in accordance to specified requirements M4
Continuous recording of flow at licenced discharge points	M7	✓	Appendix 2	Completed

1 Executive Summary

The 2018/19 season commenced with a general security allocation of 3% that plateaued at 7% by mid-September (within the summer planting window). Rainfall totals in the district were below average with 242.2mm recorded for the year which is 157.5mm below the Coleambally long term average (LTA) of 396.5mm. The total evaporation for 2018/19 was 2,111.5mm which was higher than the LTA of 1,741.4mm. This seasonal weather pattern had a negative impact on water allocation and cropping programs.

Rainfall and evaporation data is taken from the CICL 'Depot' Bureau of Meteorology daily read weather station (074249).

The area under cropping in Coleambally Irrigation Area (CIA) was 28,084 ha, compared to 34,540 ha in 2017/18. A low allocation season, coupled with an increase in demand for water allocation on the temporary market, has seen cotton and maize supplant rice as the dominant crops grown in the area. With a total area of only 236 ha sown, rice cropping has fallen to its lowest levels since 2007/08 season which was heavily impacted by the millennium drought.

Table 1.1 Crop Areas, Intensity, ML Total and % of Total Use 2018/19

Crop	Area (Ha)	Intensity (ML/Ha)	Total ML	% Total Use
Rice	236	14.1	3,329	3.2
Wheat	7,541	1.5	11,444	11.0
Cotton	3,641	11.4	41,408	39.8
Corn	2,252	11.1	25,074	24.1
Pasture	3,945	2.4	9,468	9.1
Other	7,928	1.0	7,698	7.4
Canola	1,115	2.1	2,289	2.2
Barley	859	2.3	1,977	1.9
Oats	567	2.4	1,353	1.3
TOTAL	**28,084**		**104,040**	**100**

Note: the above cropped areas are based on customer supplied pre-season crop planning estimates. The quality of this data is assessed and controlled by CICL however the figures presented should only be viewed as an estimate.

The key water statistics for the year 2018/19, for the purpose of comparison, are indicated in the following table:

Table 1.2 Water Usage in Coleambally Irrigation Area of Operations

Key Statistics	2018/19	2017/18	2016/17
Final Allocation	7%	45%	100%
Metered usage to customers	104,040 ML	263,634 ML	323,341 ML
Net channel losses	19,442 ML	11,933 ML	11,900 ML
Groundwater usage within Area of Operations	129,734 ML	139,535 ML	102,043 ML

The area of CIA where the shallow water table is within two metres of the surface reduced again to one of the lowest recorded areas since the end of the millennium drought. This year the total area where the water table was within two metres of the surface is 101 ha, as compared to 470 ha in 2018.

There was one reportable water quality incident in 2018/19 involving the detection of chemical residue (Diazinon) at a licenced discharge point (DC800A). The level indicated 0.011µg/l which was 0.001µg/l over notification level.

2 Plans of the Area of Operations, Authorised Works and Monitoring Sites

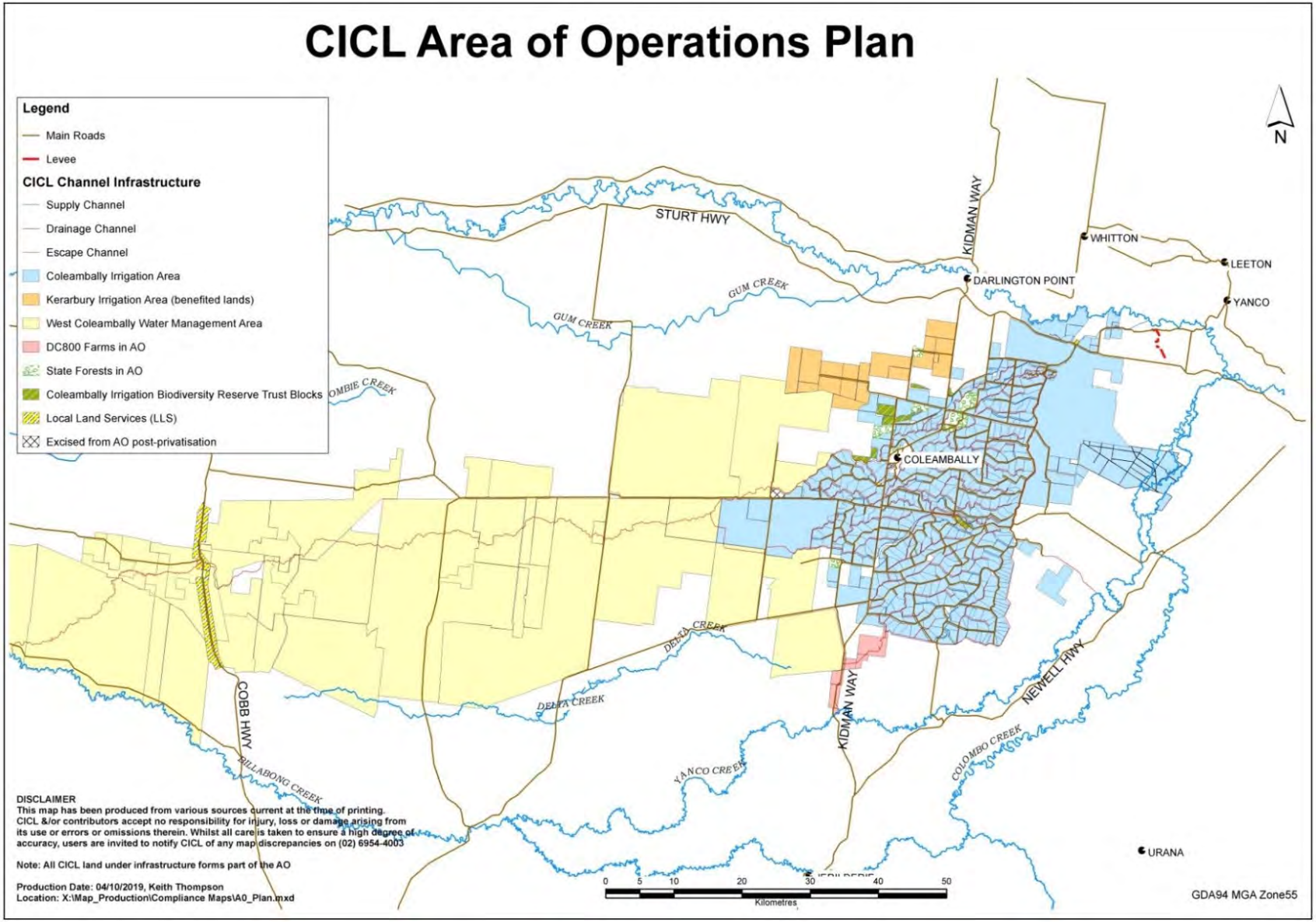
To comply with condition 2.1 and 2.2 of CICL's Monitoring and Reporting Plan the following section is provided.

2.1 Coleambally Irrigation Area of Operations

The Coleambally Irrigation Area of Operations (AO) is located south of Griffith between the towns of Darlington Point and Jerilderie, New South Wales in the southern Murray-Darling Basin of Australia as depicted in Figure 2.1.

From the 1 July 2018 to the 30 June 2019 there were no requests made to the Minister to include or exclude land from the AO.

Figure 2.1 Current Area of Operations of CICL including benefited lands.[1] (See attached Appendix 6 for higher level of detail)



[1] The term "benefited lands" is given to land that receives a benefit from our licence and/or licenced works but which are not defined as being within the AO.

2.2 Plans of Works and Monitoring Sites

Figure 2.2 shows the location of Approved Works. The Combined Approval and the groundwater work approvals 40CA403808 and 40WA404593 issued by the NSW DPI Water include three water extraction works, namely: Coleambally Main Canal Off-take, Col Bore and Hort Bore.

The Combined Approval also includes three drainage discharge points; CCD on the Coleambally Catchment Drain, DC800A on Drainage Channel 800, and CODD at Bundy on the West Coleambally Channel. One additional monitoring point has also been approved - CODA, on the West Coleambally Channel. The CODA monitoring point is used in conjunction with CICL's Rice Chemical Monitoring Program in lieu of CODD due to CODA's closer proximity to Coleambally.

Figure 2.2 also shows the location of the Kerarbury Channel Off-take Regulator, which supplies water to the benefitted lands of the Kerarbury Irrigation District.

A total of 737 piezometers are located across the AO to monitor groundwater levels in the shallow Shepparton Formation aquifer. The distribution of piezometers across the AO is shown in Figure 2.3.

The following table indicates where data contained in this report is derived from. In order to provide the most accurate data possible the source with the highest accuracy is used. All data sources are provided in electronic form if not presented in this report.

Table 2.1 Site Name and Data Source comparison

NSW DPI- Hydrometrics site number	NSW DPI- Water Licenced Site	NSW EPA Licenced Site	ACR Data Source Comment
410110	CODA	CODWonga	Salinity from CODA (410110) Flow from CODWonga (FlumeGate)
410108	DC800A	DC800A	Salinity and Flow from DC800A (410108)
410191	CCD	CCD	Salinity from CCD (410191) Flow from CCD Escape (FlumeGate)
410133	CODD	CODOaklands	Salinity from CODD (410133) Flow from CODOaklands (FlumeGate)

Figure 2.2 CICL Works Plan

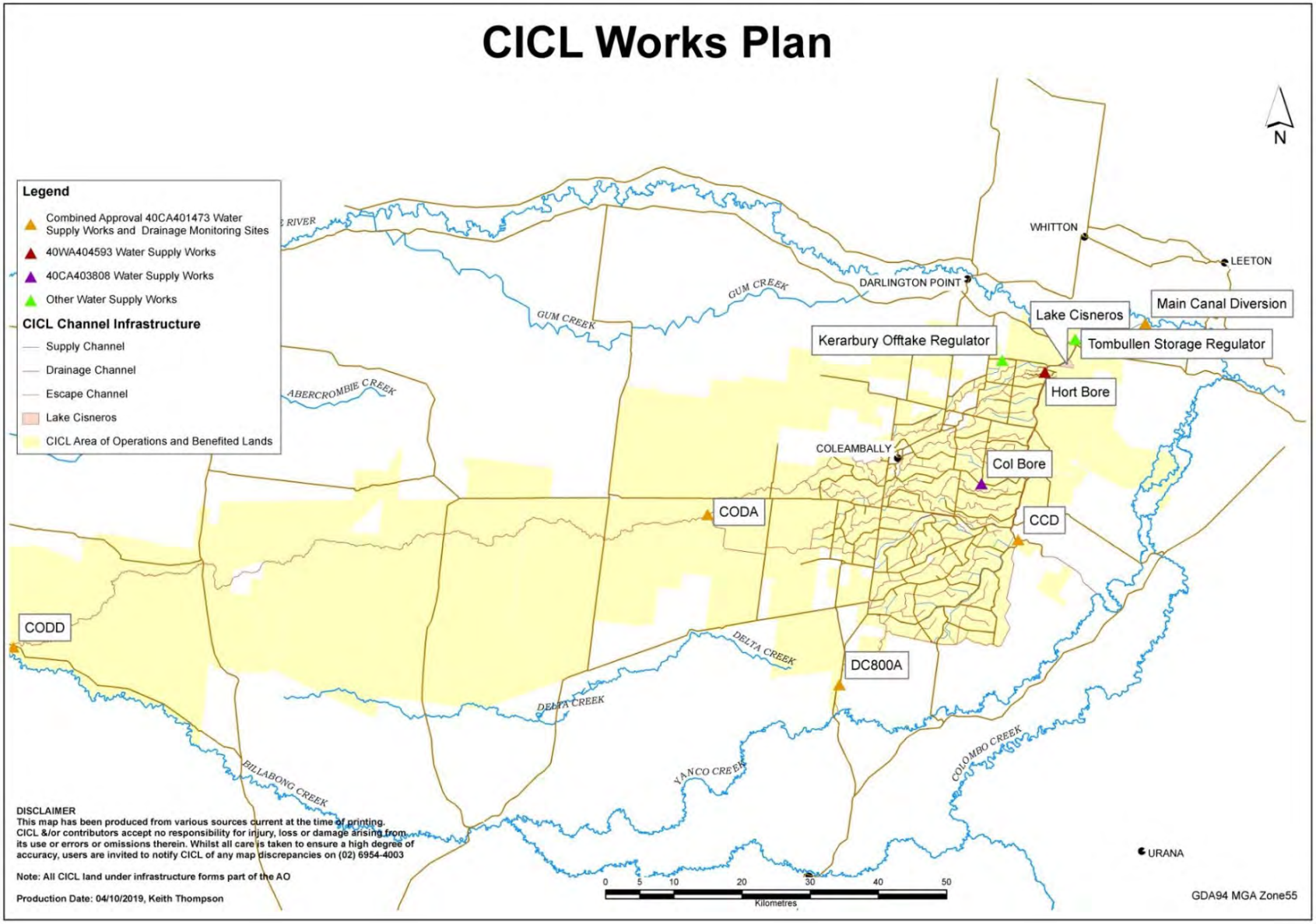
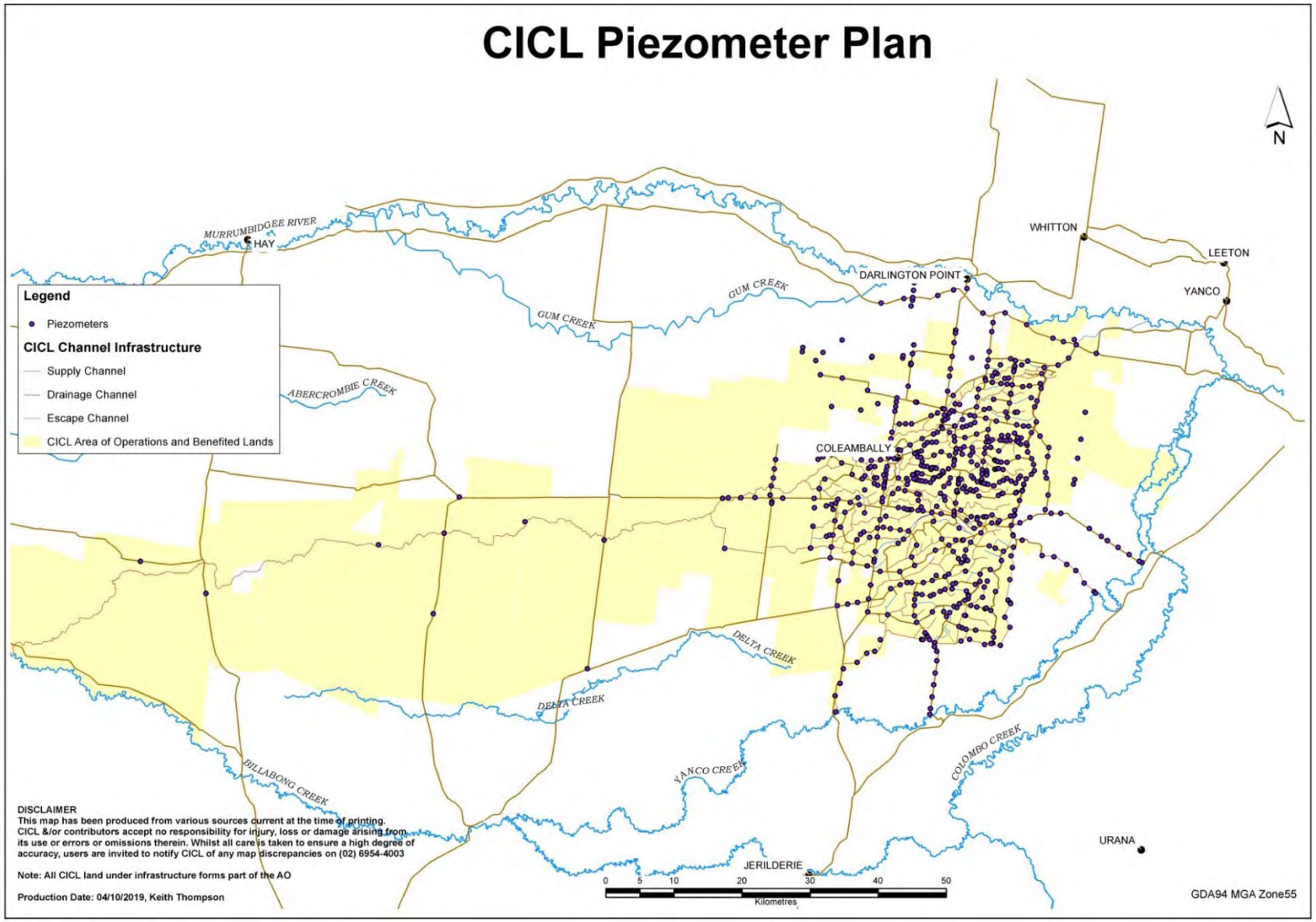


Figure 2.3 Piezometer (Monitoring Sites) Plan



3 Data and Analysis

To comply with condition 2.4 of CICL's Monitoring and Reporting Plan the following section is provided.

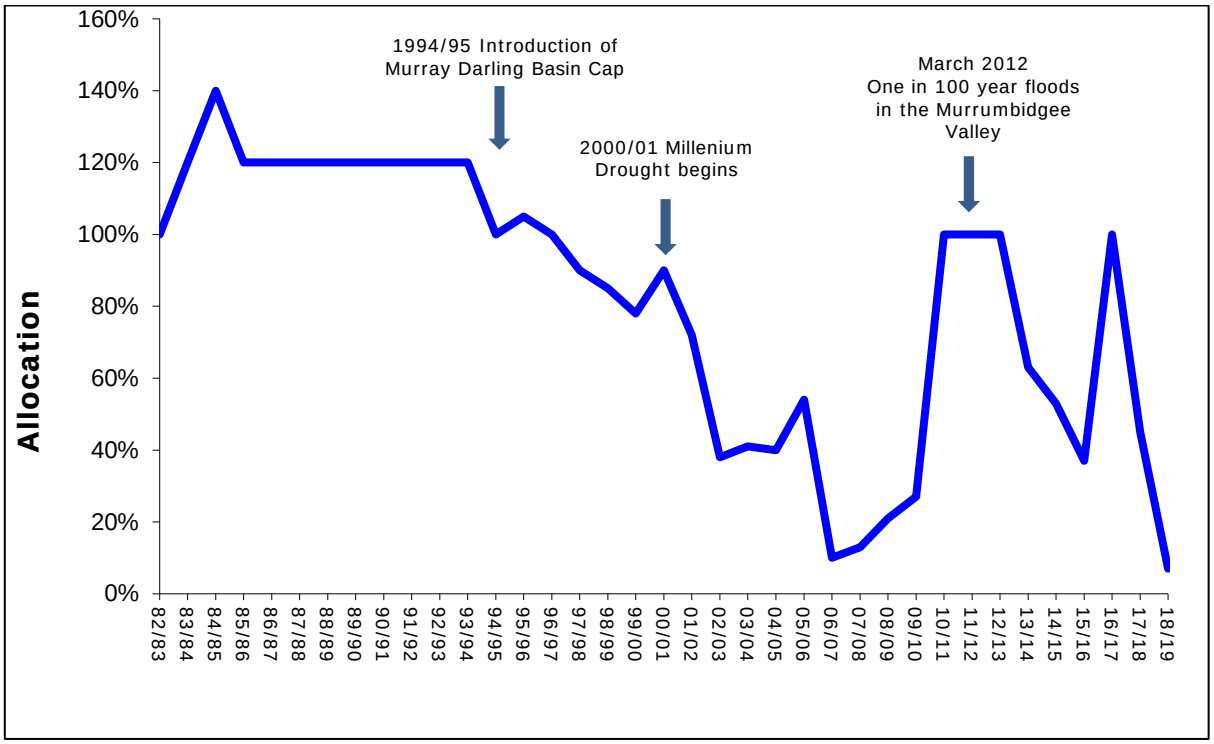
3.1 Water Allocation

Table 3.1 shows the dates and announced General Security allocations in the Murrumbidgee Valley during 2018/19.

Table 3.1 Cumulative General Security Water Allocations for 2018/19

Date	Announced Allocation (%)
1/07/2018	3
16/07/2018	6
17/09/2018	7

Figure 3.1 Annual General Security allocations in the Murrumbidgee Valley since 1982/83



3.2 Monitoring Data

To comply with Condition 2.4 of the Combined Approval, the following monitoring data is included:

Monitoring Data	Reference	Provided
Plan of the Area of Operations	Fig 2.1	✓
Plan showing the current location of works	Fig 2.2	✓
Crop Type, Crop Area and Water Usage data	Section 1.1, 3.3.4	✓
Piezometer pressure level data	Appendices	✓
Daily Surface Water Extraction and Salinity	Appendices	✓
Daily Drainage, Salinity and Flow Data	Appendices	✓
Monthly Groundwater Extraction from CICL's Approved Works, Salinity and Salt Load	Appendices	✓
Groundwater Extraction from other Approved Works	Appendices	✓
Daily Drainage Flow and Salinity data from three licensed discharge sites and one licensed monitoring site	Appendices	✓
Monthly Drainage Water quality data for Nutrients	Appendices	✓
Monthly Drainage Water quality data for Chemicals	Appendices	✓
Weekly Rice Chemical Monitoring Program results	Section 7.2	✓
Additional Detailed Map	Appendices	✓

3.3 Trends

To comply with condition 2.14, 2.15, 2.16 and 2.5 of CICL's Monitoring and Reporting Plan the following section is provided.

To satisfy condition 2.5 to provide discussion and commentary on the trends evident from the monitoring data CICL compile, CICL uses a benchmark (created) year, which consists of an average of the three years prior to privatisation (1997-2000). This benchmark has been used for all reporting requirements since 2000. Given the highly variable rainfall, water allocation and water use trends year to year, using data from a single season and/or changing the seasons used as a benchmark (comparable data) is considered by CICL to diminish the value of any discussion or commentary on the trends evident.

Salinity data was omitted from all sites during periods where no flow was detected. Where flow was present with no salinity reported the monthly average was used. To achieve improved flow accuracy, CICL has chosen to substitute flow figures for CODA (410110) from the Wonga Rubicon Flume regulator because the installation of this regulator has rendered the CODA gauging less accurate (backwater effects). The flow data from the CICL regulator at COD Oaklands (CODO) has been substituted for the WaterNSW gauge CODD at Bundy 410133. Apart from backwater effects, the FlumeGate regulator has a higher level of accuracy than a standard stage-discharge rating in this stream situation.

In providing discussion and commentary on the salinity and salt load trends for the Discharge Point CCD, the salinity appears to be higher than the benchmark. It was then discovered that the benchmark for the site contained minor errors that distorted the benchmark and lowered the electrical conductivity average and median values. After further investigations the CCD data was found to include no flow (NF) EC data included in averages and therefore the impact on this site was more evident given averages including

no flows have a greater impact on sites with less drainage flows. CICL has committed to update the benchmarks for future reporting of electrical conductivity.

3.3.1 Salinity

Tables 3.2 to 3.5 show monthly average salinity readings at three discharge points and one monitoring point. EC data is provided from WaterNSW gauging stations. However, to obtain more accurate EC, data without flow from a metered site are omitted and likewise metered flows without salinity are given monthly corrected average EC. In these tables, 2018/19 data is compared with data from the previous two years and with the benchmark data. The benchmark was set up through averaging the data of the three seasons immediately preceding the privatisation of CICL in 2000. In the case of salinity data, NF indicates no flow.

Table 3.2: Monthly Average Salinity Readings at Discharge Point CCD on the Coleambally Catchment Drain (µS/cm)

Month	2018/19	2017/18	2016/17	Benchmark
July	NF	NF	NF	120
August	195	255	NF	164
September	99	268	260	213
October	71	227	333	143
November	378	339	371	98
December	586	216	214	96
January	521	136	328	128
February	139	161	166	16
March	150	158	133	64
April	130	222	231	94
May	285	NF	197	106
June	286	NF	305	158
Average	**258**	**217**	**254**	**117**
Median	**195**	**222**	**246**	**113**

For the month of July the CCD WaterNSW gauging station had one day of flow recorded with an electrical conductivity reading of 269µS/cm, however the CCD Rubicon FlumeGate escape data recorded no flow for the month of July. The electrical conductivity readings for the month of July for the discharge point CCD were omitted (see Section 3.4).

Table 3.3: Monthly Average Salinity Readings at Licensed Discharge Point DC800A (410108) on the Drainage Channel DC800 (µS/cm)

Month	2018/19	2017/18	2016/17	Benchmark
July	NF	NF	228	1,496
August	270	261	243	1,661
September	226	213	214	338
October	245	255	247	257
November	167	248	351	314
December	180	342	345	306
January	156	213	332	268
February	157	211	252	240
March	188	168	178	268
April	176	197	228	215
May	173	271	258	226
June	181	201	261	534
Average	**193**	**234**	**261**	**510**
Median	**180**	**213**	**249**	**287**

Table 3.4: Monthly Average Salinity Readings at Monitoring Point CODA on the West Coleambally Channel (µS/cm)

Month	2018/19	2017/18	2016/17	Benchmark
July	213	437	445	1,359
August	266	475	475	1,504
September	293	327	327	886
October	321	247	246	399
November	322	246	246	524
December	298	240	240	526
January	261	198	198	457
February	NF	152	152	437
March	215	269	269	367
April	302	238	238	459
May	239	252	252	487
June	194	284	284	1,133
Average	**266**	**280**	**281**	**712**
Median	**266**	**252**	**249**	**506**

Table 3.5: Monthly Average Salinity Readings at Discharge Point CODD at BUNDY on the West Coleambally Channel (µS/cm)

Month	2018/19	2017/18	2016/17	Benchmark
July	NF	275	227	1,868
August	NF	275	NF	1,829
September	NF	275	NF	536
October	NF	275	NF	415
November	136	434	227	450
December	136	524	227	531
January	NF	502	NF	416
February	NF	502	NF	409
March	136	502	227	374
April	136	238	227	362
May	81	273	NF	330
June	190	267	227	406
Average	**136**	**362**	**227**	**660**
Median	**136**	**275**	**227**	**415**

The data in tables 3.3, 3.4 and 3.5 illustrates that the monthly average salinity in the last three years at CODA, DC800A and CODD has remained relatively low in comparison to the benchmark years.

While salinity levels in CIA drains have decreased from benchmark figures, this year saw a return to a lower salinity of all drains except CCD over the prior year. A factor in the decrease has been the regular use of DC800 to convey water for WaterNSW in addition to lower farm drainage, with supply flows making up a majority of volume.

3.3.2 Flow

To comply with condition 2.14, 2.15, 2.16 and 2.5 of CICL's Monitoring and Reporting Plan the following section is provided.

Tables 3.6 to 3.9 show monthly average drainage flows at three discharge points and one monitoring point. Again 2018/19 data is compared with the previous two years' data and with benchmark data. The benchmark was established through averaging the data from the three seasons immediately preceding privatisation of CICL in 2000.

As previously reported it should be noted that some of the gauged flow data obtained may not be entirely accurate due to high water events on the Yanco and Billabong Creeks, which potentially results in backwater from the creek levels impacting CCD Gauge (410191) and CODD (410133). In addition to backwater impacts from high flow in the Yanco, weed growth and backwater from downstream structures may impact the accuracy of the stage-discharge rating curves particularly at DC800A (410108) and CODA (410110). These sites are owned and operated by WaterNSW. Where possible CICL uses the more accurate metered FlumeGate figures for flow.

Table 3.6: Monthly Flow Readings (ML) at CCD FlumeGate escape on the Coleambally Catchment Drain (substituted for CCD (410191))

Month	2018/19	2017/18	2016/17	Benchmark
July	0	2,110	0	21
August	1,940	2,634	0	290
September	3,134	2,913	100	887
October	1,008	21	419	1,853
November	622	2,596	0	2,073
December	1,346	2,857	2,433	2,305
January	3,346	3,159	2,852	3,619
February	1,647	1,799	4,155	1,843
March	1,248	7,358	7,564	2,112
April	2,012	280	784	1,756
May	284	133	699	1,430
June	69	372	70	279
Total	**16,655**	**26,232**	**19,076**	**18,468**
Average	**1,388**	**2,186**	**1,590**	**1,539**
Median	**1,297**	**2,353**	**559**	**1,800**

(Note: CCD is used to deliver water into Yanco Creek for WaterNSW)

Table 3.7: Monthly Flow Readings (ML) at Licensed Discharge Point DC800A (410108) on the Drainage Channel DC800

Month	2018/19	2017/18	2016/17	Benchmark
July	1	0	295	432
August	545	495	102	1,197
September	440	2,369	365	4,455
October	209	645	23	5,962
November	407	1,192	211	5,119
December	1,322	1,894	621	5,162
January	1,043	3,118	233	7,660
February	453	846	897	6,795
March	1,351	3,601	2,589	7,816
April	491	606	909	3,721
May	319	348	355	2,961
June	236	360	1,269	1,675
Total	**6,817**	**15,473**	**7,869**	**52,955**
Average	**568**	**1,289**	**656**	**4,413**
Median	**447**	**746**	**360**	**4,787**

(Note: DC800 is used to deliver water into Yanco Creek for WaterNSW)

Table 3.8: Monthly Flow Readings (ML) CODWonga on the West Coleambally Channel substituted for CODA (410110)

Month	2018/19	2017/18	2016/17	Benchmark
July	164	108	694	619
August	11	8	254	739
September	1,362	2,046	1,994	4,983
October	785	328	2,102	4,494
November	1,631	1,031	1,133	5,014
December	2,091	1,536	49	4,041
January	316	573	1,104	6,806
February	0	1,361	1,941	5,540
March	1,872	1,836	4,406	8,438
April	179	70	2,216	4,427
May	1,399	180	1,333	4,209
June	1,878	5	2,565	2,183
Total	**11,688**	**9,083**	**19,792**	**51,493**
Average	**974**	**757**	**1,649**	**4,291**
Median	**1,074**	**451**	**1,637**	**4,460**

Table 3.9: Monthly Flow Readings (ML) CODOaklands FlumeGate on the West Coleambally Channel substituted for CODD (410133) at Bundy

Month	2018/19	2017/18	2016/17	Benchmark
July	0	2	71	282
August	0	23	56	2,150
September	0	0	490	3,327
October	0	0	1,195	1,914
November	152	76	89	3,187
December	23	268	130	1,536
January	0	0	58	3,523
February	0	0	64	4,461
March	26	77	6	3,517
April	99	0	167	1,814
May	21	0	45	2,511
June	189	0	20	3,053
Total	**510**	**446**	**2,390**	**31,275**
Average	**43**	**37**	**199**	**2,606**
Median	**11**	**0**	**67**	**2,782**

Table 3.10 shows the monthly total volume of water supplied through the Boona and Argoon escapes which supply planned released water through CODA and CODW and are reported in accordance with the requirements of section M2.5 of EPL 4652.

Table 3.10: Monthly Flow (ML) at Boona and Argoon FlumeGate Escapes 2018/19

Month	Boona	Argoon
July	8	0
August	0	11
September	0	1,362
October	0	785
November	0	1,631
December	0	2,091
January	0	316
February	0	0
March	42	1,872
April	0	179
May	35	1,399
June	189	1,878
Total	**274**	**11,524**

3.3.3 Extraction

To comply with condition 2.14 and 2.5 of CICL's Monitoring and Reporting Plan the following section is provided.

For all three extraction points 2018/19 data is compared with the previous two seasons' data and with benchmark data. The CCS benchmark was established through averaging the data of three seasons immediately preceding the privatisation of CICL in 2000. Table 3.11 shows monthly extraction at the Coleambally Main Canal Off-take.

Table 3.11: Monthly Extractions (ML) at licence point CCS (Main Canal Off-take)

Month	2018/19	2017/18	2016/17	Benchmark
July	0	8,012	0	0
August	19,901	18,664	1,658	0
September	20,533	36,919	10,384	42,294
October	27,226	36,089	17,485	38,311
November	18,050	36,338	51,219	57,310
December	34,168	51,245	72,930	66,774
January	30,380	75,328	92,801	95,277
February	12,580	50,146	74,157	61,406
March	18,449	46,478	61,006	105,786
April	10,727	11,489	23,496	54,865
May	16	7,532	12,608	33,506
June	0	0	0	0
Total	**192,030**	**378,239**	**417,743**	**555,533**

Tables 3.12 to 3.13 show monthly extractions from both Col Bore and Hort Bore. The benchmark is derived from the first operational season.

Table 3.12: Monthly Extractions (ML) Col Bore

Month	2018/19	2017/18	2016/17	Benchmark 2007/08
July	0	0	0	0
August	23	0	0	184
September	57	0	0	459
October	223	0	0	376
November	97	61	340	180
December	219	250	425	228
January	271	585	626	317
February	221	647	626	218
March	74	474	448	302
April	34	222	250	339
May	0	0	0	209
June	0	0	0	0
Total	**1,219**	**2,239**	**2,715**	**2,812**

Table 3.13: Monthly Extractions (ML) Hort Bore

Month	2018/19	2017/18	2016/17	Benchmark 2008/09
July	0	0	0	0
August	47	0	0	0
September	50	0	0	0
October	248	4	0	559
November	55	160	0	120
December	415	55	0	1
January	257	612	326	0
February	234	179	325	0
March	298	118	288	744
April	203	482	322	404
May	0	1	478	0
June	0	0	54	0
Total	**1,807**	**1,611**	**1,793**	**1,828**

The Hort Bore is primarily used to supply high security water on demand outside of the normal CICL irrigation supply period. In 2018/19 the combined licence extraction limit was not exceeded, however the Hort Bore limit was. Measures have been put in place to ensure this does occur in the future.

Due to the inconsistency between WaterNSW and CICL's timing of reading the meters, there are immaterial differences between invoiced and reported figures.

Groundwater bore usage is largely influenced by the value of temporary surface water relative to pumping costs.

3.3.4 Crop Water Use

To comply with condition 2.13 of CICL's Monitoring and Reporting Plan the following section is provided.

CICL uses the 'Other' category included in Table 3.14 to display crops not grown in quantities significant enough to justify separate reporting. These crops include timber, vegetables, tree crops and other niche crops.

Table 3.14 shows the crops grown by area within the Coleambally Irrigation Area, the quantity of irrigation water supplied by CICL, average crop water usage and the proportion of water supplied to each crop as a percentage of total water supplied by CICL.

Table 3.14: 2018/19 Crop Area, Total Crop Use, Crop Water Use and Proportion of Total Deliveries

Crop	Area (Ha)	Intensity (ML/Ha)	Total ML	% Total Use
Rice	236	14.1	3,329	3.2
Wheat	7,541	1.5	11,444	11.0
Cotton	3,641	11.4	41,408	39.8
Corn	2,252	11.1	25,074	24.1
Pasture	3,945	2.4	9,468	9.1
Other	7,928	1.0	7,698	7.4
Canola	1,115	2.1	2,289	2.2
Barley	859	2.3	1,977	1.9
Oats	567	2.4	1,353	1.3
TOTAL	**28,084**		**104,040**	**100**

The above data is supplied by CICL's customers at the beginning of the irrigation season and is then independently verified by various means, however the data serves only as an approximation of the area actually irrigated and the irrigation intensity as customers can change their cropping decisions during the season.

A low allocation season, coupled with an increase in demand for water on the temporary market, has contributed to rice production diminishing to its lowest seasonal share of area under cultivation and water use ever recorded in the CIA. For the 2019/2020 season contracts with the highest price for medium grain on record were released in an attempt to secure seed in the coming year.

Due to the ongoing drought and low allocations, soybeans were not grown in the CIA in 2018/19.

Table 3.15 on the following page indicates the change in area of seven major crops in the Coleambally Irrigation Area over the last 22 years. CICL expects that the cropping mix will continue to respond to three main drivers: commodity prices (grower returns); the timing and volume of water allocations and the availability and price of temporary water.

Table 3.15: Crop Areas and Relative Water Usage over Time

Season	Rice		Corn / Maize		Soybeans		Cotton		Wheat		Pasture		Canola		
	Area (ha)	Proportion of delivery (%)	Area (ha)	Proportion of delivery (%)	Area (ha)	Proportion of delivery (%)	Area (ha)	Proportion of delivery (%)	Area (ha)	Proportion of delivery (%)	Area (ha)	Proportion of delivery (%)	Area (ha)	Proportion of delivery (%)	Total (%)
2018/19	236	3.2	2,252	24.1	0	0	3,641	39.8	7,541	11.0	3,945	9.1	1,115	2.2	89.4
2017/18	6,869	35	4,442	14	2,393	1	5,796	21	6,387	6	3,921	5	2,323	2	88
2016/17	11,484	53.6	5,105	13.5	892	1.9	6,623	17.9	8,462	3.5	10,679	4.1	1,512	1.2	95.7
2015/16	3,603	34.6	8,462	13.5	1,883	3	5,105	20.6	11,484	14.8	6,623	7	892	0.1	94
2014/15	9,103	44	6,757	13	1,666	2	2,602	7	14,226	18	4,737	4	1,716	1	91
2013/14	12,500	43.6	4,358	8.4	1,734	2.4	5,587	6.9	15,071	9.8	5,264	2.8	2,540	1.5	75.4
2012/13	19,071	52.7	4,872	7.7	2,583	3.9	2,089	3	13,698	7.2	6,545	3.6	4,182	1.3	79.4
2011/12	16,745	62.1	4,767	8.2	2,238	2.7	5,280	7.9	15,989	8.7	7,472	4	5,244	1.6	91.2
2010/11	14,512	68.3	4,367	7.2	1,240	1.5	885	1.4	11,334	5.1	8,119	4.2	3,381	1.5	89.2
2009/10	3,668	46	311	2	495	1	0	0	10,635	10	6,903	12	2,523	2	73
2008/09	2,135	33.1	2,472	3.4	308	1.4	0	0	4,215	9.5	4,481	16.3	1,471	4.9	68.7
2007/08	90	1.4	941	1.2	152	0.7	0	0	6,575	20	5,004	20	1,584	6.1	49.4
2006/07	8,518	54.3	1,863	7.6	478	0.8	0	0	12,509	15.9	9,958	7.8	1,602	1	87.4
2005/06	18,025	62.8	3,306	7	2,106	2.9	0	0	13,610	8.4	15,440	8.7	1,748	0.9	90.6
2004/05	8,142	44	3,671	7.2	1,495	2.2	0	0	20,287	18.8	12,865	10.8	2,681	1.3	84.3
2003/04	12,597	55.8	3,545	5.7	1,938	3.5	0	0	21,192	15	12,131	7.5	1,763	0.7	88
2002/03	11,395	46	4,788	9.3	1,788	1	0	0	21,346	20.4	10,183	7.4	2,095	1.7	85.8
2001/02	27,493	67.5	3,808	4.2	3,297	3.4	0	0	21,103	9.2	11,581	6.1	2,191	0.6	91
2000/01	30,440	73.9	4,074	5.7	4,551	5.9	0	0	14,276	4.6	11,998	4.7	2,153	0.4	95.2
1999/00	24,138	77.7	1,178	3.1	2,185	3.9	0	0	12,649	6.1	7,485	4.4	2,152	0.7	95.9
1998/99	24,491	73.8	1,059	1.3	4,339	5.7	0	0	13,963	1.7	13,879	8.1	2,184	1.7	92.3
1997/98	24,624	70.4	1,059	1.3	4,998	7.5	0	0	14,943	7.4	9,964	6.1	2,053	0.4	94.2

3.4 Data Omissions and Discrepancies

This section identifies the variations, discrepancies, data omissions and details of any actions undertaken or proposed to remedy any monitoring and/or reporting deficiencies in satisfying condition 2.6 of the Combined Approval.

In order to provide the most accurate data possible CICL uses data sources from Table 3.16.

Table 3.16: Data sources for licence sites

NSW DPI-Hydrometrics site number	NSW DPI-Water Licenced Site	NSW EPA Licenced Site	ACR Comment
410110	CODA	1. CODWonga	Salinity from CODA (410110) Flow from CODWonga (Flume)
410108	DC800A	2. DC800A	Salinity and Flow from (410108) DC800A
410191	CCD	3. CCD	Salinity from CCD (410191) Flow from CCD Escape (Flume)
410133	CODD	4. CODOaklands	Salinity from CODD (410133) Flow from CODOaklands (Flume)

96% of the 737 piezometers were read. Approximately 4% of the piezometers were unserviceable due to physical damage or integrity of the piezometer. A summary of piezometer data is provided in the Appendix.

3.5 Monitoring and Testing Data

An electronic copy of all daily and monthly monitoring and testing data required under section 2.7 of CICL Monitoring and Reporting Plan of the Combined Approval is forwarded by email to relevant authorities.

3.6 Quality Assurance and Control Standards

The following section is provided to satisfy requirement 2.8 of the CICL Monitoring and Reporting Plan of the Combined Approval.

The following sections list the parameters monitored to comply with licence conditions and explains both the methodology used for data collection and analysis and for the calibration and certification of measuring devices.

3.6.1 Flow Monitoring

The following section is provided to satisfy requirement 2.5 of the CICL Monitoring and Reporting Plan of the Combined Approval.

3.6.1.1 Coleambally Main Canal Off-take

Surface water extraction by CICL is measured at the point of take from the Murrumbidgee River into CICL's Main Canal using an Accusonic transit-time meter with four individual velocity paths. The meter is independently checked by Certified Practicing Hydrographers on a monthly basis and subjected to in-house inspection on a weekly basis.

In response to the regulated river works and water use approval No 40CA401473 and as required under clause 237 (3) and clause 238 of the Water Management (General) Regulation 2018, CICL contracts an independent contractor to certify the accuracy of the

Accusonic 8510 meter on the main canal off-take. The following information is extracted from the report supplied by contractor to CICL.

Gaugings have been compared to the discharge from the Accusonic at the same time as the measurement to ensure that the Accusonic is accurate.

Coleambally's Accusonic site is located approximately 405m downstream of the offtake gates. There is an 8° bend in the channel at 290 m downstream of the offtake gates. The bend is gentle, and there is no evidence of siltation or erosion on the banks at that point. The water discharge has the opportunity to remain as close to laminar as possible even after going through the bend before it is measured by the Accusonic. The channel width is approximately 38m wide. There are enough upstream straight lengths between the regulator and the monitoring site.

There is approximately 730m of straight channel downstream of the measuring site.

Deviation between the gauging and the Accusonic discharge has been calculated throughout the year. Deviation has been calculated between the Accusonic discharge and the gauged discharge. In the 2018-19 flow year, there were 30 gaugings conducted to verify the Accusonic discharge. Seven measurements were conducted by WaterNSW, and 6 measurements were conducted upstream and are not directly comparable to the Accusonic. This leaves 24 gaugings available to confirm the accuracy of the Accusonic (see Appendix 6).

The average deviation is -2.38%, while the minimum is -12.51% and the maximum is 10.91%. Of the 24 gaugings available for verification purposes, 16 had a negative deviation and 8 a positive deviation.

3.6.1.2 Irrigators Water Supply Points

There are 740 water supply points within CICL's Area of Operations - 536 of these are FlumeGates, 3 are Slip-Gates; 26 are doppler flow meters, 17 are MagFlow meters; and 158 are mechanical meters.

Verification of customer supply meters is undertaken twice annually by Certified Meter Validators. A sample of these customer outlets are also verified on an annual basis by an Independent Meter Validator.

3.6.1.3 Col Bore and Hort Bore

In addition to its take of surface water, CICL extracts groundwater from its deep water bores – the Col Bore and Hort Bore. WaterNSW owned MagFlow meters are installed at both bores with meter readings provided to CICL upon request.

3.6.2 Salinity and Salt Load

The following section is provided to satisfy requirement 2.14, 2.15, 2.16 and 2.9 of the CICL Monitoring and Reporting Plan of the Combined Approval.

3.6.2.1 Salinity at Water Extraction Works

CICL has continuous monitoring of Electrical Conductivity (EC) at its Main Canal Off-take. This information is reported back through the Rubicon SCADA system. This year there was a calibration error and data provided was compared with physical readings resulting in an increase on uncalibrated results.

3.6.2.2 Salinity at Licensed Discharge Points

CICL uses EC data collected by WaterNSW at three licensed discharge points and one licensed monitoring point. These sites continuously monitor flow and EC. There have been no new measures to limit salt discharge in 2018/19.

3.6.2.4 Salt Load Calculation

The Salt Load has been calculated by using the following formula (derived from the definition of salinity under Schedule 2 of the Monitoring and Reporting Plan), which assumes that 1 ML of water with an electrical conductivity value of 1000 µS/cm contains approximately 640 kg of salt:

Salt Load (kilograms) = (EC/1000 x 0.64) x ML

The Salt Load is calculated using the most accurate flow data available for each site with Salt Load calculated on a daily basis and summed to create monthly figures. EC however is the monthly average of the daily average used in the Salt Load calculation.

3.6.3 Pesticides in Supply and Drainage Water

In accordance with the EPL, CICL monitors the range of pesticides and nutrients as specified by the EPL in both supply and drainage water. Details of results obtained are contained in Attachments and Table 7.3.

3.6.4 Turbidity and pH

CICL monitors Turbidity and pH parameters in both supply and drainage water using hand-held meters. These meters are calibrated by CICL staff.

3.6.5 Crop Type, Area and Water Usage

Crop type, area and water use information is collected from landholders using summer and winter crop type/area forms. Crop water usage information is calculated based on actual water orders with the amount of water diverted onto individual farms accurately measured. Crop information is provided by landholders prior to the commencement of the irrigation season and as such is an approximation of the actual final area planted.

3.6.6 Groundwater Levels and Groundwater Salinity

Groundwater levels and groundwater salinity parameters are measured by appropriately trained CICL staff. The methodology for groundwater levels and groundwater salinity monitoring was developed in conjunction with the licence authority.

The following statement is provided to satisfy requirement 2.9 of the CICL Monitoring and Reporting Plan of the Combined Approval.

CICL has developed and implemented a Water Use Policy which continued in 2018/19 and aims to restrict recharge by limiting water use intensity in the operational area. A copy of the Water Use Policy is available on the CICL Website.

Besides variation of CICL's Water Use Policy there have been no other measures to reduce recharge or salinity.

4 Water Management

The following section is provided to satisfy requirement 2.10 of the CICL Monitoring and Reporting Plan of the Combined Approval.

Tables 4.1 and 4.2 display reconciled monthly volumes of water:

- Taken through each authorised water supply work against the Approval Holder's water access licences;
- Taken through each authorised water supply work against other water access licences; and
- Released from each escape as an authorised credit.

Table 4.1: 2018/19 Water (ML) taken through Water Supply Works against Water Access Licences (mid-month read)

Surface Water Licences (Works Approval 40CA401473)	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total (ML)
High Security Access Licence **40AL401469**	0	2,315	0	0	0	0	0	0	0	0	0	0	**2,315**
High Security Access Licence **40AL417488**	0	6,003	0	0	0	0	0	0	0	0	0	0	**6,003**
General Security Access Licence **40AL401471**	0	0	0	0	0	0	0	0	177	3,893	10	0	**4,080**
General Security Access Licence **40AL405267**	0	0	0	0	0	0	0	0	254	0	0	0	**254**
High Security Access Licence **40AL401470**	0	70	0	0	0	0	0	0	0	0	0	0	**70**
High Security S & T Access Licence **40AL401472**	0	3,227	0	0	0	0	0	0	0	0	0	0	**3,227**
Conveyance Access Licence **40AL402990**	0	5,360	15,303	12,664	9,149	17,716	22,452	10,462	10,098	0	0	0	**103,203**
Supplementary Access Licence **40AL402991**	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	**0**	**16,975**	**15,303**	**12,664**	**9,149**	**17,716**	**22,452**	**10,462**	**10,528**	**3,893**	**10**	**0**	**119,151**
Aquifer Access Licence **40AL403806**													
Col Bore (Works Approval **40CA403808**)	0	23	57	223	97	219	271	222	74	34	0	0	**1,219**
Hort Bore (Works Approval **40WA404593**)	0	47	50	248	55	415	257	234	298	203	0	0	**1,807**
Combined Total	**0**	**17,046**	**15,410**	**13,134**	**9,301**	**18,350**	**22,980**	**10,917**	**10,900**	**4,129**	**10**	**0**	**122,177**
Authorised Credits													**1,306**
Total													**123,482**

The following information is provided to satisfy condition 2.11 of the Combined Approval. In 2018/19 there were no accidental releases from drains. Figures for delivered water are taken from monthly reports which are compiled mid month.

Table 4.2: 2018/19 Volumes (ML) Released without Credit, Released from Drain, and Released to Customers

2018/19	Released without credit from escapes	ML Released from Drains	Delivered to CICL Customers
Jul	0	0	0
Aug	0	0	790
Sep	0	0	14,379
Oct	0	0	16,074
Nov	0	0	7,173
Dec	0	0	10,894
Jan	0	0	20,235
Feb	0	0	16,477
Mar	0	0	11,272
Apr	0	0	4,460
May	0	0	1,642
Jun	0	0	644
Total	**0**	**0**	**104,040**

4.1 Estimated Annual Volumes

The following section is provided to satisfy requirement 2.12 of the CICL Monitoring and Reporting Plan of the Combined Approval.

Table 4.3 indicates the estimated annual volumes of net channel losses, including deliveries, escapes, recycling, evaporation, rainfall, change in storage and seepage.

The gains from rainfall and losses through evaporation have been calculated for the 2018/19 irrigation season only.

For the purpose of calculating evaporation in Table 4.3, the channel surface area has been estimated as 555 ha.

Table 4.3: Net Channel Loss Accounting

Losses	Estimated volume (ML)
Escapes	0
Evaporation	-10,910
Change in storage	0
Seepage	-10,303
Total Losses	**-21,213**
Rainfall	1,771
Net Channel Losses	**-19,442**

4.2 Water Balance for the Area of Operations

The following section is provided to satisfy requirement 2.10, 2.11 and 2.12 of the CICL Monitoring and Reporting Plan of the Combined Approval.

The CICL system water balance is outlined in Table 4.3 and Table 4.4.

This balance is taken from licence diversion data and does not include transmission deliveries for WaterNSW.

Table 4.4: 2018/19 Water Use (ML)

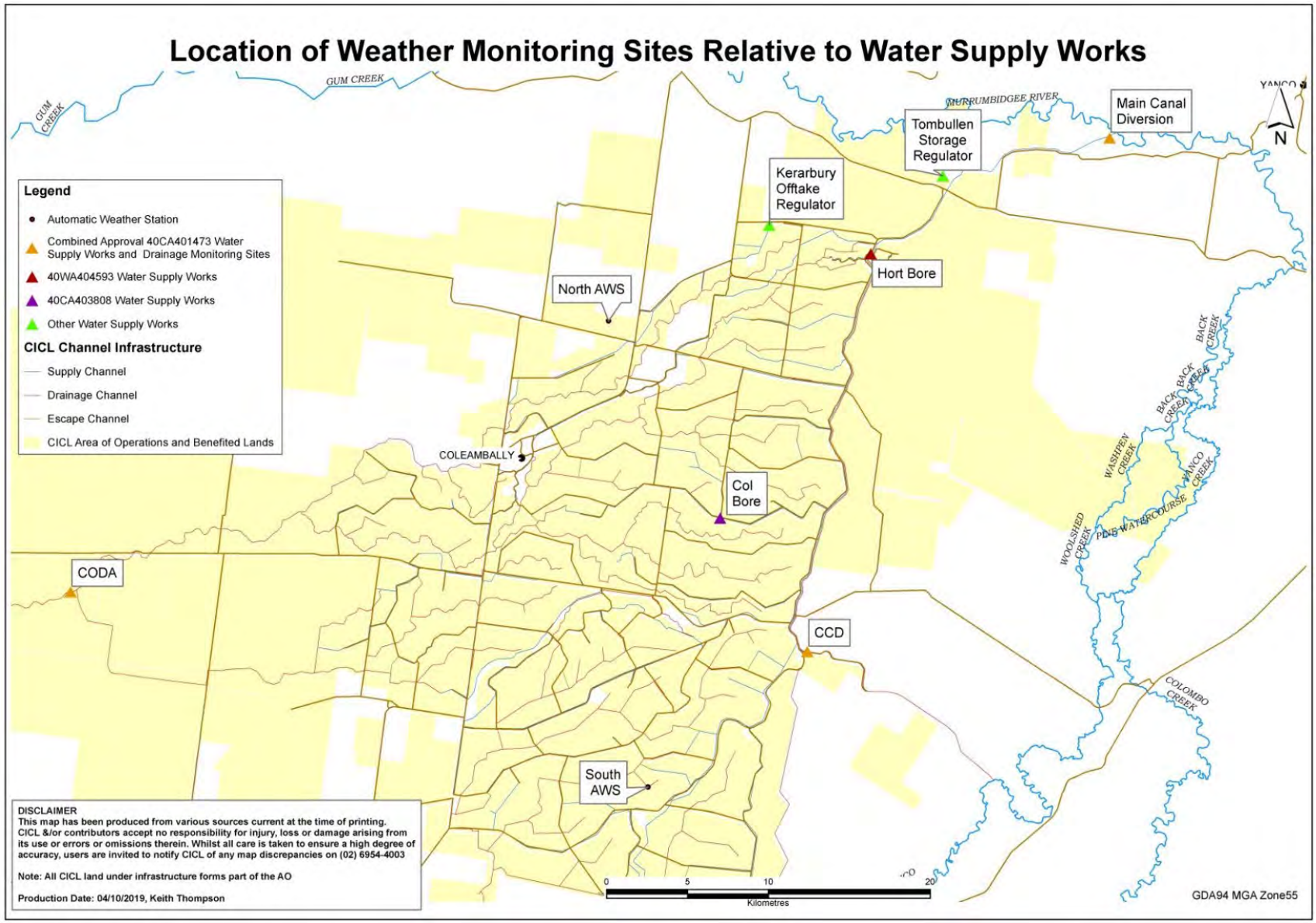
Bulk Accounts (all licences)	***Debit***	***Credit***
Carryover 17/18		112,395
Allocation (AWD)		162,573
River Operational & Environmental Deliveries		72,879
Net Annual Transfers	69,642	
River Diversions	192,030	
Groundwater Extractions	3,026	
As at 30 June 2019	**264,698**	**347,847**

Internal Water Accounting	***Debit***	***Credit***
CICL Diversions (Bore pumping + River Diversions)		123,482
Deliveries	104,040	
Net Channel Losses	19,442	
As at 30 June 2019	**123,482**	**123,482**

4.3 Estimated Annual Rainfall at each Water Supply Work

A map depicting the locations of weather monitoring sites relative to all water supply works is shown in Figure 4.1 below.

Figure 4.1: Location of Weather Monitoring Sites relative to Water Supply Works.



4.4 Estimated Annual Evaporation / Rainfall at each Water Supply Work

The following section is provided to satisfy requirement 2.13 of the CICL Monitoring and Reporting Plan of the Combined Approval.

CICL records both rainfall and evaporation at the CICL Depot Bureau of Meteorology weather station (074249). Table 4.5 shows annual rainfall and evaporation was recorded as 242.2mm and 2,111.5mm respectively, this represents 61% and 121% of the long-term average. Depot weather data can be found in electronic attachments.

Table 4.5: Rainfall and Evaporation CICL Depot 2018/19

CICL Depot	Rain (mm)	LTA Rain (mm)	Evap (mm)	LTA Evap (mm)
July	6.9	32.5	60.6	39.1
Aug	9.6	34.3	90	65.1
Sept	2.9	32.9	136.9	101.3
Oct	36.9	38.7	190.4	163.9
Nov	47.2	31.8	224.2	210.7
Dec	11.6	31.3	325.1	259.9
Jan	9.8	33.3	366.2	275.9
Feb	13.9	28.3	250.5	225.2
Mar	11.2	29.6	224.3	186.0
Apr	26.8	31.1	132.4	112.6
May	47	35.3	74.7	63.5
Jun	18.4	37.4	36.2	38.1
Total	**242.2**	**396.5**	**2,111.5**	**1,741.4**

4.5 Distribution of Irrigation Intensity

The following section is provided to satisfy requirement 2.13 of the CICL Monitoring and Reporting Plan of the Combined Approval.

The irrigation intensity for the main supply per region is represented in Table 4.6.

Rather than listing distribution of irrigation intensity in at least three intensity ranges, CICL use an exact number (ML/ha) for irrigation intensity in the regions using total region usage divided by known region area.

Table 4.6: Regional Distribution of Irrigation Intensity (ML/ha)

REGION	USE (ML)	AREA (Ha)	INTENSITY ML/Ha	% of Use
Boona	22,369	33,452	0.67	21.5
Coly	22,785	22,432	1.02	21.9
Argoon	30,380	35,427	0.86	29.2
Yamma	16,126	23,313	0.62	15.5
Kerarbury	8,323	13,335	0.75	8
WCC	4,057	317,218	0.01	3.9
Total	**104,040**	**445,177**	**0.23**	**100**

5 Salinity and Salt Load

The following section is provided to satisfy requirement 2.14 of the CICL Monitoring and Reporting Plan of the Combined Approval.

Hydrometrics site 410191 (CCD) is a supply point for WaterNSW customers and these flows are measured at the adjacent CICL delivery point – not at the WaterNSW gauge. Under condition 3 it is understood that CICL may include data of acceptable quality from other sources to meet the monitoring and reporting requirements of the Combined Approval. As with the CODA site, the flow data from CICL CCD delivery system is used in conjunction with the continuous EC data from the WaterNSW gauge to compute salt load. Table 3.16 indicates where data is sourced. The WaterNSW CCD and CODD gauges are impacted by backwater during periods of high flow in the Yanco and Billabong creeks and are considered unreliable.

The salt load is calculated using a daily average EC and total daily Salt Load. The following tables depict exact numbers for flow (ML) and Salt Load (T) however the salinity figures are a monthly average not a weighted average so as reported figures remain consistent.

Table 5.1: Salinity (µS/cm) and Salt Load (Tonnes) entering CICL's Area of Operations in 2018/19

2018/19	MAIN CANAL			COL BORE			HORT BORE		
Month	ML	µS/cm	Salt (T)	ML	µS/cm	Salt (T)	ML	µS/cm	Salt (T)
July	0	NF	0	0	NF	0	0	NF	0
August	19,901	141	1,623	23	595	9	47	262	8
September	20,533	144	1,894	57	595	22	50	262	8
October	27,226	189	3,251	223	595	85	248	262	42
November	18,050	198	2,290	97	595	37	55	256	9
December	34,168	200	4,342	219	610	85	415	256	68
January	30,380	202	3,910	271	610	106	257	256	42
February	12,580	229	1,825	221	610	86	234	256	38
March	18,449	209	2,457	74	610	29	298	256	49
April	10,727	218	1,428	34	610	13	203	256	33
May	16	224	2	0	NF	0	0	NF	0
June	0	NF	0	0	NF	0	0	NF	0
Total	**192,030**		**23,022**	**1,219**		**472**	**1,807**		**297**
Salt Total	**23,791**								
ML Total	**195,056**								

Tables 5.2 to 5.4 are provided to satisfy requirement 2.15 of Combined Approval.

WaterNSW Tombullen Storage is an in line storage used by WaterNSW to buffer Murrumbidgee downstream demand. It is located off main canal at the start of CICL's supply system. Whilst it is not a discharge monitoring site under the Combined Approval it does however account for a significant volume of water (and hence, salt) delivered by CICL through our main extraction site each season. For the Salt Load tables actual volume (ML) and actual Total Salt (Tonnes) are used however salinity (EC) is displayed as a monthly average. Where daily salinity was not available the monthly average salinity (EC) was used to calculate salt load.

Table 5.2: Salinity (µS/cm) and Salt Load (Tonnes) exiting CICL's Area of Operations in 2018/19

Month	DC 800A@ OUTFALL			Flow @ DC 500 at Wonga EC @ CODA			Flow @ CCD Escape EC @ CCD			WaterNSW Tombullen Storage		
	ML	µS/cm	Salt (T)	ML	µS/cm	Salt (T)	ML	µS/cm	Salt (T)	ML	µS/cm	Salt (T)
July	1	NF	0	164	213	22	0	NF	-	5,360	168	575
August	545	270	98	11	266	2	1,940	195	194	8,628	141	779
September	440	226	47	1,362	293	256	3,134	99	198	5,931	217	822
October	209	245	23	785	321	158	1,008	71	46	6,296	146	588
November	407	167	44	1,631	322	331	622	378	162	3,439	160	351
December	1,322	180	155	2,091	298	383	1,345	586	513	8,956	153	877
January	1,043	156	104	316	261	51	3,347	521	1,111	6,958	159	710
February	453	157	47	0	NF	-	1,647	139	165	5,267	229	771
March	1,351	188	162	1,872	215	255	1,248	150	120	13,090	209	1,748
April	491	176	55	179	302	34	1,972	130	162	422	218	59
May	319	173	35	1,399	239	211	284	285	52	2,575	224	369
June	236	181	25	1,878	194	241	69	286	13	-	NF	-
Total	**6,817**		**794**	**11,688**		**1,943**	**16,616**		**2,736**	**66,919**		**7,648**
Salt Total	**13,121**											
ML Total	**102,043**											

The seasonal flow, salinity and salt load for the CODD is displayed separately in Table 5.3 as it is situated directly downstream from the site CODA. Including both sites in the same table would lead to double counting of the salt and flow data. NF refers to No Flow.

Table 5.3: Volume of Water exiting CICL's Operational Area at CODO, Salinity (µS/cm) at CODD and calculated Salt Load (Tonnes) in 2018/19

2018/19	Flow at COD Oaklands EC at CODD at OUTFALL BUNDY		
Month	**ML**	**µS/cm**	**Salt (T)**
July	0	NF	0
August	0	NF	0
September	0	NF	0
October	0	NF	0
November	152	136	13
December	23	136	2
January	0	NF	0
February	0	NF	0
March	26	136	2
April	99	136	9
May	21	81	1
June	189	190	23
Total	**510**		**50**

Table 5.4 represents a Simple Annual Salt Balance comprising the imported, exported and retained Salt Load for the area associated with each separate water supply work and satisfies requirement 2.16 in the CICL Monitoring and Reporting Plan of the Combined Approval.

Table 5.4: CIA Simple Salt Balance (Tonnes) in 2018/19

Inflow Sites	Imported Salt (T)	Outflow Sites	Exported Salt (T)
Main Canal	23,022	DC800A	794
Col Bore	472	DC500	1,943
Hort Bore	297	CCD	2,736
		WaterNSW Tombullen	7,648
Total	**23,791**		**13,121**
Balance	**10,670**		

6 Groundwater Conditions

The following section is provided to satisfy requirement 2.17 of CICL Monitoring and Reporting Plan of the Combined Approval.

6.1 Groundwater conditions within the Area of Operations

CICL has a network of piezometers throughout its Area of Operations which is used to monitor groundwater conditions. The licence condition 2.17 of the Combined Approval requires that piezometers be read annually in August (+/- 2 weeks). It is CICL's practice to read them again in March in order to have a more complete understanding of groundwater conditions affecting our area. The related data is analysed using Arc Map GIS and MS Excel software.

In March and September 2019, 710 of CICL's 737 licensed piezometers were read. Of those read, 65 were recorded as being dry, and a further 17 as damaged. There were also some outlier readings that were disregarded as typographical or observational errors.

Piezometers are read to an accuracy of +/- 5cm with the data obtained presented as per the Licence monitoring requirements. Data analysis and mapping is based on a split set of data being: pressure levels from the upper Shepparton aquifer via piezometers < 12m deep; and pressure levels from the lower Shepparton aquifer via piezometers 12m - 60m deep.

Readings from the upper Shepparton aquifer represent the water table, while readings from the lower Shepparton aquifer represent the pieziometric level of the lower confined aquifer.

All piezometers with a recorded depth are mapped, except those recorded as dry, blocked, buried or otherwise damaged.

For comparative purposes, groundwater levels in the previous year and in the baseline year of 1998 are presented along with the current year. The inclusion of the previous year highlights the change in conditions from the last season to the present, whilst the inclusion of the baseline year allows a comparison with groundwater conditions in 1998.

In this section we display tables with six depth ranges to depict change, this is to provide a more detailed analysis and to remain consistent with historical reporting. This exceeds the licence requirement to provide three depth ranges.

Figures 6.1 and 6.2 are contour maps of the piezometric levels below natural surface for September 2019. A 3D surface of piezometric levels was created from point measurements (depth to water below natural surface at each piezometer) by using the Inverse Distance Weighted (IDW) method of interpolation. This method requires inputs of XY locational coordinates and a Z coordinate for the piezometric level.

Tables 6.1 and 6.2 are tabular representations of Figures 6.1 and 6.2 respectively.

Table 6.1: Groundwater depth below natural surface; 0-12m piezometers; Sept 2019 Comparison of areas 1998, 2018 & 2019

Groundwater Depth Range Below Natural Surface (m)	Years and Area of Groundwater Depth (ha)			Change in Area of Groundwater Depth (ha) [+ = rising][- = falling]	
	1998	2018	2019	2019 vs 1998	2019 vs 2018
0-1	1,939	8	0	-1,939	-8
1-2	34,102	462	101	-34,001	-361
2-4	41,559	39,363	8,139	-33,420	-31,224
4-6	13,442	30,566	54,535	41,093	23,969
6-8	4,256	12,723	17,063	12,807	4,340
8+	504	12,680	15,964	15,460	3,284
Total	**95,802**	**95,802**	**95,802**		

From Table 6.1 for 0-12m depth piezometers 8,240 ha or 1% of the mapped groundwater area existed in the 0-4m zone in 2019, which in Figure 6.1 is represented in red, orange and yellow combined. This compares to 42% in 2017/18.

Comparing years 2018 and 2019 the area of the 0-1m range has decreased from 8 ha to 0 ha. For the same period there was also a reduction in area of 1-2m from 462 to 101 ha.

Table 6.2: Change in area of Groundwater depth ranges below natural surface; 12-60m piezometers; years 2018 to 2019, and years 1998 to 2019

Groundwater Depth Range Below Natural Surface (m)	Years and Area of Groundwater Depth (ha)			Change in Area of Groundwater Depth (ha) [+ = rising][- = falling]	
	1998	2018	2019	2019 vs 1998	2019 vs 2018
0-1	760	0	0	-760	-
1-2	22,264	99	6	-22,258	-93
2-4	33,481	21,813	2,155	-31,326	-19,658
4-6	17,300	29,546	35,462	18,162	5,916
6-8	10,549	13,412	19,883	9,334	6,471
8+	11,448	30,932	38,296	26,848	7,364
Total	**95,802**	**95,802**	**95,802**		

Table 6.2 Compares the 12–60m range in 2019 and demonstrates that there is virtually zero in the 0-2m range, falling from 99 ha in 2018 to 6 ha in 2019.

2,161ha or 2.3% of mapped groundwater area existed in the 0-4m zone in 2019. This area is significantly lower than the 23% in 2019.

The 0-1, 1-2 and 2-4m values are depicted in red, orange and yellow on Fig 6.2.

Figure 6.1: Groundwater depth below natural surface; 0-12m piezometers Sep 2019

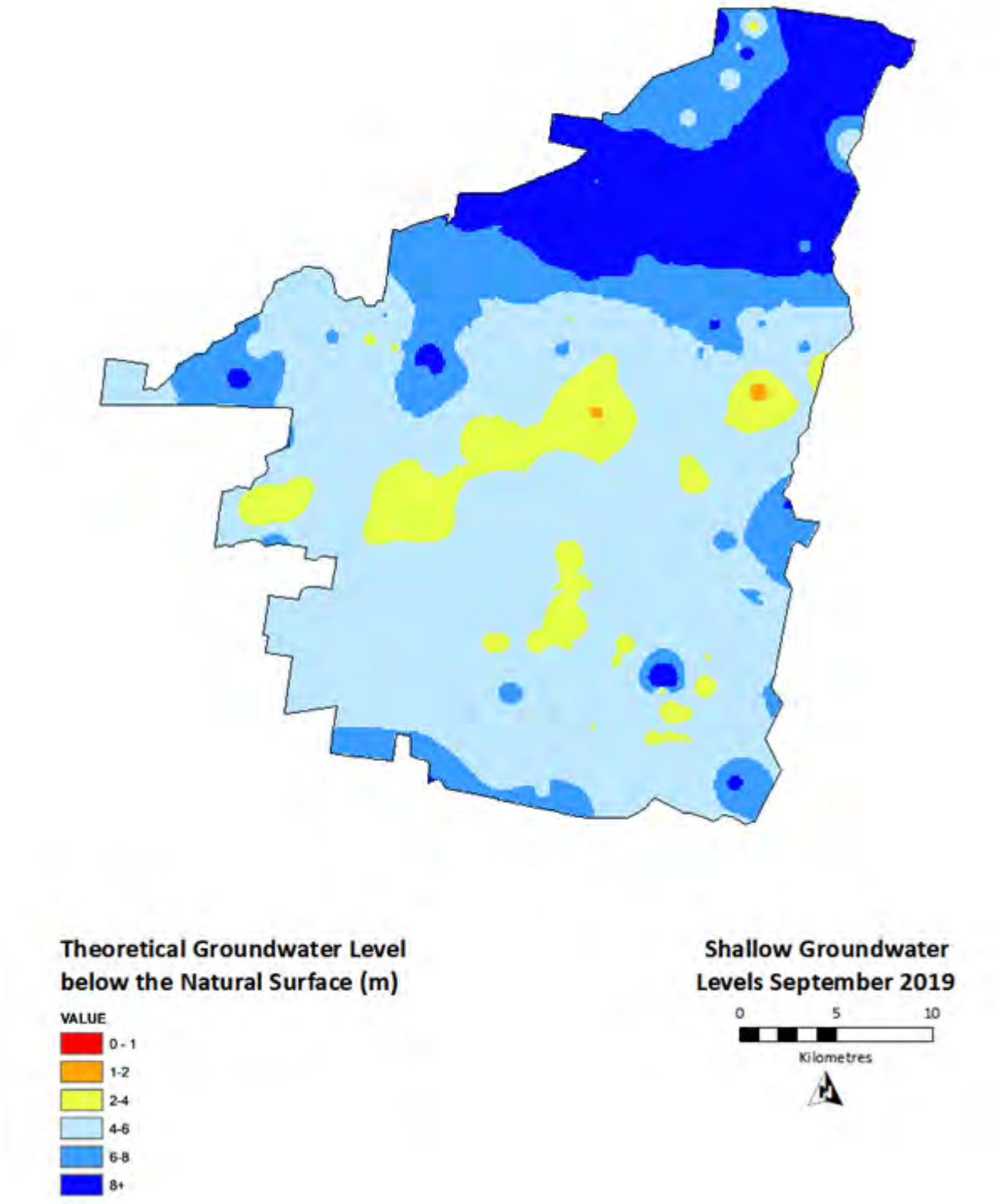
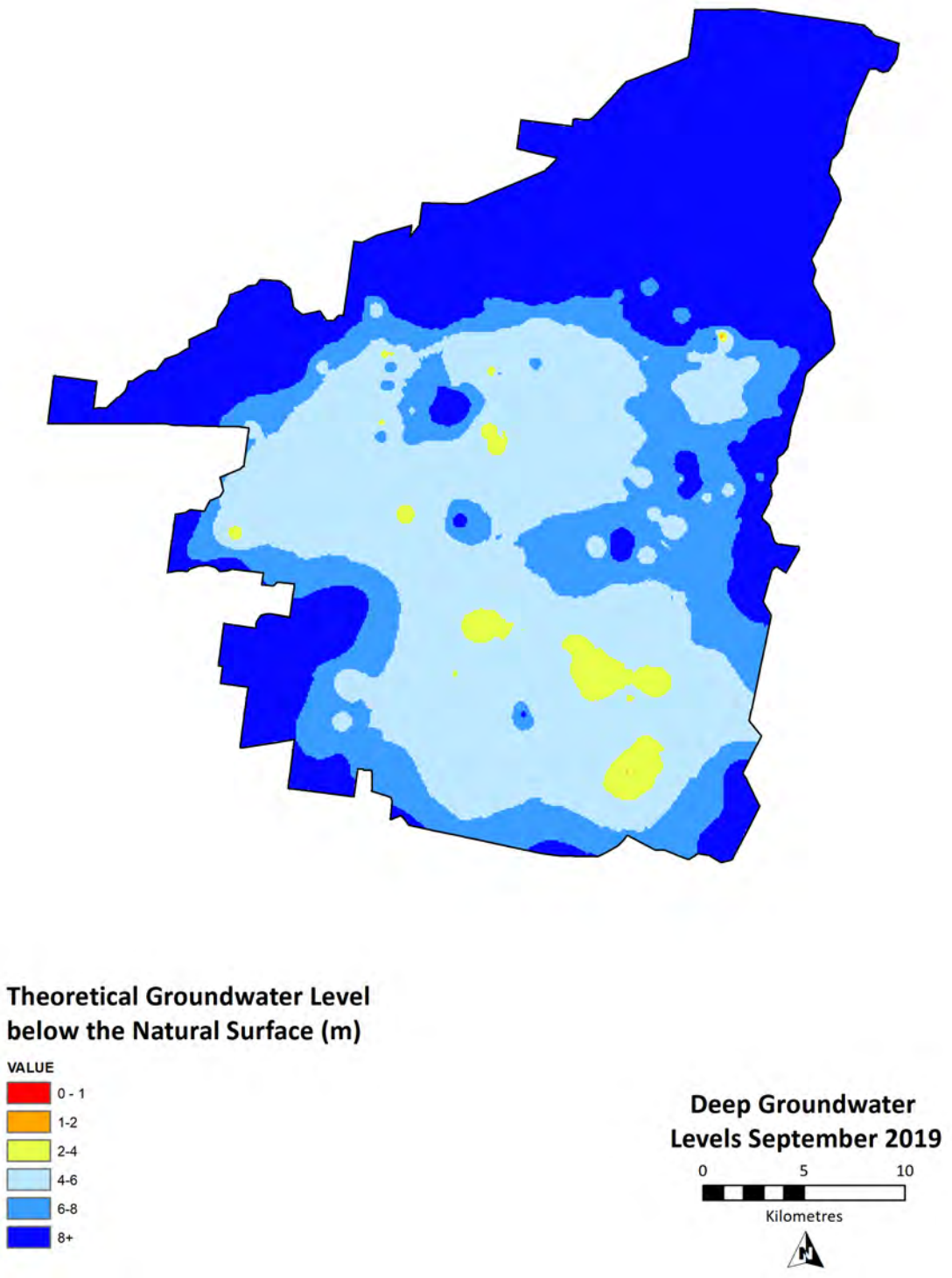


Figure 6.2 Groundwater depth below natural surface: 12-60m Sept 2019



Figures 6.3 and 6.4 depict the groundwater depth below natural surface, in the years 2019 and 1998, as converted to the Australian Height Datum (mAHD) and mapped for all of the 0-12m and 12-60m piezometers. Figure 6.5 compares the changes in the 0-12m groundwater depth between 2018 and 2019, and 1998 and 2019. Table 6.6 compares the changes in the 12-60m groundwater depth between 2018 and 2019, and 1998 and 2019. These are the upper and lower parts of the Shepparton Aquifer, respectively. These levels represent the groundwater height above sea level and can be used to identify the direction of groundwater flow. In general, the direction of groundwater flow is West South West.

Tables 6.3 and 6.4 are tabular representations of Figures 6.3 and 6.4 respectively.

Table 6.3: Groundwater Depth, below natural surface; 0-12m piezometers; Sep 2019 versus Sep 1998

Groundwater Depth Below Natural Surface (mAHD)	2019 Area (Ha)	1998 Area (Ha)
123 – 127 (higher)	613	4,151
119 - 122	13,213	39,182
115 - 118	42,602	31,548
111 - 114	36,303	11,211
107 - 110	3,068	5,724
94 – 106 (lower)	3	3,986
Total	**95,802**	**95,802**

Table 6.4: Groundwater Depth, below natural surface; 12-60m piezometers; Sep 2019 versus Sep 1998

Groundwater Depth Below Natural Surface (mAHD)	2019 Area (Ha)	1998 Area (Ha)
123 – 127 (higher)	2	6,381
119 - 122	4,321	42,337
115 - 118	31,601	34,921
111 - 114	36,704	11,432
107 - 110	14,483	731
94 – 106 (lower)	8,691	0
Total	**95,802**	**95,802**

Figure 6.3 Groundwater Level (mAHD); 0-12m and 12-60m piezometers Sept 2019

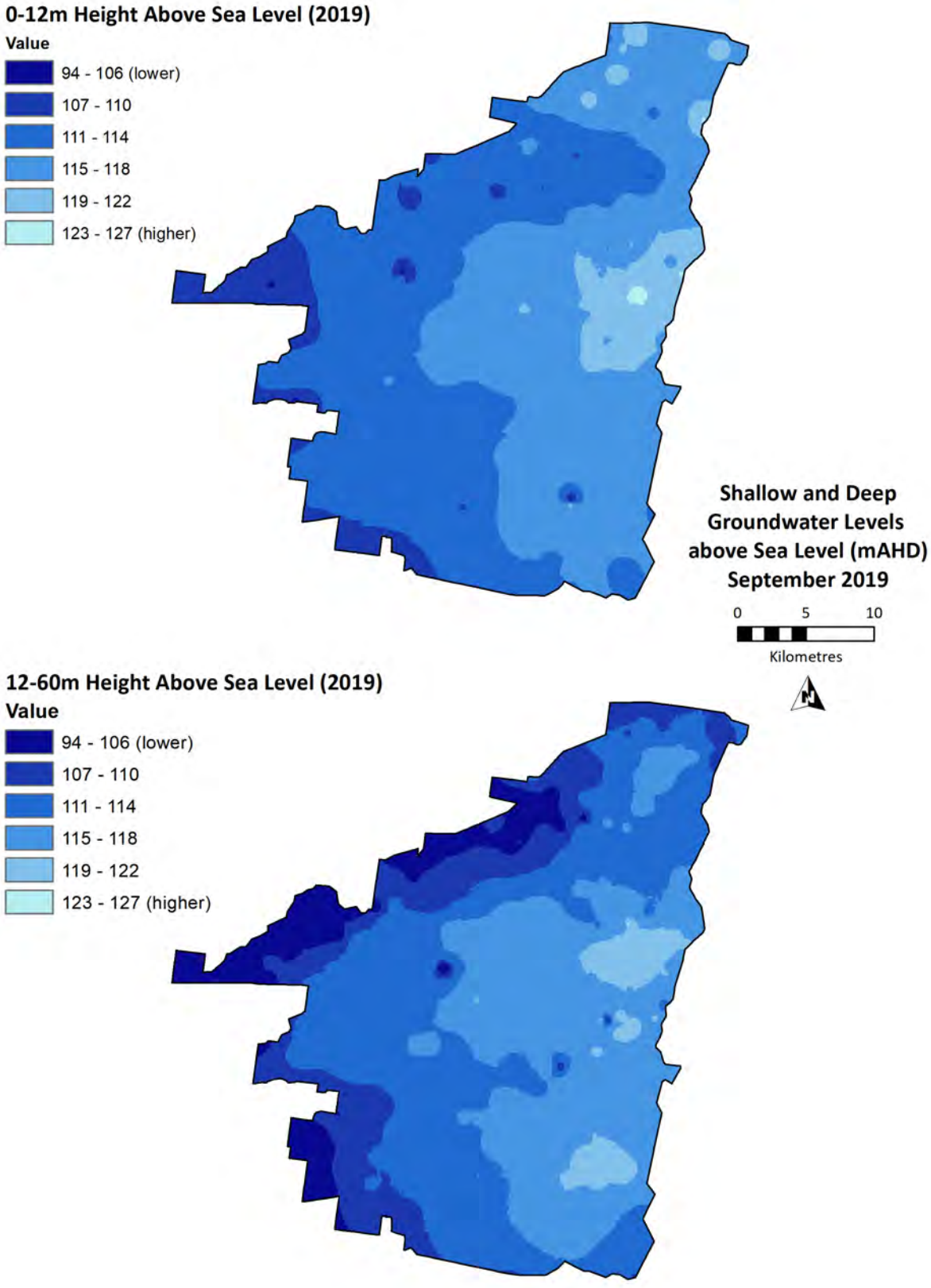


Figure 6.4: Groundwater Level (AHD); 0-12m & 12-60m piezometers; Sep 1998

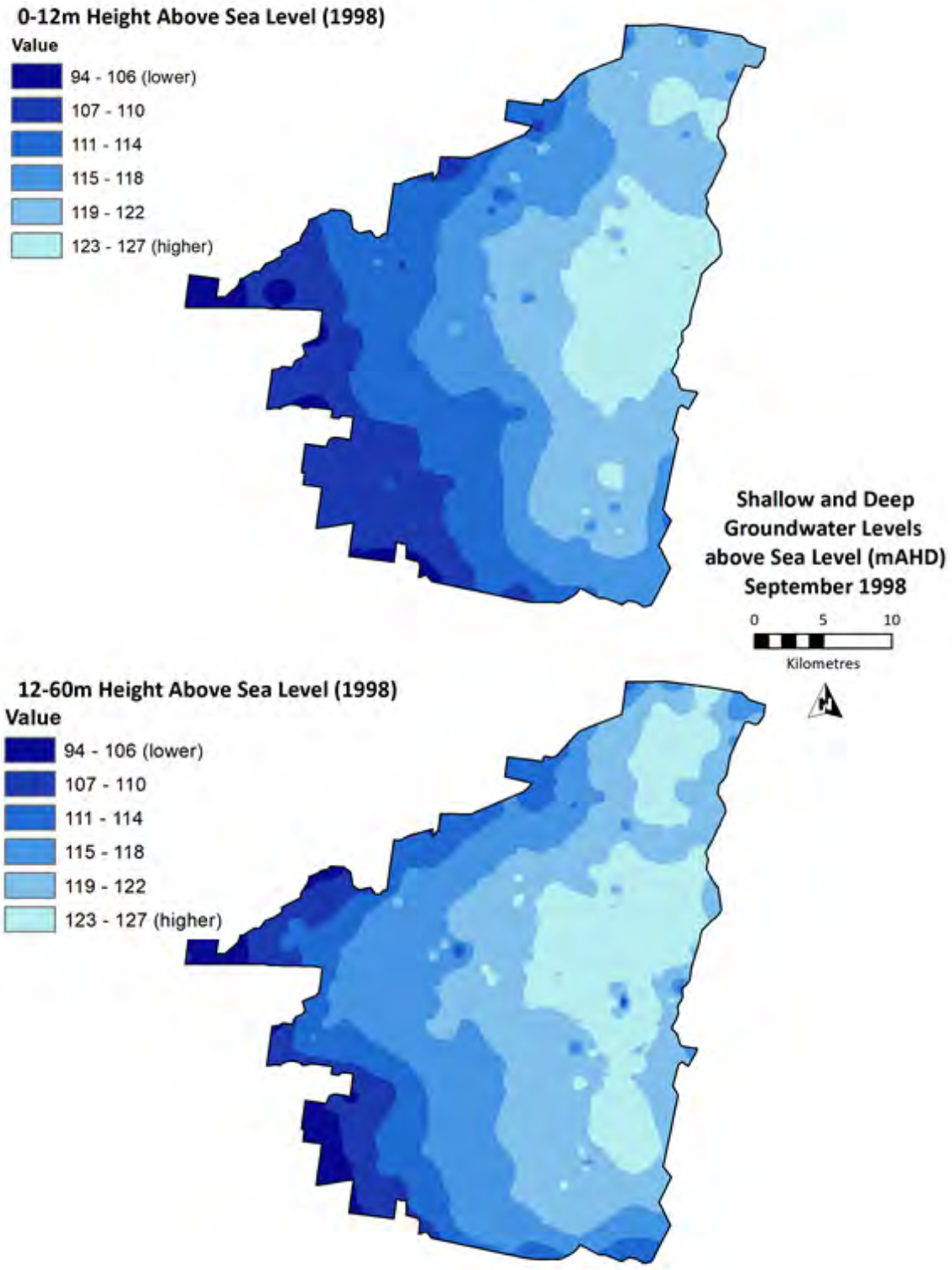
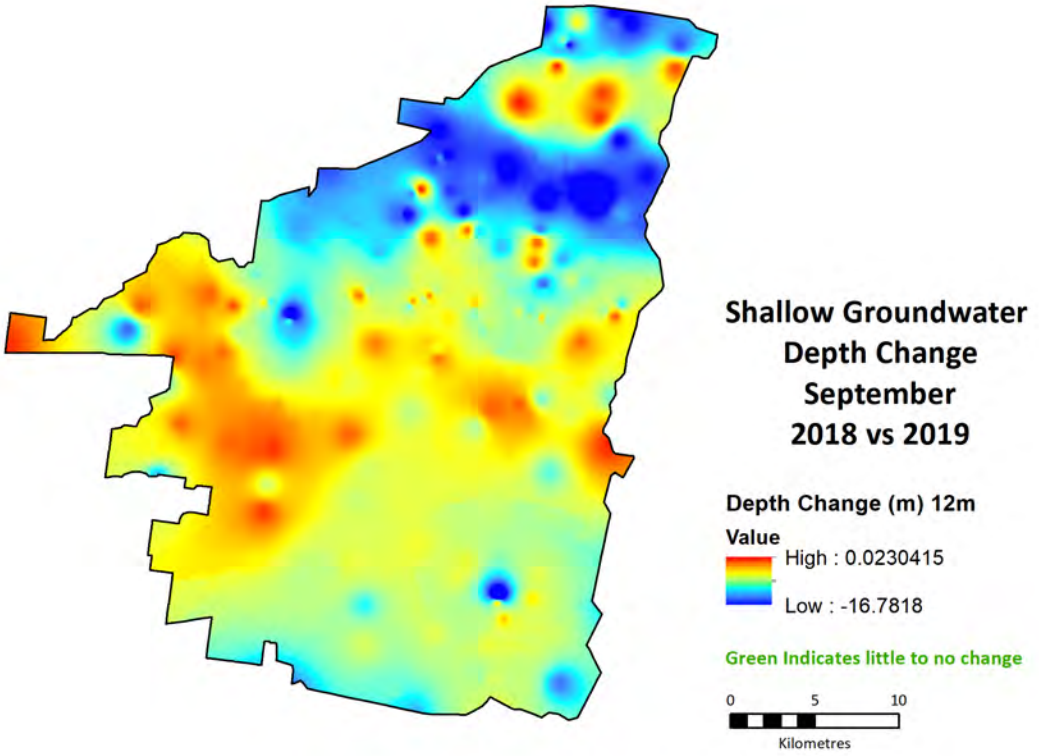


Figure 6.5: Changes in groundwater depth, below natural surface 0-12m piezometers comparing years 2018 to 2019 and 1998 to 2019



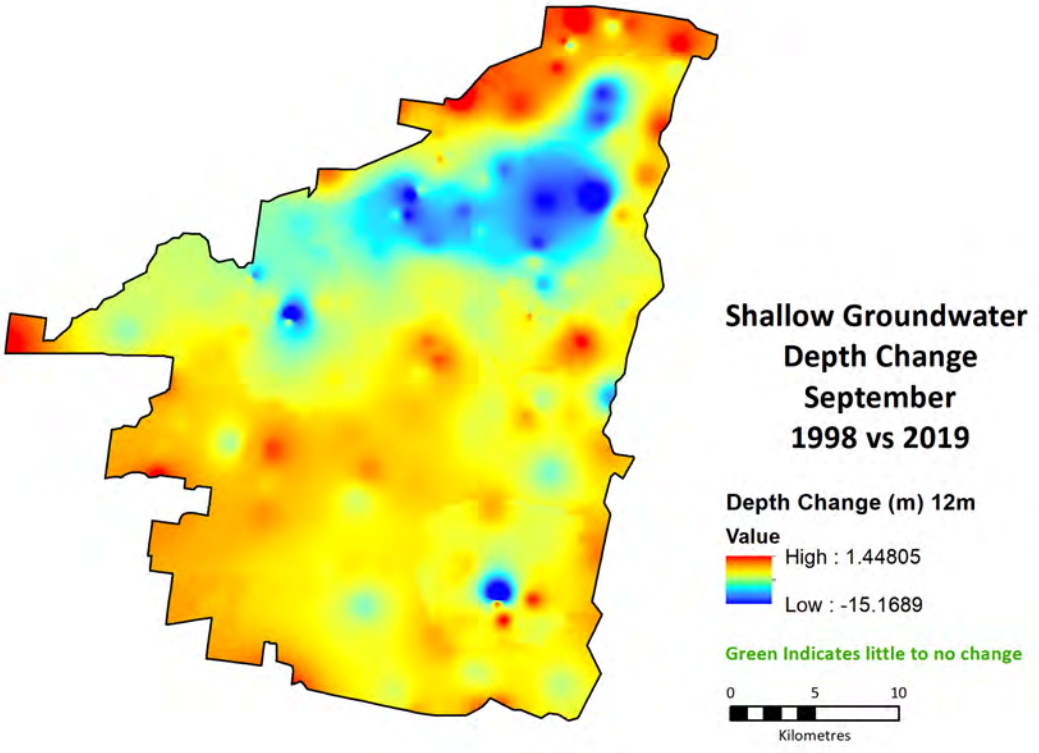
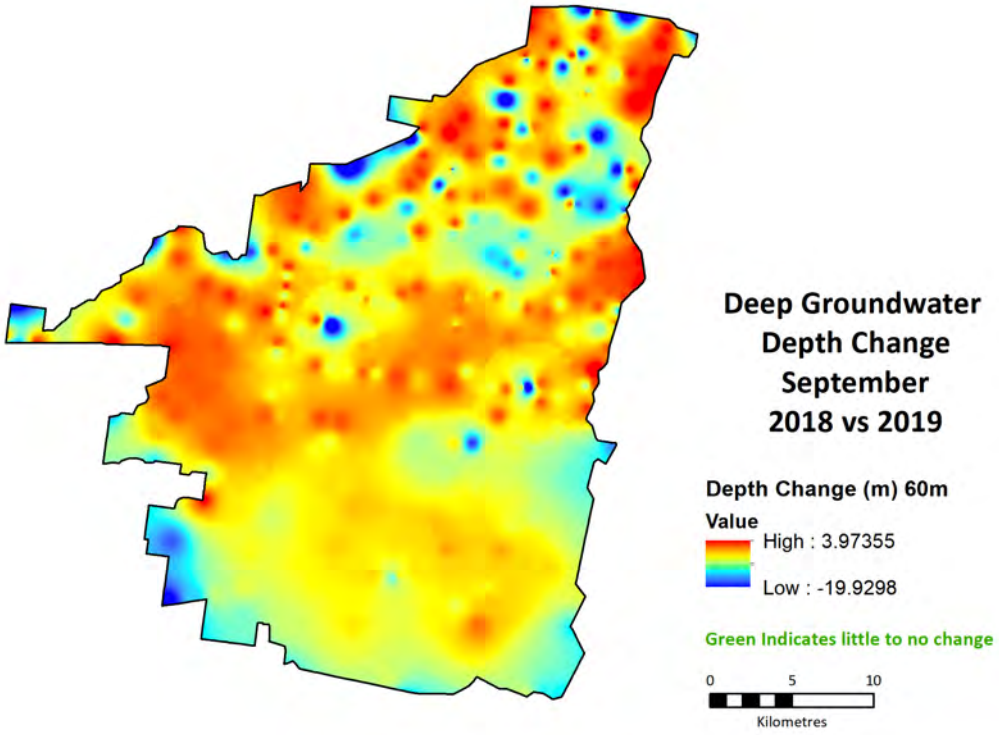


Fig 6.6: Changes in groundwater depth, below natural surface 12-60m piezometers comparing years 2018 to 2019 and 1998 to 2019



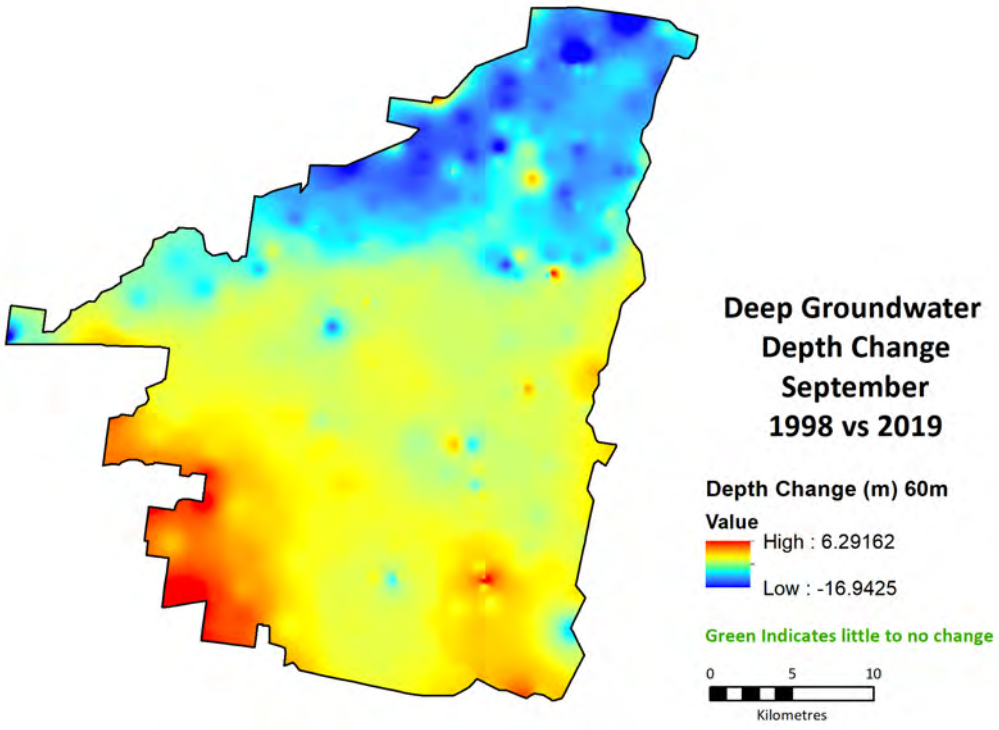
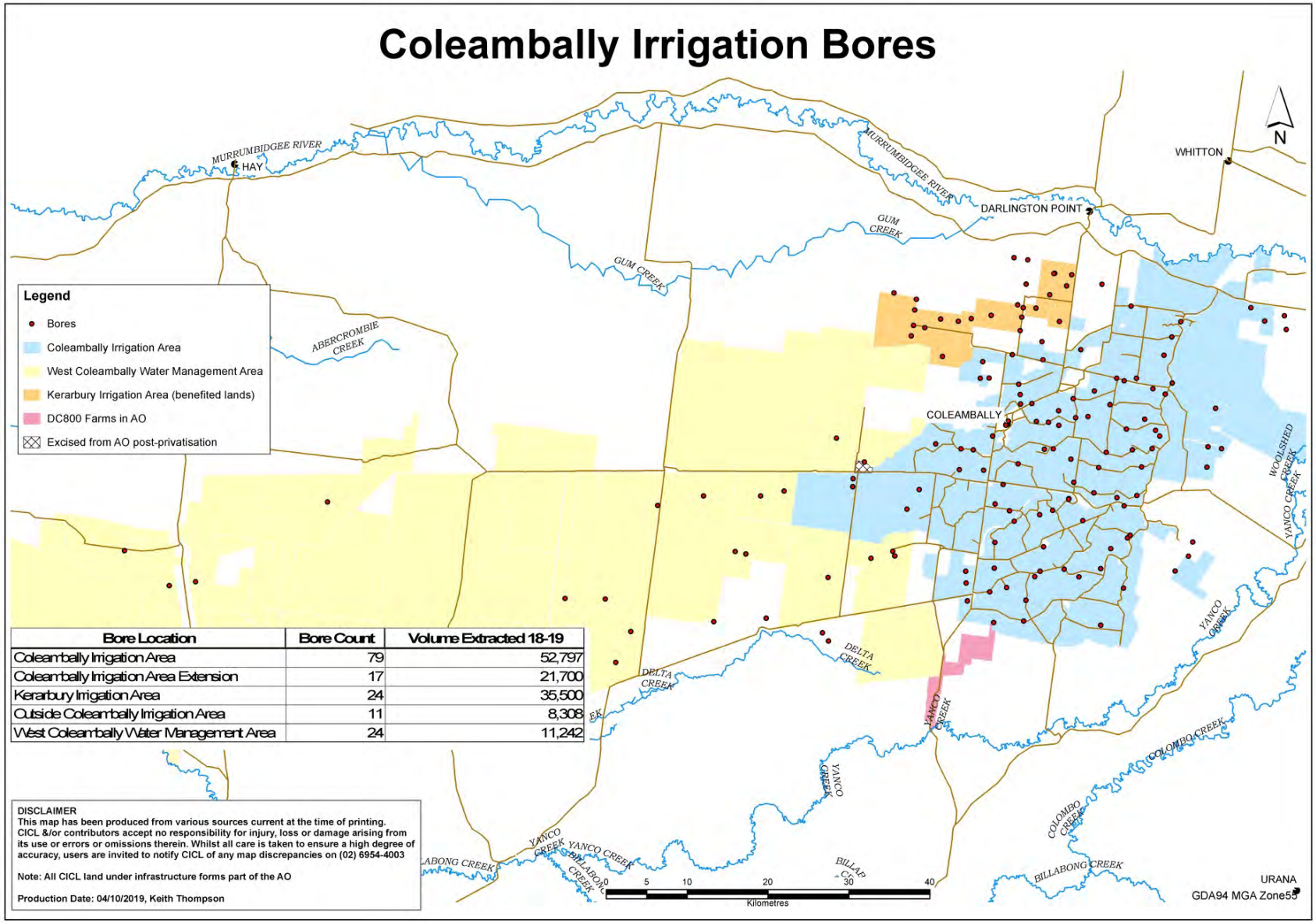


Figure 6.7: Location of Irrigation Bores with reference to CICL's Area of Operations



Bore Location	Bore Count	Volume Extracted 18-19
Coleambally Irrigation Area	79	52,797
Coleambally Irrigation Area Extension	17	21,700
Kerarbury Irrigation Area	24	35,500
Outside Coleambally Irrigation Area	11	8,308
West Coleambally Water Management Area	24	11,242

6.2 Groundwater Usage

The total metered groundwater usage for 2017/18 and 2018/19 and for the baseline season of 1998/99 is presented in Table 6.5. For the 2018/19 season, the total groundwater extraction within the reporting area was 129,547ML. It should be noted that the bores identified for inclusion in this section were originally identified by the Office of Water but they include some bores that lie outside the Coleambally Irrigation Area of Operations as indicated in Table 6.7. The number of bores in the area has increased with 53 more licences issued since 2014/15. The overall cap was not breached in 2018/19 and the allocation remained at 100%.

Table 6.5: Groundwater Extraction in 2018/19

Area	Number of bore licences (2018/19)	Extraction 2018/19 (ML)	Extraction 2017/18 (ML)	Number of bore licences (2014/15)	Extraction 1998/99 (ML) [baseline]
CIA	79	52,797	64,822	25	28,714
CIA Ext	17	21,700	20,209	10	N/A
Kerarbury IA	24	35,500	35,283	21	29,161
WCCWMA	24	11,242	11,399	46	11,065
Outside CIA	11	8,308	7,823		
Total	**155**	**129,547**	**139,536**	**102**	**68,940**

7 Environment Protection Licence

7.1 Water Quality

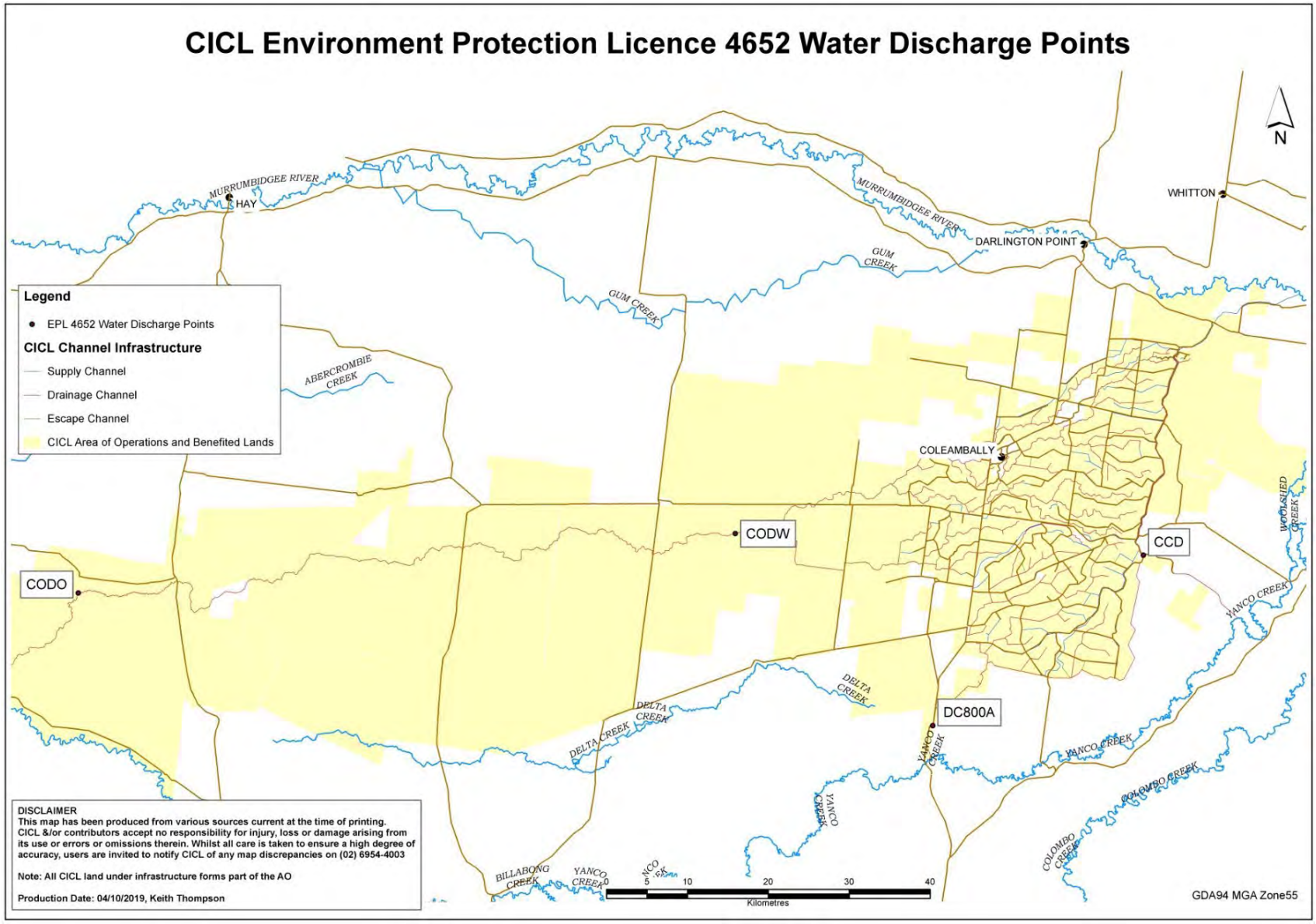
CICL's surface water quality program is aimed at monitoring supply and drainage water quality within CICL's operational area, including at the licensed discharge points. The program monitors flow, turbidity, dissolved oxygen, pH, EC, chemical and nutrient levels at various points To comply with licence conditions. CICL's water quality monitoring sites are shown in Figure 7.1.

There are three licensed drainage discharge points; Coleambally Outfall Drain monitoring site A (CODA) is used as a licensed site in place of Coleambally Outfall Drain monitoring site D (CODD) for the Rice Chemical Management Program (RCMP). Although the CODA site is not identified in the Environment Protection Licence (EPL), the site has been selected for its accessibility and is listed as an approved monitoring site. This arrangement has previously been agreed with the Department of Environment and Conservation (DEC), NSW DPI Water and the NSW Environmental Protection Agency.

The Combined Approval refers to the above discharge points; however a different terminology has been used to identify these sites, as indicated in Table 2.1.

At the licensed sites, flow, salinity and the temperature of drainage water are monitored continuously. Monthly water samples are collected from these sites and are analysed for the presence of chemicals as required by CICL's EPL. Samples are also collected and analysed from one supply site at the Main Canal (CCS) and one escape site (CE-160-2) when flowing. Salinity levels at the CCS are monitored constantly.

Figure 7.1: Water Quality Monitoring Sites



7.2 Environmental Monitoring

This section is in response to condition M4 of the EPL 4652.

From October to December each year, water samples are collected from a maximum number of 21 sites (dependent on flow) and are analysed for Molinate residue levels. This monitoring program was historically named the Rice Chemical Monitoring Program (RCMP) to detect Molinate contamination a major herbicide used in Rice.

Molinate residue levels are used as an indicator to the presence of other rice chemicals in the drainage water.

There were no detections of Molinate exceeding either the Notification Level or Action Level. During the program on two occasions there was flow to sample sites. The related results are in Table 7.1.

Table 7.1 Environmental Monitoring Licence Point Results in 2018/19

Date	Sample ID	Sample point	Report No.	Molinate µg/L
24/10/2018	5	CODW	ES1831721	<0.005
NF	18	DC800A		
NF	5	CODW		
NF	18	DC800A		
NF	5	CODW		
NF	18	DC800A		
NF	5	CODW		
NF	18	DC800A		
NF	5	CODW		
NF	18	DC800A		
NF	5	CODW		
NF	18	DC800A		
NF	5	CODW		
NR	18	DC800A		
NF	5	CODW		
12/12/2018	18	DC800A	ES1837529	<0.005
NF	5	CODW		
NF	18	DC800A		

Note:
NF = No Flow
NS = Not Sampled Supply Water Flow Only
NR = No Result

7.3 Chemical Use

In absolute terms chemical usage by CICL is down this season compared to last season. This is due to cycling pesticide use to alleviate growing resistance, drier seasons leading to less weeds and utilising alternative controls.

In endeavouring to minimise chemical usage CICL has purchased a UTV sprayer that allows for more precise application of chemicals by entering the drain base.

Table 7.2: CICL Chemical Usage in 2018/19

Product	Litres	Kg	Application
Access	96		Boxthorns
Surfactant Oil	1,981		Surfactant
700 Surfactant	320		Surfactant
Dicamba	494		Weed control
Dalapon		400	Cumbungi, water couch
Grazon	40		Brush weeds
Glyphosate	1,920		Weed control
Sulfomac		3	Weeds around structures
Tordon	146		Woody Weeds

7.4 Reportable Incidents

There was one reportable water quality incident in 2018/19 where a chemical exceeded notifiable levels. A complete report detailing CICL's investigation and response was submitted to the EPA as required under our licence conditions.

Table 7.3 Reportable water quality incidents in 2018/19

Month	Program	Chemical	Level	Drainage Area
October	Monthly WQ	Diazinon	0.011µg/L	DC800

8 Pollution Studies and Reduction Program (Environmental Improvement Program)

During the course of the year under review, the EPA agreed to an additional clause in CICL's EPL 4652 which was primarily in response to detections of Metolachlor in the drainage system. It was agreed that an Environmental Improvement Program (EIP) should include the following aspects:

- An audit to ascertain the range of chemical products used in the Coleambally Irrigation District.
- A risk assessment of properties.
- Conduct half life studies and matrixes for Metolachlor.
- Investigate agronomic practices that reduce risk of contamination.
- Identify an early notification system to indicate those customers that discharge into waterways.
- Develop contingencies for those customers who repeatedly discharge chemical into waterways.
- Customer education on improving environmental performance.

These matters were attended to as follows:

CICL conducted a survey of chemicals used in the CIA using bulk data from three re-sellers in Coleambally plus data from one of the largest contract applicators in the district. After collating the data and looking at the chemical properties that pose a risk to water quality, it was determined that there were no new risks. It was however identified that cotton insect pressure could lead to new product applications, therefore requiring ongoing vigilance. We have also identified that as cropping patterns change with less rice and more row-crop layouts, cotton has replaced rice in water use. With the cotton genetic engineering technology (Bollguard 3) there is less chemical required with the exception of Glyphosate. This survey also indicated a reduction of approximately 65% in Metolachlor use over the last 5 years. CICL's management plan that includes registration of Metolachlor users, enforced restrictions on drainage and member/ grower education programs have led to this reduction in use and the substitution of alternative products such as Pendamethalin and Dimethenamid-P.

CICL has conducted inspections of 102 properties growing corn. These properties were subject to inspections of different types of layouts, drainage water quality, on-farm storage/drainage capacity including pumps, drainage inlet structures and peak flow. This risk assessment revealed two properties were using Metolachlor without adequate layout or infrastructure and led to them being temporarily prevented from receiving irrigation water until these issues were remedied. An infrastructure program to replace drainage inlets to CICL drains was initiated and is ongoing using this data to prioritise "at risk" properties. These new inlets are made from HDPE plastic with welded headwall and aluminium sealed door. So far this program has replaced in excess of 60 inlets significantly reducing risk.

As part of the risk assessment of the 102 properties, CICL conducted half life testing on 25 samples known to contain Metolachlor residue which were kept in a controlled environment between tests. Using the average half life results from these tests CICL calculated the half life to be 116 days in water. This result was twice that indicated on the manufacturer's label. CICL research did discover that EU guidelines indicated 360 day half life in water. CICL then ran the three half life models on the tested farms and provided member/ growers with three scenarios indicating when contaminated drainage water at levels < EPA Notification Limit could be safely discharged.

CICL and one of the largest suppliers reviewed member/grower agronomic practices that reduce risk of chemical contamination. The highest risk seemed to be the improper or minimal incorporation of the product into the soil coupled with premature irrigation. A member/grower meeting focused on incorporation of the product and the scheduling of irrigation around application. CICL also conducted testing of silt samples from within CICL's

drainage system. This testing indicated there was no reportable level of residual contamination. This is due to complete draining of the system occurring between seasons thereby allowing air and sunlight to increase chemical breakdown.

CICL has been investigating early warning system technology. Using CICL's current RCMP program we can deduce contamination sources from positive data provided at key drainage sites. It is envisaged that sensors operating at strategic locations may assist with an early warning system. CICL has trialled two technologies from providers who have looked at different sensors coupled with LoRaWan telemetry. One of these providers trialled ultrasonic sensors and pressure sensors whilst the other concentrated on capacitance probes and accelerometers. Platforms providing SMS alarms based on calculations such as rate of change and deviation from normal has been one of the biggest challenges along with the influence of vegetative trash in the drains causing ultrasonic false alarms. The LoRaWan option has also been trialled but combining data from alternative telemetry options has been challenging. A third supplier whose platform can integrate with our SCADA network is currently beginning a trial which should be completed in the 2019/20 irrigation season. We are not yet satisfied that we have an acceptable solution for early warning system technology. In the absence of this technology we have continued to conduct surveillance of our drainage system to identify any unauthorised drainage events.

CICL has engaged with its members and their suppliers in an education program. The first step was a meeting of local agronomists who discussed the practices which increased the probability of contamination. Also discussed were using alternative chemical products such as Pendamethalin and Dimethenamid-P in their cropping system. Representatives from a major manufacturer of Metolachlor were invited to meet with member/growers to discuss label rates, environmental conditions and practices which would improve chemical performance. At the point of sale a product information flyer was handed to the purchaser acting as a reminder to the alternatives available and label conditions.

CICL reviewed the PIRMP to develop contingencies for customers that continue to discharge chemical into waterways. After the risk assessment of the property and the prohibition on water supply for those whose systems were deemed inadequate, locations for bunding of drains were identified along with potential sites for pumping out contaminated water. Co-operation was sought from members who had capacity to pump contaminated water onto their land in an attempt to limit contamination leaving CICL's Area of Operation. A surge area adjacent to DC800 at the property 'Red Swamp' was also identified and the owner/member consulted in order to secure an agreement to store contaminated water if required.

9 Appendices

Appendix 1: Piezometer pressure level data (raw data)

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
1	Boona	12-60	128.60	0.08	128.52	20.60	18.89	
4	Boona	12-60	128.90	0.38	128.52	24.70	18.69	
5	Boona	12-60	128.00	0.20	127.80	20.60	17.53	
10	Boona	12-60	128.00	0.50	127.50	21.60	11.83	
17	Boona	12-60	124.40	0.20	124.20	27.00	18.45	
19	Boona	12-60	124.30	0.55	123.75	18.50	-	Dry
25	Boona	12-60	125.00	0.00	125.00	26.90	11.85	
94	Boona	12-60	128.20	0.60	127.60	20.60	11.60	
96	Boona	12-60	127.30	0.25	127.05	24.40	14.82	
200	Boona	12-60	128.40	0.10	128.30	25.30	16.96	
201	Boona	12-60	128.40	0.10	128.30	32.40	12.56	
202	Boona	12-60	125.80	0.35	125.45	18.70	15.25	
203	Boona	12-60	124.80	0.35	124.45	26.90	19.21	
204	Boona	12-60	127.60	0.40	127.20	34.90	13.27	
207	Boona	12-60	124.10	0.40	123.70	25.90	18.03	
208	Boona	12-60	124.30	0.30	124.00	35.40	20.34	
376	Boona	12-60	127.30	0.44	126.86	31.90	18.33	
392	Boona	12-60	120.90	0.90	120.00	14.20	11.73	
396	Boona	12-60	122.10	0.73	121.37	32.50	14.10	
437	Boona	12-60	119.90	0.10	119.80	26.90	12.09	
443	Boona	12-60	121.10	0.28	120.82	26.10	-	Dry
496	Coly	12-60	118.90	1.30	117.60	27.10	5.03	
498	Coly	12-60	120.50	0.10	120.40	20.50	6.05	
499	Coly	12-60	118.20	0.38	117.82	23.80	4.20	
501	Coly	12-60	119.40	0.47	118.93	16.00	6.82	
502	Boona	12-60	119.30	0.82	118.48	28.40	13.18	
503	Boona	12-60	120.50	0.20	120.30	27.60	15.88	
504	Boona	12-60	120.40	0.33	120.07	28.80	18.28	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
507	Boona	12-60	120.60	0.20	120.40	39.00	24.68	
508	Boona	12-60	120.50	0.18	120.32	25.40	23.59	
509	Boona	12-60	119.20	0.05	119.15	21.90	20.64	
510	Boona	12-60	120.90	0.27	120.63	23.20	19.89	
520	Boona	12-60	121.80	0.28	121.52	21.60	13.97	
521	Boona	12-60	123.40	0.54	122.86	21.60	16.33	
594	Boona	12-60	121.80	0.41	121.39	17.70	12.55	
595	Boona	12-60	122.90	0.20	122.70	21.20	13.92	
596	Boona	12-60	123.10	0.25	122.85	23.30	15.34	
598	Boona	12-60	121.70	0.37	121.70	22.90	15.14	
614	Boona	12-60	122.70	0.45	122.25	15.50	-	Dry
615	Boona	12-60	123.60	0.12	123.30	15.80	-	Dry
617	Boona	12-60	124.90	0.60	124.30	24.90	10.40	
618	Boona	12-60	124.60	0.37	124.14	12.60	10.40	
619	Boona	12-60	124.90	0.00	124.90	24.10	10.02	
620	Boona	12-60	123.90	0.30	123.60	26.90	12.27	
621	Boona	12-60	126.90	0.23	126.67	14.00	13.65	
622	Boona	12-60	125.90	0.63	125.27	22.10	15.01	
623	Boona	12-60	125.30	0.47	124.83	12.40	10.35	
624	Boona	12-60	127.20	0.00	127.20	19.80	11.48	
625	Boona	12-60	123.30	0.13	123.17	26.90	13.79	
626	Coly	12-60	122.90	0.23	122.67	25.50	9.70	
627	Coly	0-12	122.80	0.13	122.67	9.60	8.62	
629	Boona	12-60	129.80	0.30	129.50	29.40	17.19	
630	Coly	12-60	128.20	0.56	127.64	19.30	10.80	
631	Boona	12-60	130.30	0.13	130.17	31.30	22.41	
635	Boona	12-60	129.60	0.31	129.29	31.90	22.04	
636	Boona	12-60	129.20	0.26	128.94	16.80	13.78	
637	Boona	12-60	128.90	0.24	128.66	28.20	13.23	
643	Boona	12-60	127.30	0.27	127.03	21.90	15.28	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
644	Boona	12-60	127.30	0.45	126.85	12.30	12.15	
645	Boona	0-12	126.60	0.32	126.28	11.90	9.93	
647	Boona	0-12	128.50	0.25	128.25	11.90	9.95	
648	Boona	12-60	127.90	0.60	127.30	10.50	10.02	
651	Boona	12-60	126.40	0.50	125.90	12.90	12.00	
652	Boona	12-60	125.90	0.80	125.10	12.60	5.58	
653	Boona	12-60	127.00	0.00	127.00	21.80	12.64	
654	Boona	12-60	126.50	0.25	126.25	32.50	21.05	
655	Coly	12-60	127.50	0.24	127.26	35.90	12.35	
656	Boona	12-60	126.40	0.00	126.40	27.30	17.84	
657	Coly	12-60	126.90	0.00	126.90	36.50	13.16	
658	Coly	12-60	124.00	0.34	123.66	22.30	7.12	
659	Coly	0-12	124.30	0.63	123.67	10.20	7.20	
661	Boona	12-60	128.60	0.19	128.41	14.40	14.40	
662	Boona	12-60	126.50	0.28	126.22	13.80	13.49	
663	Coly	0-12	125.20	0.10	125.10	7.30	7.22	
664	Coly	12-60	125.90	0.16	125.74	19.10	10.73	
665	Coly	12-60	123.20	0.15	123.05	20.10	7.38	C= 0.50m
667	Boona	0-12	127.00	0.70	126.30	7.50	6.50	
668	Coly	12-60	123.20	0.00	123.20	26.50	10.03	
669	Coly	0-12	123.00	0.00	123.00	11.00	8.50	
673	Coly	12-60	125.10	0.05	125.05	24.90	6.59	
676	Coly	12-60	125.20	0.14	125.06	23.40	5.31	
677	Coly	12-60	125.00	0.05	124.95	15.50	5.23	
678	Coly	12-60	126.70	0.13	126.57	23.60	6.07	
679	Coly	12-60	126.70	0.50	126.20	13.70	6.07	
680	Coly	12-60	126.10	0.00	126.10	23.10	5.84	
681	Coly	12-60	125.90	0.00	125.90	18.70	5.80	
682	Coly	0-12	125.80	0.00	125.80	10.50	5.71	
683	Coly	12-60	126.50	0.00	126.50	23.80	6.30	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
684	Coly	0-12	126.50	0.00	126.50	11.20	5.48	
685	Coly	12-60	127.40	0.10	127.30	12.70	7.10	
687	Coly	12-60	127.60	0.00	127.60	22.90	8.25	
688	Coly	12-60	127.80	0.20	127.60	13.70	8.42	
689	Coly	12-60	128.00	0.60	127.40	26.10	13.25	
690	Coly	12-60	127.90	0.26	127.64	27.70	11.91	
691	Coly	12-60	126.70	0.13	126.57	20.70	9.50	
692	Coly	12-60	126.70	0.20	126.50	15.80	8.85	
693	Coly	12-60	127.90	0.41	127.49	24.50	9.80	
695	Coly	12-60	126.40	0.05	126.35	20.40	8.42	
696	Coly	12-60	126.90	0.22	126.68	58.50	14.66	
697	Boona	12-60	123.40	0.54	122.86	21.90	19.68	
698	Boona	12-60	123.50	0.19	123.31	20.60	4.39	
700	Coly	12-60	123.10	0.17	122.93	24.60	4.85	
701	Coly	12-60	123.20	0.30	122.90	17.10	4.93	
702	Coly	0-12	122.90	0.13	122.77	11.20	4.70	
704	Coly	12-60	123.70	0.05	123.65	24.30	5.71	
708	Coly	12-60	123.80	0.08	123.72	26.20	5.90	
709	Coly	12-60	123.90	0.30	123.60	19.40	6.12	
711	Coly	12-60	125.60	0.00	125.60	27.10	6.81	
725	Boona	12-60	126.30	0.25	126.05	27.10	15.20	
726	Boona	0-12	126.60	0.55	126.05	5.10	4.88	
730	Boona	12-60	124.90	0.12	124.78	23.90	21.20	
732	Boona	12-60	124.90	0.28	124.62	23.20	4.61	
734	Boona	12-60	124.70	0.14	124.56	18.90		Dead
738	Boona	0-12	126.50	0.25	126.25	10.90	11.18	
739	Boona	12-60	126.20	0.40	125.80	18.30	10.77	
752	Boona	0-12	127.30	0.00	126.94	11.80	11.40	
753	Coly	12-60	126.50	0.40	126.10	26.70	10.26	
755	Yamma	0-12	126.90	0.20	126.70	9.30	8.93	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
756	Yamma	0-12	127.00	0.46	126.54	4.40	-	Dry
757	Coly	12-60	126.90	0.32	126.58	30.40	9.76	
758	Coly	12-60	126.90	0.35	126.55	15.80	10.64	
762	Coly	12-60	126.10	0.00	126.10	25.90	6.01	
763	Coly	12-60	125.80	0.10	125.70	17.00	6.15	
764	Coly	12-60	124.80	0.10	124.70	20.90	6.35	
765	Coly	12-60	122.40	0.00	122.40	15.60	4.70	
766	Coly	0-12	122.30	0.00	122.30	3.90	-	Dry
767	Argoon	12-60	123.40	0.08	123.32	24.30	5.35	
768	Coly	12-60	122.40	0.05	122.35	21.40	5.28	
769	Coly	12-60	122.70	0.30	122.40	16.60	5.40	
770	Argoon	12-60	124.80	0.12	124.68	17.80	5.82	
771	Argoon	12-60	125.63	0.02	125.61	26.00	5.53	
772	Argoon	12-60	122.50	0.06	122.44	18.30	4.73	
773	Argoon	12-60	122.40	0.11	122.29	25.30	4.74	
774	Argoon	12-60	121.10	0.36	120.74	25.10	5.08	
776	Argoon	0-12	122.20	0.04	122.16	7.30	5.24	C = 0.00cm
778	Argoon	12-60	121.00	0.02	120.98	20.90	6.20	
779	Argoon	12-60	120.20	0.25	119.95	18.60	5.89	C = 31cm
781	Yamma	0-12	126.70	0.21	126.49	8.50	7.36	
789	Coly	12-60	128.10	0.44	127.66	23.70	10.87	
790	Boona	0-12	127.30	0.25	127.05	9.40	8.93	
791	Coly	0-12	124.10	0.00	124.10	10.10	5.48	
792	Coly	0-12	124.10	0.06	124.04	4.90	4.76	
793	Coly	0-12	124.20	0.05	124.15	4.50	3.73	
794	Coly	0-12	124.30	0.12	124.18	4.20	2.95	
798	Coly	12-60	122.80	0.15	122.65	19.10	6.45	
799	Coly	0-12	122.90	0.27	122.63	10.90	6.56	
800	Coly	12-60	123.30	0.13	123.17	30.40	5.98	
801	Coly	0-12	123.30	0.18	123.12	8.30	5.40	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
802	Coly	12-60	121.20	0.00	121.20	15.00	5.25	
803	Coly	0-12	121.20	0.00	121.20	7.70	5.27	
804	Boona	12-60	123.30	0.30	123.00	32.50	18.83	
805	Boona	0-12	123.30	0.25	123.05	11.80	9.81	
806	Boona	12-60	123.50	0.27	123.23	34.70	18.07	
807	Boona	12-60	123.30	0.05	123.25	20.40	17.77	
809	Coly	12-60	119.79	0.00	119.79	25.85	5.78	
810	Coly	12-60	119.82	0.08	119.74	17.10	5.22	
813	Coly	12-60	119.10	0.35	118.75	25.20	13.44	
814	Coly	0-12	118.70	0.00	118.70	7.40	6.20	
815	Coly	12-60	117.50	0.00	117.50	28.70	15.78	
821	Coly	12-60	119.20	0.02	119.18	25.90	5.61	
822	Coly	0-12	118.90	0.02	118.88	9.80	5.55	
826	Coly	0-12	114.90	0.25	114.65	5.80	-	Dry
828	Coly	0-12	114.90	0.86	114.60	9.80	-	Dry
830	Coly	12-60	116.90	0.34	116.56	19.50	11.57	
831	Coly	0-12	116.90	0.05	116.85	6.30	5.83	
834	Boona	12-60	127.30	0.15	127.15	36.40	21.03	
835	Boona	0-12	127.30	0.15	127.15	5.90	3.45	
836	Boona	12-60	126.20	0.20	126.00	23.60	17.57	
837	Boona	0-12	126.30	0.25	126.05	11.50	11.30	
839	Boona	12-60	130.50	0.10	130.40	22.60	12.06	
841	Coly	12-60	115.00	0.12	114.88	37.10	18.38	
843	Boona	12-60	127.30	0.10	127.20	21.70	19.34	
845	Boona	12-60	127.40	0.00	127.40	23.50	19.12	
846	Boona	12-60	126.80	0.05	126.75	20.90	-	Dry
946	Boona	12-60	125.22	0.26	124.96	23.30	18.42	
949	Boona	0-12	128.60	0.17	128.43	10.50	10.44	
952	Boona	12-60	126.00	0.00	126.00	30.30	16.61	
954	Boona	12-60	126.60	0.00	126.60	14.10	12.93	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
964	Boona	12-60	124.20	0.13	124.07	27.50	17.76	
966	Boona	12-60	124.90	0.10	124.80	21.00	19.97	
967	Boona	12-60	123.80	0.20	123.60	26.60	16.48	
968	Boona	12-60	129.70	0.16	129.54	24.80	14.85	
969	Boona	12-60	130.00	0.45	129.55	14.30	13.53	
974	Boona	12-60	128.30	0.23	128.07	25.70	15.16	
977	Boona	12-60	129.90	0.13	129.77	24.00	19.00	
980	Boona	0-12	128.32	1.10	127.22	11.60	11.88	
983	Boona	12-60	130.10	0.00	130.10	33.20	21.60	
985	Boona	12-60	126.60	0.19	126.41	30.60	15.92	
986	Boona	0-12	126.70	0.30	126.40	11.10	10.80	
987	Argoon	12-60	120.50	0.00	120.50	24.30	4.43	
992	Argoon	12-60	121.60	0.16	121.44	32.80	8.97	
993	Argoon	0-12	121.50	0.07	121.43	8.40	4.60	
1000	Argoon	12-60	118.90	0.06	118.84	24.90	4.17	
1001	Argoon	12-60	118.90	0.00	118.90	14.90	5.52	
1002	Argoon	12-60	118.50	0.00	118.50	15.20	4.80	
1003	Argoon	12-60	117.70	0.00	117.70	28.10	6.32	
1004	Argoon	12-60	117.80	0.20	117.60	15.00	5.47	
1006	Argoon	12-60	117.30	0.27	117.03	15.00	4.84	
1007	Argoon	0-12	117.10	0.17	116.93	15.00	3.95	
1008	Argoon	12-60	118.30	0.05	118.25	15.00	5.33	
1009	Argoon	12-60	118.80	0.08	118.72	15.00	5.32	
1012	Coly	12-60	124.50	0.00	124.50	20.80	6.23	
1015	Argoon	12-60	119.80	0.35	119.45	15.00	6.01	
1016	Argoon	0-12	119.60	0.16	119.44	15.00	5.41	
1018	Argoon	12-60	118.80	0.00	118.80	15.00		Buried
1022	Argoon	0-12	119.10	0.15	118.95	15.00	2.97	
1048	Argoon	12-60	119.30	0.00	119.30	15.00	-	Blocked
1049	Argoon	0-12	118.50	0.10	118.40	15.00	6.04	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
1050	Coly	12-60	117.60	0.18	117.42	33.20	4.65	
1052	Argoon	12-60	117.40	0.12	117.28	15.00	5.91	
1060	Argoon	0-12	118.40	0.17	118.23	15.00	2.59	
1061	Argoon	0-12	119.10	0.64	118.46	15.00	3.20	
1070	Argoon	12-60	119.10	0.08	119.02	15.00	15.55	
1071	Argoon	12-60	116.50	0.08	116.42	15.00	9.60	C = 20cm
1080	Argoon	0-12	118.90	0.07	118.83	15.00	5.12	
1082	Argoon	0-12	117.49	0.21	117.28	15.00	5.99	
1148	Argoon	12-60	114.40	0.15	114.25	15.00	19.90	
1149	Argoon	12-60	114.60	0.42	114.18	15.00	-	Dry at 6.22
1150	Argoon	12-60	114.10	0.18	113.92	15.00	-	Dry at 18.7
1151	Argoon	12-60	114.60	0.37	114.23	15.00	-	Dry at 15.2
1152	Argoon	0-12	118.70	0.15	118.55	15.00	4.90	
1154	Boona	12-60	122.20	0.00	122.20	27.90	14.43	
1165	Boona	12-60	122.50	0.23	122.27	32.30	15.98	
1166	Boona	0-12	122.70	0.05	122.65	9.20	8.63	
1168	Argoon	12-60	115.20	0.14	115.06	15.00	9.54	
1169	Argoon	12-60	115.53	0.08	115.45	15.00	9.39	
1170	Argoon	12-60	116.43	0.04	116.39	15.00	4.94	
1177	Boona	12-60	121.30	0.08	121.22	31.80	12.79	
1178	Argoon	12-60	113.60	0.10	113.50	15.00	17.33	
1179	Argoon	0-12	113.80	0.26	113.54	15.00	-	Dry at 5.70
1180	Argoon	12-60	114.00	0.00	114.00	15.00	16.25	
1181	Argoon	12-60	114.70	0.12	114.58	15.00	16.78	
1190	Argoon	0-12	116.43	0.04	116.39	15.00	-	Dry at 2.20
1256	Argoon	0-12	116.30	0.07	116.23	15.00	4.60	C - 1.21
1257	Argoon	0-12	116.70	0.07	116.63	15.00	4.74	C = 1.23
1262	Argoon	0-12	114.90	0.00	114.90	15.00	7.39	
1263	Argoon	12-60	115.64	0.10	115.54	15.00	12.13	
1264	Argoon	12-60	115.90	0.35	115.55	15.00	-	Dry at 6.37

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
1279	Argoon	0-12	119.11	0.34	118.77	15.00	4.68	
1596	Boona	0-12	123.50	0.12	123.38	9.70	9.63	
1616	Boona	0-12	121.80	0.16	121.64	5.60	5.68	
1635	Boona	12-60	126.20	0.15	126.05	13.60	12.68	
1659	Boona	12-60	128.60	0.12	128.48	27.50	14.27	
1660	Boona	12-60	128.20	0.10	128.10	30.90	14.47	
1661	Boona	0-12	128.40	0.27	128.13	12.00	-	Dry
1740	Boona	12-60	118.90	0.34	118.56	25.70	21.52	
1780	Boona	0-12	123.20	0.20	123.00	10.80	10.70	
1853	Argoon	12-60	114.10	0.26	113.84	15.00	-	Locked gate
1868	Argoon	12-60	114.30	0.17	114.13	15.00	19.35	
1878	Argoon	12-60	114.80	0.12	114.68	15.00	-	Locked gate
1896	Coly	12-60	116.51	0.15	116.36	26.20	12.97	
1897	Coly	12-60	117.50	0.15	117.29	26.40	12.96	
2141	Boona	12-60	130.64	0.30	130.34	22.40	18.22	
2142	Boona	12-60	130.60	0.17	130.43	23.30	17.76	
2288	Boona	0-12	123.00	0.15	122.85	11.10	-	Dry
2338	Argoon	12-60	119.72	0.12	119.60	15.00	5.70	
2377	Boona	0-12	119.85	0.25	119.60	10.50	9.75	
2428	Argoon	0-12	119.92	0.38	119.54	15.00	4.67	
2431	Argoon	0-12	118.90	0.24	118.56	15.00	4.74	
2456	Boona	0-12	120.61	0.20	120.41	10.80	-	Dry
2458	Boona	0-12	119.61	0.28	119.33	11.10	10.77	
2519	Argoon	0-12	122.70	0.00	122.70	15.00	4.70	
2723	Boona	0-12	123.05	0.22	122.83	7.40	7.37	
2727	Boona	0-12	122.83	0.24	122.59	5.20	5.33	
2951	Argoon	0-12	124.00	0.13	123.87	15.00	5.16	
3371	Argoon	0-12	119.81	0.38	119.43	15.00	4.28	
4109	Yamma	12-60	125.38	0.25	125.65	17.90	8.61	
4113	Yamma	0-12	123.88	0.37	123.51	8.50	6.50	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
4131	Yamma	12-60	124.91	0.33	124.64	26.20	7.64	
4137	Yamma	0-12	126.56	0.42	126.14	8.50	-	Dry
4193	Argoon	0-12	123.31	0.11	123.20	15.00	4.56	
4209	Yamma	12-60	125.60	0.30	125.30	12.20	6.78	
4237	Argoon	12-60	121.00	0.07	120.93	15.00	6.84	
4238	Argoon	12-60	122.20	0.05	122.15	15.00	4.63	
4239	Yamma	12-60	121.10	0.18	120.92	22.90	4.28	
4241	Yamma	12-60	124.66	0.19	124.47	17.10	5.64	
4242	Yamma	0-12	124.58	0.24	124.34	9.90	5.08	
4250	Boona	12-60	125.30	0.28	125.02	20.10	10.83	
4372	Boona	0-12	122.29	0.32	122.29	9.10	9.23	
4375	Boona	12-60	122.29	0.44	121.85	18.20	11.93	
4546	Boona	12-60	121.19	0.35	120.84	19.40	14.59	
4547	Boona	12-60	121.30	0.23	121.07	19.10	15.59	
4548	Boona	12-60	128.00	0.35	127.65	18.30	17.42	
4558	Boona	12-60	127.10	0.20	126.90	21.50	-	Dry
4912	Boona	12-60	129.20	0.20	129.00	13.70	-	Dry
4914	Boona	0-12	128.45	0.32	128.13	6.90	4.35	
4921	Yamma	0-12	119.30	0.17	119.13	10.70	4.08	
4925	Yamma	12-60	120.70	0.40	120.30	12.30	4.63	
4927	Yamma	0-12	120.50	0.12	120.38	11.70	3.78	
4929	Yamma	0-12	122.30	0.36	122.06	5.40	3.98	
4930	Yamma	12-60	121.50	0.40	121.10	13.70	3.37	
4934	Yamma	0-12	118.54	0.05	118.49	10.80	3.97	
4935	Yamma	0-12	118.00	0.28	117.72	10.80	4.04	
4936	Yamma	0-12	117.84	0.27	117.57	11.10	5.11	
4937	Yamma	12-60	117.95	0.24	117.71	25.20	5.13	
4938	Yamma	0-12	117.89	0.12	117.77	11.00	5.00	
4941	Argoon	12-60	117.70	0.34	117.36	15.00	5.93	
4942	Argoon	12-60	116.65	0.18	116.47	15.00	5.12	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
4944	Yamma	0-12	123.88	0.28	123.60	8.40	5.05	
4956	Yamma	12-60	116.80	0.43	116.37	17.40	6.73	
4960	Yamma	12-60	118.60	0.12	118.48	28.70	5.32	
4962	Yamma	12-60	118.30	0.30	118.00	12.80	5.14	
4963	Yamma	0-12	118.60	0.13	118.47	9.70	6.72	
4999	Yamma	0-12	119.49	0.37	119.12	11.30	6.22	
5000	Yamma	12-60	119.40	0.13	119.27	14.90	6.14	
5001	Yamma	12-60	119.61	0.07	119.54	17.40	6.12	
5002	Yamma	0-12	119.97	0.42	119.55	10.50	7.30	
5003	Yamma	0-12	117.56	0.22	117.34	3.50	-	Dry
5004	Yamma	12-60	118.13	0.14	117.99	15.00	6.90	
5011	Yamma	12-60	120.87	0.29	120.58	17.10	5.89	
5436	Yamma	0-12	121.97	0.25	121.72	7.30	5.02	
5439	Yamma	0-12	122.03	0.19	121.84	4.30	4.16	
5443	Yamma	12-60	124.70	0.15	124.55	24.40	4.32	
5447	Yamma	12-60	123.83	0.13	123.70	23.40		Not on sheet
5448	Yamma	0-12	122.90	0.64	122.90	11.00	4.63	C = .30
5449	Yamma	0-12	122.63	0.32	122.31	9.40	4.17	
5528	Yamma	0-12	123.04	0.17	122.87	8.20	5.08	
5577	Yamma	0-12	122.88	0.00	122.88	8.50	8.43	
5588	Boona	12-60	118.81	0.16	118.65	25.50	-	Dry
5911	Boona	12-60	115.97	0.29	115.68	13.10	12.06	
5915	Boona	0-12	116.34	0.18	116.16	9.30	7.02	
5935	Boona	12-60	116.57	0.15	116.42	20.70	11.74	
5952	Yamma	0-12	121.21	0.21	121.00	7.60	4.37	
5954	Yamma	0-12	120.71	0.14	120.57	11.80	5.37	
5955	Yamma	0-12	120.25	0.10	120.15	9.40	5.18	
5957	Yamma	0-12	120.14	0.24	119.90	10.10	7.87	
5960	Yamma	0-12	119.43	0.12	119.31	7.00	4.55	
5961	Yamma	0-12	120.05	0.13	119.92	6.40	4.15	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
5964	Yamma	12-60	121.00	0.35	120.65	20.20	9.43	
5965	Yamma	12-60	122.82	0.36	122.46	15.50	4.00	C = .085
6102	Boona	0-12	117.39	0.09	117.30	11.60	-	Dry
6801	Yamma	12-60	127.46	0.20	127.26	20.70	11.74	
6802	Yamma	12-60	128.23	0.24	127.99	18.30	12.75	
6803	Yamma	12-60	128.29	0.32	127.97	16.20	12.83	
6804	Coly	12-60	128.47	0.00	128.47	28.00	15.28	
9317	Coly	0-12	126.74	1.18	125.56	5.60	7.02	
9318	Coly	0-12	125.67	0.13	125.54	4.70	4.22	
9320	Boona	12-60	129.49	0.00	129.49	13.80	-	Dry
9323	Boona	12-60	128.17	0.18	127.99	14.20	12.09	
9324	Boona	12-60	128.58	0.20	128.38	14.10	13.55	
9325	Coly	12-60	127.08	0.11	126.97	16.40	9.60	
9326	Boona	12-60	123.66	0.20	123.46	13.40	12.17	
9327	Coly	12-60	125.01	0.40	124.61	31.20	9.74	
9329	Boona	0-12	130.20	0.05	130.15	9.20	9.11	
9331	Boona	0-12	124.95	0.33	124.62	7.10	6.86	
9349	Coly	0-12	121.58	0.34	121.24	9.50	3.97	
9351	Coly	0-12	122.43	0.20	122.23	4.00	1.41	
9352	Coly	0-12	122.87	0.10	122.77	8.50	4.88	
9353	Coly	0-12	123.31	0.16	123.15	6.40	5.38	
9354	Coly	0-12	123.25	0.12	123.13	6.70	5.30	
9355	Coly	0-12	122.75	0.27	122.50	6.40	5.15	
9356	Coly	12-60	122.26	0.12	122.14	13.60	4.56	
9357	Coly	0-12	122.10	0.12	121.98	4.30	3.98	
9358	Coly	12-60	121.56	0.22	121.34	12.95	4.90	
9359	Coly	0-12	122.73	0.00	122.73	6.90	4.52	
9376	Boona	0-12	128.25	0.27	127.98	4.50	-	Dry
9379	Boona	12-60	127.90	0.21	127.69	12.40	10.28	
9380	Coly	0-12	124.52	0.30	124.22	11.50	5.86	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
9381	Coly	0-12	124.42	0.22	124.20	11.30	5.88	
9388	Coly	0-12	121.45	0.25	121.20	11.50	3.20	
9393	Coly	0-12	122.13	0.10	122.03	5.18	3.62	
9394	Coly	0-12	120.74	0.25	120.49	7.50	2.88	
9395	Coly	0-12	121.66	0.16	121.50	10.80	3.76	
9396	Coly	0-12	122.37	0.15	122.22	9.40	4.25	
9397	Coly	12-60	123.38	0.28	123.23	16.50	5.13	
9398	Coly	0-12	123.35	0.12	123.23	6.77	4.51	
9399	Coly	0-12	122.36	0.20	122.16	5.18	-	Dry
12101	Coly	0-12	121.85	0.19	121.66	3.05	-	Dry
12102	Coly	0-12	122.90	0.14	122.76	5.50	-	Dry
12103	Coly	0-12	126.38	0.14	126.24	3.60	2.21	
12104	Coly	0-12	127.07	0.30	126.77	3.20	1.36	
12116	Coly	0-12	124.37	0.00	124.37	6.30	5.67	
12166	Boona	12-60	122.85	0.30	122.55	31.83	19.50	
12171	Boona	12-60	122.65	0.07	122.58	16.00	11.49	
12178	Coly	0-12	121.52	0.16	121.36	9.35	5.46	
12179	Coly	0-12	120.36	0.23	120.13	6.10	5.22	
12180	Coly	0-12	121.23	0.23	121.00	7.21	5.78	
12181	Argoon	12-60	118.69	0.25	118.57	15.00	4.35	
12184	Argoon	12-60	119.46	0.24	119.41	15.00	3.65	
12188	Boona	0-12	121.37	0.10	121.27	9.70	8.23	
12190	Boona	12-60	121.73	0.26	121.47	22.01	20.20	
12191	Boona	12-60	121.23	0.15	121.08	22.00	-	Dry
12192	Boona	0-12	120.91	0.14	120.77	10.15	9.15	
12194	Boona	0-12	119.59	0.24	119.37	9.25	8.02	
12197	Boona	12-60	127.20	0.22	126.98	19.02	19.06	
12199	Coly	12-60	123.49	0.02	123.47	27.17	8.48	
12200	Coly	12-60	123.57	0.17	123.40	14.38	-	Blocked
12201	Boona	12-60	128.92	0.25	128.67	23.60	-	Dry

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
12202	Boona	12-60	129.31	0.25	129.06	32.23	18.37	
12205	Yamma	12-60	126.54	0.22	126.32	22.50	11.54	
12207	Yamma	12-60	125.30	0.16	125.14	12.75	9.00	
12210	Yamma	12-60	125.57	0.30	125.27	27.25	9.00	
12211	Yamma	12-60	125.57	0.30	125.27	17.30	8.96	
12215	Yamma	12-60	123.77	0.05	123.72	22.80	8.03	
12217	Yamma	12-60	124.38	0.35	124.03	22.50	7.38	
12218	Yamma	0-12	124.30	0.29	124.01	7.38	6.21	
12220	Yamma	12-60	122.97	0.02	122.95	15.80	5.49	
12221	Yamma	0-12	122.75	0.21	122.54	11.45	6.86	
12222	Yamma	0-12	121.82	0.18	121.64	10.00	6.37	
12223	Yamma	12-60	121.30	0.41	120.89	20.00	9.69	
12224	Yamma	12-60	121.36	0.15	121.21	20.05	9.13	
12225	Yamma	12-60	120.51	0.09	120.42	20.60	9.70	
12226	Yamma	0-12	120.98	0.06	120.92	10.10	-	Destroyed
12229	Yamma	12-60	120.69	0.12	120.57	24.00	6.57	
12230	Yamma	0-12	122.36	0.38	121.98	9.80	-	Dry
12232	Yamma	0-12	122.05	0.22	121.83	5.50	5.47	Dry
12233	Yamma	0-12	122.02	0.19	121.83	5.50	4.21	
12234	Yamma	12-60	121.94	0.16	121.78	23.25	3.89	
12235	Yamma	0-12	121.30	0.14	121.16	6.15	2.64	
12237	Yamma	0-12	123.37	0.20	123.17	11.00	4.60	
12238	Yamma	12-60	120.67	0.18	120.49	17.80	2.17	
12239	Yamma	0-12	120.60	0.08	120.52	7.50	3.84	
12241	Yamma	0-12	121.90	0.17	121.73	8.50	3.24	
12242	Yamma	12-60	123.85	0.19	123.66	19.10	4.72	
12243	Yamma	12-60	123.35	0.15	123.20	18.90	4.25	
12244	Yamma	0-12	123.55	0.13	123.42	8.30	4.07	
12245	Coly	12-60	129.33	0.21	129.12	18.30	-	Blocked
12247	Coly	12-60	128.81	0.18	128.63	23.10	15.57	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
12250	Coly	12-60	127.94	0.16	127.78	24.40	16.66	
12251	Coly	12-60	128.32	0.13	128.19	22.40	6.20	
12253	Coly	12-60	127.42	0.46	126.96	20.06	13.89	
12260	Yamma	12-60	127.29	0.40	126.89	12.05	-	Dry
12261	Yamma	12-60	128.48	0.10	128.38	16.45	14.42	
12262	Yamma	12-60	129.32	0.05	129.27	19.10	16.46	
12263	Yamma	12-60	129.41	0.20	129.21	18.00	18.06	
12264	Yamma	0-12	129.41	0.13	129.28	10.30	11.10	
12265	Yamma	12-60	126.90	0.00	126.70	17.20	-	Dry
12266	Yamma	12-60	128.29	0.18	128.11	18.20	17.10	
12267	Yamma	0-12	128.29	0.30	127.99	10.10	10.00	
12268	Yamma	12-60	129.25	0.15	129.10	22.50	18.32	
12270	Yamma	12-60	128.32	0.15	128.17	23.55	19.17	
12271	Yamma	12-60	128.18	0.24	127.94	24.68	18.03	
12272	Coly	12-60	129.17	0.14	129.03	24.60	15.03	
12274	Yamma	0-12	115.80	0.24	115.56	10.40	10.39	
12275	Yamma	12-60	115.80	0.29	115.51	16.48	14.08	
12276	Yamma	12-60	115.42	0.15	115.27	18.30	14.43	
12277	Yamma	12-60	116.65	0.12	116.53	22.33	15.46	
12278	Yamma	12-60	120.66	0.16	120.50	21.78	11.00	
12279	Yamma	12-60	118.19	0.11	118.08	22.45	12.98	
12280	Yamma	12-60	117.61	0.29	117.32	19.50	14.62	
12294	Yamma	0-12	119.53	0.22	119.31	9.00	-	Dry
12297	Boona	12-60	124.00	0.21	123.79	21.00	12.13	
12298	Boona	0-12	124.02	0.16	123.86	8.90	-	Dry
12299	Boona	12-60	124.77	0.20	124.57	22.20	13.52	
12311	Boona	0-12	127.20	0.15	127.05	10.50	9.27	
12312	Boona	0-12	127.13	0.27	126.86	6.00	6.00	
12313	Boona	12-60	126.64	0.29	126.35	19.00	-	Dry
12314	Boona	0-12	126.63	0.26	126.37	8.20	6.65	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
12315	Boona	0-12	126.62	0.22	126.40	6.00	4.78	
12316	Boona	12-60	127.07	0.16	126.91	21.00	-	Dry
12317	Boona	0-12	127.09	0.39	126.70	6.60	3.62	
12321	Boona	0-12	128.72	0.19	128.53	11.30	10.53	
12323	Boona	0-12	127.53	0.37	127.16	9.50	8.76	
12332	Boona	0-12	128.32	0.30	128.02	9.00	-	Dry
12333	Boona	0-12	127.51	0.26	127.25	9.40	10.76	
12334	Boona	0-12	128.69	0.22	128.47	8.50	7.88	
12346	Argoon	12-60	119.30	0.10	119.20	15.00	4.56	
12347	Boona	12-60	119.93	0.10	119.71	15.90	8.30	
12349	Boona	12-60	121.16	0.26	120.90	16.30	10.08	
12350	Boona	0-12	118.68	0.14	118.54	6.00	-	Dry
12351	Coly	0-12	120.62	0.26	120.36	7.20	14.05	
12352	Argoon	12-60	115.81	0.20	115.61	15.00	15.04	
12354	Argoon	12-60	115.76	0.26	115.50	15.00	10.25	
12355	Argoon	12-60	115.80	0.23	115.57	15.00	6.80	
12356	Yamma	12-60	115.93	0.16	115.77	23.50	8.34	
12357	Yamma	12-60	115.63	0.08	115.55	23.00	10.59	
12358	Yamma	0-12	115.63	0.20	115.43	11.00	10.45	
12362	Yamma	12-60	125.79	0.05	125.74	19.20	13.00	
12363	Yamma	12-60	125.63	0.25	125.38	21.70	13.85	
12364	Yamma	12-60	125.78	0.21	125.57	17.60	10.33	
12365	Yamma	12-60	125.31	0.23	125.08	20.00	14.25	
12366	Yamma	12-60	124.35	0.27	124.08	17.20	13.21	
12367	Yamma	12-60	126.73	0.08	126.65	19.00	11.18	
12368	Yamma	12-60	126.79	0.10	126.69	16.20	9.66	
12370	Yamma	12-60	115.34	0.07	115.27	20.00	13.90	
12371	Yamma	12-60	115.40	0.18	115.22	24.00	14.77	
12372	Yamma	12-60	114.83	0.10	114.73	20.00	1.60	
12373	Argoon	12-60	110.39	0.32	110.07	15.00	16.80	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
12374	Argoon	12-60	112.61	0.44	112.17	15.00	-	Dry
12375	Argoon	12-60	110.26	0.19	110.07	15.00	-	Dry
12376	Argoon	12-60	113.34	0.15	113.19	15.00	21.71	
12377	Argoon	12-60	117.44	0.13	117.31	15.00	6.88	
12378	Argoon	12-60	119.28	0.19	119.09	15.00	9.25	
12379	Argoon	12-60	116.71	0.32	116.39	15.00	8.95	
12379	Argoon	12-60	117.31	0.99	116.32			Dry
12381	Boona	0-12	124.69	0.30	124.39	9.00	-	Dry
12383	Boona	12-60	126.83	0.13	126.70	15.50	-	Dry
12384	Argoon	12-60	119.28	0.27	119.01	16.00	8.40	
12387	Argoon	0-12	116.66	0.20	116.46	10.50	8.79	
12387	Argoon	0-12	117.38	0.99	116.39			
12389	Boona	12-60	130.48	0.23	130.25	21.90	15.25	
12391	Boona	12-60	131.28	0.25	131.03	17.00	15.29	
12393	Boona	0-12	125.20	0.00	125.20	10.00	-	Dry
12394	Boona	0-12	125.59	1.00	124.59	12.00	-	Dry
12395	Coly	12-60	125.88	0.17	125.71	15.60	7.08	C= 0.00m
12396	Coly	0-12	125.67	0.05	125.62	6.90	4.00	
12397	Coly	12-60	124.37	0.17	124.20	13.00	6.08	
12398	Coly	12-60	123.36	0.17	123.19	13.00	8.33	
12399	Coly	12-60	126.07	0.42	125.65	17.70	6.54	
12401	Boona	12-60	127.82	0.15	127.67	15.00	12.81	
12402	Boona	12-60	125.99	0.16	125.83	19.50	9.74	
12403	Boona	0-12	127.05	0.28	126.77	9.80	8.05	
12404	Boona	12-60	125.86	0.27	125.59	12.70	-	Dry
12405	Boona	12-60	125.94	0.29	125.65	14.50	12.29	
12406	Boona	12-60	125.38	0.22	125.16	17.00	-	Dry
12407	Boona	12-60	126.24	0.23	126.01	12.10		Dead
12409	Boona	0-12	125.84	0.05	125.79	11.30		Dead
12410	Coly	0-12	126.89	0.28	126.61	10.10	6.01	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
12411	Coly	0-12	126.38	0.14	126.24	9.00	5.36	
12412	Coly	0-12	124.67	0.29	124.38	11.80	7.00	
12413	Coly	12-60	126.41	0.27	126.14	19.00	6.22	
12420	Yamma	12-60	117.95	0.06	117.89	15.50	4.50	
12421	Yamma	0-12	118.05	0.11	117.94	7.30	4.42	
12430	Boona	0-12	126.34	0.25	126.09	9.80		Dead
12431	Boona	0-12	125.97	0.20	125.77	9.80	14.10	
12432	Boona	12-60	125.37	0.04	125.33	17.10	14.00	
12434	Boona	0-12	126.16	0.18	125.98	10.80	11.07	
12436	Boona	0-12	123.32	0.22	123.10	11.30	8.64	
12437	Boona	0-12	124.34	0.11	124.23	8.00	-	Dry
12438	Boona	0-12	123.89	0.10	123.79	8.80	-	Dry
12441	Coly	12-60	127.06	0.17	126.89	18.10	8.29	
12442	Coly	12-60	126.87	0.20	126.67	18.50	7.49	
12445	Coly	12-60	126.19	0.80	126.19	19.50	6.39	
12448	Coly	0-12	126.15	0.38	125.77	3.50	-	Dry
12449	Coly	0-12	126.34	0.00	126.34	2.87	-	Dry
12454	Yamma	12-60	122.42	0.18	122.24	20.00	4.16	
12455	Yamma	0-12	122.43	0.12	122.31	10.50	4.00	
12458	Yamma	12-60	122.95	0.04	122.91	16.50	4.00	
12459	Yamma	12-60	123.81	0.17	123.64	17.50	4.18	
12460	Yamma	12-60	120.49	0.12	120.37	14.50	4.59	
12462	Yamma	12-60	120.37	0.05	120.32	16.50	4.25	
12465	Yamma	12-60	120.26	0.15	120.11	23.80	5.00	
12466	Yamma	12-60	119.75	0.23	119.52	34.00	8.66	
12467	Yamma	12-60	119.31	0.13	119.18	18.10	4.20	
12468	Yamma	12-60	118.46	0.15	118.31	19.50	4.47	
12471	Yamma	12-60	124.88	0.14	124.74	20.00	5.63	
12472	Yamma	0-12	124.67	0.24	124.43	4.80	3.00	
12473	Yamma	12-60	124.50	0.00	124.50	18.80		Destroyed

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
12477	Yamma	12-60	124.23	0.10	124.13	18.50	5.69	
12481	Coly	0-12	124.83	0.10	124.73	11.70	9.12	
12482	Coly	0-12	124.53	0.17	124.36	11.30	6.57	
12483	Coly	12-60	124.68	0.18	124.50	12.80	5.77	
12484	Coly	12-60	124.88	0.22	124.66	20.30	8.54	
12485	Coly	12-60	124.91	0.32	124.59	20.00	1.23	
12486	Coly	0-12	124.93	0.30	124.63	9.30	4.83	
12487	Coly	0-12	125.89	0.12	125.77	10.30	6.19	
12488	Coly	0-12	126.17	0.21	125.96	7.00	7.85	
12489	Coly	12-60	126.19	0.00	126.19	14.20	10.67	
12490	Coly	12-60	126.39	0.12	126.27	12.80	10.30	
12491	Coly	12-60	126.62	0.15	126.47	14.30	-	
12502	Yamma	12-60	122.20	0.19	122.01	15.50	4.91	
12512	Boona	12-60	129.21	0.34	128.87	22.50	18.82	
12514	Boona	12-60	131.26	0.34	130.92	16.30	13.46	
12528	Boona	12-60	126.96	0.20	126.76	17.50	15.27	
12529	Boona	0-12	127.18	0.10	127.08	10.50	11.28	C = 1M
12534	Boona	12-60	126.72	0.17	126.55	15.80	8.72	
12542	Boona	12-60	125.80	0.00	125.32	11.77	11.73	
12551	Yamma	12-60	111.27	0.48	110.79	19.80	16.33	
12552	Yamma	12-60	111.46	0.08	111.38	14.30	15.00	
12553	Yamma	12-60	111.88	0.18	111.70	13.30	13.18	
12554	Yamma	12-60	114.02	0.20	113.82	24.50	15.99	
12555	Coly	0-12	123.30	0.15	123.15	11.30	6.50	
12556	Coly	12-60	124.30	1.20	123.10	13.80	6.97	
12557	Coly	12-60	122.60	0.15	122.45	17.80	5.84	
12558	Coly	12-60	121.60	0.21	121.39	20.80	5.97	
12559	Coly	12-60	120.90	0.15	120.75	22.00	5.15	
12560	Coly	12-60	121.10	0.18	120.92	14.00	5.41	
12562	Coly	12-60	120.90	0.04	120.86	14.50	5.20	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
12563	Coly	12-60	120.20	1.12	120.11	15.00	6.56	
12564	Boona	12-60	125.60	0.30	125.30	19.50	-	Dry
12567	Boona	12-60	127.70	0.25	127.45	18.00	16.33	
12568	Boona	0-12	128.70	0.10	128.60	12.00	-	Dry
12569	Boona	12-60	124.10	0.17	123.93	12.16	10.25	
12570	Boona	0-12	123.40	0.30	123.10	11.60	11.78	
12571	Boona	0-12	123.10	0.16	122.94	11.00	9.16	
12572	Boona	0-12	122.60	0.25	122.23	11.30	8.43	
12573	Boona	12-60	123.10	0.69	122.90	26.50	14.52	
12574	Boona	0-12	123.10	0.63	123.00	11.30	10.13	
12576	Boona	12-60	121.60	0.20	121.40	14.30	10.96	
12577	Boona	0-12	121.30	0.20	121.10	11.80	10.75	
12578	Boona	0-12	121.00	0.54	120.62	11.30	9.14	
12580	Boona	0-12	119.60	0.13	119.47	8.80	7.26	
12618	Argoon	12-60	120.70	0.05	120.65	18.80	3.56	
12619	Boona	12-60	119.80	0.18	119.62	17.30	8.48	
12620	Coly	12-60	121.80	0.30	121.50	17.00	2.85	
12621	Coly	12-60	121.53	0.10	121.43	15.80	6.25	
12622	Boona	12-60	119.66	0.16	119.50	17.80	10.45	
12623	Boona	12-60	120.51	0.30	120.21	24.50	11.05	
12624	Coly	0-12	121.60	0.13	121.47	10.80	6.61	
12625	Coly	0-12	121.90	0.20	121.60	8.80	5.72	
12626	Coly	0-12	122.20	0.08	122.12	9.50	5.72	
12627	Coly	0-12	122.20	0.19	122.01	8.80	5.80	
12628	Coly	12-60	123.30	0.60	123.15	16.00	-	Blocked
12629	Coly	12-60	121.30	0.12	121.18	18.80	7.70	
12630	Coly	12-60	121.80	0.15	121.58	17.30	5.38	
12631	Coly	12-60	121.90	0.30	121.60	18.50	5.61	
12633	Argoon	12-60	122.20	0.02	122.18	29.80	5.39	
12634	Argoon	12-60	122.50	0.28	122.23	17.50	2.95	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
12635	Argoon	12-60	122.20	0.22	121.98	18.80	3.65	
12636	Argoon	12-60	121.90	0.27	121.63	18.80	-	Blocked
12638	Argoon	12-60	121.30	0.16	121.14	16.30	6.28	
12638	Argoon	12-60	121.30	0.23	121.07	47.80	19.77	
12640	Argoon	12-60	120.40	0.18	120.22	18.80	6.09	
12644	Argoon	12-60	120.90	0.22	120.68	19.00	5.73	
12645	Argoon	0-12	120.90	0.03	120.87	3.50	3.10	C = 0.05
12646	Argoon	12-60	121.20	0.24	120.96	21.50	5.49	
12647	Argoon	12-60	123.10	0.05	123.05	20.30	4.28	
12648	Coly	12-60	123.00	0.18	122.82	23.30	5.85	
12655	Argoon	12-60	122.00	0.32	121.68	13.00	4.52	
12658	Argoon	12-60	121.30	0.06	121.04	24.50	7.13	
12665	Argoon	12-60	119.80	0.20	119.60	30.00	6.69	
12666	Coly	12-60	120.10	0.21	119.89	25.80	6.14	
12672	Argoon	12-60	119.20	0.06	119.14	20.30	5.37	
12675	Argoon	12-60	118.90	0.07	118.83	23.30	4.90	
12676	Coly	12-60	127.40	0.14	127.26	16.30	7.52	C = 0.29
12677	Coly	12-60	126.40	0.15	126.25	20.00	5.45	
12678	Coly	12-60	125.50	0.22	125.28	19.30	5.58	
12679	Coly	12-60	124.50	0.16	124.34	23.80	5.59	
12680	Coly	12-60	123.40	0.10	123.30	24.30	6.07	
12681	Argoon	12-60	118.80	0.09	118.71	14.30	6.04	
12682	Argoon	12-60	118.50	0.24	118.26	25.30	5.11	
12683	Argoon	12-60	118.50	0.21	118.29	13.80	4.53	
12684	Argoon	12-60	119.50	0.23	119.27	13.30	3.70	
12686	Argoon	12-60	122.40	0.16	122.24	17.50		Destroyed
12687	Argoon	12-60	124.80	0.26	124.54	16.30	5.35	
12688	Argoon	12-60	123.40	0.46	122.94	23.30	5.79	
12689	Argoon	12-60	123.60	0.26	123.34	20.80	6.39	
12690	Argoon	12-60	120.70	0.30	120.40	26.50	7.10	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
12691	Argoon	12-60	122.00	0.11	121.89	27.30	5.09	
12701	Argoon	12-60	122.60	0.12	122.48	24.50	4.72	
12708	Boona	0-12	122.64	0.18	122.46	11.30	10.73	
12709	Coly	12-60	122.71	0.11	122.60	14.80	7.93	
12710	Coly	0-12	124.07	0.00	124.07	11.30	7.43	
12711	Argoon	12-60	122.53	0.12	122.41	17.80	5.84	
12751	Coly	12-60	123.29	0.00	123.29	14.00	10.02	
12753	Coly	12-60	124.70	0.80	123.70	16.30	11.68	
12759	Coly	0-12	122.15	0.15	122.00	8.30	7.28	
12760	Coly	12-60	123.10	0.08	123.02	18.30	9.00	
12841	Coly	12-60	123.30	0.25	123.05	18.30	8.25	
12842	Coly	12-60	123.40	0.25	123.15	15.40	7.51	
12843	Coly	12-60	123.40	0.27	123.13	18.90	6.53	
12844	Coly	12-60	123.40	0.22	123.18	17.30	6.64	
12845	Coly	12-60	123.00	0.19	122.81	22.80	5.72	
12846	Coly	12-60	124.80	0.28	124.52	17.80	10.92	
12848	Boona	12-60	122.47	0.20	122.27	21.80	20.81	
12854	Argoon	12-60	116.60	0.20	116.40	27.00	3.68	
12855	Argoon	0-12	116.60	0.23	116.37	8.80	3.34	
12880	Argoon	12-60	114.90	0.29	114.61	19.50	-	Destroyed
12901	Argoon	0-12	114.90	0.21	114.69	4.80	-	Dry at 3.47
12943	Argoon	12-60	120.12	0.35	119.77	14.30	5.40	
12944	Argoon	0-12	120.12	0.25	119.87	2.28	-	Dry at 2.53
12957	Argoon	12-60	118.16	0.34	117.82	44.20	6.72	
12958	Argoon	12-60	118.56	0.25	118.31	33.00	4.10	
12960	Argoon	12-60	122.24	0.22	122.02	40.50	13.17	
12961	Yamma	12-60	117.71	0.24	117.47	26.00	4.23	
12962	Boona	12-60	132.16	0.35	131.81	33.00	21.29	
12963	Coly	12-60	130.65	0.15	130.50	19.00		Dry
12963	Coly	12-60	130.67	0.15	130.52	41.50		Dry

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
12964	Coly	12-60	130.88	0.11	130.77	22.00		Dry
12966	Coly	0-12	121.22	0.23	120.99	11.00	7.78	
12966	Coly	12-60	121.20	0.25	120.95	20.00	7.51	
12966	Coly	12-60	121.19	0.29	120.90	27.50	10.16	
12967	Argoon	12-60	123.22	0.17	123.05	20.00	4.97	
12967	Argoon	12-60	123.22	0.15	123.07	24.50	5.07	
12968	Coly	12-60	132.02	0.35	131.67	20.50		Dry
12968	Coly	12-60	131.96	0.29	131.67	42.00		Dry
12969	Coly	12-60	130.92	0.22	130.66	24.50	20.20	
12970	Coly	12-60	130.26	0.22	130.04	19.50	19.73	
12972	Boona	12-60	125.06	0.17	124.89	18.50	18.92	
12972	Boona	12-60	125.05	0.18	124.87	48.00	10.51	
12973	Coly	0-12	125.92	0.19	125.73	7.50	6.03	
12973	Coly	12-60	125.84	0.06	125.78	23.00	5.90	
12973	Coly	12-60	125.90	0.10	125.80	44.50	19.31	
12974	Yamma	0-12	123.60	0.29	123.31	10.00	17.24	
12974	Yamma	12-60	123.60	0.29	123.31	28.50	5.23	
12974	Yamma	12-60	123.52	0.21	123.31	50.50	4.48	
12975	Argoon	12-60	116.10	0.19	115.91	25.00	12.25	
12976	Coly	0-12	127.93	0.18	127.75	1.90	-	
12976	Coly	12-60	127.93	0.22	127.71	19.70	9.52	
12977	Coly	0-12	127.93	0.08	127.85	4.60	3.28	
12978	Coly	0-12	127.33	0.13	127.20	8.00	3.81	
12979	Coly	0-12	127.57	0.08	127.49	6.50	3.20	
12984	Coly	0-12	126.66	0.20	126.46	11.80	6.34	
12985	Coly	0-12	127.31	0.11	127.20	10.00	6.33	
12986	Coly	0-12	127.91	0.14	127.77	9.30	6.33	
12987	Coly	0-12	125.61	0.05	125.56	8.30	6.15	
12988	Coly	0-12	125.10	0.10	125.00	9.20	6.31	
12989	Coly	0-12	125.43	0.10	125.33	8.80	6.36	

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
12990	Coly	12-60	125.93	0.16	125.77	12.50	6.17	
12991	Coly	0-12	125.15	0.25	124.90	10.00	2.96	
12992	Coly	0-12	125.33	0.17	125.16	9.60	6.16	
12993	Coly	12-60	125.87	0.21	125.66	16.00	6.07	
12994	Coly	0-12	125.12	0.13	124.99	10.45	5.94	
12995	Coly	0-12	125.22	0.13	125.09	7.10	5.85	
12996	Coly	0-12	119.32	0.19	119.13	8.90	5.10	
12996	Coly	12-60	119.32	0.10	119.22	20.60	5.61	
12998	Boona	12-60	120.48	0.17	120.31	26.50	16.40	
12999	Boona	12-60	121.65	0.21	121.44	23.00	15.62	
13000	Boona	12-60	121.93	0.11	121.82	23.00	13.17	
13001	Boona	12-60	123.25	0.16	123.09	20.50	16.38	
13002	Boona	12-60	117.62	0.24	117.38	21.50	10.19	
13003	Boona	12-60	116.52	0.23	116.29	25.18	10.14	
13004	Boona	12-60	116.82	0.55	116.27	26.00	24.37	Needs Repair
13005	Boona	12-60	118.49	0.32	118.17	17.80	-	Dry
13007	Coly	0-12	116.80	0.17	116.63	8.50	3.33	
13008	Coly	0-12	119.62	0.00	119.62	11.40	5.80	
13009	Coly	0-12	119.01	0.17	118.84	7.00	3.32	
13011	Argoon	0-12	120.12	0.09	120.03	5.00	4.01	C = 0.13
13011	Argoon	0-12	120.23	0.20	120.03	6.70	4.13	C = 0.23
13012	Argoon	0-12	119.92	0.17	119.75	5.00	3.90	Overgrown
13012	Argoon	0-12	119.92	0.18	119.74	7.00	3.90	Overgrown
13016	Coly	0-12	118.01	1.00	117.79	10.00	5.96	
13019	Coly	0-12	118.96	0.20	118.76	10.50	6.85	
13020	Coly	0-12	120.08	0.28	119.80	7.00	6.28	
13020	Coly	12-60	120.09	0.23	119.86	13.50	6.60	
13022	Coly	12-60	121.71	0.54	121.17	13.00	7.27	C=0.45
13023	Coly	12-60	119.50	0.32	118.96	16.00	6.91	
13024	Coly	12-60	116.88	0.26	116.68	13.50	3.66	C=0.26

No	sub-region	Piezo depth range (m)	Top of pipe (mAHD)	Top of pipe above NS (m)	Natural Surface (m_AHD)	Pipe depth below NS(m)	RD0919	Comment
13030	Coly	12-60	119.80	0.27	119.53	13.50	7.55	
13031	Coly	0-12	118.59	0.32	118.27	9.00	6.42	
13034	Argoon	0-12	116.23	0.65	115.58	7.08	-	Dry
13035	Argoon	0-12	116.47	0.21	116.26	5.14	-	Dry
13036	Argoon	0-12	116.72	0.26	116.46	7.34	-	Dry
13037	Argoon	0-12	115.86	0.53	115.33	7.80	7.37	
13038	Argoon	12-60	116.22	0.67	115.55	15.44	11.79	C=0.21
13040	Argoon	12-60	115.46	0.35	115.11	16.19	10.26	
13041	Coly	12-60	117.32	0.65	116.67	20.80	19.85	
13042	Coly	12-60	116.69	0.67	116.02	17.30	-	DRY
13043	Coly	12-60	116.55	0.40	116.15	18.10	-	DRY
OD 1	Outfall	12-60	82.88	0.33	82.55	23.50	11.97	
OD 10	Outfall	12-60	12-60	102.7	0.33	102.40	42.20	22.58
OD 2	Outfall	12-60	86.62	0.33	86.29	22.50	13.80	
OD 3	Outfall	12-60	91.94	0.37	91.57	22.00	14.83	
OD 4	Outfall	12-60	99.20	0.33	98.87	15.50	15.69	
OD 5	Outfall	12-60	95.92	0.37	95.55	34.00	19.43	
OD 6	Outfall	12-60	95.54	0.38	95.16	49.00	19.85	
OD 7	Outfall	12-60	100.33	0.37	99.96	46.00	21.95	
OD 8	Outfall	12-60	104.17	0.34	103.83	22.50	20.43	
OD 9	Outfall	12-60	110.83	0.34	110.49	41.50	24.21	

Appendix 2: Surface Water Extraction and Salinity

Where no flow was recorded EC data was removed (this is indicated in red font). Where a flow was indicated without corresponding EC the monthly average was used (indicated in green font).

Appendix Table 2.1: Flow (ML) for CCS Coleambally Main Off-take

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	0	0	442	1,205	585	1,657	984	780	597	1,152	16	0
2	0	0	467	1,665	439	1,645	1,010	684	486	1,051	0	0
3	0	204	508	1,769	471	1,221	962	661	430	998	0	0
4	0	736	629	1,635	1,033	757	772	615	506	989	0	0
5	0	789	783	1,007	1,355	680	1,006	489	500	1,003	0	0
6	0	786	754	714	1,312	764	733	383	566	602	0	0
7	0	772	746	846	1,269	818	806	452	602	278	0	0
8	0	875	844	776	1,251	796	885	229	594	276	0	0
9	0	980	796	788	1,033	763	1,536	262	652	236	0	0
10	0	971	501	737	583	818	1,778	366	675	210	0	0
11	0	736	523	813	148	714	1,744	364	639	194	0	0
12	0	629	626	759	182	1,104	1,165	374	639	194	0	0
13	0	625	671	650	219	1,576	922	365	600	255	0	0
14	0	705	729	712	169	1,861	1,078	516	485	243	0	0
15	0	667	723	457	166	1,952	1,132	466	409	138	0	0
16	0	791	695	347	173	2,080	1,156	392	359	200	0	0
17	0	984	726	1,110	255	1,976	898	384	333	208	0	0
18	0	875	813	1,821	244	1,459	989	288	339	276	0	0
19	0	922	843	1,788	267	878	1,004	266	336	303	0	0
20	0	802	832	1,190	365	933	817	287	326	285	0	0
21	0	742	907	1,210	454	776	875	340	335	180	0	0
22	0	691	864	1,145	453	820	1,017	360	329	151	0	0
23	0	603	832	951	456	675	976	360	333	163	0	0
24	0	594	755	522	410	763	1,008	391	329	231	0	0
25	0	534	702	321	385	821	921	487	528	198	0	0
26	0	384	699	344	438	917	896	658	1,009	141	0	0
27	0	436	651	330	521	983	695	670	1,050	119	0	0
28	0	453	628	320	538	1,030	650	692	1,086	207	0	0
29	0	505	436	347	1,240	1,016	652		1,112	130	0	0
30	0	551	408	433	1,640	960	610		1,122	116	0	0
31	0	562		516		956	705		1,144		0	

Appendix Table 2.2: Salinity (µS/cm) for CCS Coleambally Main Off-take

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	NF	173	134	141	200	201	190	213	224	196	226	NF
2	NF	174	134	155	196	202	191	213	222	196	228	NF
3	NF	176	134	186	193	209	194	218	223	197	230	NF
4	NF	NF	135	187	190	207	193	221	224	199	230	NF
5	NF	180	138	187	188	204	192	221	225	199	227	NF
6	NF	180	140	189	187	205	191	222	225	200	225	NF
7	NF	NF	142	193	187	203	192	222	225	200	223	NF
8	NF	139	142	193	187	203	193	225	223	201	221	NF
9	NF	128	143	193	186	203	194	225	220	201	220	NF
10	NF	126	144	193	187	204	194	224	215	201	221	NF
11	NF	123	145	192	189	201	195	223	211	202	220	NF
12	NF	130	146	189	190	195	197	222	202	203	220	NF
13	NF	133	146	189	191	190	203	221	197	204	219	NF
14	NF	134	146	188	192	187	208	219	195	206	220	NF
15	NF	133	147	187	192	187	208	218	194	211	223	NF
16	NF	134	149	187	193	188	209	220	193	215	225	NF
17	NF	136	152	187	195	191	209	226	193	221	226	NF
18	NF	137	153	190	197	192	209	237	193	224	NF	NF
19	NF	136	154	192	199	199	204	251	194	226	NF	NF
20	NF	132	153	192	203	196	204	250	201	227	NF	NF
21	168	130	152	191	205	192	204	243	213	230	NF	NF
22	169	132	146	192	208	193	209	244	213	234	NF	NF
23	168	134	141	192	209	195	214	255	212	238	NF	NF
24	168	137	139	195	209	202	209	249	212	239	NF	NF
25	168	137	140	196	209	206	206	233	211	238	NF	NF
26	166	137	140	197	209	231	207	232	209	253	NF	NF
27	165	137	142	198	209	229	206	229	206	256	NF	NF
28	168	137	144	199	209	201	204	226	202	246	NF	NF
29	168	137	144	201	220	196	204		199	239	NF	NF
30	168	137	142	203	217	201	205		198	232	NF	NF
31	169	135		203		196	213		197		NF	

Appendix Table 2.3 Flow (ML) for DC 800 at Outfall into Yanco Creek

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	0		1	0		31	29	16	37	31	22	41
2	0		6	0		31	40	16	37	10	6	40
3	0		3	17		32	49	16	38	0	1	26
4	0		1	31		31	51	16	38	7	0	18
5	0		0	35		31	51	18	38	30	4	13
6	0		2	32		31	53	18	50	30	0	16
7	0		2	27		32	54	19	57	31	0	21
8	0		1	23		32	53	19	58	31	0	16
9			1	31		33	25	18	57	29	0	12
10			0	12		35	15	20	57	8	0	7
11			0	0		44	12	19	58	0	0	5
12			0	0		52	11	7	56	0	0	3
13			0	0		64	32	0	58	0		2
14			0	0		76	41	0	58	0		3
15			35	0		79	42	0	59	0		1
16		7	65	0		66	43	0	59			1
17		67	47	0		46	42		59			1
18		102	29	0		47	42		58			1
19		106	27	0		48	44		41			2
20		100	29			48	45		32	11		1
21		103	29		33	48	46		31	22	5	1
22		47	30		54	49	46	21	31	26	23	1
23		9	28		55	52	46	40	31	45	22	1
24		1	28		58	54	20	41	32	44	22	1
25		0	29		55	52	12	41	30	24	25	0
26		0	28		55	38	12	36	32	22	22	0
27		0	17		31	31	13	35	31	23	20	0
28		0	3		18	28		36	32	23	22	0
29		0	0		22	27	45		32	21	38	1
30		0	0		26	27	16		30	23	44	0
31		0				28	15		33		45	

Appendix Table 2.4 Salinity (µS/cm) for DC800A at Outfall into Yanco Creek

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	*NF*		310	*NF*		153	135	103	180	206	175	166
2	*NF*		406	*NF*		151	144	111	182	212	175	166
3	*NF*		362	267		149	147	110	184	*NF*	175	165
4	*NF*		334	170		158	151	121	179	225	193	161
5	*NF*		322	177		165	161	150	173	163	186	159
6	*NF*		322	169		169	174	172	175	145	179	159
7	*NF*		336	149		167	178	186	173	139	175	159
8	*NF*		299	155		155	200	191	182	138	173	160
9			246	147		184	191	174	205	143	169	161
10			*NF*	163		186	199	157	220	146	165	166
11			*NF*	*NF*		190	209	157	211	*NF*	*NF*	171
12			*NF*	*NF*		197	200	155	197	*NF*	*NF*	175
13			*NF*	*NF*		179	203	*NF*	190	*NF*		181
14			*NF*	*NF*		194	166	*NF*	183	*NF*		185
15			228	*NF*		186	165	*NF*	182	*NF*		187
16		*270*	166	*NF*		183	164	*NF*	175			191
17		305	152	*NF*		184	158	0	169			195
18		321	142	*NF*		197	147	0	171			198
19		310	143	*NF*		198	140	0	176			199
20		285	149			205	138	0	182	190		198
21		233	154		*167*	269	139	0	188	192	174	196
22		206	164		184	233	142	181	193	193	178	194
23		232	150		156	181	149	163	192	192	175	192
24		264	152		165	171	150	164	193	191	173	190
25		*NF*	143		172	174	155	164	197	190	176	191
26		*NF*	147		175	181	153	172	200	186	174	192
27		*NF*	152		171	201	147	178	197	182	170	191
28		*NF*	168		162	188	*NF*	178	193	179	168	192
29		*NF*	175		161	146	86		189	177	171	197
30		*NF*	180		160	138	107		196	175	168	196
31		*NF*				135	112		200		167	

Appendix Table 2.5 Flow (ML) for CODA at West Coleambally Channel

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	0	0	99	31	40	104	68	0	0	50	0	161
2	0	0	104	31	38	103	66	0	0	47	1	166
3	0	0	100	32	35	122	55	0	0	34	0	159
4	0	0	93	35	31	132	52	0	0	40	34	139
5	0	0	83	34	28	128	40	0	28	65	44	143
6	0	0	58	34	106	117	6	0	98	53	55	141
7	0	0	48	30	116	112	0	0	91	43	64	151
8	0	0	55	33	113	61	3	0	74	27	46	146
9	0	0	38	39	106	43	16	0	66	14	47	106
10	0	0	66	40	126	38	0	0	44	0	56	63
11	0	0	63	42	129	85	0	0	53	0	58	38
12	0	0	54	42	123	96	0	0	61	0	59	42
13	15	0	53	46	116	96	0	0	60	0	57	29
14	32	0	52	57	129	101	0	0	70	0	57	36
15	13	0	53	59	133	83	0	0	84	0	56	60
16	0	0	54	71	131	57	0	0	80	0	52	61
17	0	0	54	107	121	85	0	0	53	0	52	54
18	0	0	48	104	133	94	0	0	72	0	65	40
19	0	0	5	83	156	109	0	0	71	0	67	45
20	0	0	0	67	161	127	0	0	64	0	59	56
21	0	0	7	54	161	127	0	0	80	0	39	54
22	0	0	8	42	149	115	0	0	84	0	35	55
23	0	0	7	68	139	107	0	0	84	0	95	36
24	0	0	36	72	140	107	0	0	86	0	136	36
25	0	0	59	68	140	108	0	0	61	0	134	38
26	0	0	59	72	107	108	0	0	33	0	126	35
27	0	0	50	62	85	106	0	0	86	0	130	26
28	0	0	62	52	112	105	0	0	95	0	133	9
29	0	0	56	48	107	103	0		76	0	138	0
30	0	0	44	46	100	102	0		44	0	148	0
31	0	54		43		83	0		50		147	

Appendix Table 2.6 Flow (ML) for CODWonga at West Coleambally Channel

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	0	0	19	40	0	50	64	0	0	49	0	183
2	5	0	57	29	0	53	50	0	0	49	0	207
3	5	0	74	30	0	50	51	0	0	40	0	211
4	4	0	83	30	0	72	43	0	0	31	0	186
5	4	0	78	32	0	77	43	0	0	5	6	151
6	4	0	63	28	16	74	39	0	30	5	11	153
7	3	0	42	26	51	53	12	0	114	0	9	176
8	3	0	38	26	52	53	5	0	102	0	14	203
9	2	0	48	19	32	26	2	0	68	0	2	178
10	2	0	38	34	44	36	5	0	62	0	1	100
11	2	0	63	40	59	23	2	0	49	0	3	54
12	1	0	57	34	63	61	0	0	56	0	4	20
13	2	0	50	30	65	71	0	0	66	0	4	23
14	16	0	51	32	57	56	0	0	75	0	3	16
15	36	0	50	39	74	45	0	0	87	0	3	1
16	21	0	50	31	69	55	0	0	77	0	5	2
17	12	0	56	43	65	34	0	0	68	0	4	1
18	10	0	51	61	55	56	0	0	49	0	5	0
19	6	0	40	47	79	73	0	0	69	0	12	0
20	4	11	12	23	113	94	0	0	72	0	13	0
21	4	0	3	8	123	117	0	0	77	0	13	0
22	2	0	8	23	105	108	0	0	96	0	7	0
23	1	0	1	15	82	87	0	0	99	0	33	14
24	1	0	0	27	77	76	0	0	94	0	115	3
25	1	0	39	15	73	77	0	0	76	0	168	0
26	1	0	70	9	70	83	0	0	41	0	159	0
27	1	0	59	8	48	88	0	0	34	0	148	0
28	1	0	48	6	42	88	0	0	94	0	153	0
29	11	0	61	2	58	88	0		100	0	158	0
30	0	0	53	0	61	87	0		75	0	166	0
31	0	0		0		83	0		43		181	

Appendix Table 2.7 Salinity (µS/cm) for CODA at West Coleambally Channel

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1			303	316	338	324	252			273		218
2	213		302	319	346	323	252			286		220
3	213		306	321	344	320	244			304		222
4	213		302	324	346	327	275			315	241	205
5	213		300	324	344	340	275			320	265	191
6	213		299	325	346	354	271		166	317	271	182
7	213		301	327	334	364			191	305	260	188
8	213		299	327	317	368	*13*		230	301	255	188
9	213		297	324	310	368			262	303	258	193
10	213		299	318	308	374			280		251	193
11	213		297	312	312	383			276		237	190
12	213		292	308	314	351			267		244	186
13	213		289	306	313	292			253		242	181
14	209		286	306	310	287			240		235	186
15	215		281	305	313	293			225		232	193
16	216		273	301	312	316			222		236	199
17	213		270	299	314	301			221		236	201
18	213		268	302	316	270			211		241	201
19	213		268	307	318	280			201		236	205
20	213	266	293	306	321	268			173		229	200
21	213		293	304	320	247			168		221	179
22	213		293	309	314	236			166		207	170
23	213		293	313	308	233			162		201	173
24	213			315	309	243			162		234	172
25	213		288	339	314	242			167		259	170
26	213		288	358	322	247			182		263	173
27	213		295	354	330	257			205		251	176
28	213		303	346	327	246			219		235	178
29	213		307	343	323	255			235		230	
30			311	342	323	265			252		214	
31				341		253			262		211	

Appendix Table 2.8 Flow (ML) for CCD at Coleambally Catchment Drain Outfall into Yanco Creek

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1		13	101	44		17	85	84	35	36		47
2		13	100	44		17	85	85	35	36		28
3		13	101	44		43	85	85	36	36		7
4		11	100	44		60	85	85	36	39		
5		10	101	44		61	85	85	36	69		
6		10	98	44		60	86	88	36	70		
7		10	79	44		59	93	88	35	70		
8		9	75	44		59	100	88	36	70		
9		8	83	44		58	97	89	36	69		
10		8	84	43		59	78	88	36	70		
11		80	84	45		20	62	89	35	70		
12		150	84	45		16	67	90	35	70		
13		113	83	45		20	110	83	35	70		
14		89	101	44		17	143	42	35	70		
15		88	145	45		17	143	35	36	70		
16		89	144	54		17	145	35	35	70		
17		90	144	46	29	17	144	35	36	70		
18		91	144	44	28	16	144	35	36	70		
19		90	144	44	28	16	146	34	36	70		
20		178	143		30	16	146	34	36	69		
21		106	144		44	17	145	34	36	70		
22		72	139		44	17	145	35	35	72		
23		71	129		44	20	126	35	36	70		
24		71	118	5	44	21	83	35	36	70		
25		72	82	6	44	25	83	35	35	70		
26		77	72	6	44	52	83	35	35	69	46	
27		99	45		44	52	84	35	35	62	53	
28		99	44		44	54	84	35	36	11	50	
29		100	43		42	83	84		36	0	51	
30	1	100	44		19	85	84		36		49	
31	9	101				86	84		35		49	

Appendix Table 2.9 Flow (ML) for CCD FlumeGate Escape at Coleambally Catchment Drain Outfall into Yanco Creek

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	0	0	101	50	0	20	101	80	40	40	0	50
2	0	0	101	50	0	20	101	80	40	40	0	19
3	0	0	101	50	0	35	101	80	40	40	0	0
4	0	0	101	50	0	70	101	80	40	40	0	0
5	0	0	101	51	0	70	101	76	40	71	0	0
6	0	0	101	51	0	70	101	85	40	80	0	0
7	0	0	75	49	0	70	101	81	40	85	0	0
8	0	0	75	50	0	70	101	76	40	81	0	0
9	0	0	75	50	0	65	101	80	40	80	0	0
10	0	0	81	50	0	70	81	80	40	76	0	0
11	0	0	81	65	0	40	65	81	40	80	0	0
12	0	76	81	55	0	20	60	81	40	80	0	0
13	0	111	81	50	0	20	91	80	41	80	0	0
14	0	101	81	50	0	20	141	45	41	81	0	0
15	0	101	141	50	0	20	151	40	41	81	0	0
16	0	101	152	60	25	20	151	40	41	81	0	0
17	0	101	152	50	30	25	151	40	42	82	0	0
18	0	101	153	50	30	15	151	40	40	79	0	0
19	0	101	150	50	30	22	151	40	40	80	0	0
20	0	126	151	25	30	23	151	40	40	80	0	0
21	0	183	152	0	45	20	146	40	40	81	0	0
22	0	65	152	0	50	20	151	40	40	76	0	0
23	0	70	146	0	50	20	151	40	41	80	0	0
24	0	70	152	0	50	20	89	40	39	80	0	0
25	0	70	106	0	50	20	77	40	40	80	0	0
26	0	70	91	0	50	55	81	40	40	81	33	0
27	0	91	55	0	50	61	81	40	40	80	50	0
28	0	101	50	0	50	60	80	40	40	17	50	0
29	0	101	50	0	50	86	81		40	NF	50	0
30	0	101	50	0	30	101	80		40	NF	50	0
31	0	101		0		96	80		40		50	

Appendix Table 2.10: Salinity (µS/cm), for CCD at Coleambally Catchment Drain Outfall into Yanco Creek

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1		*265*	101	77		567	606	450	21	75		298
2		*252*	102	73		595	586	460	45	84		296
3		*252*	101	72		608	578	189	80	71		*263*
4		*250*	103	71		593	595	169	114	79		
5		*246*	98	69		590	599	164	152	77		
6		*252*	94	69		601	597	108	162	97		
7		*262*	95	70		612	596	143	163	117		
8		*266*	102	71		606	588	182	163	130		
9		*269*	98	67		610	578	154	152	134		
10		*279*	92	65		627	575	140	159	135		
11		*327*	90	61		609	560	128	146	135		
12		312	91	71		537	560	133	139	134		
13		304	92	66		537	545	118	130	134		
14		302	94	58		579	523	112	133	130		
15		262	95	71		593	512	98	148	133		
16		198	90	77	378	563	514	33	158	139		
17		167	91	80	138	537	521	29	163	150		
18		133	89	83	126	566	528	37	166	149		
19		114	87	80	111	573	513	72	178	81		
20		121	86	71	108	543	478	131	186	78		
21		107	90		260	623	451	150	188	92		
22		107	106		475	600	447	131	189	104		
23		114	117		506	561	452	102	189	118		
24		121	117	*67*	498	560	442	100	192	201		
25		119	118	*98*	506	579	452	94	188	265		
26		120	127	*102*	514	593	459	101	176	207	285	
27		115	121		525	586	464	96	174	170	261	
28		108	102		494	593	462	81	175	*216*	283	
29		102	91		500	602	458		174		291	
30		98	83		525	616	454		167		295	
31	*269*	100				617	452		93		296	*31*

Appendix Table 2.11 Flow (ML) for CODD at West Coleambally Channel at Bundy

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1												
2												
3											4	
4											3	
5											0	
6												
7												
8												
9												
10												
11												
12												
13												33
14												21
15												11
16											4	7
17											4	5
18											3	3
19											1	2
20											0	2
21												1
22												0
23												
24												
25												
26												
27												
28												
29												
30												
31												

Appendix Table 2.12: Flow (ML) for CODOaklands FlumeGate at West Coleambally Channel

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	0	0	0	0	0	10	0	0	0	10	0	0
2	0	0	0	0	0	5	0	0	0	10	0	0
3	0	0	0	0	0	3	0	0	0	10	8	0
4	0	0	0	0	0	5	0	0	0	12	8	14
5	0	0	0	0	0	0	0	0	0	12	1	8
6	0	0	0	0	0	0	0	0	0	11	1	27
7	0	0	0	0	0	0	0	0	0	13	3	24
8	0	0	0	0	0	0	0	0	0	12	1	11
9	0	0	0	0	0	0	0	0	0	9	0	1
10	0	0	0	0	0	0	0	0	0	1	0	11
11	0	0	0	0	0	0	0	0	0	0	0	38
12	0	0	0	0	0	0	0	0	0	0	0	30
13	0	0	0	0	0	0	0	0	0	0	0	19
14	0	0	0	0	0	0	0	0	0	0	0	6
15	0	0	0	0	0	0	0	0	0	0	0	1
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	7	0	0	0	0	0	0	0
22	0	0	0	0	20	0	0	0	0	0	0	0
23	0	0	0	0	20	0	0	0	0	0	0	0
24	0	0	0	0	20	0	0	0	0	0	0	0
25	0	0	0	0	20	0	0	0	0	0	0	0
26	0	0	0	0	20	0	0	0	0	0	0	0
27	0	0	0	0	15	0	0	0	0	0	0	0
28	0	0	0	0	10	0	0	0	0	0	0	0
29	0	0	0	0	11	0	0		4	0	0	0
30	0	0	0	0	10	0	0		13	0	0	0
31	0	0		0		0	0		9		0	

Appendix Table 2.13: Salinity (µS/cm) for CODD West Coleambally Channel at Bundy

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1						136				136		
2						136				136	81	
3						136				136	70	190
4										136	78	190
5										136	96	190
6										136	81	190
7										136	81	190
8										136		190
9										136		190
10												190
11												190
12												190
13												191
14												190
15												190
16											*111*	*190*
17											*127*	*191*
18											*128*	*193*
19											*129*	*195*
20					136						*130*	*196*
21					136							*198*
22					136							*197*
23					136							
24					136							
25					136							
26					136							
27					136							
28					136				136			
29					136				136			
30					136				136			
31									136			

Appendix Table 2.14: Flow (ML) for Argoon FlumeGate Escape

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	0	0	19	40	0	50	64	0	0	49	0	183
2	0	0	57	29	0	53	50	0	0	49	0	207
3	0	0	74	30	0	50	51	0	0	40	0	211
4	0	0	83	30	0	72	43	0	0	31	0	186
5	0	0	78	32	0	77	43	0	0	5	6	151
6	0	0	63	28	16	74	39	0	30	5	11	153
7	0	0	42	26	51	53	12	0	114	0	9	176
8	0	0	38	26	52	53	5	0	102	0	14	203
9	0	0	48	19	32	26	2	0	68	0	2	178
10	0	0	38	34	44	36	5	0	62	0	1	100
11	0	0	63	40	59	23	2	0	49	0	3	54
12	0	0	57	34	63	61	0	0	56	0	4	20
13	0	0	50	30	65	71	0	0	66	0	4	23
14	0	0	51	32	57	56	0	0	75	0	3	16
15	0	0	50	39	74	45	0	0	87	0	3	1
16	0	0	50	31	69	55	0	0	77	0	5	2
17	0	0	56	43	65	34	0	0	68	0	4	1
18	0	0	51	61	55	56	0	0	49	0	5	0
19	0	0	40	47	79	73	0	0	69	0	12	0
20	0	11	12	23	113	94	0	0	72	0	13	0
21	0	0	3	8	123	117	0	0	77	0	13	0
22	0	0	8	23	105	108	0	0	96	0	7	0
23	0	0	1	15	82	87	0	0	99	0	33	14
24	0	0	0	27	77	76	0	0	94	0	115	3
25	0	0	39	15	73	77	0	0	76	0	168	0
26	0	0	70	9	70	83	0	0	41	0	159	0
27	0	0	59	8	48	88	0	0	34	0	148	0
28	0	0	48	6	42	88	0	0	94	0	153	0
29	0	0	61	2	58	88	0		100	0	158	0
30	0	0	53	0	61	87	0		75	0	166	0
31	0	0		0		83	0		43		181	

Appendix Table 2.15: Flow (ML) for Boona FlumeGate Escape

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	0	0	0	0	0	0	0	0	0	0	0	12
2	0	0	0	0	0	0	0	0	0	0	0	10
3	1	0	0	0	0	0	0	0	0	0	0	12
4	2	0	0	0	0	0	0	0	0	0	0	14
5	2	0	0	0	0	0	0	0	9	0	0	14
6	2	0	0	0	0	0	0	0	21	0	0	13
7	1	0	0	0	0	0	0	0	12	0	0	5
8	0	0	0	0	0	0	0	0	0	0	0	7
9	0	0	0	0	0	0	0	0	0	0	0	12
10	0	0	0	0	0	0	0	0	0	0	0	2
11	0	0	0	0	0	0	0	0	0	0	0	2
12	0	0	0	0	0	0	0	0	0	0	0	3
13	0	0	0	0	0	0	0	0	0	0	0	2
14	0	0	0	0	0	0	0	0	0	0	0	1
15	0	0	0	0	0	0	0	0	0	0	0	1
16	0	0	0	0	0	0	0	0	0	0	0	1
17	0	0	0	0	0	0	0	0	0	0	0	1
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	6
20	0	0	0	0	0	0	0	0	0	0	0	9
21	0	0	0	0	0	0	0	0	0	0	2	9
22	0	0	0	0	0	0	0	0	0	0	3	7
23	0	0	0	0	0	0	0	0	0	0	1	10
24	0	0	0	0	0	0	0	0	0	0	1	16
25	0	0	0	0	0	0	0	0	0	0	0	5
26	0	0	0	0	0	0	0	0	0	0	0	7
27	0	0	0	0	0	0	0	0	0	0	0	5
28	0	0	0	0	0	0	0	0	0	0	0	3
29	0	0	0	0	0	0	0		0	0	9	2
30	0	0	0	0	0	0	0		0	0	9	1
31	0	0		0		0	0		0		9	

Appendix 3: Groundwater Extraction from other Approved Works

Appendix Table 3.1: Flow (ML), Salinity (µS/cm), Salt Load (Tonnes) at Col Bore Hort Bore for 2018/19

2018/19	COL BORE			HORT BORE		
Month	**ML**	**µS/cm**	**Salt (T)**	**ML**	**µS/cm**	**Salt (T)**
Jul	0		0	0		0
Aug	23	595	9	47	262	8
Sep	57	595	22	50	262	8
Oct	223	595	85	248	262	42
Nov	97	595	37	55	256	9
Dec	219	610	85	415	256	68
Jan	271	610	106	257	256	42
Feb	221	610	86	234	256	38
Mar	74	610	29	298	256	49
Apr	34	610	13	203	256	33
May	0		0	0		0
Jun	0		0	0		0
Total	**1,219**		**472**	**1,807**		**297**

Appendix 4: Water Quality Data

Appendix Table 4.1: Nutrient (mg/L) and Pesticide Data (µg/L) for CCS at Coleambally Main Canal (Tubbo Wells) for 2018/19

Month	Oxidised Nitrogen as N	Soluble Phosphorous	Total Nitrogen	Total Phosphorous	Total Suspended Solids	Atrazine	Chlorpyrifos	Diazinon	Diuron	Malathion	Metolachlor	Molinate	Simazine	Thiobencarb	Trifluralin	2, 4-D
July	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
Aug	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
Sep	0.02	<0.01	0.7	0.03	30	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	0.016	NA	<0.005	<0.01
Oct	<0.01	<0.01	<0.1	<0.01	19	<0.005	<0.005	<0.005	0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01
Nov	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Dec	<0.01	<0.01	<0.1	<0.01	24	<0.005	<0.005	<0.005	<0.005	<0.002	<0.005	<0.005	0.006	<0.005	<0.005	<0.01
Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NA	NS	NA	NS	NS
Feb	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Apr	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NA	NS	NS	NS	NS
May	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA	NA	NS	NS	NS	NS
Jun	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF

NF = No Flow
NA = Not Applicable
NS = Not Sampled

Appendix Table 4.2: Nutrient (mg/L) and Pesticide Data (µg/L) for CODW (WCC) at Wonga Station for 2018/19

Month	Oxidised Nitrogen as N	Soluble Phosphorous	Total Nitrogen	Total Phosphorous	Total Suspended Solids	Atrazine	Chlorpyrifos	Diazinon	Diuron	Malathion	Metolachlor	Molinate	Simazine	Thiobencarb	Trifluralin	2, 4-D
July	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aug	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sep	<0.01	<0.01	0.5	0.07	82	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	0.012	NA	<0.005	<0.01
Oct	<0.01	<0.01	0.1	0.01	71	0.005	<0.005	<0.005	<0.005	<0.002	<0.005	<0.005	0.017	<0.005	<0.005	<0.01
Nov	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
Dec	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
Jan	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
Feb	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Apr	NF	NF	NF	NF	NF	NF	NF	NF	NF	NA	NA	NA	NF	NA	NF	NF
May	0.05	<0.01	0.4	0.08	36	0.007	<0.005	<0.005	0.025	NA	NA	NA	0.013	NA	<0.005	<0.01
Jun	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NF = No Flow

NA = Not Applicable

Appendix Table 4.3: Nutrient (mg/L) and Pesticide Data (µg/L) for DC800A at Outfall into Yanco Creek for 2018/19

Month	Oxidised Nitrogen as N	Soluble Phosphorous	Total Nitrogen	Total Phosphorous	Total Suspended Solids	Atrazine	Chlorpyrifos	Diazinon	Diuron	Malathion	Metolachlor	Molinate	Simazine	Thiobencarb	Trifluralin	2, 4-D
July	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aug	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sep	0.02	<0.01	0.7	0.06	53	0.398	<0.005	0.011	<0.005	NA	NA	NA	0.021	NA	<0.005	<0.01
Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
Nov	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
Dec	<0.01	<0.01	0.2	<0.01	38	0.252	<0.005	<0.005	<0.005	<0.002	0.005	<0.005	0.01	<0.005	<0.005	<0.01
Jan	0.01	<0.01	0.8	0.14	223	<0.005	<0.005	<0.005	<0.005	NA	<0.005	NA	0.008	NA	<0.005	<0.01
Feb	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Apr	NF	NF	NF	NF	NF	NF	NF	NF	NF	NA	NA	NA	NF	NF	NF	NF
May	NF	NF	NF	NF	NF	NF	NF	NF	NF	NA	NA	NA	NF	NA	NF	NF
Jun	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NF = No Flow

NA = Not Applicable

Appendix Table 4.4: Nutrient (mg/L) and Pesticide Data (µg/L) for Coleambally Catchment Drain (CCD) at Outfall into Yanco Creek for 2018/19

Month	Oxidised Nitrogen as N	Soluble Phosphorous	Total Nitrogen	Total Phosphorous	Total Suspended Solids	Atrazine	Chlorpyrifos	Diazinon	Diuron	Malathion	Metolachlor	Molinate	Simazine	Thiobencarb	Trifluralin	2, 4-D
July	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aug	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sep	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oct	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nov	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dec	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Feb	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Apr	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
May	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jun	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NF = No Flow

NA = Not Applicable

Appendix Table 4.5: Nutrient (mg/L) and Pesticide Data (µg/L) for CODO (WCC) at Oaklands Station for 2018/19

Month	Oxidised Nitrogen as N	Soluble Phosphorous	Total Nitrogen	Total Phosphorous	Total Suspended Solids	Atrazine	Chlorpyrifos	Diazinon	Diuron	Malathion	Metolachlor	Molinate	Simazine	Thiobencarb	Trifluralin	2, 4-D
July	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aug	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sep	NF	NF	NF	NF	NF	NF	NF	NF	NF	NA	NA	NA	NF	NA	NF	NF
Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
Nov	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
Dec	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
Jan	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
Feb	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Apr	NF	NF	NF	NF	NF	NF	NF	NF	NF	NA	NA	NA	NF	NA	NF	NF
May	NF	NF	NF	NF	NF	NF	NF	NF	NF	NA	NA	NA	NF	NA	NF	NF
Jun	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NF = No Flow

NA = Not Applicable

Appendix 5: Coleambally Offtake Verification 2018/2019

Appendix Table 5.1: Deviation between Gauging and Accusonic

Date	Time	Gauged m3/s	Gauged ML/day	Accusonic	Variation	Gauging Performed by
9/08/2018	8:30	10.497	906.9408	876	-3.41%	WaterNSW
28/08/2018	13:32	5.373	464.2272	483	4.04%	WaterNSW
31/08/2018	9:58	6.462	558.3168	547	-2.03%	WaterNSW
31/08/2018	11:25	6.756	583.7184	536	-8.17%*	WaterNSW
16/09/2018	13:00	7.357	635.6448	705	10.91%**	Ventia
16/09/2018	13:40	7.48	646.272	698.8	8.13%**	Ventia
19/09/2018	9:58	10.593	915.2352	842	Upstream	Ventia
26/09/2018	16:09	8.65	747.36	684	Upstream	WaterNSW
4/10/2018	12:26	19.826	1712.966	1624	-5.19%	WaterNSW
19/10/2018	7:27	22.13	1912.032	1840	-3.77%	WaterNSW
10/10/2018	12:38	8.625	745.2	742	-0.43%	Ventia
10/10/2018	13:16	8.847	764.3808	746	-2.40%	Ventia
19/11/2018	16:24	2.624	226.7136	346	Upstream	Ventia
19/11/2018	15:36	2.879	248.7456	354	Upstream	Ventia
19/11/2018	18:48	3.135	270.864	273	0.79%	Ventia
19/11/2018	19:38	3.134	270.7776	279	3.04%	Ventia
18/12/2018	12:34	18.102	1564.0	1507	-3.65%	Ventia
18/12/2018	13:33	17.982	1553.6	1511	-2.74%	Ventia
25/01/2019	10:30	10.848	937.3	870.0	-7.18%`	Ventia
25/01/2019	22:12	10.925	943.9	893.0	-5.39%`	Ventia
20/02/2019	13:58	3.464	299.3	314.0	4.92%	Ventia
20/02/2019	14:46	3.490	301.5	309.3	2.57%	Ventia
21/02/2019	6:28	3.580	309.3	287.4	-7.08%~	Ventia
21/02/2019	7:06	3.740	323.1	282.7	-12.51%~	Ventia
20/02/2019	11:12	3.320	286.8	331.7	Upstream	Ventia
20/02/2019	12:24	3.744	323.5	326.8	Upstream	Ventia
22/03/2019	9:00	3.951	341.4	331.0	-3.04%	Ventia
22/03/2019	9:45	4.208	363.6	325.3	-10.53%^	Ventia
17/04/2019	12:30	2.199	190.0	192.4	1.27%	Ventia
17/04/2019	13:16	2.163	186.9	180.2	-3.58%	Ventia

Notes on Table 5.1:

* Gauging done with moving boat method and only two transects but considered acceptable. As only two transects the gauging is not being heavily relied upon.

** During the gauging, it is believed that the width was measured incorrectly and the measurement should therefore be discounted.

` Discharge was increasing at the site during the first measurement. The second measurement was conducted in more stable conditions, but the discharge was not completely stable, leading to the higher deviation.

^ There was a standing wave, possibly caused by seiching at the site which may have influenced the gauging result, especially as the first measurement was within ±5 % deviation.

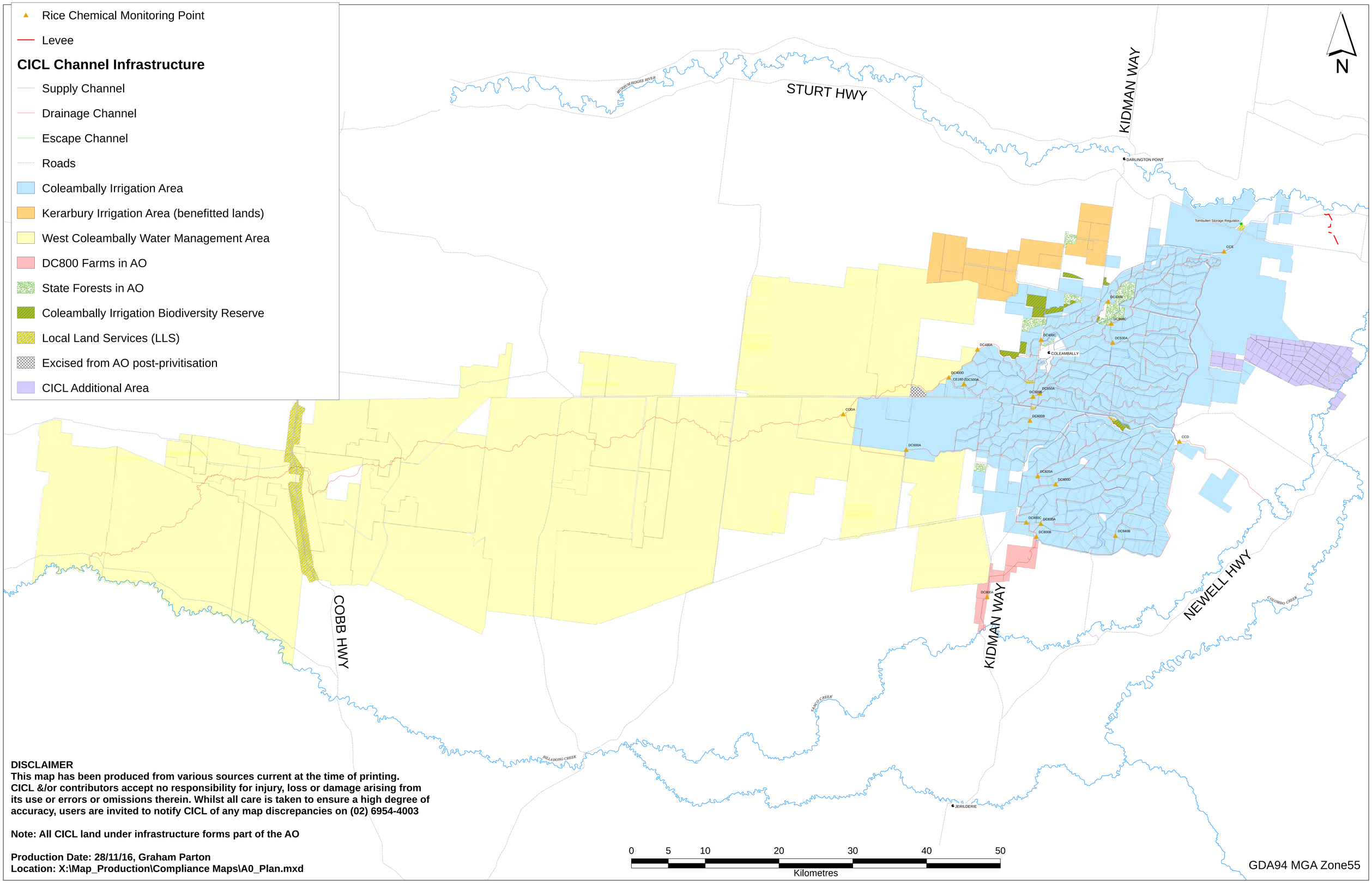
~ There were strong winds heading upstream which has impacted on the gauging result.

CICL Area of Operations (AO) Plan

- Rice Chemical Monitoring Point
- Levee

CICL Channel Infrastructure

- Supply Channel
- Drainage Channel
- Escape Channel
- Roads
- Coleambally Irrigation Area
- Kerarbury Irrigation Area (benefitted lands)
- West Coleambally Water Management Area
- DC800 Farms in AO
- State Forests in AO
- Coleambally Irrigation Biodiversity Reserve
- Local Land Services (LLS)
- Excised from AO post-privitisation
- CICL Additional Area



DISCLAIMER
This map has been produced from various sources current at the time of printing. CICL &/or contributors accept no responsibility for injury, loss or damage arising from its use or errors or omissions therein. Whilst all care is taken to ensure a high degree of accuracy, users are invited to notify CICL of any map discrepancies on (02) 6954-4003

Note: All CICL land under infrastructure forms part of the AO

Production Date: 28/11/16, Graham Parton
Location: X:\Map_Production\Compliance Maps\A0_Plan.mxd