



ANNUAL COMPLIANCE REPORT

(Combined Approval 60CA581273)

2021/22

Contact: David Hilton - Executive Manager Operations

LICENCE COMPLIANCE REPORT 2021/22

PREFACE

This report is prepared by Western Murray Irrigation Limited (WMI) as part of licence requirements which WMI holds with the NSW Department of Planning and Environment - Water (DPE Water) and the Environmental Protection Authority (EPA). It discusses our annual compliance performance, including the environmental performance and impacts of the works and infrastructure owned or controlled by WMI and the quality of irrigation wastewater discharged from works and infrastructure.

Our environmental programs, which aim to exceed our environmental obligations, demonstrate our commitment to ensuring that our operations do not impact negatively on the environment.

Western Murray Irrigation Limited

Table of Contents

INTRODUCTION	4
STATEMENT OF APPROVAL 60CA581273 – COMPLIANCE OF CONDITIONS.....	5
Take of Water	5
MW0655-00001	5
MW2452-00001	5
Metering Calibration Certificates	6
Water Management Works.....	15
MW3192-00001	15
MW0491-00001	15
Monitoring and Recording.....	15
MW2338-00001	15
MW2336-00001	15
MW2337-00001	15
MW0482-00001	15
MW2339-00001	15
Reporting.....	15
MW0051-00001	15
Other Conditions - Monitoring and Recording	15
DK5891-00004	15
WMIL – MONITORING AND REPORTING PLAN FOR COMBINED APPROVAL 60CA581273.....	16
Schedule 1 – Requirements.....	16
Reporting and Notification Requirements:	16
Submission of an Annual Compliance Report.	16
Condition 1	16
Condition 2	16
Condition 2.1	16
Condition 2.2	17
Statement of Compliance.....	22
Condition 2.3	22
Condition 2.4	24
Condition 2.5	24
Condition 2.5-Salinity	24
Condition 2.5-Discharge	27
Condition 2.5-Groundwater	28
Condition 2.5-Extraction	29
Condition 2.5-Water Use	31
Condition 2.6	32
Condition 2.7	32
Condition 2.8	32
New Measures to Limit Groundwater Recharge and Discharge of Salt.....	32

Condition 2.9	32
Reporting on Water Management	33
Condition 2.10	33
Condition 2.11	33
Condition 2.12	33
Condition 2.13	34
Reporting on Salinity and Saltload	36
Condition 2.14	36
Condition 2.15	37
Condition 2.16	38
Reporting Groundwater Requirements	39
Condition 2.17	39
Attachment 2- p.1	39
Attachment 2, p.2 - Condition 1	42
Location of Active Buronga Piezometers:	42
Buronga groundwater heights below natural surface (M)	43
Buronga groundwater heights below natural surface (M), combined image:	44
Location of Active Coomealla piezometers:	45
Coomealla groundwater height below natural surface (M):	46
Coomealla groundwater heights below natural surface (M), combined image:	47
Location of Curlwaa active piezometers:	48
Curlwaa groundwater heights below natural surface (M), combined image:	50
Attachment 2, p.2 - Condition 2.	51
Attachment 2, p.2 - Condition 3.	51
Attachment 2, p.2 –Condition 4.....	51
Attachment 2, p.2 – Condition 5.....	52
Buronga Salinity Contours (µ/Siemens):	52
Buronga Salt Contours – Combined Image:	53
Coomealla Salt Contours – Combined Image:	55
Curlwaa Salt Contours – Combined Image:	57
Attachment 2, p.2 – Condition 6.....	58
Attachment 2, p.3	59
Quality Assurance for Monitoring & Reporting	59
Condition 3.	59
Presentation of Data	59
Condition 4.	59
Environment Protection and Management Requirements	59
Discharge of Noxious Aquatic weeds	59
Condition 5.	59
Discharge of Blue-Green Algae.....	60
Condition 6.	60
Basin Salinity Management Strategy.....	60
Condition 7.	60

2021/22 Annual Compliance report

INTRODUCTION

WMI supplies water to customers in its three irrigation areas, Buronga, Coomealla and Curlwaa under Combined Approval Number 60CA581273. The Statement of Approval has a date of effect 01 July 2004 and expiry of 23 February 2030. Details of the Statement of Approval can be found at:

<https://waterregister.watarnsw.com.au/water-register-frame>.

Operating licence for Western Murray Irrigation was renewed and amended for a period of ten years on 24th January 2018, published in NSW Government Gazette No 10 of 25th January 2018:

Government Notices

WATER MANAGEMENT ACT 2000

Sections 123 and 124

RENEWAL AND AMENDMENT OF OPERATING LICENCE

NOTICE is given that, pursuant to sections 123 and 124 of the *Water Management Act 2000*, the Governor of New South Wales has, on 24th January 2018, renewed and amended the Operating Licence of Western Murray Irrigation Limited, for a period of ten years. The renewed Operating Licence commences on the day this notice is published in the NSW Government Gazette.

[n2018-247]

This Compliance Report details the monitoring and reporting activities undertaken by WMI during the 2021/22 financial year to comply with the water management licences. It also outlines irrigation development data that explains the trends in monitoring results.

All mapping details are using projected coordinate system: GDA-1994- MGA-Zone 54.

STATEMENT OF APPROVAL 60CA581273 – COMPLIANCE OF CONDITIONS

Take of Water

MW0655-00001

All water supply works authorised by this approval take water in compliance with the conditions of the access licence under which water is being taken.

MW2452-00001

Water is taken through metering equipment that meet the following requirements:

- A. The metering equipment accurately measures and records the flow of all water taken through the water supply work authorised by this approval.
- B. Status of metering equipment compliance with the current Australian Standard AS 4747: 'Meters for non-urban supply':
 - Buronga pump station meter (1) is pattern approved to NMI-M-10; installed/commissioned 05May21.
 - Coomealla pump station meters (1-6) are pattern approved to NMI-M-10; installed/commissioned 01July2021.
 - Curlwaa pump station meters (1-2) are pattern approved to NMI-M-10. Installed/commissioned 12July21(1) and 12Jun21(2)

Commissioning of Telemetry for DAS – WMI are working with NRAR to commission our existing telemetry in accordance with 'Marketing engagement policy for metering and telemetry; Part 3 – Assessment process for 'other telemetry systems'.

- C. All metering equipment is sited and installed at a place in the pipe, between the water source and the first discharge outlet. There is no flow of water into or out of the pipe, between the water source and the metering equipment.
- D. The metering equipment is always operated and maintained in a proper and efficient manner. Calibration certificates have been performed at different times; there was an initial failure on the Coomealla pump station meters, this was later proven to be a problem with the test equipment, after consulting with Siemens.

Metering Calibration Certificates

Buronga Pump Station.



SUDEL INDUSTRIES PTY LTD
1300 415 512
 www.sudelindustries.com
 PGE156188 | REC27448 | 335158C

**INSTRUMENT CALIBRATION REPORT****Western Murray Irrigation Limited****Calibration ID: 145170****Contact :** David Hilton**City :** Dareton**PM Task No :****Phone :** 0429183619**State :** NSW**Work Order :** 372349**Address :** 5 Tapio Street**Postcode :** 2717

Instrument ID	BGA MAIN	Manufacturer:	Siemens
Description	1Y Verification of BGA Main Flowmeter - ModBus address	Model:	MAG5100W with MAG 6000 CT
Calibrated	10/Feb/2022	Serial:	974403H280 / N1M0075045
Location	Buronga Pumps	Classification:	Critical Item
Area		Previous Inst Status:	In Service
Equipment ID	BURONGA PUMPS		

Calibration Data

Origin of Stated Accuracy	Manufacturer Specification
Calibration Type:	In Service
Document ID:	VERIFICATION

Group #	1	Test Type :	TaskList.bpl
Group Name	Verification	Group Result :	Pass
Step #	Step	Result	Comments
1	Converter Test (Enter Pass / Fail in Comment)	Completed	Pass
2	Sensor Insulation (Enter Pass / Fail in Comment)	Completed	Pass
3	Sensor Magnetism (Enter Pass / Fail in Comment)	Completed	Pass
4	Enter WO# in Notes on Verification Report	Completed	

Test Instruments Used During the Calibration:

<u>Test Instrument ID</u>	<u>Description</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Serial Number</u>	<u>Last Cal Date</u>	<u>Next Cal Date</u>
STDN313	Seimens Magflo Verifactor	Siemens	083F5060	00519N089	21/06/2021	21/06/2022
STDN453	1Y Calibration of Fluke 175 Multimeter - Unit belongs to Neil Zander Personnel Equipment	Fluke	175	26680423	19/05/2021	19/05/2022

Calibration Result:	Calibration Successful	Performed By :	Neil Zander
Finalized By :	Denise Harrison	Finalized Date :	01/03/2022
Calibration Frequency :	Annual	Next Calibration Date	10/2/2023
Amb. Temp. (DEG.C) :		Amb. Humidity (%R.H.) :	

This Certificate and/or report may not be published or reproduced except in full unless permission for the publication/reproduction of an approved extract has been obtained in writing from Sudel Industries Pty Ltd. The Tolerances and Test Points set out in this calibration report are selected using Customer advised specifications, manufacturers recommendations or Government Regulation / Statutory Requirement. This report uses guidelines from Australian National standards detailed in AS ISO/IEC 17025 to document the results of the tests, calibrations and/or measurements included in this certificate.

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 Olympic Dam
 Whyalla

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Printed On 01-Mar-2022

Page 10 of 14

Coomella Pump Station - Pump A

SIEMENS MAGFLO® Verification Certificate

Customer:		MAGFLO® Identification:	
Name	<u>Western Murray Irrigation Ltd</u>	TAG No./Name	<u>0</u>
Address	<u>5 Tapio Street</u>	Sensor Code No.	<u>FDK-083X13539</u>
	<u>Dareton NSW 2717</u>	Sensor Serial No.	<u>982003H280</u>
	<u>David Hilton</u>	Transmitter Code No.	<u>7ME69201AA301AD0</u>
Phone	<u>0429 183 619</u>	Transmitter Serial No.	<u>N1M9215020</u>
Email	<u>david@westernmurray.com.au</u>	Location	<u>Pump A - Coomeala</u>

Results:		Verification file name or No.	<u>Pump A</u>
		Transmitter	<u>Passed</u>
		Sensor Insulation	<u>Passed</u>
		Magnetic Circuit	<u>Passed</u>

Velocity	Current Output			Frequency Output		
Theoretical	Theoretical	Actual	Deviation	Theoretical	Actual	Deviation
0.5m/s	4.800mA	4.802mA	0.27%	0.500kHz	0.500kHz	0.06%
1.0m/s	5.600mA	5.601mA	0.08%	1.000kHz	1.000kHz	0.02%
3.0m/s	8.800mA	8.802mA	0.03%	3.000kHz		0.04%

Current Output 4-20mA Frequency Output 0-10kHz

Transmitter Settings:			Sensor Details:	
Basic	Qmax.	<u>1750.00 l/s</u>	Size	<u>DN 500 20 IN</u>
	Flow Direction	<u>Positive</u>	Cal. Factor	<u>239.27409363</u>
	Low flow Cut-off	<u>1.50%</u>	Correction Factor	<u>1.0</u>
	Empty Pipe	<u>ON</u>	Excitation Freq.	<u>1.563Hz</u>
Output	Current Output	<u>OFF</u>	Vericator Details (083F5060)	
	Time Constant	<u>N/A</u>		
	Relay Output	<u>Error Level</u>		
	Digital Output	<u>Pulse</u>		
	Frequency Range	<u>N/A</u>		
	Time Constant	<u>N/A</u>		
	Volume/pulse	<u>1.0 m³/p</u>		
	Pulse width	<u>0.066 sec.</u>		
	Pulse polarity	<u>Positiv</u>		
	Totalizer 1 value before test	<u>4242.9685 MI</u>		
Totalizer 1 value after test	<u>4242.969 MI</u>			
Totalizer 2 value before test	<u>0.07826065 MI</u>			
Totalizer 2 value after test	<u>0.07826065 MI</u>			
Operating time in days	<u>399</u>			

Comments

These tests verify that the flowmeter is functioning within 2% deviation of the original test parameters.

Verification is traceable to National and International Standards.

Date and signature

2022.05.18

Budiman Wiman
Digitally signed by Budiman Wiman
 DN: cn=Budiman Wiman, o=Western
 Murray Irrigation, email=budiman.wiman@wimans.com
 Date: 2022.05.18 15:22:30 +1000

Wiman Budiman

Coomella Pump Station - Pump B

SIEMENS MAGFLO® Verification Certificate**Customer:**

Name Western Murray Irrigation Ltd
 Address 5 Tapio Street
Dareton NSW 2717
David Hilton
 Phone 0429 183 619
 Email david@westernmurray.com.au

MAGFLO® Identification:

TAG No./Name 0
 Sensor Code No. FDK-083X13539
 Sensor Serial No. 982203H280
 Transmitter Code No. 7ME69201AA301AD0
 Transmitter Serial No. N1MO025053
 Location Pump B - Coomeala

Results:

Verification file name or No. Pump B
 Transmitter Passed
 Sensor Insulation Passed
 Magnetic Circuit Passed

Velocity		Current Output			Frequency Output		
Theoretical		Theoretical	Actual	Deviation	Theoretical	Actual	Deviation
0.5m/s		4.800mA	4.800mA	-0.01%	0.500kHz	0.500kHz	0.03%
1.0m/s		5.600mA	5.600mA	-0.02%	1.000kHz	1.000kHz	0.04%
3.0m/s		8.800mA	8.797mA	-0.05%	3.000kHz		0.02%

Current Output 4-20mA

Frequency Output 0-10kHz

Transmitter Settings:

Basic Qmax. 1750.00 l/s
 Flow Direction Positive
 Low flow Cut-off 1.50%
 Empty Pipe ON

Output Current Output OFF
 Time Constant N/A
 Relay Output Error Level
 Digital Output Pulse
 Frequency Range N/A
 Time Constant N/A
 Volume/pulse 1.0 m³/p
 Pulse width 0.066 sec.
 Pulse polarity Positiv

Totalizer 1 value before test 3533.7085 MI
 Totalizer 1 value after test 3533.70875 MI
 Totalizer 2 value before test 0.71529694 MI
 Totalizer 2 value after test 0.715297 MI
 Operating time in days 400

Sensor Details:

Size DN 500 20 IN
 Cal. Factor 241.57209778
 Correction Factor 1.0
 Excitation Freq. 1.563Hz

Vericator Details (083F5060)

Serial No. N1DO140060
 Device No. 130046
 Software Version 1.40
 PC-Software Version 5.01
 Cal. date 2022.03.04
 ReCal. date 2023.03.04

Comments

These tests verify that the flowmeter is functioning within 2% deviation of the original test parameters.

Verification is traceable to National and International Standards.

Date and signature

2022.05.18

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Wiman Budiman

Coomella Pump Station - Pump C

SIEMENS MAGFLO® Verification Certificate

Customer:		MAGFLO® Identification:	
Name	<u>Western Murray Irrigation Ltd</u>	TAG No./Name	<u>0</u>
Address	<u>5 Tapio Street</u>	Sensor Code No.	<u>FDK-083X13539</u>
	<u>Dareton NSW 2717</u>	Sensor Serial No.	<u>982303H280</u>
	<u>David Hilton</u>	Transmitter Code No.	<u>7ME69201AA301AD0</u>
Phone	<u>0429 183 619</u>	Transmitter Serial No.	<u>N1N5275011</u>
Email	<u>david@westernmurray.com.au</u>	Location	<u>Pump C - Coomeala</u>

Results:		Verification file name or No.	<u>Pump C</u>
		Transmitter	<u>Passed</u>
		Sensor Insulation	<u>Passed</u>
		Magnetic Circuit	<u>Passed</u>

Velocity	Current Output			Frequency Output		
Theoretical	Theoretical	Actual	Deviation	Theoretical	Actual	Deviation
0.5m/s	4.800mA	4.801mA	0.07%	0.500kHz	0.500kHz	0.08%
1.0m/s	5.600mA	5.600mA	-0.01%	1.000kHz	1.001kHz	0.06%
3.0m/s	8.800mA	8.799mA	-0.01%	3.000kHz		0.10%

Current Output 4-20mA Frequency Output 0-10kHz

Transmitter Settings:			Sensor Details:	
Basic	Qmax.	<u>1750.00 l/s</u>	Size	<u>DN 500 20 IN</u>
	Flow Direction	<u>Positive</u>	Cal. Factor	<u>237.88490295</u>
	Low flow Cut-off	<u>1.50%</u>	Correction Factor	<u>1.0</u>
	Empty Pipe	<u>ON</u>	Excitation Freq.	<u>1.563Hz</u>
Output	Current Output	<u>OFF</u>	Vericator Details (083F5060)	
	Time Constant	<u>N/A</u>		
	Relay Output	<u>Error Level</u>		
	Digital Output	<u>Pulse</u>		
	Frequency Range	<u>N/A</u>		
	Time Constant	<u>N/A</u>		
	Volume/pulse	<u>1.0 m³/p</u>		
	Pulse width	<u>0.086 sec.</u>		
Pulse polarity	<u>Positiv</u>			
Totalizer 1 value before test		<u>454.65909375 MI</u>	Serial No.	<u>N1D0140060</u>
Totalizer 1 value after test		<u>454.659375 MI</u>	Device No.	<u>130046</u>
Totalizer 2 value before test		<u>0.01621095 MI</u>	Software Version	<u>1.40</u>
Totalizer 2 value after test		<u>0.01621095 MI</u>	PC-Software Version	<u>5.01</u>
Operating time in days		<u>61</u>	Cal. date	<u>2022.03.04</u>
			ReCal. date	<u>2023.03.04</u>

Comments

These tests verify that the flowmeter is functioning within 2% deviation of the original test parameters.

Verification is traceable to National and International Standards.

Date and signature

2022.05.18

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Wiman Budiman

Coomella Pump Station - Pump D

SIEMENS MAGFLO® Verification Certificate

Customer:		MAGFLO® Identification:	
Name	<u>Western Murray Irrigation Ltd</u>	TAG No./Name	<u>0</u>
Address	<u>5 Tapio Street</u>	Sensor Code No.	<u>FDK-083X13539</u>
	<u>Dareton NSW 2717</u>	Sensor Serial No.	<u>982503H280</u>
	<u>David Hilton</u>	Transmitter Code No.	<u>7ME69201AA301AD0</u>
Phone	<u>0429 183 619</u>	Transmitter Serial No.	<u>N1MO025057</u>
Email	<u>david@westernmurray.com.au</u>	Location	<u>Pump D - Coomeala</u>

Results:		Verification file name or No.		<u>Pump D</u>
		Transmitter		<u>Passed</u>
		Sensor Insulation		<u>Passed</u>
		Magnetic Circuit		<u>Passed</u>

Velocity	Current Output			Frequency Output		
Theoretical	Theoretical	Actual	Deviation	Theoretical	Actual	Deviation
0.5m/s	4.800mA	4.800mA	-0.05%	0.500kHz	0.500kHz	-0.01%
1.0m/s	5.600mA	5.599mA	-0.04%	1.000kHz	1.000kHz	0.02%
3.0m/s	8.800mA	8.798mA	-0.03%	3.000kHz		0.04%

Current Output 4-20mA Frequency Output 0-10kHz

Transmitter Settings:			Sensor Details:	
Basic	Qmax.	<u>1750.00 l/s</u>	Size	<u>DN 500 20 IN</u>
	Flow Direction	<u>Positive</u>	Cal. Factor	<u>238.91360474</u>
	Low flow Cut-off	<u>1.50%</u>	Correction Factor	<u>1.0</u>
	Empty Pipe	<u>ON</u>	Excitation Freq.	<u>1.563Hz</u>
Output	Current Output	<u>OFF</u>	Vericator Details (083F5060)	
	Time Constant	<u>N/A</u>		
	Relay Output	<u>Error Level</u>		
	Digital Output	<u>Pulse</u>		
	Frequency Range	<u>N/A</u>		
	Time Constant	<u>N/A</u>		
	Volume/pulse	<u>1.0 m³/p</u>		
	Pulse width	<u>0.066 sec.</u>		
	Pulse polarity	<u>Positiv</u>		
Totalizer 1 value before test		<u>3584.1285 MI</u>	Serial No.	<u>N1DO140060</u>
Totalizer 1 value after test		<u>3584.12875 MI</u>	Device No.	<u>130046</u>
Totalizer 2 value before test		<u>0.30754599 MI</u>	Software Version	<u>1.40</u>
Totalizer 2 value after test		<u>0.30754611 MI</u>	PC-Software Version	<u>5.01</u>
Operating time in days		<u>400</u>	Cal. date	<u>2022.03.04</u>
			ReCal. date	<u>2023.03.04</u>

Comments

These tests verify that the flowmeter is functioning within 2% deviation of the original test parameters.

Verification is traceable to National and International Standards.

Date and signature

2022.05.18

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Date: 2022.05.18 15:38:17 +1000

Wiman Budiman

Coomella Pump Station - Pump E

SIEMENS MAGFLO® Verification Certificate**Customer:**

Name Western Murray Irrigation Ltd
 Address 5 Tapio Street
Dareton NSW 2717
David Hilton
 Phone 0429 183 619
 Email david@westernmurray.com.au

MAGFLO® Identification:

TAG No./Name 0
 Sensor Code No. FDK-083X13539
 Sensor Serial No. 982603H280
 Transmitter Code No. 7ME69201AA301AD0
 Transmitter Serial No. N1M9045190
 Location Pump E - Coomeala

Results:

Verification file name or No. Pump E
 Transmitter Passed
 Sensor Insulation Passed
 Magnetic Circuit Passed

Velocity	Current Output			Frequency Output		
Theoretical	Theoretical	Actual	Deviation	Theoretical	Actual	Deviation
0.5m/s	4.800mA	4.801mA	0.13%	0.500kHz	0.500kHz	0.07%
1.0m/s	5.600mA	5.601mA	0.05%	1.000kHz	1.000kHz	0.04%
3.0m/s	8.800mA	8.802mA	0.05%	3.000kHz		0.08%

Current Output 4-20mA

Frequency Output 0-10kHz

Transmitter Settings:

Basic Qmax. 1750.00 l/s
 Flow Direction Positive
 Low flow Cut-off 1.50%
 Empty Pipe ON

Output Current Output OFF
 Time Constant N/A
 Relay Output Error Level
 Digital Output Pulse
 Frequency Range N/A
 Time Constant N/A
 Volume/pulse 1.0 m³/p
 Pulse width 0.066 sec.
 Pulse polarity Positiv

Totalizer 1 value before test 3452.17675 MI
 Totalizer 1 value after test 3452.177 MI
 Totalizer 2 value before test 0.2663273 MI
 Totalizer 2 value after test 0.26632733 MI
 Operating time in days 400

Sensor Details:

Size DN 500 20 IN
 Cal. Factor 242.16600037
 Correction Factor 1.0
 Excitation Freq. 1.563Hz

Vericator Details (083F5060)

Serial No. N1D0140060
 Device No. 130046
 Software Version 1.40
 PC-Software Version 5.01
 Cal. date 2022.03.04
 ReCal. date 2023.03.04

Comments

These tests verify that the flowmeter is functioning within 2% deviation of the original test parameters.

Verification is traceable to National and International Standards.

Date and signature

2022.05.18

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 Date: 2022.05.18 15:34:36 +1000

Wiman Budiman

Coomella Pump Station - Pump F

SIEMENS MAGFLO® Verification Certificate**Customer:**

Name Western Murray Irrigation Ltd
 Address 5 Tapio Street
Dareton NSW 2717
David Hilton
 Phone 0429 183 619
 Email david@westernmurray.com.au

MAGFLO® Identification:

TAG No./Name 0
 Sensor Code No. FDK-083X13536
 Sensor Serial No. 979503H280
 Transmitter Code No. 7ME69201AA301AD0
 Transmitter Serial No. N1M9045212
 Location Pump F - Coomeala

Results:

Verification file name or No. Pump F
 Transmitter Passed
 Sensor Insulation Passed
 Magnetic Circuit Passed

Velocity	Current Output			Frequency Output		
Theoretical	Theoretical	Actual	Deviation	Theoretical	Actual	Deviation
0.5m/s	4.800mA	4.799mA	-0.08%	0.500kHz	0.500kHz	-0.07%
1.0m/s	5.600mA	5.600mA	0.00%	1.000kHz	1.000kHz	0.05%
3.0m/s	8.800mA	8.799mA	-0.01%	3.000kHz		0.04%

Current Output 4-20mA

Frequency Output 0-10kHz

Transmitter Settings:

Basic Qmax. 695.000 l/s
 Flow Direction Positive
 Low flow Cut-off 1.50%
 Empty Pipe ON

Output Current Output OFF
 Time Constant N/A
 Relay Output Error Level
 Digital Output Pulse
 Frequency Range N/A
 Time Constant N/A
 Volume/pulse 1.0 m³/p
 Pulse width 0.066 sec.
 Pulse polarity Positiv

Totalizer 1 value before test 3121.79 MI
 Totalizer 1 value after test 3121.79 MI
 Totalizer 2 value before test 0.00839774 MI
 Totalizer 2 value after test 0.00839775 MI
 Operating time in days 400

Sensor Details:

Size DN 350 14 IN
 Cal. Factor 88.79692078
 Correction Factor 1.0
 Excitation Freq. 1.563Hz

Vericator Details (083F5060)

Serial No. N1D0140060
 Device No. 130046
 Software Version 1.40
 PC-Software Version 5.01
 Cal. date 2022.03.04
 ReCal. date 2023.03.04

Comments

These tests verify that the flowmeter is functioning within 2% deviation of the original test parameters.

Verification is traceable to National and International Standards.

Date and signature

2022.05.18

Budiman Wiman
Digitally signed by Budiman Wiman
 DN: cn=Budiman Wiman, o=Western
 Murray Irrigation, email=budiman.wiman@westernmurray.com.au, c=au
 Date: 2022.05.18 15:25:56 +1000

Wiman Budiman

Curlwaa Pump Station – Main.



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**INSTRUMENT CALIBRATION REPORT****Western Murray Irrigation Limited****Calibration ID: 145172****Contact : David Hilton****City : Dareton****PM Task No :****Phone : 0429183619****State : NSW****Work Order : 372349****Address : 5 Tapio Street****Postcode : 2717**

Instrument ID	CWA MAIN	Manufacturer:	Siemens
Description	1Y Verification of Curlwaa Pumps - CWA MAIN	Model:	MAG5100W with MAG 6000 CT
Calibrated	10/Feb/2022	Serial:	918903H480 / N1MO09508
Location	Curlwaa Pumps	Classification:	Critical Item
Area		Previous Inst Status:	In Service
Equipment ID	CURLWAA PUMPS		

Calibration Data

Origin of Stated Accuracy	Manufacturer Specification
Calibration Type:	In Service
Document ID:	VERIFICATION

Group #	1	Test Type :	TaskList.bpl
Group Name	Verification	Group Result :	Pass
Step #	Step	Result	Comments
1	Converter Test (Enter Pass / Fail in Comment)	Completed	Pass
2	Sensor Insulation (Enter Pass / Fail in Comment)	Completed	Pass
3	Sensor Magnetism (Enter Pass / Fail in Comment)	Completed	Pass
4	Enter WO# in Notes on Verification Report	Completed	

Test Instruments Used During the Calibration:

<u>Test Instrument ID</u>	<u>Description</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Serial Number</u>	<u>Last Cal Date</u>	<u>Next Cal Date</u>
STIN313	Siemens Magflo Vericator	Siemens	083F5060	00519N089	21/06/2021	21/06/2022

Calibration Result:	Calibration Successful	Performed By :	Neil Zander
Finalized By :	Denise Harrison	Finalized Date :	01/03/2022
Calibration Frequency :	Annual	Next Calibration Date	10/2/2023
Amb. Temp. (DEG.C) :		Amb. Humidity (%R.H.) :	

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BRANCH

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 odo@sudelindustries.com
 whyalla@sudelindustries.com

CWA MAIN

145172/22

372349

Printed On 01-Mar-2022

Page 12 of 14

Curlwaa Pump Station - By-pass



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**INSTRUMENT CALIBRATION REPORT****Western Murray Irrigation Limited****Calibration ID: 145171**

Contact : David Hilton

City : Dareton

PM Task No :

Phone : 0429183619

State : NSW

Work Order : 372349

Address : 5 Tapio Street

Postcode : 2717

Instrument ID	CWA BYPASS	Manufacturer:	Siemens
Description	1Y Verification of Curlwaa Pumps - CWA Bypass - ModBus address	Model:	MAG5100W with MAG 6000 CT
Calibrated	10/Feb/2022	Serial:	978303H280 / N1M9045200
Location	Curlwaa Pumps	Classification:	Critical Item
Area		Previous Inst Status:	In Service
Equipment ID	CURLWAA PUMPS		

Calibration Data

Origin of Stated Accuracy	Manufacturer Specification
Calibration Type:	In Service
Document ID:	VERIFICATION

Group #	1	Test Type :	TaskList.bpl
Group Name	Verification	Group Result :	Pass
Step #	Step	Result	Comments
1	Converter Test (Enter Pass / Fail in Comment)	Completed	Pass
2	Sensor Insulation (Enter Pass / Fail in Comment)	Completed	Pass
3	Sensor Magnetism (Enter Pass / Fail in Comment)	Completed	Pass
4	Enter WO# in Notes on Verification Report	Completed	

Test Instruments Used During the Calibration:

<u>Test Instrument ID</u>	<u>Description</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Serial Number</u>	<u>Last Cal Date</u>	<u>Next Cal Date</u>
STIN313	Seimens Magflo Verificator	Siemens	083F5060	00519N089	21/06/2021	21/06/2022
STIN453	1Y Calibration of Fluke 175 Multimeter - Unit belongs to Neil Zander Personnel Equipment	Fluke	175	26680423	19/05/2021	19/05/2022

Calibration Result:	Calibration Successful	Performed By :	Neil Zander
Finalized By :	Denise Harrison	Finalized Date :	01/03/2022
Calibration Frequency :	Annual	Next Calibration Date	10/2/2023
Amb. Temp. (DEG.C) :		Amb. Humidity (%R.H.) :	

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 whyalla@sudelindustries.com

CWA 8111438

130100022

372349

Printed On 01-Mar-2022

Page 11 of 14

Water Management Works**MW3192-00001**

Government-provided metering equipment is not installed on any of WMI water supply works authorised by this approval, any water taken using the works is metered as detailed at MW2452-00001 above.

MW0491-00001

All works authorised by this approval remain in use; there are presently no future plans to decommission the works.

Monitoring and Recording**MW2338-00001**

The metered usage is recorded electronically at least every 15 minutes and stored on WMI servers; historical data can be accessed back at least 10 years. Live, end of day and end of month meter readings are also available on the WWW:

https://orderwater.westernmurray.com.au/PumpTotalisers_sql.asp .

MW2336-00001

The purpose for which water is taken is based on the WMI Crop Report. It is not feasible to create a record each time water is used for type, area, dates of planting and harvesting of each individual owner's crop.

MW2337-00001

The following information is recorded electronically for each 15-minute period that all water is taken:

- A. Time, date, volume of water, start and end times and flowrate.
- B. The access licence number under which the water is taken; also, our order system records individual customer orders; each customer meter is read each quarter.
- C. The approval number under which the water is taken.
- D. Volume of water taken for domestic consumption and/or stock watering is not recorded separately; this is recorded on customer metered outlets.

MW0482-00001

A water meter is installed on all water supply works authorised by this approval, the meter reading is recorded at least every 15 minutes.

MW2339-00001

All works are metered and fitted with a WaterNSW data logger. The metered records are also sent directly to WaterNSW every 15 minutes and daily to MDBA via telemetry; Historical records are also recorded on WMI servers. Western Murray Irrigation are still discussing options with NRAR regarding connection to DAS (Eagle-Eye), utilising our existing telemetry/business systems.

Reporting**MW0051-00001**

WMI are not aware any breaches of the conditions on this approval.

Other Conditions - Monitoring and Recording**DK5891-00004**

Monitoring and Reporting has been carried out as specified in the 'Western Murray Irrigation Limited Monitoring and Reporting Plan for 60CA581273', dated 16 March 2018, as below.

WMIL – MONITORING AND REPORTING PLAN FOR COMBINED APPROVAL 60CA581273

Schedule 1 – Requirements

The Approval Holder of 60CA 581273 has provided all data in the format detailed in each specific requirement of the Monitoring and Reporting Plan, unless otherwise authorised by NRAR. The data has been submitted to the nominated officer within NRAR.

Reporting and Notification Requirements:

Submission of an Annual Compliance Report.

Condition 1

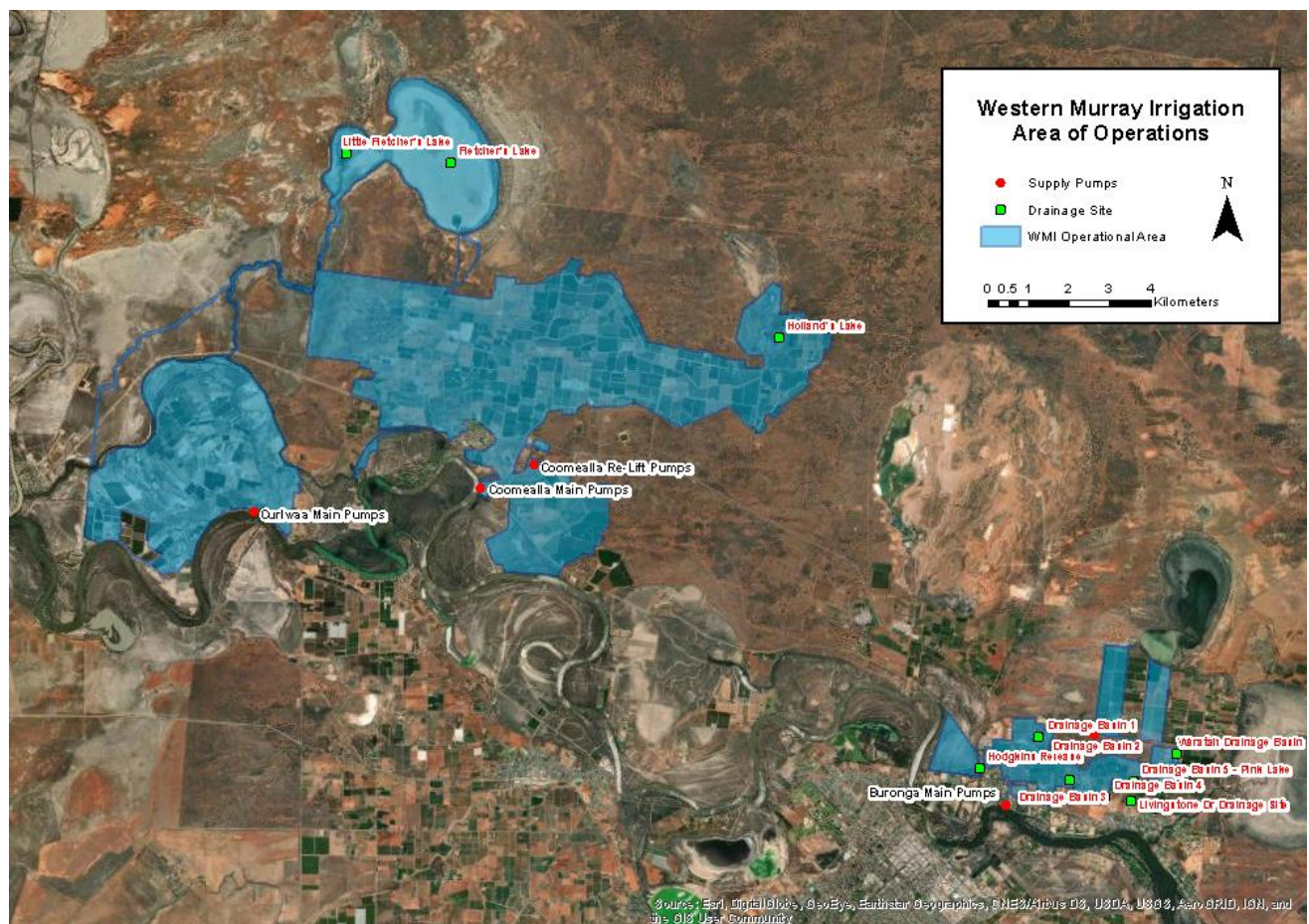
The Approval Holder has, by the 31st of October each year, submitted to the Minister an electronic copy of an Annual Compliance Report for the preceding water year (from 1 July to 30 June). 2 weeks extension has been accepted for 21/22 ACR.

Condition 2

Following are plans of Western Murray Irrigation Limited Infrastructure for the year 2021/22.

Condition 2.1

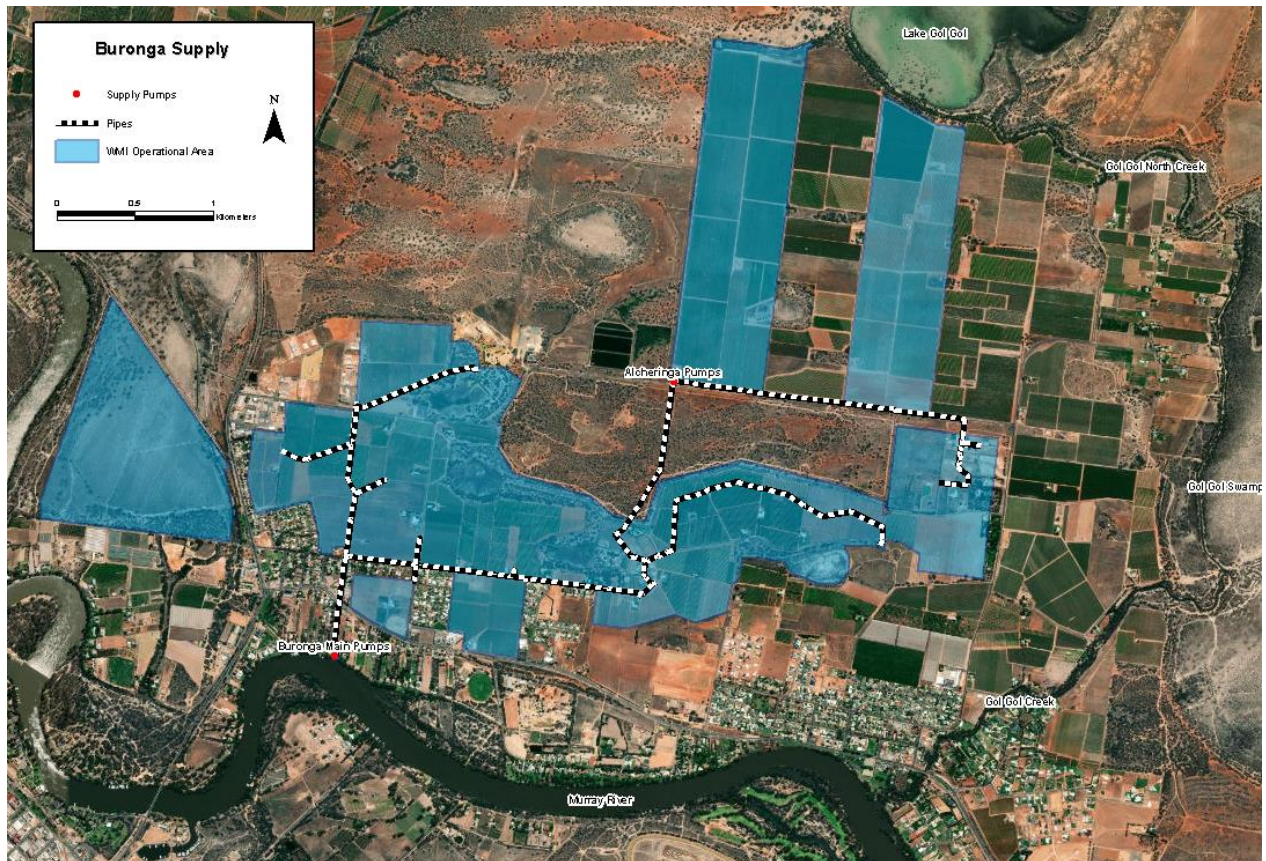
Area of Operations, existing on 30 June 2022, showing, to the Minister's satisfaction, the boundary of all included land and including any amendments made by the inclusion and exclusion of lands in accordance with sections 131 and 135 of the *WMA 2000*, and showing the boundary of any other land water is supplied to that are not included in the Area of Operations. Zero changes to area of operations in financial year 2021/22.



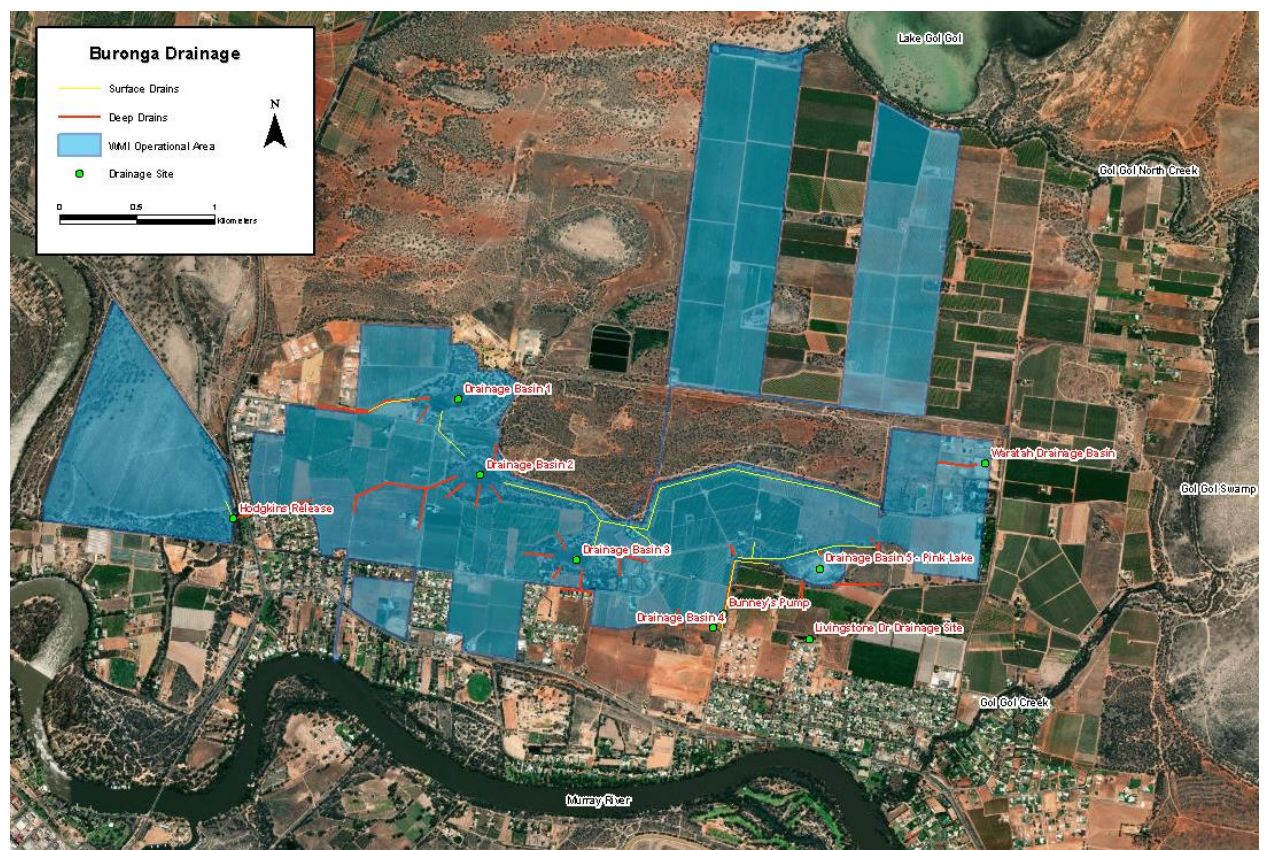
WMI Operational Area

Condition 2.2

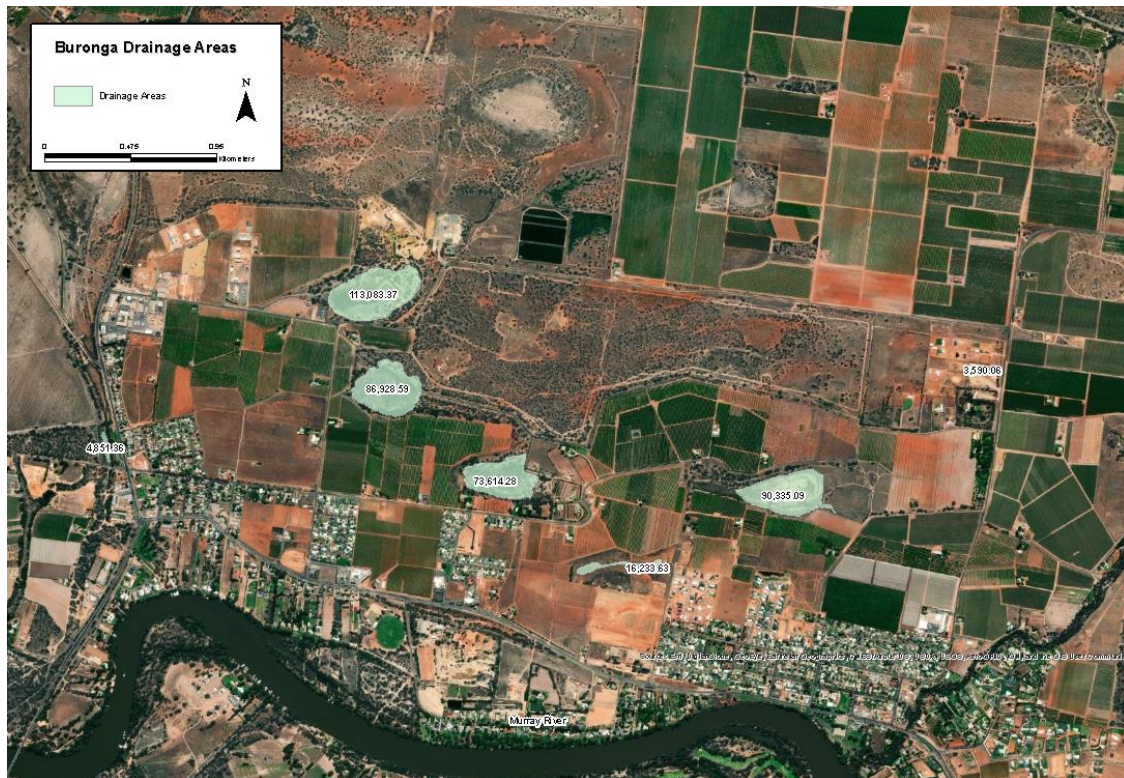
Plans showing current location of Major water courses, Authorised works and supply infrastructure, Drainage infrastructure, Drainage disposal sites and Monitoring sites.



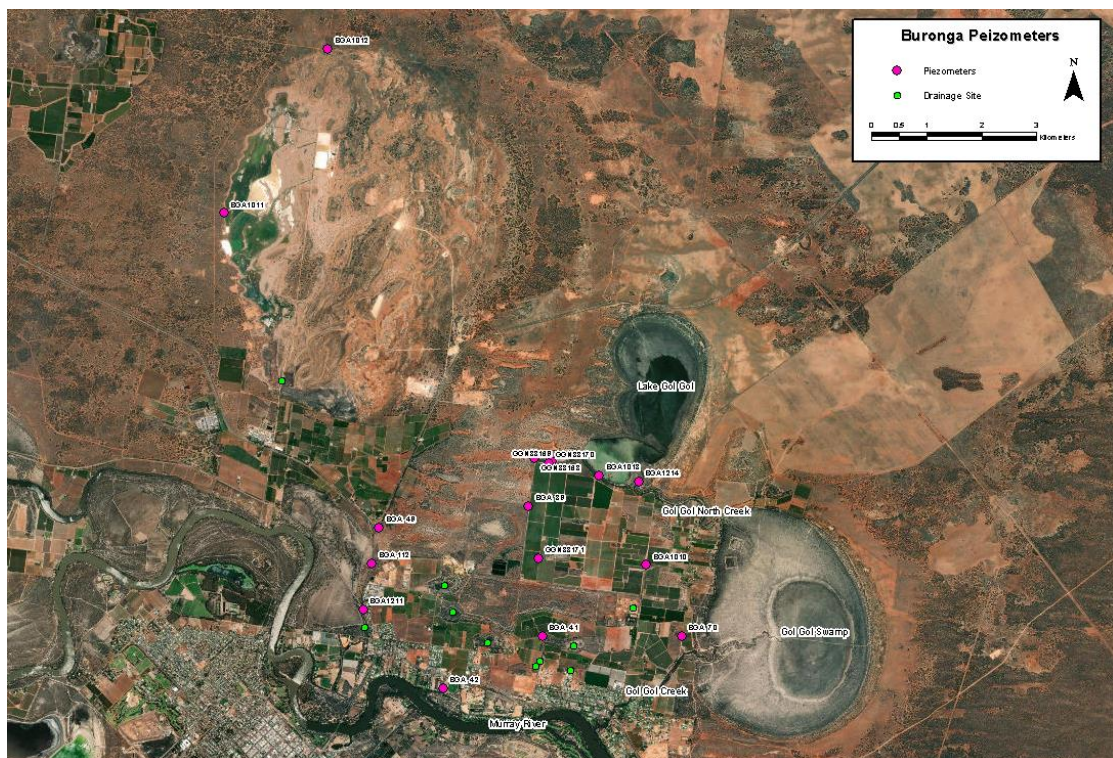
W01 – Buronga supply. Area of operations.



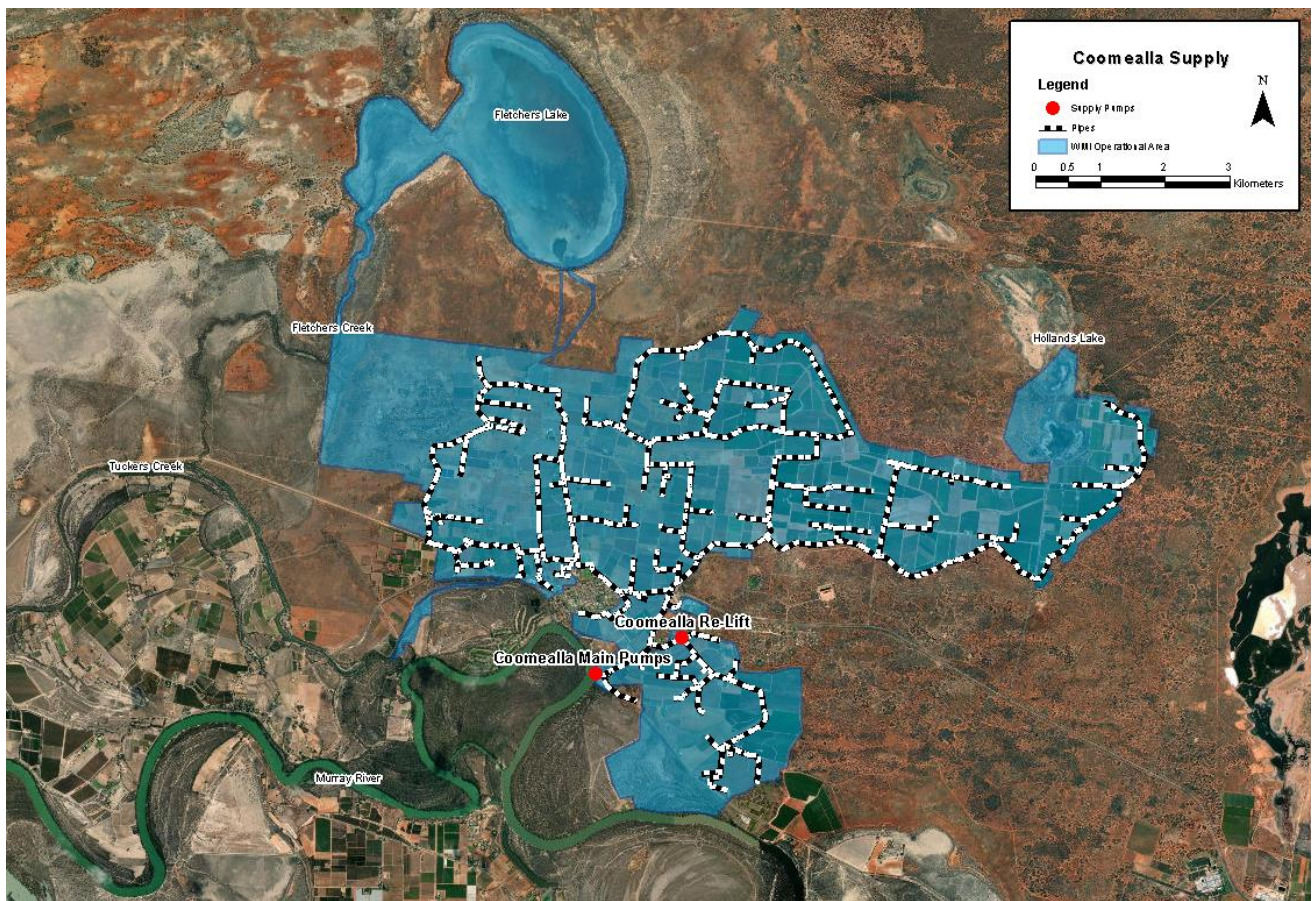
Buronga drainage infrastructure



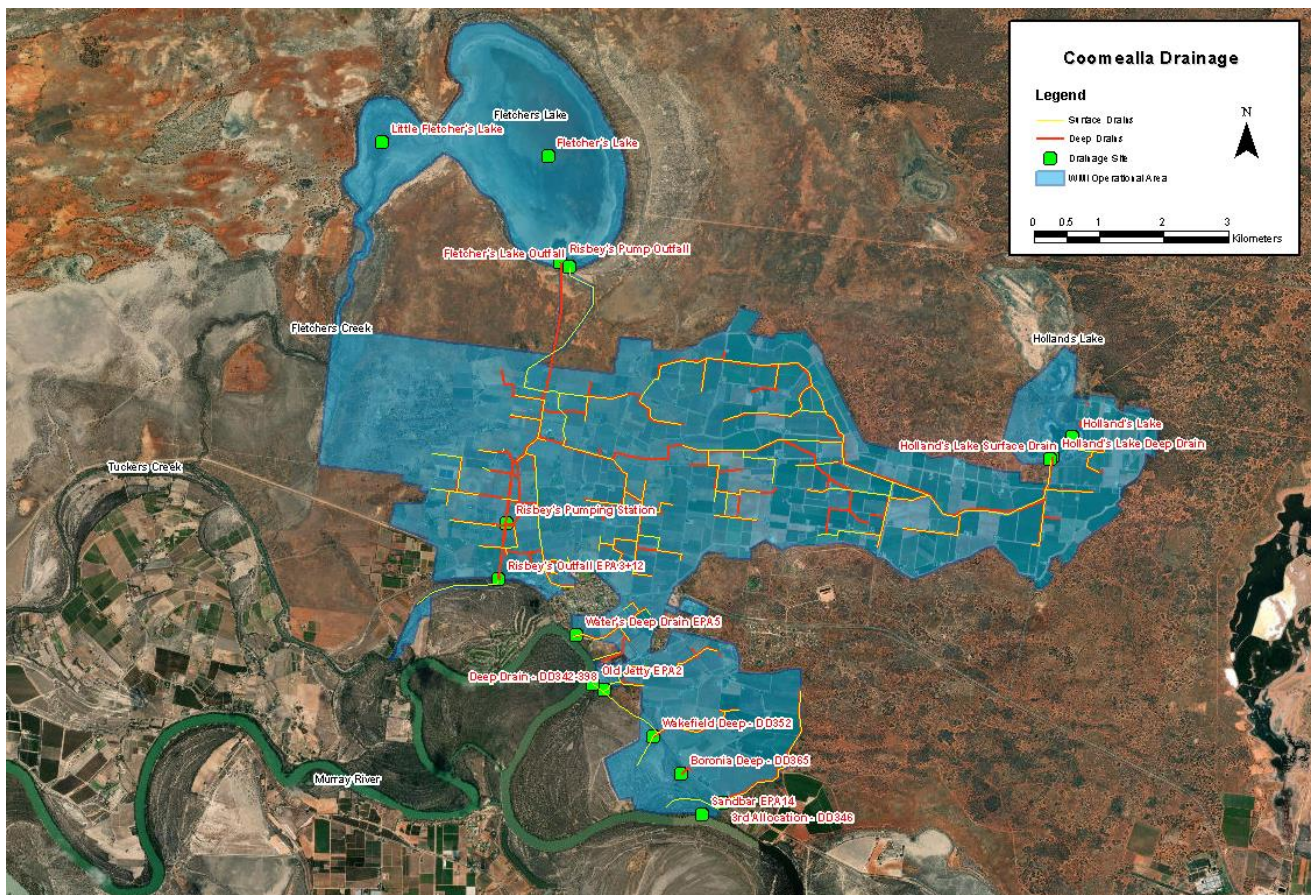
Buronga - Extent of area (square metres) that are temporarily inundated to store drainage and storm water (evaporation basins).



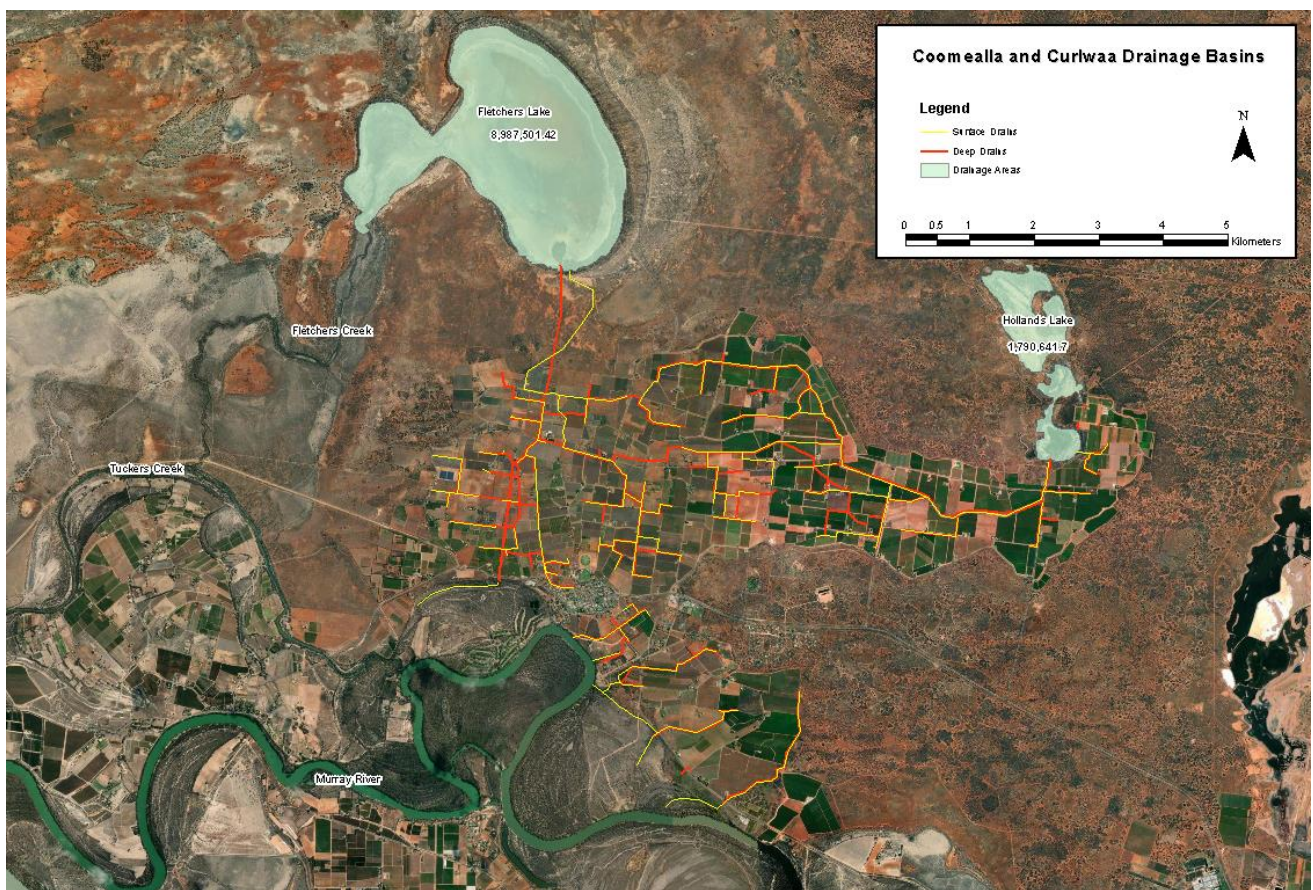
Buronga Piezometers



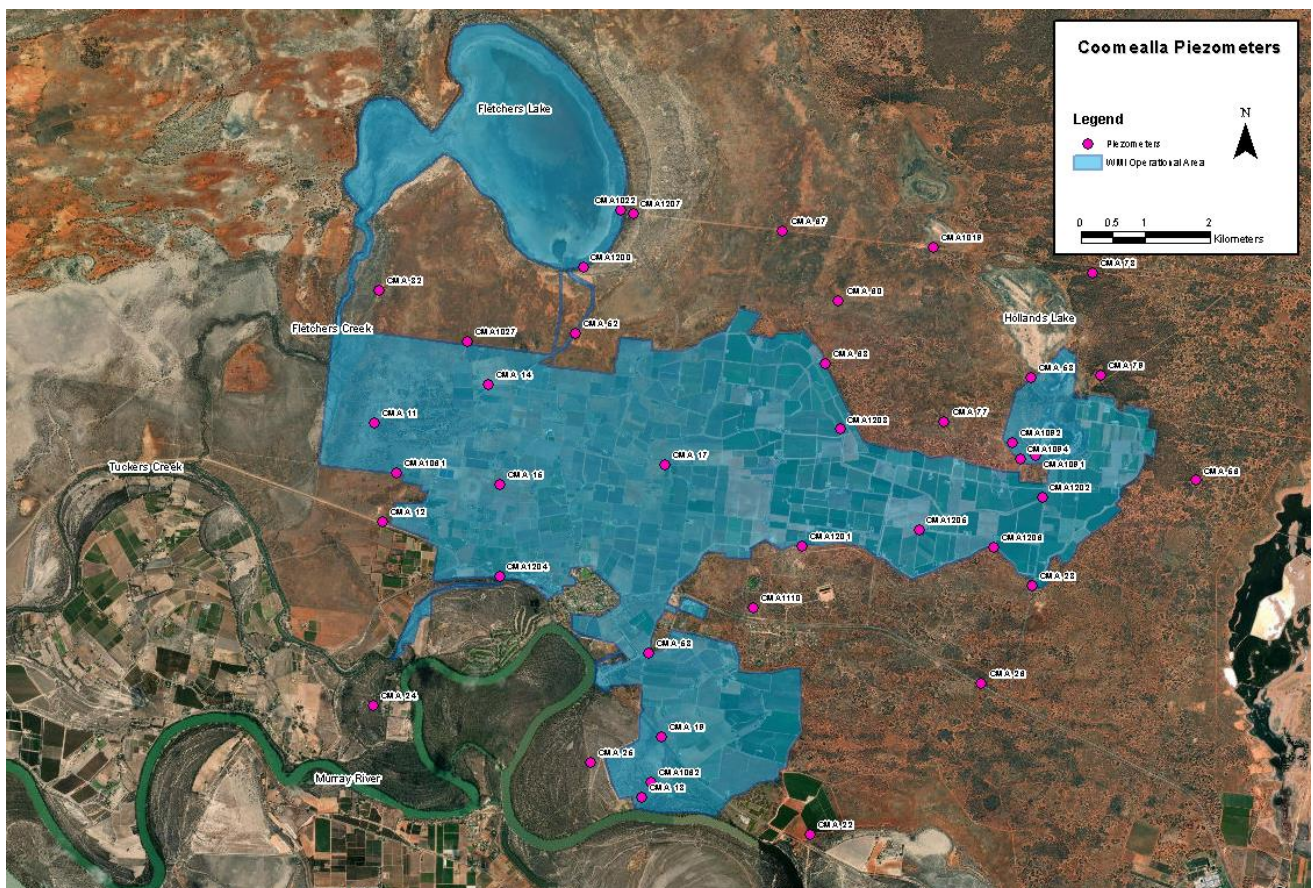
W02 - Coomealla supply.



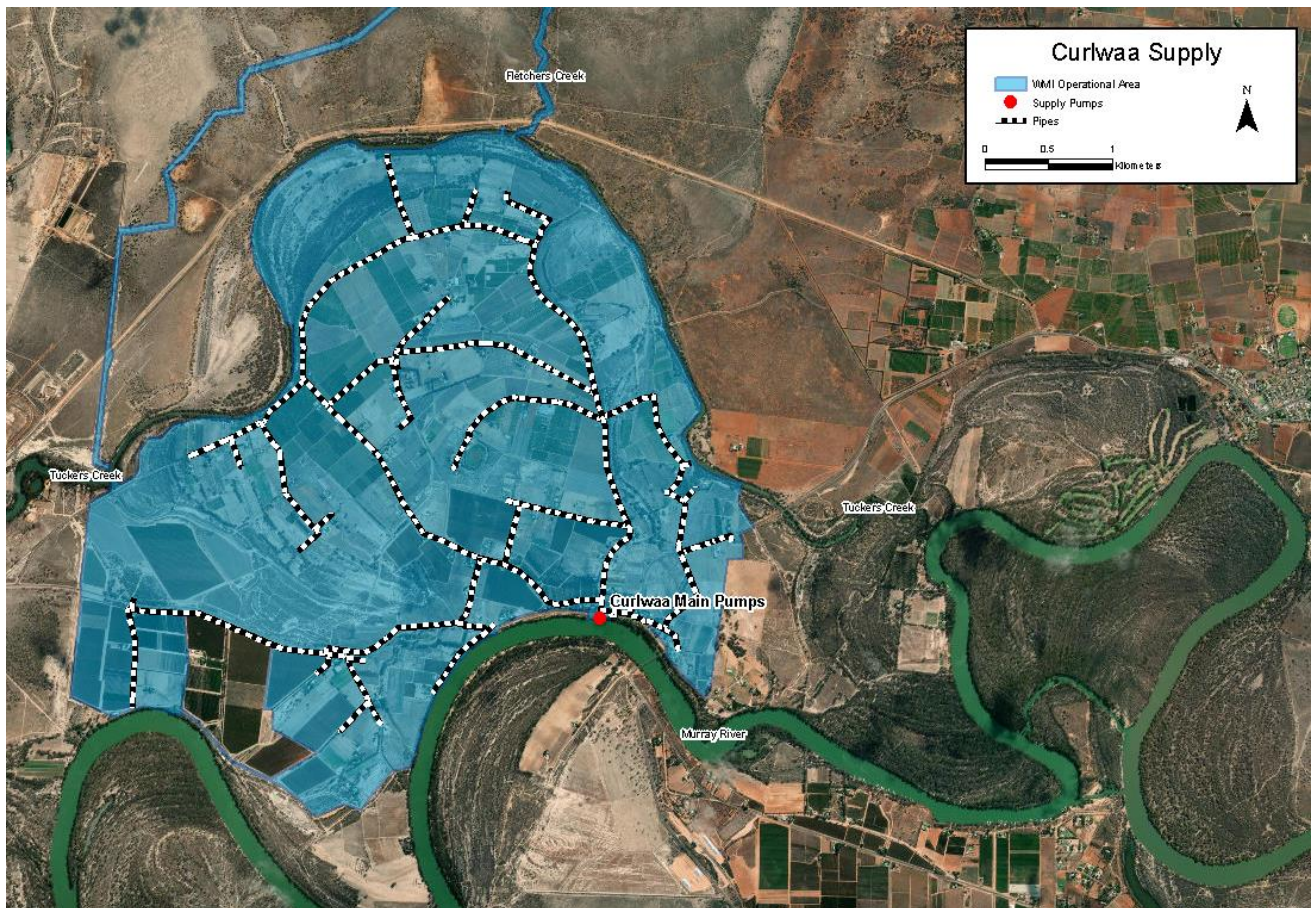
Coomealla Drainage Infrastructure



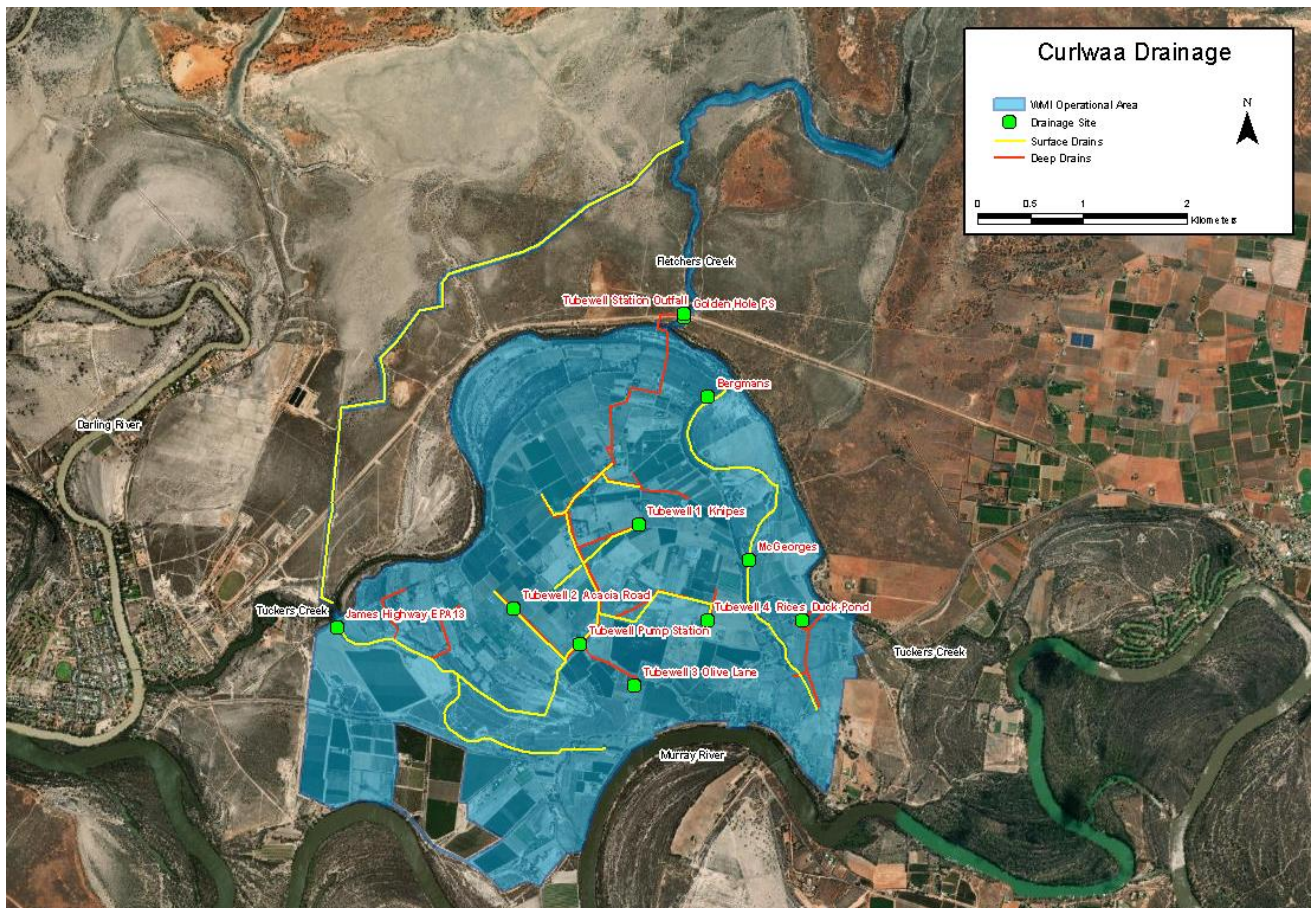
Coomealla and Curlwaa - Extent of area (square metres) that are temporarily inundated to store drainage and storm water (evaporation basins).



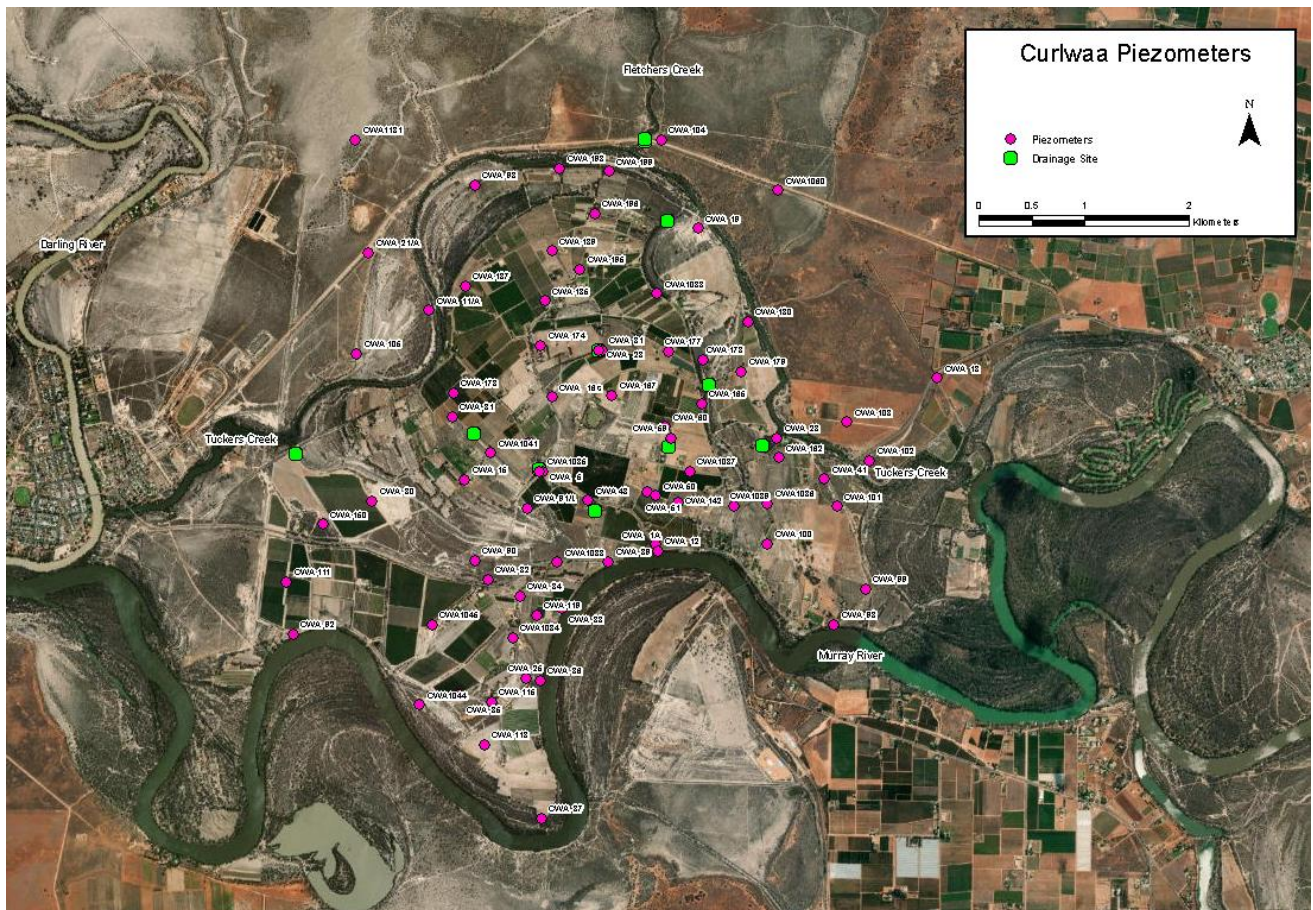
Coomealla Piezometers



W03 - Curlwaa pumping plant and supply infrastructure



Curlwaa Drainage Infrastructure



Curlwaa piezometers

Statement of Compliance

Condition 2.3

WMI is in compliance of Approval number 60CA581273.

Groundwater monitoring results showing destroyed, dry, inactive, and active piezometers are included in this report.

The Saltwater Interception Scheme (SIS) is a government project and has operated since the late 1960's under various configurations; maintained by government until 1995 and WMI thereafter. NRAR have informed WMI on 18August2021 there is now a requirement for a works approval and WAL to operate the SIS. WMI has requested further information from NRAR investigating why there is a requirement for WMI to pursue a separate works approval and WAL for a SIS, that is a government project and is already a part of our combined Water Supply Work Approval and Water Usage approval (e-mail dated 05May2022 – Attached).

WMI has attached a consultant's groundwater hydrogeologist report October 2020, this is a long-term audit of our groundwater control and monitoring. This has been used to establish the best course of action for destroyed piezometers. Extract from report:

Recommendations for Groundwater Monitoring

It is recommended that WMI continue monitoring within their operating network to comply with conditions of the water use approval, maintain a consistent data set, and ensure the collection of time series salinity data (which is not routinely collected as part of state monitoring. For the WMI monitoring program going forward the following recommendations may be adopted to confirm and or improve confidence in monitoring data quality. This includes:

■ Confirm correct bore location details by taking GPS co-ordinates at each site comparing the results to the existing WMI records and NSW government records to identify the correct dataset.

Complete (extract from GIS)

■ Measure total bore depth during the next annual monitoring round and comparison of this data to known construction details to confirm that monitoring bores remain open to the aquifer.

Complete

■ Exclude dry bores from ongoing monitoring where the 2019-2020 monitoring data indicates the screen is mostly or completely blocked.

Not yet excluded, screens maybe OK, bore depths not reaching low water table. This will become apparent after large rain event, Nov2022.

■ Survey the natural surface elevation and reference elevation of bores in the current network where this data is unavailable (10 bores) so that depth to water measurements can be compared to river levels and changes in groundwater gradients can be assessed.

Not started.

■ It is recommended that a selection of bores in the WMI network (20%) are surveyed. This data can be compared to the existing data to assess the accuracy of reference elevation data as most sites have no documented survey methodology. Additional survey may then be required to improve confidence in groundwater elevations and the assessment of groundwater trends.

Not started.

Several bores within the WMI networks have been destroyed or are listed as dry, despite this the existing monitoring data provides a relatively good spatial coverage of the irrigation footprint to identify the potential impacts of irrigation and drainage. However, it is recommended that the network distribution be reviewed following the collection of data listed above, particularly confirmation of correct bore locations and measurement of total bore depth. This data can then be used to identify gaps in the current monitoring network and determine if existing bores not currently monitored by WMI can be included in the annual monitoring round or if replacement bores are required where there are gaps. It is then recommended that a groundwater monitoring plan be developed and presented to the regulator to provide an agreed monitoring strategy going forward. This should also include an update of the agreed set of reporting outputs or performance indicators to be included in the annual compliance report.

To be completed after Surveys.

It is also recommended that WMI continue the collection of 3 yearly crop report data to capture changes in irrigation methods, irrigated area, and crops. This is a valuable data set and can be used to support the analysis of groundwater trends.

Recommendations for SIS Operations

The review of the operational and monitoring data indicates that the Curlew SIS does not need to operate under current conditions and there is currently no need to refurbish tubewell 1. However, groundwater monitoring data should continue to be collected annually and reviewed against trigger levels to provide a safeguard if groundwater levels begin to rise. Groundwater levels should be reviewed in the context of rainfall and river level data as hydrograph analysis shows that the floodplain aquifer responds to flood and rainfall events which may result in rises in groundwater levels that are only short term. Irrigation supply and method data should also be reviewed with groundwater trends. Previous communications with Department of Natural Resources by WMI have suggested a trigger level of 31.8m AHD (i.e., 1m above pool level) as a trigger to reinstate SIS operation. This trigger level is considered reasonable however it is also proposed that if groundwater levels rise to 31.3 MAHD (0.5m above pool level) this should trigger a review of SIS operations and the development of a plan to reinstate pumping. This is to prevent a significant time lag for reinstating groundwater pumping if the 31.8m AHD level is reached.

"Knipes" Tubewell 1 is now operational after successful rehabilitation.

It has been noted Schedule One – 'Authorised Supply Works' needs to be updated:

W02 Work details should read:

5 Variable axial flow pumps of 63ML/day each.

3 Variable centrifugal pumps of 10 ML/day each

Four original (55.2MLD) pumps have been replaced with more efficient 63MLD pumps, last pump is expected to arrive 22/23.

3 variable centrifugal pumps of 10, 10, 10 MLD – used as auxiliary/winter pumps.

Condition 2.4

Data from all monitoring required by this Monitoring and Reporting Plan has been supplied in electronic format, including:

- PDF of this report.
- Original Excel spreadsheets used for calculations and presentations within this report.
- Other original documents forming part of this report.

Condition 2.5

Condition 2.5 has been broken down into Salinity, Discharge, Groundwater, Extraction and Water use, monitoring data.

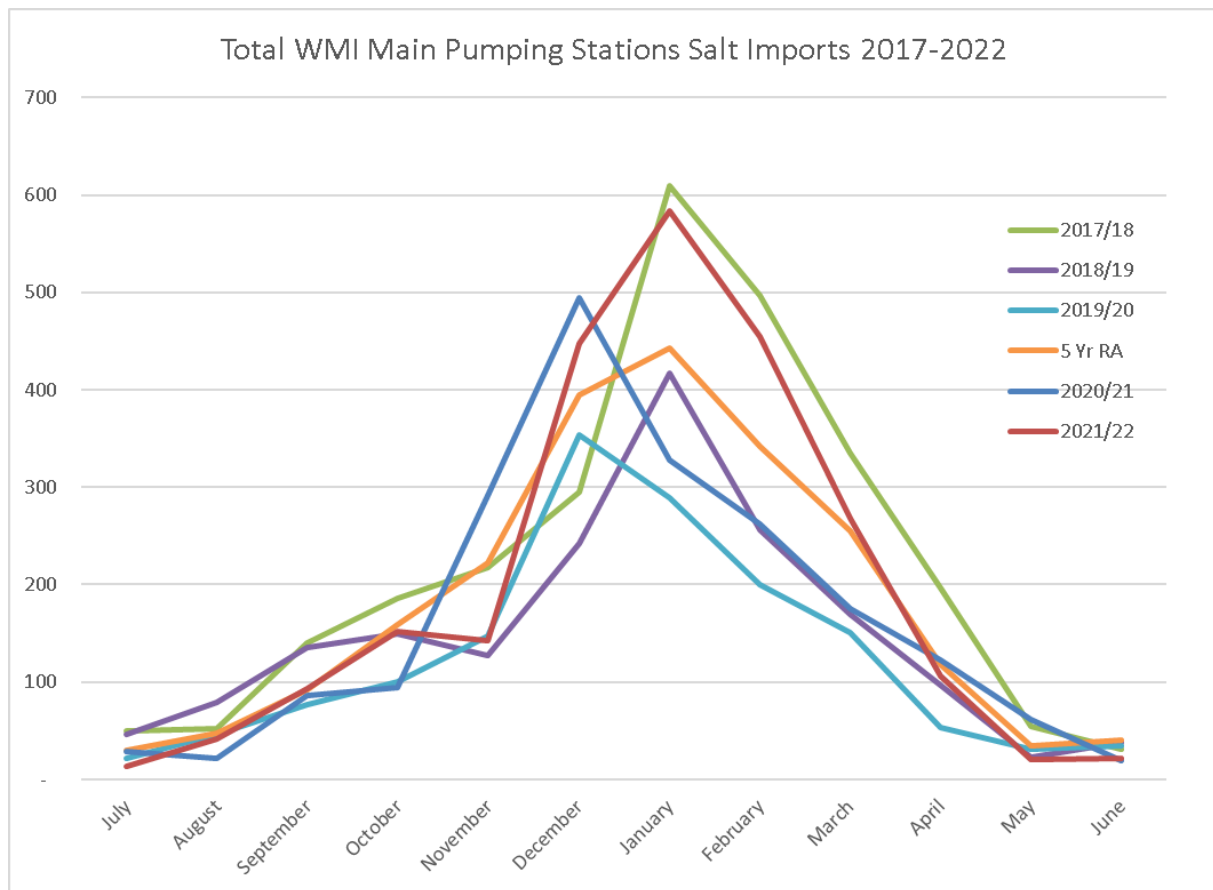
Condition 2.5-Salinity

There have been no significant salt load discharges and no changes to any works or practices that could lead to increased impact trends on the River Murray. EC is in a normal range of 100-150 $\mu\text{S}/\text{cm}$.

a) Comparable salinity import data for at least 2 years (5 years):

Total Salt Imports (Tonnes)						
Month	2017/18	2018/19	2019/20	2020/21	2021/22	5 Yr RA
July	50	46	22	29	14	32
August	52	79	46	22	42	48
September	140	135	77	86	93	106
October	186	149	100	94	152	136
November	218	127	147	292	142	185
December	295	242	354	494	447	366
January	610	417	289	328	583	445
February	497	256	200	262	455	334
March	335	170	151	175	268	220
April	197	97	53	122	107	115
May	55	23	31	61	20	38
June	31	38	34	19	21	29
Year to Date	2,635	1,741	1,470	1,965	2,322	2,027
Total	2,666	1,779	1,504	1,984	2,343	2,055
Average EC	163	138	139	114	142.50	139

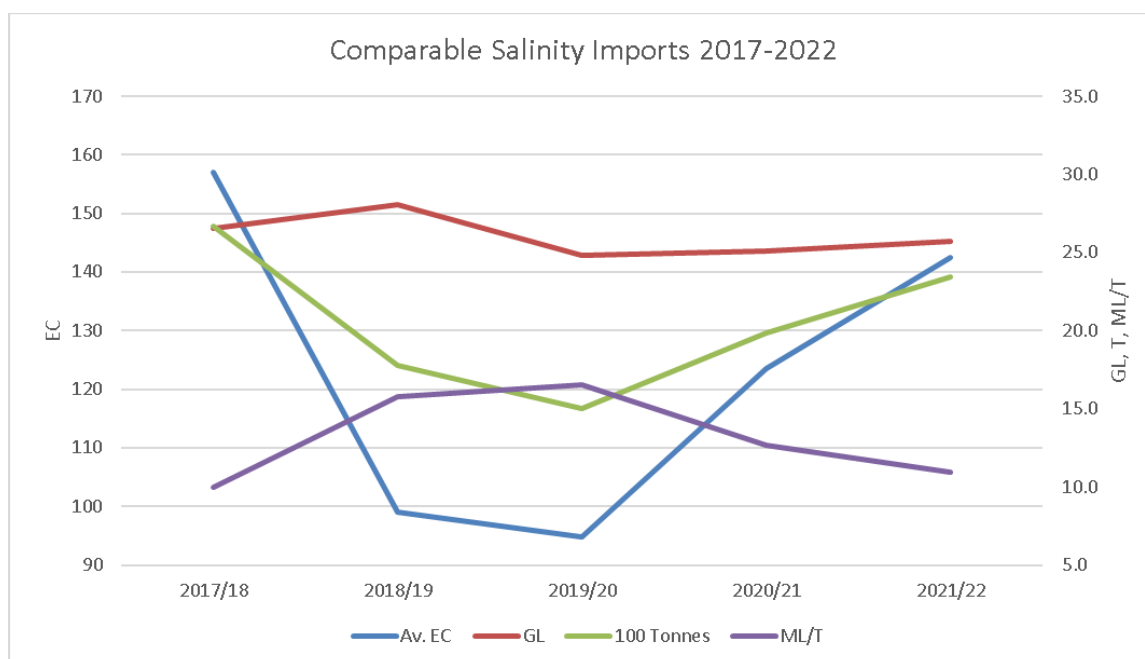
O:\Supply\WMIL Supply Figures\WMIL Supply 2021-22\WMIL Daily Flow s ALL Stations 2021-22.xlsx\Monthly Salt Summary



The chart shows seasonal water usage affecting salt imports for each month; this is in line with normal annual irrigation. For annual trends, see para 2.5 Salinity (b).

b) Comparable Salinity import data for a year being at least 5 years prior:

Annual	2017/18	2018/19	2019/20	2020/21	2021/22	5 Yr RA
Av. EC	157	99	95	124	142	123
GL	26.5	28.1	24.8	25.1	25.7	26.0
100 Tonnes	26.7	17.8	15.0	19.8	23.4	20.6
ML/T	10.0	15.8	16.5	12.7	11.0	12.7



This chart shows the effect of EC on annual salt imports.

(c) There are no new targets identified, the salt imports are controlled purely by the salt content of the river and quantity of water extracted. The annual EC average has been calculated by daily salt imported in tonnes /daily water pumped in GL/0.64; this gives a true average EC of 'supplied' water. This is an identified benchmark although we have no control over this.

d) Supply remains in a range of between 24-28GL per year. Average EC and salt imports have increased. The increase in salt load is due to the increase in EC.

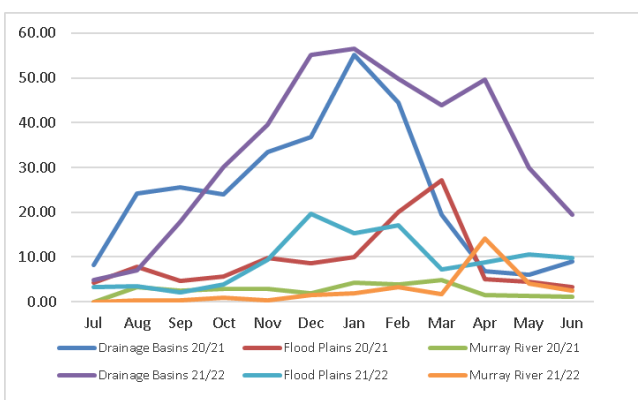
Condition 2.5-Discharge

a) Discharges from all drainage outfalls for the 2021/22 year:

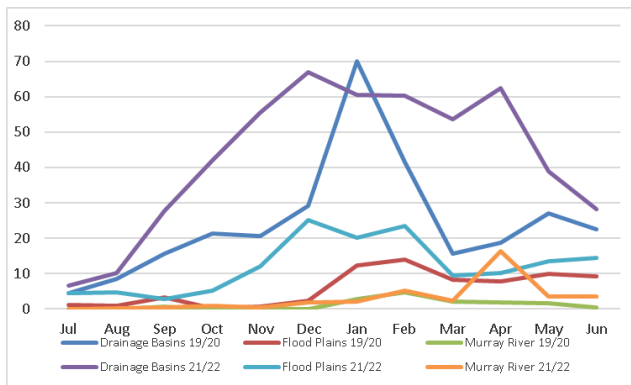
Buronga			Coomealla			Curlwaa			Total		
Total Drainage			Total Drainage			Total Drainage			Total Drainage		
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)
48.72	1,086	33.85	495.41	2,086	661.47	1.24	400	0.32	545.37	1190.68	695.65
Drainage Basins			Drainage Basins			Drainage Basins			Drainage Basins		
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)
48.72	1,086	33.85	354.77	2,110	479.09	0.00	NA	0.00	403.48	1597.92	512.94
Flood Plains			Flood Plains			Flood Plains			Flood Plains		
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)
0.00	NA	0.00	110.66	2,057	145.64	0.00	NA	0.00	110.66	2056.52	145.64
Murray River			Murray River			Murray River			Murray River		
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)
0.00	NA	0.00	29.99	1,914	36.74	1.24	400	0.32	31.23	1157.23	37.06

O:\Supply\WM IL Supply Figures\WM IL Supply 2021+22\2021+22 Weather Data.xls\BOM Rainfall

Drainage water (ML) - Comparable data for last 2 years						
	Drainage Basins 20/21	Flood Plains 20/21	Murray River 20/21	Drainage Basins 21/22	Flood Plains 21/22	Murray River 21/22
Jul	8.22	4.37	0.00	4.77	3.33	0.00
Aug	24.27	7.88	3.31	6.98	3.55	0.24
Sep	25.58	4.77	2.50	17.82	2.07	0.37
Oct	24.08	5.59	2.90	30.03	3.83	0.83
Nov	33.48	9.86	2.92	39.65	9.36	0.37
Dec	36.78	8.54	1.96	55.09	19.65	1.57
Jan	55.19	9.96	4.23	56.46	15.23	1.83
Feb	44.60	20.00	3.91	49.85	17.14	3.38
Mar	19.36	27.21	4.84	43.91	7.17	1.79
Apr	6.79	5.02	1.61	49.58	8.83	14.21
May	6.00	4.47	1.35	29.85	10.64	4.10
Jun	8.92	3.32	1.04	19.47	9.84	2.52

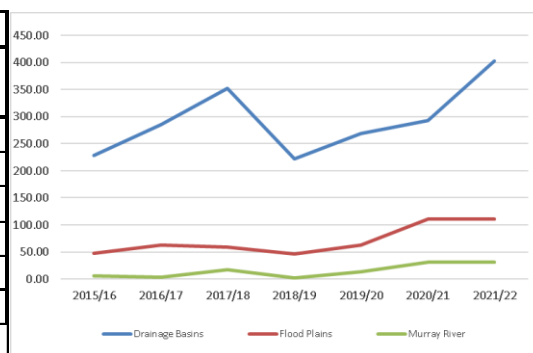


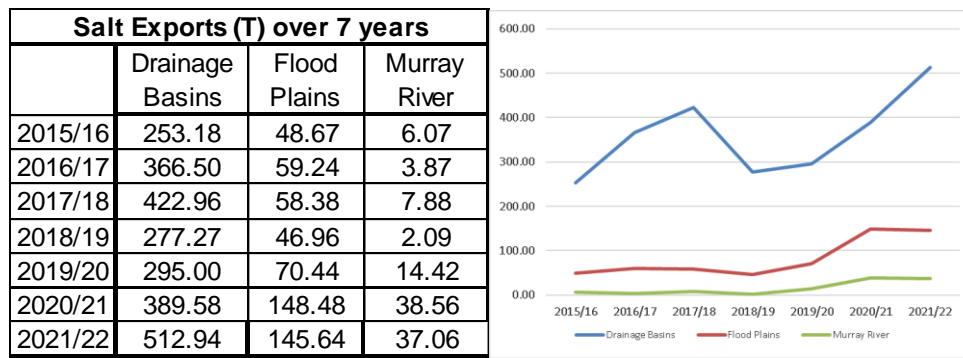
Salt Exports (T) - Comparable data for last 2 years						
	Drainage Basins 20/21	Flood Plains 20/21	Murray River 20/21	Drainage Basins 21/22	Flood Plains 21/22	Murray River 21/22
Jul	9.21	5.18	0.00	6.70	4.47	0.00
Aug	34.43	9.39	3.41	10.27	4.74	0.29
Sep	34.77	5.95	3.04	27.77	2.78	0.47
Oct	31.98	6.75	3.41	41.96	5.09	0.83
Nov	41.76	11.77	3.31	55.50	12.00	0.36
Dec	44.49	10.35	2.11	66.82	25.18	1.86
Jan	70.48	12.37	5.58	60.59	20.05	2.08
Feb	64.25	27.15	5.63	60.24	23.55	5.16
Mar	29.84	42.60	7.28	53.53	9.49	2.38
Apr	7.94	6.60	1.99	62.47	10.27	16.44
May	8.05	5.82	1.63	38.84	13.58	3.61
Jun	12.37	4.55	1.17	28.26	14.43	3.59



b) Comparable discharge data for a year being at least 5 years prior:

Drainage Water (ML) over 7 years			
	Drainage Basins	Flood Plains	Murray River
2015/16	227.98	47.84	6.33
2016/17	285.71	62.57	3.30
2017/18	352.41	58.93	17.57
2018/19	221.99	46.33	1.81
2019/20	268.59	63.23	13.27
2020/21	293.28	111.00	30.56
2021/22	403.48	110.66	31.23





c) The majority of the drainage water trend follows the irrigation demand and to a lesser degree rainfall events. 2021/22 irrigation supply was 98.65% of the 5-year average; Rainfall was 358.0mm, above the 50-year average of 284.6mm considerably more than the last 4 years; there was an increase in drainage water, possibly in line with the increase in rainfall. September 2019 WMI introduced pulsed hydrogen peroxide dosing, currently at 4 hours a day at 5ppm at all our extraction sites, this is increased up to 24/7 depending on river water quality and demand; This is to control bryozoan growths in the pipeline, aimed at improved water quality at customer outlets; Customers have generally noticed their on-farm filters have been running for longer between backflushes, this has reduced the quantity of backflush water returned to the surface drain system; although when river water quality is bad, peroxide dosing cannot dissolve organic matter in the pipeline.

d) Salt exported follows a similar pattern to drainage water throughout the year; Long term change from dominant furrow irrigation in 1997 to dominant drip irrigation in 2022 has reduced drainage water from 4848ML in 1998/99 to 545ML in 2021/22; exported salt in 1998/99 was 6538 tonnes, while 2021/22 was 696 tonnes. If this is compared against salt imports, it appears the imported salt is now being retained on irrigated land; sustained rainfall may control the salinity to some extent.

- Individual salinity and salt load of schedule 1 extraction sites is continued at condition 2.14.
- Individual salinity and salt loads of attachment 1 discharge sites is found at condition 2.15
- A simple salt balance report is found at condition 2.16

Condition 2.5-Groundwater

The Curlwaa salt interception scheme tubewell pumps have been mostly turned off for the 2021/22 irrigation season, with maintenance runs only. With low ground water the pumps run dry as the ground water flow cannot keep up with the pump output. The low ground water has not warranted the continued operation and the expense of running these pumps. Following advice from 'Department of Natural Resources' in 2009, pumping may be suspended when groundwater falls to 0.5m above river level. Pumping will recommence when ground water levels rise to 1 metre above pool level (currently 31.80 m AHD). Tubewell #1 (Knipes) is now back on-line.

Recommendations for SIS Operations

The review of the operational and monitoring data indicates that the Curlwaa SIS does not need to operate under current conditions and there is currently no need to refurbish tubewell 1. However, groundwater monitoring data should continue to be collected annually and reviewed against trigger levels to provide a safeguard if groundwater levels begin to rise. Groundwater levels should be reviewed in the context of rainfall and river level data as hydrograph analysis shows that the floodplain aquifer responds to flood and rainfall events which may result in rises in groundwater levels that are only short term. Irrigation supply and method data should also be reviewed with groundwater trends. Previous communications with Department of Natural Resources by WMI have suggested a trigger level of 31.8m AHD (i.e., 1m above pool level) as a trigger to reinstate SIS operation. This trigger level is considered reasonable however it is also proposed that if groundwater levels rise to 31.3 MAHD (0.5m above pool level) this should trigger a review of SIS operations and the development of a plan to reinstate pumping. This is to prevent a significant time lag for reinstating groundwater pumping if the 31.8m AHD level is reached.

Western Murray Irrigation | 30 October 2020
Groundwater Monitoring and Salt Interception Scheme Review Page 4

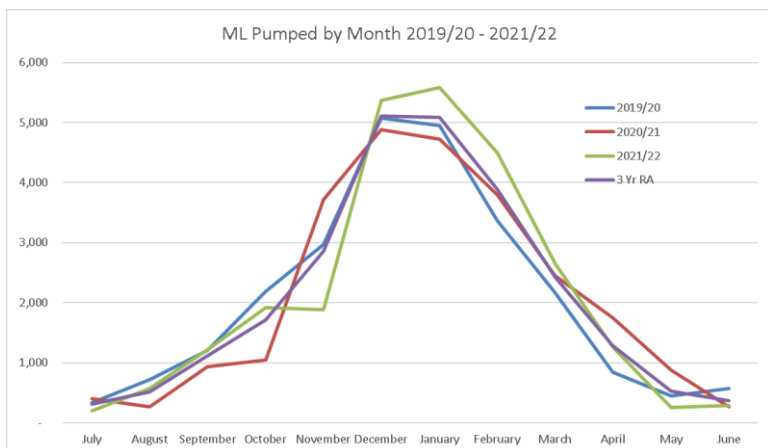
The water table has remained low for the past year, as expected during a dry season. Drip is now the dominant irrigation method; this retains water around the plantings' root ball, which does not tend to recharge the water table to the same extent.

Full details of groundwater at Condition 2.17.

Condition 2.5-Extraction

a) Comparable extraction data (ML) for at least 2 previous years (3 years):

TOTAL				
2019/20	2020/21	2021/22	3 Yr RA	%
335	404	199	313	64%
714	268	578	520	111%
1,204	936	1,213	1,118	108%
2,193	1,044	1,915	1,717	112%
2,967	3,710	1,879	2,852	66%
5,071	4,885	5,365	5,107	105%
4,945	4,718	5,587	5,083	110%
3,364	3,794	4,493	3,884	116%
2,165	2,451	2,656	2,424	110%
841	1,748	1,261	1,283	98%
444	879	257	527	49%
572	262	287	374	77%
24,816	25,099	25,691	25,202	101.9%
24,816	25,099	25,691	25,202	

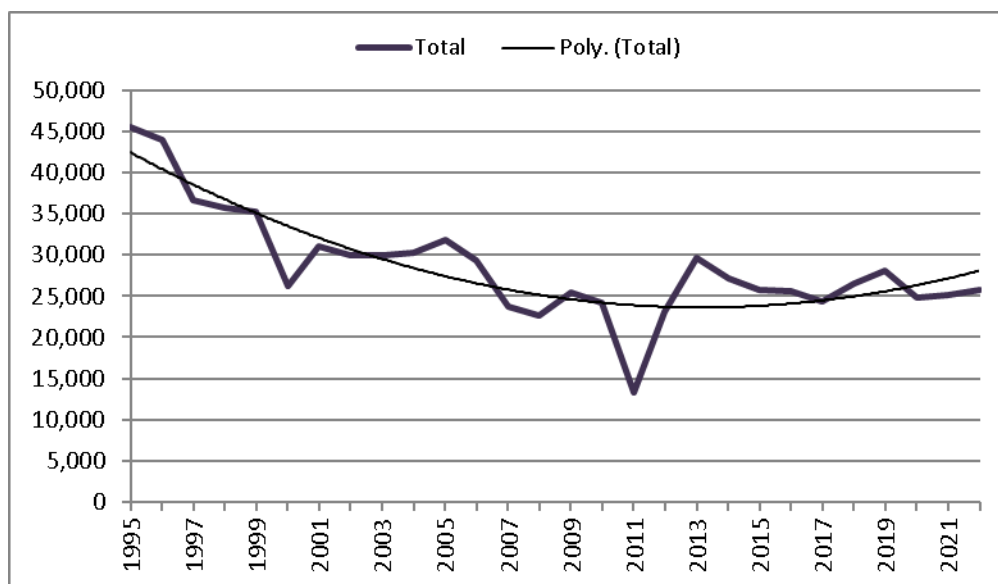


2021/22 extraction (ML) was 2% above the 3-year average, another unremarkable year.

b) Comparable extraction data for a year being at least five years (27 years):

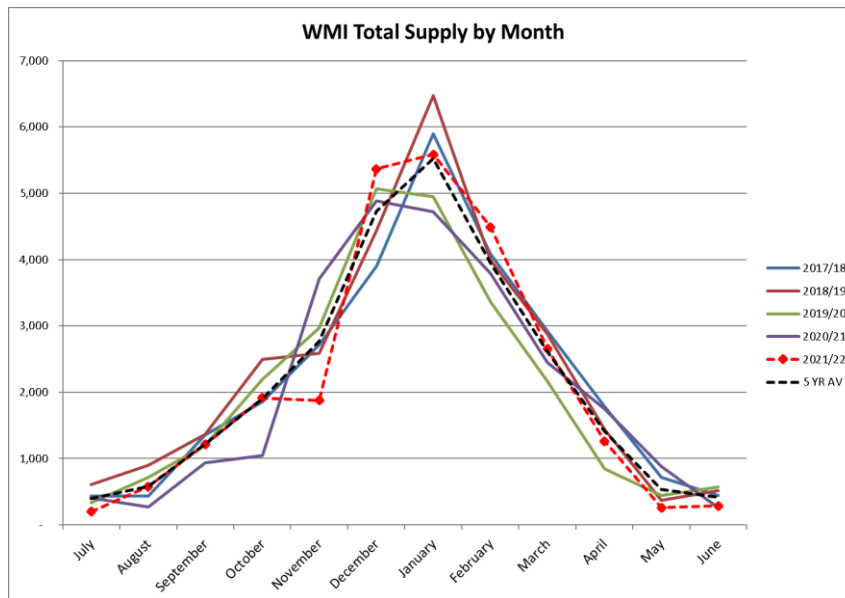
Long-term annual extraction

Jun-30	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Buronga	3,387	3,585	3,496	3,277	2,925	2,505	2,879	3,245	3,494	3,385	3,466	3,053	2,472	2,285	3,006	3,223	1,822	3,273	4,033	3,289	2,816	2,906	2,892	3,248	3,542	2,338	2,578	2,597
Coomesilla	34,661	33,385	25,967	25,236	25,537	18,199	21,831	20,509	21,218	21,031	21,930	20,502	16,640	16,199	17,877	16,733	9,108	15,943	20,478	19,319	18,596	18,376	17,751	19,266	20,584	18,671	19,269	19,496
Quirinea	7,413	6,953	7,145	7,245	6,798	5,509	6,314	6,139	5,309	5,894	6,373	6,750	4,676	4,134	4,525	4,323	2,380	3,909	5,132	4,534	4,352	4,353	3,660	4,027	3,943	3,607	3,252	3,597
Total	45,461	43,923	36,628	35,760	35,260	26,213	31,024	29,893	30,021	30,220	31,769	29,305	23,788	22,618	25,408	24,279	13,310	23,125	29,643	27,142	25,764	25,635	24,303	26,541	28,069	24,816	25,099	25,691



Monthly extraction over the past 5 years:

	Total WMI Diversions					
Month	2017/18	2018/19	2019/20	2020/21	2021/22	5 YR AV
July	431	612	335	404	199	396
August	437	904	714	268	578	580
September	1,356	1,366	1,204	936	1,213	1,215
October	1,861	2,498	2,193	1,044	1,915	1,902
November	2,719	2,583	2,967	3,710	1,879	2,772
December	3,896	4,435	5,071	4,885	5,365	4,731
January	5,896	6,472	4,945	4,718	5,587	5,524
February	4,082	3,995	3,364	3,794	4,493	3,946
March	2,924	2,881	2,165	2,451	2,656	2,615
April	1,783	1,437	841	1,748	1,261	1,414
May	714	371	444	879	257	533
June	442	514	572	262	287	415
Year to Date	26,541	28,067	24,816	25,099	25,691	26,043
Total	26,541	28,067	24,816	25,099	25,691	26,043



c) Long-term extraction shows a marked reduction in water usage; utilisation of irrigation area is presently at 79%, 1997 this was 98%; Irrigable area has increased by 9% from 1997. Water savings have largely been achieved by a change from dominant furrow irrigation in 1997 to dominant drip irrigation in 2021:

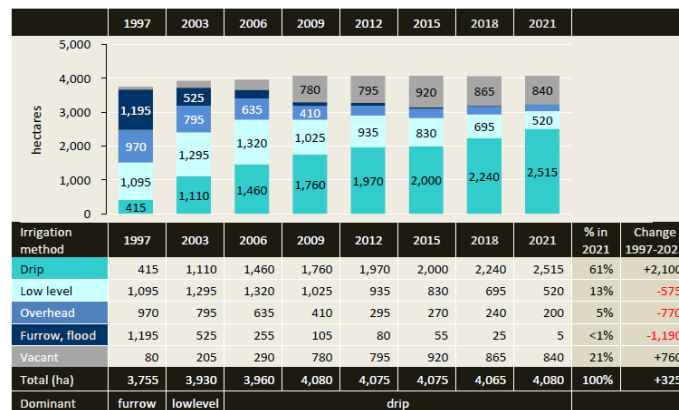


Figure 5: Western Murray Irrigation - irrigation methods from 1997 to 2021

(2021 WMI Crop Report, p15)

d) Long-term climate tends to go through long periods of drought followed by heavy rainfall. 2021/22 was above average annual rainfall 358.0mm (284.6mm 50-year average), with a 'relatively' even distribution throughout the year:

Season	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
2021/22	32.2	11.8	14.8	15.2	56.6	1.6	86.2	6.0	14.8	49.0	52.8	17.0	358.0

Rainfall mm (Original data from B.O.M. - Mildura Airport)

Condition 2.5-Water Use

- 2021/22 WMI extracted 25,691ML for water use (see 2.5 – Extraction a), this report) , this was used predominantly for horticulture with a small amount of this allocated for General Security (79ML) and Domestic and Stock use (560ML).
- WMI crops are planned to be surveyed every three years, (COVID19 delayed the 2021 report, by one year):

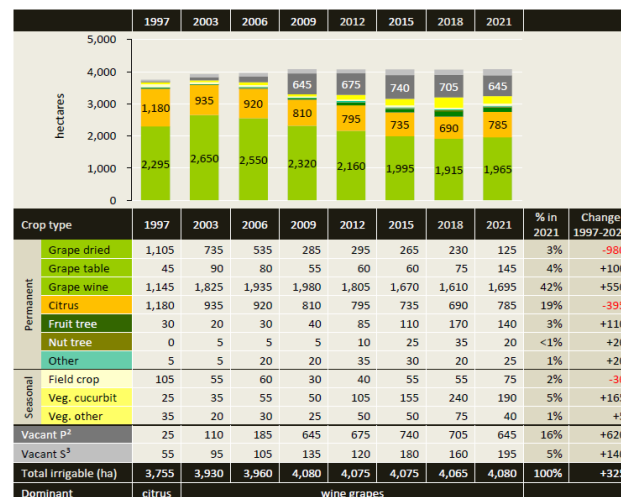


Figure 2: Western Murray Irrigation - crop types from 1997 to 2021

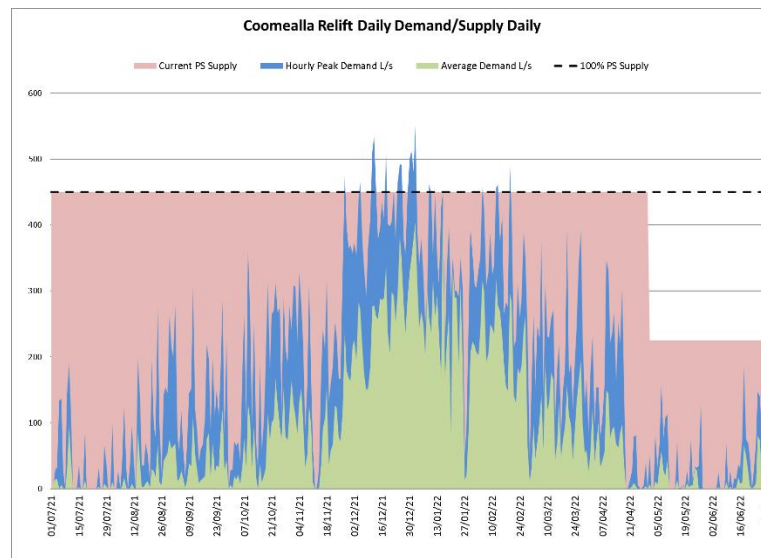
² Vacant P: not irrigated but previously an irrigated permanent planting

³ Vacant S: not irrigated but previously an irrigated seasonal crop

It has been noticed the horticulture business is gaining some momentum within WMI. Short term trends indicate more irrigable land is being put back into production; this will also increase water usage which will challenge our infrastructure in its current configuration.

- We are pumping less water annually than 1997, but drip irrigation puts excessive intra-day pressure on our infrastructure (designed around furrow irrigation); days above 40C create very high peaks of demand from drip

irrigation systems, targeted pipeline upgrades are necessary to alleviate the intra-day demand, the first upgrade is due for completion in spring 2022 to alleviate two bottlenecks in our system.



Coomeealla relift pump station emphasises demand at peak season. Three rain events can be clearly seen effecting demand in November, January and February. When Coomealla relift pump station is above 450L/s, customer pressure drops below service level.

Condition 2.6

The following have been identified as possible data omissions and discrepancies with an explanation of action undertaken/proposed to remedy the monitoring and reporting deficiency.

- a) Several destroyed piezometers have not been replaced; however, consideration is being given to which piezometers are required to achieve the appropriate reporting coverage with consultation with a groundwater hydrogeologist. Rehabilitation of several piezometers has been attempted in 2017/18; we will know if they are functional if the ground water rises to a measurable level. Piezometers have been checked for GPS location and updated; several were found incorrect. As built screen depths have been updated from historical files, See condition 2.17. *At the time of writing this report 23Oct22, there is now sufficient rain and high river activity to raise the ground water, the previously 'dry' piezometers will be remeasured, to assure they are operational (likely) rather than having blocked screens.*

Condition 2.7

All files including the Compliance Report and all associated Excel spread sheets have been provided, as a record of monitoring and testing data for discharged water salinity and volume and groundwater conditions. These are provided in an unrestricted access, electronic format.

Condition 2.8

"Salinity Training Manual"; Published by NSW Department of Primary Industries, June 2014 is used as a reference for understanding the effects of salination and methods for monitoring and control. Quality assurance is achieved by annual calibration of our extraction meters for extraction volume. MDBA website is used for salinity readings from Wentworth weir. Volume of exports is measured by V-notch or electronically; Salinity is measured with a salinity meter which is calibrated before every use with a test solution. These measurements are increased during flood/rain events. As part of EPA reporting, at least once a year (depending on drainage flow) drainage water samples are sent to consultants 'Pinion Advisory-Mildura' for NATA approved laboratory testing for chemical content (at NMI, 105 Delhi Road, North Ryde, NSW 2113). Piezometers are measured in accordance with the works approval. Training is also carried out, so at least 3 staff are familiar with the current monitoring procedures. Consultants are used for advice when required.

New Measures to Limit Groundwater Recharge and Discharge of Salt

Condition 2.9

A continuing trend towards drip irrigation requires much finer filtration, this requires more frequent operation of filter backflush systems; Hydrogen peroxide treatment was introduced in 2019/20 to stop the growth of pipeline bryozoans and other organic growths, it has reduced backflush water at the on-farm filtration systems, and reduced flows into the surface drainage system, thereby reducing groundwater recharge and discharge of salt.

The water table has been below trigger-level for several years, minimising discharge of salt into the Murray River system. *At the time of writing this report 23Oct2022, river level has hit the trigger level, tubewell pumps are now operating to maintain a positive flow of salt away from the river, water is discharged into Fletchers Lake, via Fletchers Creek.*

Reporting on Water Management

Condition 2.10

In respect of each water supply work listed in schedule one (of the Monitoring and Reporting Plan for Combined Approval 60CA581273) the reconciled monthly water volumes in megalitres are as follows:

- a) Extracted under water access licences held by the approval holder. Domestic+Stock, General Security and High Security are not metered separately. There is a 2.7ML totalised discrepancy between Water NSW statements and WMI reported figures.

IWAS Statement		
Type	WAL	ML
HS	60AL581271	25,080.9
DS	60AL581272	490.0
DS	60AL682421	34.0
DS	60AL583565	36.0
GS	60AL583086	47.4
	Total	25,688.3

WMI – Reconciled Usage for each Authorised supply works

	BURONGA				COOMEALLA				CURLWAA				TOTAL				
Month	2019/20	2020/21	2021/22	3 Yr RA	2019/20	2020/21	2021/22	3 Yr RA	2019/20	2020/21	2021/22	3 Yr RA	2019/20	2020/21	2021/22	3 Yr RA	%
July	16	43	30	30	224	287	127	213	95	74	41	70	335	404	199	313	64%
August	63	26	58	49	500	197	413	370	151	45	107	101	714	268	578	520	111%
September	103	109	136	116	879	652	863	798	222	175	214	204	1,204	936	1,213	1,118	108%
October	232	133	215	193	1,611	757	1,410	1,259	350	154	290	265	2,193	1,044	1,915	1,717	112%
November	272	374	185	277	2,276	2,890	1,422	2,196	419	446	272	379	2,967	3,710	1,879	2,852	66%
December	413	482	480	458	4,031	3,837	4,190	4,019	627	566	696	630	5,071	4,885	5,365	5,107	105%
January	433	427	552	471	3,904	3,752	4,330	3,995	608	538	705	617	4,945	4,718	5,587	5,083	110%
February	348	370	416	378	2,522	2,973	3,503	3,000	494	451	574	506	3,364	3,794	4,493	3,884	116%
March	263	288	293	281	1,563	1,788	1,935	1,762	339	375	428	381	2,165	2,451	2,656	2,424	110%
April	86	209	153	149	625	1,290	913	943	130	249	195	191	841	1,748	1,261	1,283	98%
May	56	85	41	61	314	649	182	381	74	145	35	85	444	879	257	527	49%
June	53	32	38	41	422	196	209	275	97	34	40	57	572	262	287	374	77%
Year to Date	2,338	2,578	2,597	2,504	18,871	19,269	19,496	19,212	3,607	3,252	3,597	3,485	24,816	25,099	25,691	25,202	101.9%
Total	2,338	2,578	2,597	2,504	18,871	19,269	19,496	19,212	3,607	3,252	3,597	3,485	24,816	25,099	25,691	25,202	

- b) No other water access licences were used for extraction.
 c) No water was extracted for environmental or river operational purposes.
 d) All water is delivered to customers except for leakage and scouring; leakage is so minute it is not measurable with any confidence, scouring used 19.83ML.

Condition 2.11

Water discharged from (drainage) sites listed in Attachment 1:

This “Drainage” water is a combination of:

- Groundwater - from the deep drainage system, this drains the farms of excessive water from irrigation and rain events, these drains were very active when furrow irrigation was dominant.
 - Surface water - from the surface drain system, from backflush, deep drains discharge and rain events.
- a) Discharged without credit:
- 514.14 ML was retained in area of operations i.e., drainage basins and flood plains, not to the river.
 - 31.23 ML was discharged to Murray River.
- b) Nil discharges for environmental or river operational purposes.

Condition 2.12

- a) Discharged without credit (not including rain or evapo-transpiration rates).
- Buronga – 2,597ML water extracted from river, 0.108ML scoured to drains, 48.72ML drained to basins.
 - Coomealla – 19,496ML water extracted from river, 19.5565ML scoured to drains, 465.42ML drained to basins and flood plains, 29.99ML drained to river.
 - Curlwaa – 3,597ML extracted from river, 0.1635ML scoured to drains, 1.24ML discharged to river.

- b) Negligible losses in fully pipelined network <10ML (0.05%).
- c) No change to offline storages – (balance towers) they are a fixed size metal cylinder, kept at a constant height to maintain pressure on the pipelined systems, i.e., part of the pipelined system. Coomealla tower (1995) is approximate 2ML(0.01% of annual use), Curlwaa tower (1986) is approximately 0.6ML(0.017% of annual use), they have been at the same level (except maintenance) since construction.

Condition 2.13

The estimated annual values in measurement units requested for:

- a) Rainfall = 358mm
- b) Evapo-transpiration = 1693mm
- c) Water deliveries for horticulture = 22,587L
- d) Water deliveries for summer crops = 2545ML
- e) Water deliveries for winter crops = 20ML

Table 2: Western Murray Irrigation - irrigated crops in 2021

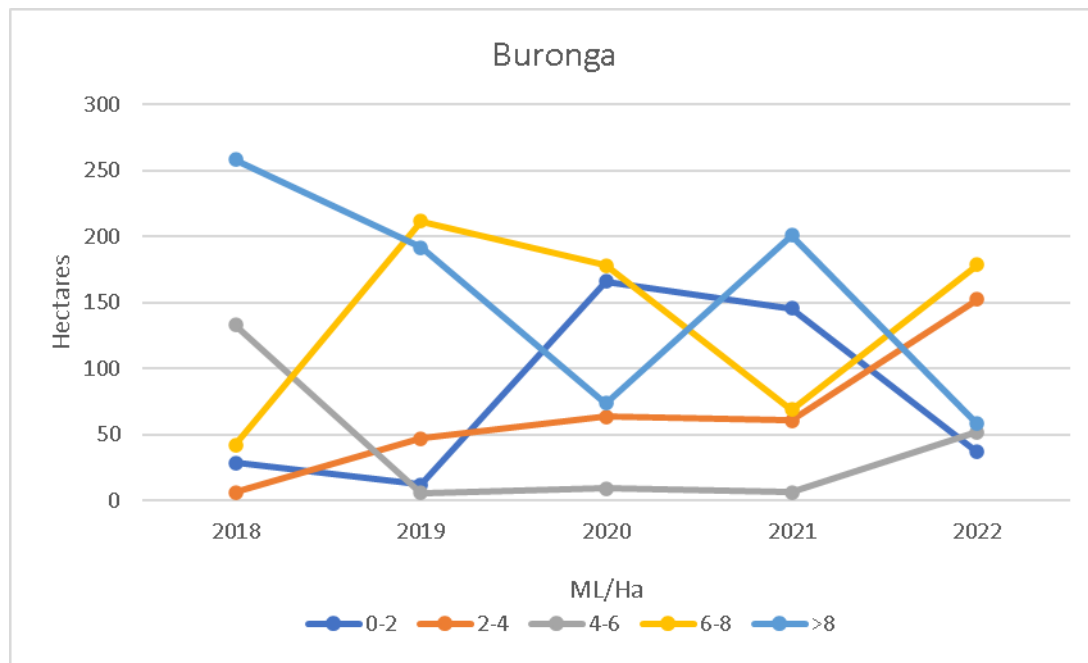
Crop type		2021 (ha)	2021 %	Description
Permanent	Grape dried	125	3%	
	Grape table	145	4%	
	Grape wine	1,695	42%	
	Citrus	785	19%	Mainly navel varieties. Other citrus includes; blood orange, grapefruit, lemon, lime, mandarin, common orange, pomelo, tangelo and Valencia.
	Fruit tree	140	3%	Mainly avocado, fig and stone fruit. Also, date palm, jujube, olive and pomegranate.
	Nut tree	20	<1%	Almonds
	Other	25	1%	Mainly nurseries. Other includes; berries, fresh flowers, native plants and tree plantations.
Seasonal	Field crop	75	2%	Mainly pasture and fodder crops.
	Veg. cucurbit	190	5%	Mainly melons. Other cucurbits include pumpkin and zucchini.
	Veg. other	40	1%	Mainly asparagus. Other vegetables included; beans, chilli, eggplant, peas, sweet corn and tomato.
Total irrigated (ha)		3,240	79%	
Vacant	Vacant P	645	16%	Vacant (not irrigated), previously an irrigated permanent crop
	Vacant S	195	5%	Vacant (not irrigated), previously an irrigated seasonal crop
Total irrigable (ha)		4,080	100%	

WMI Crop Report 2021, p.10

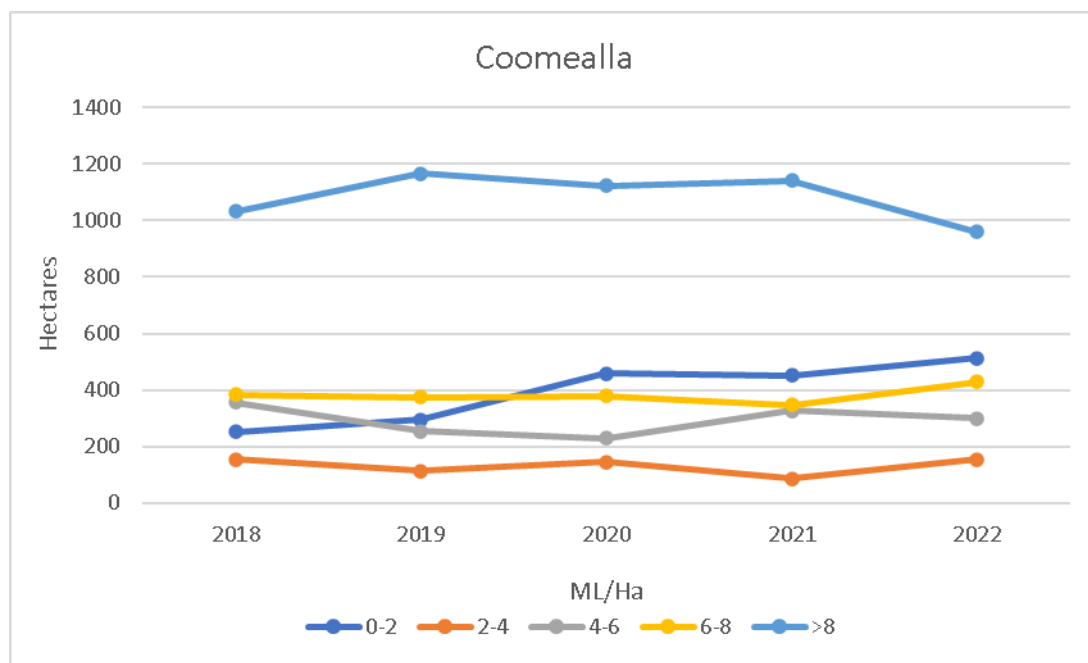
- f) Water deliveries for Domestic and Stock = 560ML.
- g) Application areas for the water uses c) to f) estimated from locally relevant crop water use factors = 3,240ha.

- h) The distribution of irrigation intensity (ML/ha/year) in at least three intensity ranges for the main supply sub-division areas.

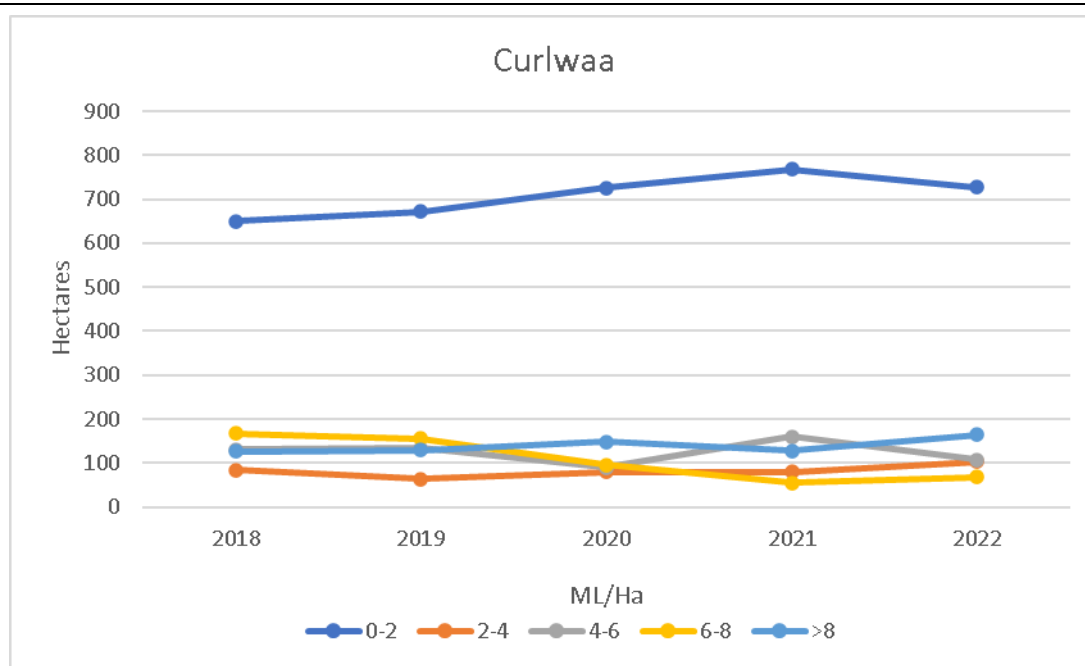
Five intensity ranges total Ha of ML/Ha over a period of 5 years for each irrigation area; the lower ranges will have been unstable over the COVID19 period, mainly due to lack of pickers, there were decisions made to not to plant seasonal crops at all in some areas, also if there is no market for grapes, the growers will cut back on the water to minimal requirements to only keep the vines alive:



Buronga looks complex, this is due to a lot of replanting, the addition of small acreage house blocks in 2020, one large irrigator taking supply from another water source and Buronga being a small system.



Coomealla has also had a lot of replanting and redevelopment of previously dry blocks, we expect to see the >8ML/Ha range to increase in hectareage as the new crops increase their demand for water.



Small increase in large previously dry blocks, but more smaller blocks going dry each year. Curlwaa soil has a high clay content and tends to retain water more than Coomealla and Buronga.

Reporting on Salinity and Saltload

Condition 2.14

The salinity and saltload of extractions at the sites listed in schedule 1, and in accordance with requirements set out in schedule 1:

- Flow - ML/Month
- Salt Loads - Tonnes/Month
- Salinity - micro-Siemens/cm
- In table format

	BURONGA W01		COOMEALLA W02		CURLWAA W03		Average
Month	ML	Salt (T)	ML	Salt (T)	ML	Salt (T)	EC
July	30	2	127	9	41	3	110
August	58	4	413	30	107	8	114
September	136	10	863	66	214	16	119
October	215	17	1,410	112	290	23	124
November	185	15	1,422	107	272	21	119
December	480	40	4,190	350	696	58	130
January	552	58	4,330	452	705	74	163
February	416	45	3,503	355	574	55	158
March	293	30	1,935	195	428	43	158
April	153	13	913	75	195	16	129
May	41	3	182	15	35	3	128
June	38	3	209	16	40	3	120
Year to Date	2,597	240	19,496	1,782	3,597	323	143

All Areas	2021/22		
	ML	Salt (T)	AV EC
Year to Date	25,691	2,345	143

Condition 2.15

The salinity and salt loads of discharges at the sites listed in Attachment 1, and in accordance with the requirements set out in Attachment 1:

- Volume - ML/Month
- Salt Load - Tonnes/Month
- Monthly min, max, average
- Table format

District	Curlwaa										Location Details				Type	Centrifugal Pumps			
Work/Site Identifier	CW 6										Coordinates (WGS84)				Dimensions	80mm & 200mm			
Name	James' Highway										586760E 6225910N				Capacity	X- Section = 0.04m ²			
Representing discharge	Discharges to Fletchers Lake/Tuckers Creek														13 ML/D				
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site Visits		
Volume (ML)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	0.0	0.0	1.2	0.0	0.0 ML	1.2	0.0	0.1	Flow	No Flow	
Salt Load (T)	0.0	0.0	0.0	0.0	0.0	0.0	Salt	0.0	0.0	0.0	0.3	0.0	0.4 T	0.3	0.0	0.0			
Average EC	NA	NA	NA	NA	NA	NA	EC Av.	NA	NA	NA	400	0		400	0	NA	2	50	

District Buronga Work/Site Identify B1 Name Corbett Ave Representing disc Discharges to Basin No.1										Location Details Coordinates (WGS84) 609902E 6219514N				Type Dimensions Weir - 90° V Notch 300mm Pipe X Section = 0.07m ² 2 ML/D				
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site Visits	
Volume (ML)	0.0	0.0	0.4	2.08	4.0	5.1	4.78	6.6	6.508	5.5	8.8	4.9	48.7 ML	8.8	0.0	4.1	Flow	No Flow
Salt Load (T)	0.0	0.0	0.3	1.56	2.6	3.5	3.82	4.2	4.345	3.5	6.2	3.8	33.9 T	6.2	0.0	2.8		
Average EC	946	910	1,274	1,171	1,004	1,065	1,250	995	1,043	984	1,107	1,223		1,274	910	1,086	52	0

District	Cooamealla										Location Details Coordinates (WGS84) 603200E 6228800N				Type	Weir - 60° V Notch			
Work/Site Identifier	CM 5														Dimensions	600mm Pipe			
Name	Hollands Lake Main Deep Drain														X- Section = 1.13m ²				
Representing discharge	Discharge to Hollands Lake														Capacity	8 ML/D			
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site Visits		
Volume (ML)	1.4	0.9	3.1	7.8	12.1	31.6	32.0	31.0	24.8	24.3	11.4	10.6	191.0 ML	32.0	0.9	15.9	Flow	No Flow	
Salt Load (T)	2.0	1.3	4.6	9.9	17.6	43.7	38.3	43.0	34.3	32.5	17.0	18.4	262.7 T	43.7	1.3	21.9			
Average EC	2,186	2,362	2,297	1,978	2,275	2,164	1,871	2,168	2,161	2,090	2,321	2,729		2,729	1,871	2,149	52	0	

District	Cooamealla									Location Details Coordinates (WGS84) 594080E 6226900N				Type	Weir - 90° V Notch			
Work/Site Identifier	CM 1													Dimensions:	600mm Pipe			
Name	Risbey's Outfall - Risbey's Main Deep Drain									Capacity				X- Section = 1.13m ²				
Representing discharge	Discharge to Tuckers Creek													8 ML/D				
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site Visits	
Volume (ML)	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ML	0.0	0.0	0.0	Flow	No Flow
Salt Load (T)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 T	0.0	0.0	0.0		
Average EC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		0	0	NA	0	52

District	Cooamealla										Location Details				Type	Weir - 90° V Notch			
Work/Site Identifier	CM 2										Coordinates (WGS84)				Dimensions	600mm Pipe			
Name	Risbey's Outfall - Branch Channel No.1 Main Deep Drain										594080E6226900N				Capacity	X- Section = 1.13m ² 8 ML/D			
Representing discharge	Discharge to Tuckers Creek																		
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site Visits		
Volume (ML)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ML	0.0	0.0	0.0	Flow	No Flow	
Salt Load (T)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 T	0.0	0.0	0.0			
Average EC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		0	0	NA	0	52	

District	Cooamealla										Location Details				Type	Bank & Pipe			
Work/Site Identifier	CM 7										Coordinates (WGS84)				Dimensions	150mm Pipe			
Name	Water's Deep Drain										595825E6226100N				X- Section = 0.07m ²				
Representing discharge	Discharges to Murray River														Capacity	0.5 ML/D			
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site Visits		
Volume (ML)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.4	0.0	0.9 ML	0.5	0.0	0.1	Flow	No Flow	
Salt Load (T)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.3 T	0.2	0.0	0.0			
Average EC	NA	NA	NA	NA	NA	NA	NA	NA	NA	600	300	NA		600	300	467	2	50	

District	Cooamealla									Location Details				Type	Bank & Pipe				
Work/Site Identifier	CM 21									Coordinates (WGS84)				Dimensions	150mm Pipe				
Name	Old Jetty									596298E6225511N				Capacity	X- Section = 0.07m²				
Representing discharge	Discharges to Murray River														0.5 ML/D				
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site Visits		
Volume (ML)	0.0	0.2	0.4	0.8	0.4	1.6	1.8	3.4	1.8	13.7	2.5	2.5	0.0 ML	13.7	0.0	2.4	Flow	No Flow	
Salt Load (T)	0.0	0.3	0.5	0.8	0.4	1.9	2.1	5.2	2.4	16.2	3.2	3.6	0.0 T	16.2	0.0	3.0			
Average EC	NA	1,900	1,954	1,554	1,485	1,861	1,772	2,382	2,076	1,851	2,040	2,228		2,382	1,485	NA	37	15	

District	Cooamealla										Location Details				Type	Bank & Pipe			
Work/Site Identifier	CM 12&13										Coordinates (WGS84)				Dimensions	150mm Pipe			
Name	Deep Drain 342-398 WMIL Depot										596125E6225325N				Capacity	X- Section = 0.07m ² 0.5 ML/D			
Representing discharge	Discharges to Murray River Flood Plain																		
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site Visits		
Volume (ML)	0.0	0.0	0.4	1.0	1.0	1.6	1.5	3.4	1.6	1.8	2.5	2.5	17.2 ML	3.4	0.0	1.4	Flow	No Flow	
Salt Load (T)	0.0	0.0	0.5	1.2	0.9	1.9	1.7	5.2	2.1	1.7	3.2	3.6	21.9 T	5.2	0.0	1.8			
Average EC	NA	NA	1,954	1,871	1,432	1,861	1,727	2,382	2,086	1,527	2,040	2,228		2,382	1,432	1,995	36	16	

District	Coomeealla										Location Details Coordinates (WGS84)				Type Dimensions	Bank & Pipe 150mm Pipe X- Section = 0.07m ²			
Work/Site Identifier	CM 14										597200E 6224650N				Capacity	0.5 ML/D			
Name	Wakefield Deep DD352																		
Representing discharge	Discharges to Murray River Flood Plain																		
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site Visits		
Volume (ML)	1.4	1.3	0.5	1.1	3.5	4.6	3.9	3.2	2.0	2.5	3.3	3.3	30.6 ML	4.6	0.5	2.6	Flow	No Flow	
Salt Load (T)	1.8	1.6	0.6	1.5	4.7	5.3	4.5	3.6	2.5	3.0	4.0	5.1	38.4 T	5.3	0.6	3.2			
Average EC	2,007	2,004	2,136	2,153	2,135	1,805	1,796	1,795	1908	1,851	1,867	2,406		2,406	1,795	1,958	49	3	

District	Coomeealla										Location Details Coordinates (WGS84)				Type Dimensions	Bank & Pipe 150mm Pipe X- Section = 0.07m ²			
Work/Site Identifier	CM 15										597500E 6224050N				Capacity	0.5 ML/D			
Name	Boronia Deep Drain - DD365																		
Representing discharge	Discharges to Murray River Flood Plain																		
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site Visits		
Volume (ML)	0.4	0.6	0.2	0.5	1.1	1.4	1.0	1.5	0.4	1.6	1.0	0.8	10.5 ML	1.6	0.2	0.9	Flow	No Flow	
Salt Load (T)	0.5	0.8	0.3	0.6	1.3	1.7	0.9	1.7	0.4	1.7	1.1	1.1	12.0 T	1.7	0.3	1.0			
Average EC	1,900	1,900	1,900	1,900	1,909	1,900	1,400	1,733	1400.0	1,663	1,759	2,100		2,100	1,400	1,777	27	25	

District	Coomeealla										Location Details Coordinates (WGS84)				Type Dimensions	Bank & Pipe 150mm Pipe X- Section = 0.07m ²			
Work/Site Identifier	CM 17										597850E 6223350N				Capacity	0.5 ML/D			
Name	3rd Allocation Main Deep Drain - DD346																		
Representing discharge	Discharges to Murray River Flood Plain																		
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site Visits		
Volume (ML)	1.5	1.6	1.0	1.2	3.8	12.1	8.8	9.1	3.1	2.9	3.9	3.2	52.3 ML	12.1	0.97	4.4	Flow	No Flow	
Salt Load (T)	2.2	2.3	1.4	1.8	5.0	16.3	13.0	13.1	4.5	3.8	5.3	4.6	73.3 T	16.3	1.4	6.1			
Average EC	2,233	2,222	2,200	2,242	2,056	2,108	2,303	2,250	2252.9	2,048	2,131	2,268		2,303	2,048	2,191	51	1	

Condition 2.16

A simple annual salt balance representing the imported, exported and retained salt load for the area associated with each separate water supply work:

WMI Supply Imports

Buronga			Coomeealla			Curlwaa		
Main Pumping Station			Main Pumping Station			Main Pumping Station		
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)
2,597	144	240	19,496	143	1,782	3,597	140	323

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WMI Drainage Outfalls

Buronga			Coomeealla			Curlwaa			Total		
Total Drainage			Total Drainage			Total Drainage			Total Drainage		
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)
48.72	1,086	33.85	495.41	2,086	661.47	1.24	400	0.32	545.37	1190.68	695.65
Drainage Basins			Drainage Basins			Drainage Basins			Drainage Basins		
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)
48.72	1,086	33.85	354.77	2,110	479.09	0.00	NA	0.00	403.48	1597.92	512.94
Flood Plains			Flood Plains			Flood Plains			Flood Plains		
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)
0.00	NA	0.00	110.66	2,057	145.64	0.00	NA	0.00	110.66	2056.52	145.64
Murray River			Murray River			Murray River			Murray River		
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)
0.00	NA	0.00	29.99	1,914	36.74	1.24	400	0.32	31.23	1157.23	37.06

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WMI Salt Balance

Salt (T)	Buronga	Coomeealla	Curlwaa	Total
Imported	240.00	1,782.00	323.00	2,345.00
Exported to Drainage Basins	33.85	479.09	0.00	512.94
Exported to Murray Flood Plains	0.00	145.64	0.00	145.64
Exported to Murray River	0.00	36.74	0.32	37.06
Retained on Irrigated Land	206.15	1,120.53	322.68	1,649.35

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Retained salt T/ha			
	Buronga	Coomeealla	Curlwaa
Irrigated ha	430	2290	515
Tonnes salt retained	206	1121	323
Average T/ha	0.48	0.49	0.63

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Reporting Groundwater Requirements

Condition 2.17

The results of monitoring of groundwater conditions by means of piezometers and groundwater control bores (tube-wells) in accordance with the monitoring and reporting requirements set out in Attachment 2.

On advice from NRAR, WMI have had the groundwater monitoring network reviewed by a consultant hydrogeologist 20/21, this report will be sent with the Annual Compliance Report. In accordance with this report the following audit has been started in 2021/22:

- 100% of WMI controlled Piezometers accounted for. – *Complete.*
- GPS location re-established for GDA1994 and GDA2020 – *Only for GDA1994, we will convert to GDA2020 when hand-held GPS has this function. A two-stage verification is being carried out, desktop utilising GIS and a physical GPS read using a hand-held GPS, a lot of sites are walk-in only.*
- AHD, screen depth and overall depth measured and confirmed at each piezometer. - *No way of physically confirming screen depth, overall depth has been measured. Missing AHD's will be confirmed in 2022-23.*
- Assess dry/destroyed piezometers for rehabilitation. – *Ideal time in November 2022, while we have relatively high water table from high river and high rain fall; if the dry piezometers are functioning, they should go to a wet state.*
- Liaise with other stakeholders to establish a plan of rectification for the whole piezo network. – *This will be started once we have completed auditing our existing piezometers.*

Attachment 2- p.1

Piezometers are read in accordance with appropriate procedures and standards detailed in: DPI NSW, Salinity Training Manual - 2014, Chapter 13.

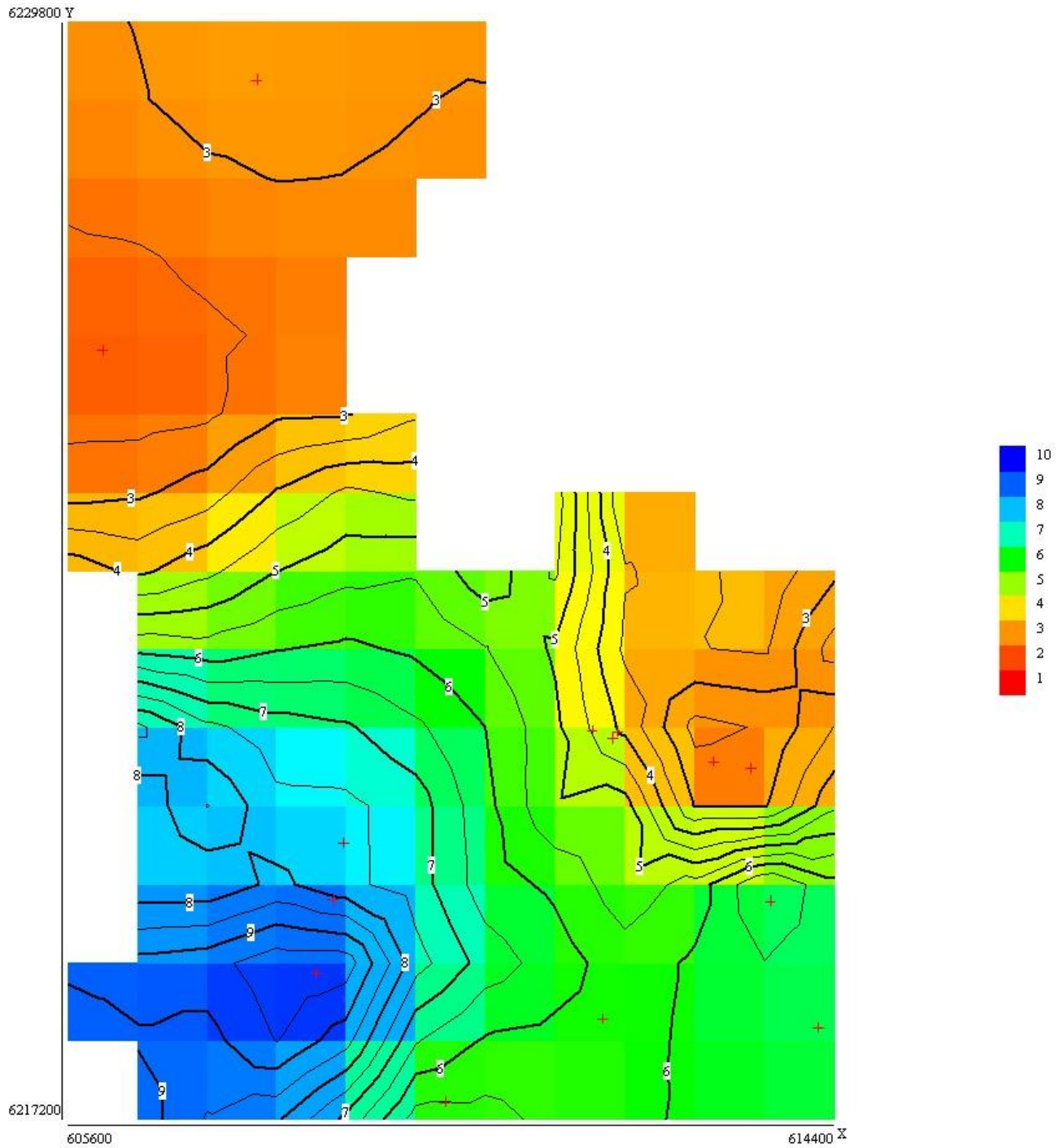
Current listing of piezometers by area:

Buronga							
Site ID	Use Y/N	Top of Pipe above NS (M)	NS (AHD)	Depth below top of pipe (M)	Easting	Northing	Condition
BGA 39	Y	0.1	38.77	6.59	611596	6220944	6.81
BGA 41	Y	0.1	38.65	5.51	611848	6218576	5.77
BGA 42	Y	0.16	36.84	5.11	610060	6217619	5.35
BGA 49	Y	0.1	38.54	7.26	608899	6220552	7.64
BGA 70	Y	0.15	38.64	6.70	614388	6218591	6.16
BGA 94	N	0.03		destroyed			Destroyed @ Aug17
BGA 112	Y	0.1	38.52	7.67	608758	6219897	7.64
BGA 113	N	0.09		destroyed	608497	6220032	Destroyed @ Aug21
BGA1010	Y	0.17	38.58	6.73	613727	6219873	7.03
BGA1011	Y	0.22	33.44	2.67	606063	6226306	2.59
BGA1012	Y	0.15	33.50	2.20	607952	6229274	3.24
BGA1013	Y	0.5	33.15	1.70	612890	6221512	1.86
BGA1080	N	0.16	35.40	dry	612169	6218409	Dry
BGA1211	Y	0.2	Unknown	10.12	608603	6219051	10.31
BGA1214	Y	0.3	34.41	2.49	613588	6221369	2.69
GGN 88168	Y	0.55	Unknown	5.28	611721	6221813	5.2
GGN 88169	Y	0.5	Unknown	3.96	612022	6221746	3.9
GGN 88170	Y	0.52	Unknown	6.59	611983	6221716	6.19
GGN 88171	N	0.33		destroyed	611794	6219994	Destroyed @Aug19
GGN 88172	N	0.68		destroyed			Destroyed @ Aug17

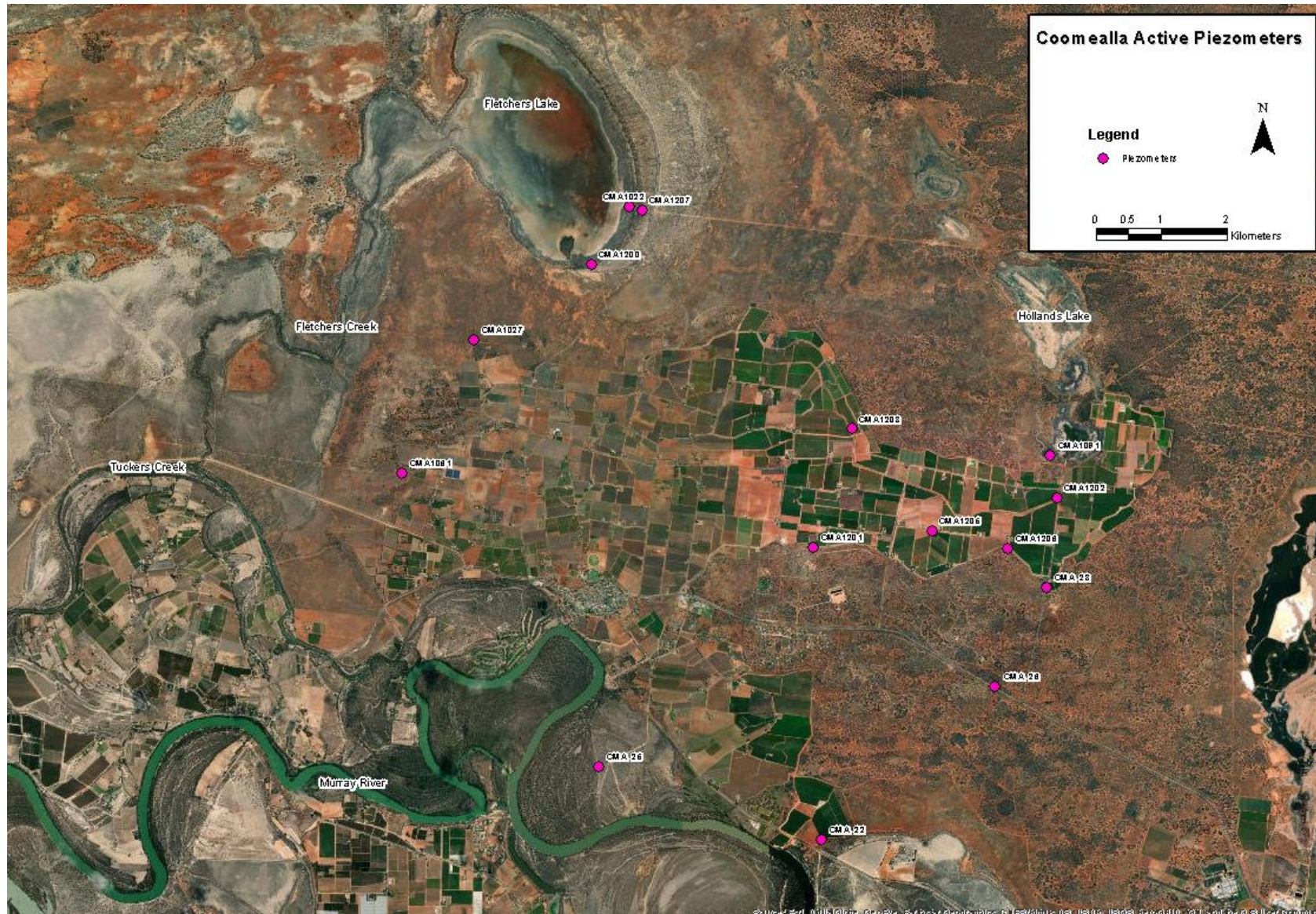
Coomealla							
Site ID	Use Y/N	Top of Pipe above NS (M)	NS (AHD)	Depth below top of pipe (M)	Easting	Northing	Condition
CMA 11	N	0.15	47.15	Dry	592915	6229568	Dry
CMA 12	N	0.12	45.92	Dry	593009	6228063	Destroyed 15Sep19
CMA 13	N	0.34	38.61	Dry	597023	6223774	Dry
CMA 14	N	0.09	41.81	Dry	594653	6230167	Dry
CMA 15	N	0.03	35.28	Destroyed	594817	6228622	Destroyed @ 15Sep19
CMA 17	N	0.1	47.08	Destroyed	597383	6228923	Destroyed @ 15Sep19
CMA 19	N	0.4	46.56	Destroyed	597325	6224713	Destroyed @ 02Aug17
CMA 22	Y	0.07	38.34	7.05	599617	6223215	7.01
CMA 23	Y	0.12	51.22	19.29	603061	6227033	19.11
CMA 24	N	0.28	35.98	Destroyed	592878	6225203	Destroyed @ 02Aug17
CMA 25	Y	0.08	35.83	5.82	596229	6224325	5.69
CMA 26	Y	0.04	54.09	22.24	602272	6225543	22.14
CMA 52	N	0.15	39.25	Dry	595998	6230943	Dry
CMA 53	N	0.07	53.2	Dry	597130	6226011	Dry
CMA 56	N	0.075	57.75	Destroyed	605588	6228670	Destroyed @ 02Aug17
CMA 58	N	0.18	35.58	Dry	603039	6230274	Dry
CMA 60	N	0.15	48.57	Dry	600069	6231438	Dry
CMA 63	N	0.07	47.3	Destroyed	599865	6230483	Dry
CMA 67	N	0.11	48.94	Dry	599199	6232530	Dry
CMA 77	N	0.22	51.07	Dry	601703	6229596	Dry
CMA 78	N	0.16	44.25	Dry	603992	6231885	Dry
CMA 79	N	0.14	40.56	Dry	604117	6230293	Dry
CMA 82	N	0.12	35.59	Dry	592958	6231604	Dry
CMA1019	N	0.2	36.1	Destroyed	601536	6232279	Destroyed @ 15Sep19
CMA1022	Y	0.36	32.09	2.13	596700	6232852	1.74
CMA1027	Y	0.33	40.67	10.24	594332	6230809	10.06
CMA1061	Y	0.36	42.36	12.19	593234	6228788	11.77
CMA1062	N	0.34		Dry	597169	6224019	Dry
CMA1091	Y	0.3		3.37	603116	6229059	2.93
CMA1092	N	0.25		Dry	602753	6229261	Dry
CMA1094	N	0.4		Dry	602876	6228999	Destroyed @ 04Aug17
CMA1110	N			Destroyed	598750	6226700	Destroyed @ 04Aug17
CMA1200	Y	0.26	34.09	4.02	596116	6231978	3.65
CMA1201	Y	0.28		20.12	599510	6227665	19.74
CMA1202	Y	0.32		4.67	603217	6228415	4.28
CMA1203	Y	0.4		6.06	600093	6229461	5.7
CMA1204	N	0.34		Dry	594827	6227186	Dry
CMA1205	Y	0.4		10.25	601311	6227909	9.85
CMA1206	Y	0.2		18.78	602469	6227643	18.62
CMA1207	Y	0.34	37.67	7.81	596891	6232802	7.45

Curlwaa							
Site ID	Use Y/N	Top of Pipe above NS (M)	NS (AHD)	Depth below top of pipe (M)	Easting	Northing	Condition
CWA 1/A	Y	0.2	35.89	5.91	590306	6225162	5.71
CWA 5	Y	0.08	33.07	1.54	589227	6225851	1.46
CWA 6	Y	0.21	35.14	6.27	589093	6226126	6.06
CWA 11/A	N	0.2	33.1	Destroyed	588144	6227392	Destroyed @ 10Sep19
CWA 12	N	0.22	35.4	Dry	590323	6225100	Dry
CWA 13	N	0.03	34.89	Destroyed	592990	6226745	Destroyed @ 09Aug2017
CWA 15	N	0.3	35.24	Destroyed	588485	6225780	Destroyed @ 09Aug2017
CWA16s	Y	0.46	34.36	5.59	589317	6226567	5.13
CWA 19	N	0.26	34.35	Destroyed	590711	6228173	Destroyed @ 09Aug2017
CWA 21/A	N	0.23	35.21	Destroyed	587570	6227940	Destroyed @ 10Sep19
CWA 23	Y	0.25	33.28	3.95	591464	6226173	3.70
CWA 25	N	0.4	33.19	Destroyed	591464	6226173	Destroyed @ 09Aug2017
CWA 27	N	0.16	34.36	Destroyed			Destroyed @ 10Sep19
CWA 28	Y	0.18	34.36	5.25	589766	6227008	5.07
CWA 31	N	0.1	34.36	Destroyed	589789	6227013	Destroyed @ 09Aug2017
CWA 41	Y	0.15	36.42	6.76	591913	6225786	6.61
CWA 48	Y	0.14	35.82	6.35	589662	6225583	6.21
CWA 50	Y	0.17	35.52	5.4	590307	6225625	5.23
CWA 51	Y	0.08	35.29	5.4	590221	6225662	5.32
CWA 59	Y	0.06	35.52	6.1	590447	6226179	6.04
CWA 60	Y	0.26	35.52	5.9	590396	6226282	5.64
CWA 80	N	0.07	35.12	Destroyed	587603	6225578	Destroyed @ 10Sep19
CWA 81	N	0.08	33.56	Dry	588369	6226383	Dry
CWA 82	N	0.22	34.89	Dry	588703	6224826	Dry
CWA 84	Y	0.06	33.88	3.51	589012	6224670	3.45
CWA 85	N	0.09	33.88	Destroyed	588427	6223730	Destroyed @ 09Aug2017
CWA 86	Y	0.12	34.83	4.51	589204	6223870	4.39
CWA 87	Y	0.1	34.38	4.01	589214	6222556	3.91
CWA 88	Y	0.09	35.42	4.73	589407	6224552	4.64
CWA 89	Y	0.02	35.5	5.35	589853	6225001	5.33
CWA 90	Y	0.15	33.8	4.39	588579	6225011	4.24
CWA 91/L	Y	0.15	33.5	4.37	589078	6225510	4.22
CWA 92	N	0.16	34.39	Destroyed	586853	6224310	Destroyed @ 09Aug2017
CWA 93	N	0.11	34.44	Dry	588584	6228583	Dry
CWA 98	Y	-0.03	35.96	5.56	592007	6224399	5.59
CWA 99	Y	0.2	36.52	6.59	592308	6224741	6.39
CWA 100	N	0.7	35.36	Dry	591369	6225167	DestroyedAug2020
CWA 101	N	0.15	36.24	Dry	592034	6225526	Dry
CWA 102	Y	0.13	35.83	6.51	592346	6225958	6.38
CWA 103	N	0.08	37.78	Destroyed	592128	6226328	Destroyed 10Sep19
CWA 104	Y	0.15	35.15	6.05	590359	6229019	5.90
CWA 105	N	0.23	34.34	Dry	587455	6226976	Dry
CWA 111	N	0.06	33.89	Destroyed	586780	6224807	Destroyed @ 09Aug2017
CWA 113	N	0.12	33.71	Destroyed	588670	6223255	Destroyed @ 09Aug2017
CWA 115	N	0.15	33.92	Destroyed	588740	6223660	Destroyed @ 09Aug2017
CWA 119	N	0.15	34.61	Destroyed	589170	6224490	Destroyed @ 09Aug2017
CWA 142	N	0.15	35.84	Destroyed	590515	6225565	Destroyed @ 09Aug2017
CWA 150	N	0.21	32.39	Destroyed	587130	6225355	Destroyed @ 09Aug2017
CWA 162	N	0.1	34.6	Destroyed	591481	6225988	Destroyed @ 10Sep19
CWA 165	N	0.15	36.3	Destroyed	590741	6226502	Destroyed @ 09Aug2017
CWA 167	N	0.01	35.01	Destroyed	589890	6226582	Destroyed @ 09Aug2017
CWA 173	N	0.15	34.26	Destroyed	588375	6226606	Destroyed @ 09Aug2017
CWA 174	N	0.1	34.69	Dry	589212	6227061	Destroyed @ 10Sep19
CWA 177	N	0.02	35.69	Destroyed	590424	6227000	Destroyed @ 10Sep19
CWA 178	N	0.005	34.26	Destroyed	590755	6226923	Destroyed @ 10Sep19
CWA 179	N	0.13	34.81	Dry	591121	6226812	Dry
CWA 180	N	0.12	35.58	Dry	591185	6227286	Dry
CWA 185	N	0.02	34.21	Dry	589248	6227481	Dry
CWA 187	N	0.005	35.5	Destroyed	588493	6227621	Destroyed 10Sep19
CWA 189	N	0.07	35.27	Dry	589320	6227956	Dry
CWA 195	N	0.09	35.18	Destroyed	589585	6227785	Destroyed 10Sep19
CWA 196	N	0.15	35.22	Destroyed	589725	6228312	Destroyed 10Sep19
CWA 198	N	0.09	35.43	Destroyed	589393	6228745	Destroyed 10Sep19
CWA 199	N	0.09	35.18	Destroyed	589863	6228716	Destroyed 10Sep19
CWA1039	N	0.22	34.72	Dry	591054	6225532	Dry
CWA1041	Y	1.2	34.35	5.13	588734	6226034	3.93
CWA1044	Y	0.32	34.06	4.22	588055	6223634	3.90
CWA1045	Y	0.31	35.19	5.28	588171	6224401	4.97
CWA1060	Y	0.24	34.66	5.37	591471	6228536	5.13
CWA1083	Y	0.3	34.63	4.7	589366	6224994	4.40
CWA1084	N	0.2	34.93	Destroyed	588942	6224276	Destroyed 10Sep19
CWA1085	Y	0.18	32.36	5.24	589200	6225855	5.06
CWA1086	Y	0.32	34.88	5.36	591372	6225553	5.04
CWA1087	Y	0.08	35.88	6.31	590627	6225856	6.23
CWA1088	N	0.16	35.85	Destroyed	590321	6227549	Destroyed 10Aug21
CWA1131	Y	0.17	33.69	5.02	587444	6229017	4.85

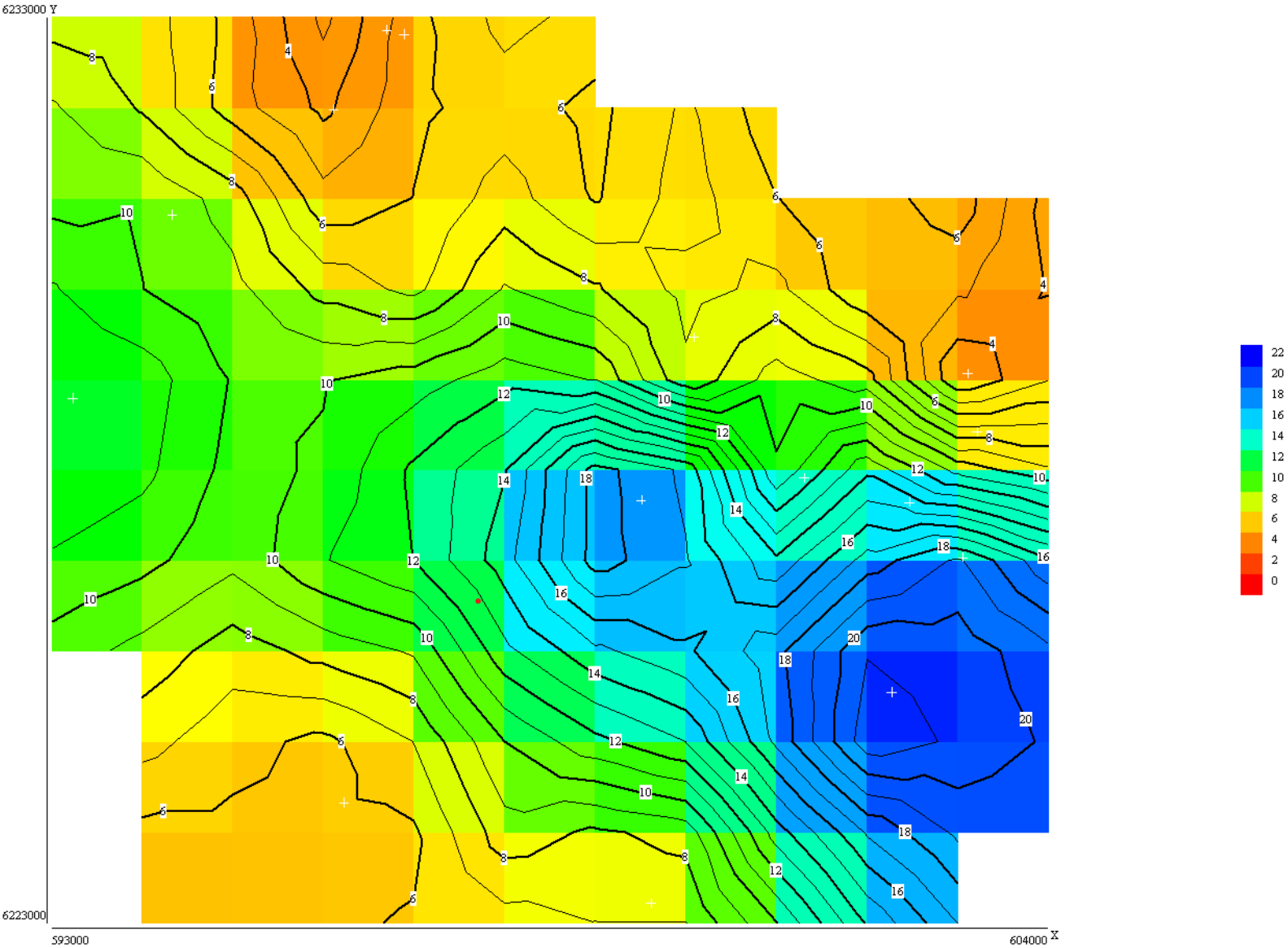
Buronga groundwater heights below natural surface (M)



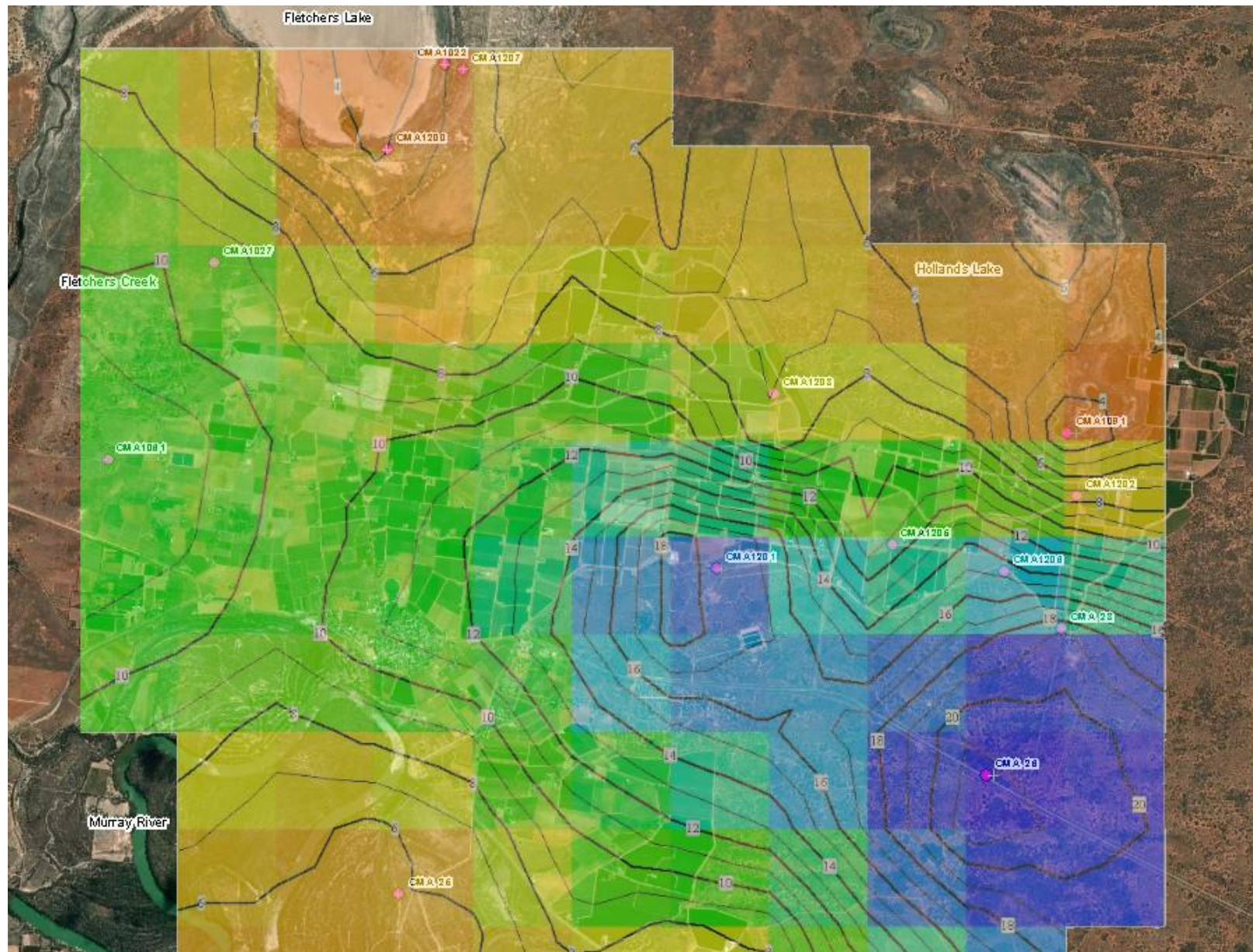
Location of Active Coomealla piezometers:



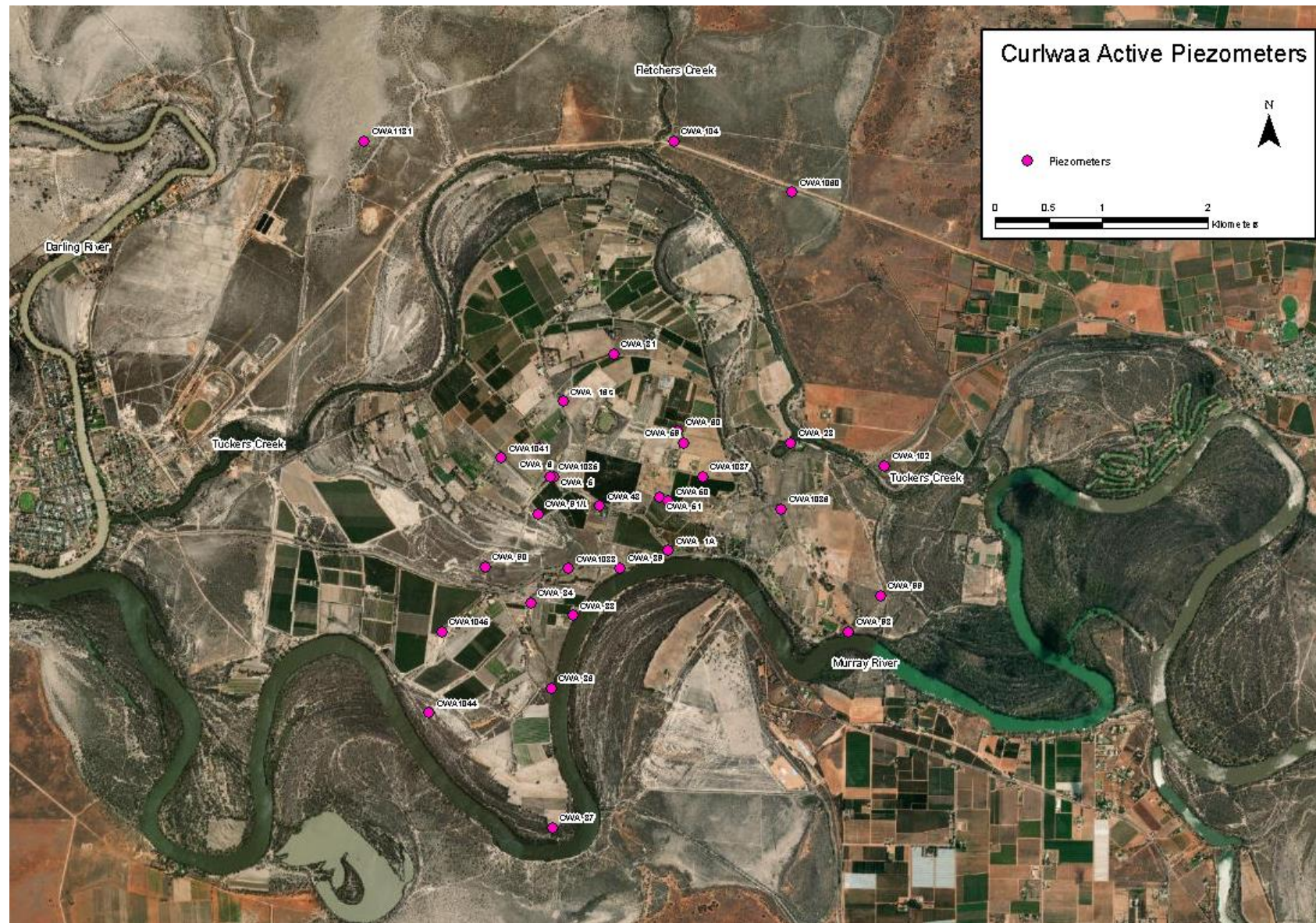
Coomealla groundwater height below natural surface (M):



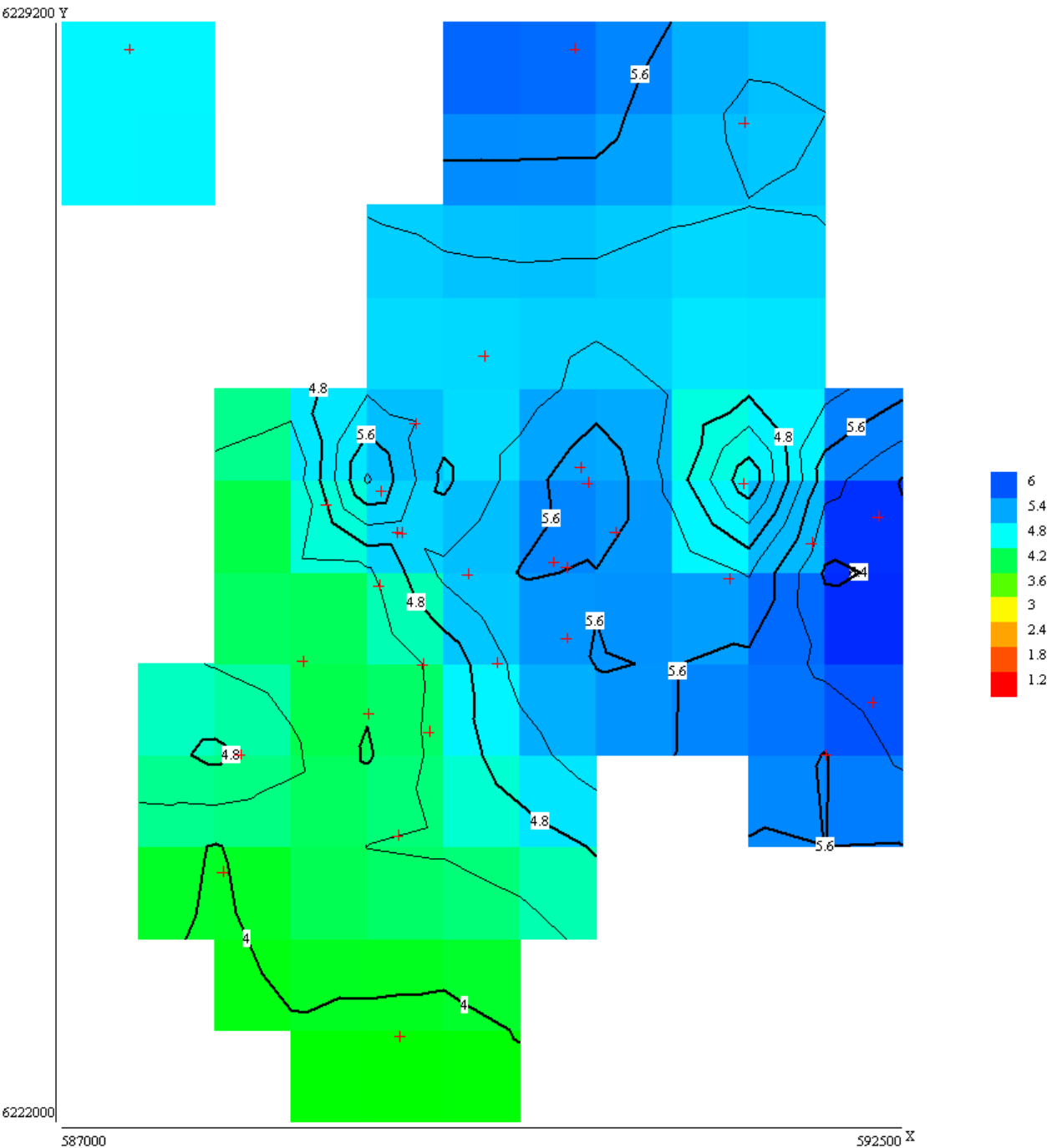
Coomealla groundwater heights below natural surface (M), combined image:



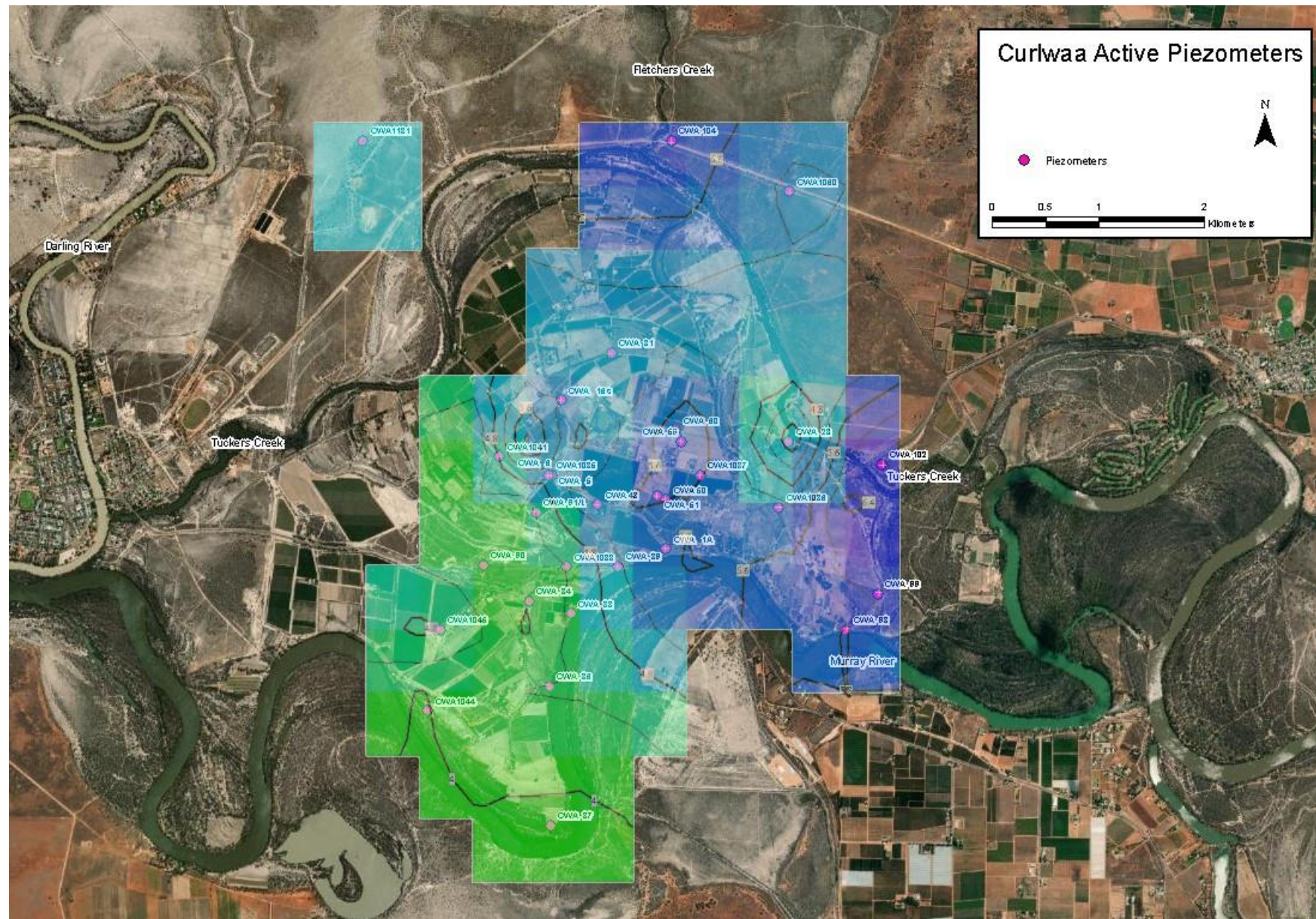
Location of Curlwaa active piezometers:



Curlwaa groundwater height below natural surface (M):



Curlwaa groundwater heights below natural surface (M), combined image:



Attachment 2, p.2 - Condition 2.

No consultation with the minister required, where levels have risen above the historical reference.

Contour maps have been provided at condition 1; groundwater levels have remained low for 2021/22. Continuing dry conditions have slowed down groundwater recharge; all piezometers are read in August/September of each year.

Attachment 2, p.2 - Condition 3.

Table of the area (ha) of shallow (<2M), moderate (2-4M) and >4M groundwater depth.

Approximate areas at different depths of groundwater (Ha)				
	<2M	2-4M	>4M	Total mapped area
Buronga	240	1260	1020	2520
Coomealla	0	300	9400	9700
Curlwaa	0	900	1620	2520

- Evaporation basins form a large part of our area of operations, the figures indicate this as being a large area of high groundwater, whereas it is a low laying drainage/evaporation basin.

Attachment 2, p.2 –Condition 4.

Table of the change in the three depth class areas (ha) within the area of operations, relative to the previous and historical reference years:

Approximate areas at different heights of groundwater (ha)												
2021/22				2021/22 - 2020/21 difference (ha)				2021/22 - 2010/11 difference (ha)				
	<2M	2-4M	>4M	Total op. area	<2M	2-4M	>4M		<2M	2-4M	>4M	
Buronga	0	60	597	657	0	30	-30	Buronga	-3.2	46.25	-43.05	
Coomealla	0	75	4,106	4,181	0	75	-75	Coomealla	-473.55	-129.28	602.83	
Curlwaa	0	0	1,641	1,641	0	-5	5	Curlwaa	0	-54.91	54.91	
2020/21				2020/21 - 2019/20 difference (ha)				2020/21 - 2010/11 difference (ha)				
	<2M	2-4M	>4M	Total op. area	<2M	2-4M	>4M		<2M	2-4M	>4M	
Buronga	0	30	627	657	0	-5	5	Buronga	-3.2	16.25	-13.05	
Coomealla	0	0	4,181	4,181	0	-200	200	Coomealla	-473.55	-204.28	677.83	
Curlwaa	0	5	1,636	1,641	0	-85	85	Curlwaa	0	-49.91	49.91	
2019/20				2010/11								
	<2M	2-4M	>4M	Total op. area								
Buronga	0	35	622.29	657								
Coomealla	0	200	3980.74	4,181								
Curlwaa	0	90	1551	1,641								

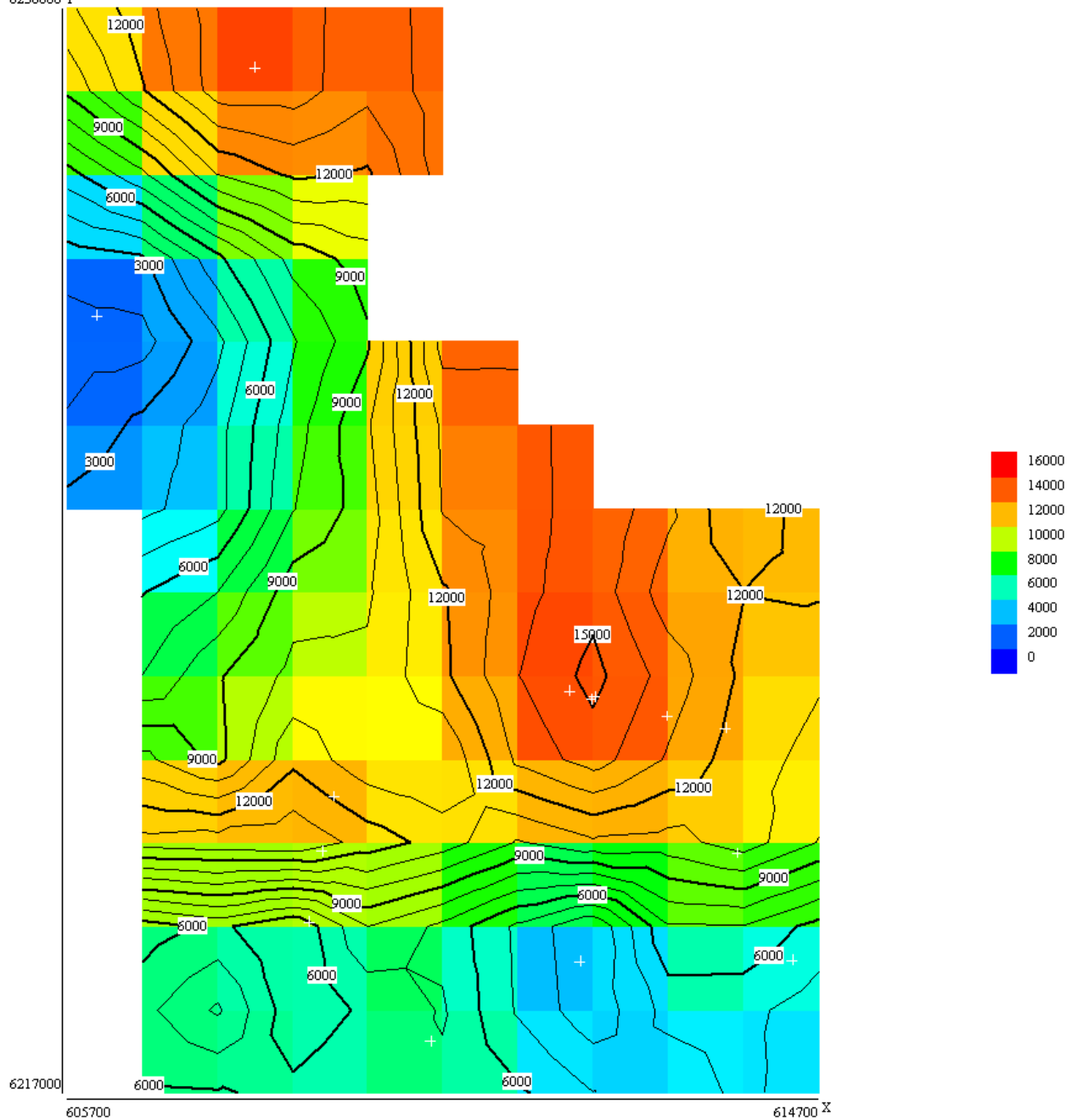
River has remained at normal level and low rainfall has not charged the water table. Water table appears to have dropped slightly in all areas. 2010/11 has been used as a significant historical year; up until August 2010 the prior year was close to average rainfall, followed by the wettest year ever. Groundwater monitoring and SIS review made an observation that significant rainfall changes the groundwater temporarily; below are monthly rainfall figures covering this monitoring period.

Monthly rainfall BOM – Mildura Airport:

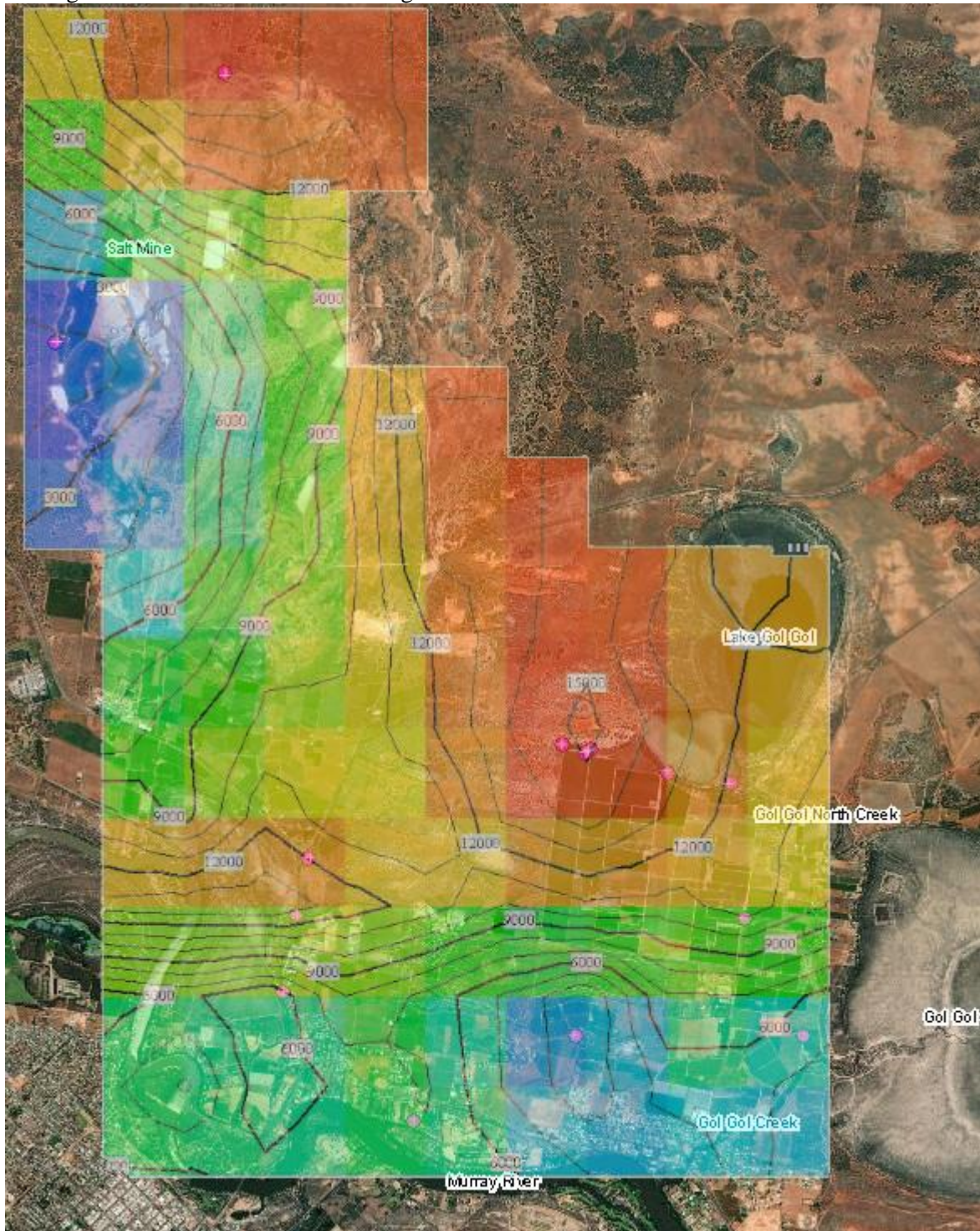
Season	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total	Total 2 years	Total 3 years
2008/09	19.6	34.2	2.0	3.0	42.6	34.8	0.8	0.0	24.0	21.8	9.2	37.0	229.0	379.8	574.4
2009/10	11.8	8.2	30.4	10.8	65.6	13.2	8.4	19.8	35.8	18.8	51.2	14.6	288.6	517.6	668.4
2010/11	26.4	29.2	56.6	92.2	110.2	146.8	127.0	183.2	119.8	11.8	13.2	10.2	926.6	1,215.2	1,444.2
2011/12	15.4	20.8	7.2	27.6	43.4	61.8	12.6	36.6	64.2	4.0	2.6	8.0	304.2	1,230.8	1,519.4
2012/13	41.4	17.0	13.6	7.0	4.6	4.4	1.2	14.6	10.8	6.2	29.2	35.8	185.8	490.0	1,416.6
2013/14	14.8	10.4	18.8	14.4	2.4	57.8	0.6	67.2	29.2	58.4	22.8	6.4	303.2	489.0	793.2
2014/15	13.0	18.2	18.6	0.6	13.4	9.6	57.0	0.6	0.0	93.0	10.2	30.6	264.8	568.0	753.8
2015/16	11.6	12.0	13.0	3.8	6.0	1.6	68.2	0.2	0.4	3.0	43.4	18.2	181.4	446.2	749.4
2016/17	19.2	30.8	93.6	24.8	51.2	5.6	29.4	5.2	4.2	44.0	19.6	1.8	329.4	510.8	775.6
2017/18	4.0	34.0	4.0	23.0	55.4	45.0	3.4	0.2	2.2	1.8	17.4	19.2	209.6	539.0	720.4
2018/19	3.4	10.6	0.8	12.2	19.2	44.6	2.6	2.8	3.0	1.8	48.0	13.4	162.4	372.0	701.4
2019/20	10.4	5.4	12.0	0.0	13.8	2.6	2.8	11.0	27.6	48.6	48.1	8.4	190.7	353.1	562.7
2020/21	10.4	41.6	25.0	59.0	5.2	8.6	45.0	0.2	4.8	0.0	8.0	30.6	238.4	429.1	591.5
2021/22	32.2	11.8	14.8	15.2	56.6	1.6	86.2	6.0	14.8	49.0	52.8	17.0	358.0	596.4	787.1

Groundwater salinity @ 0-2000, -5000,-10,000, -20,000,-30,000,-40,000 micro-Siemens/cm contours:

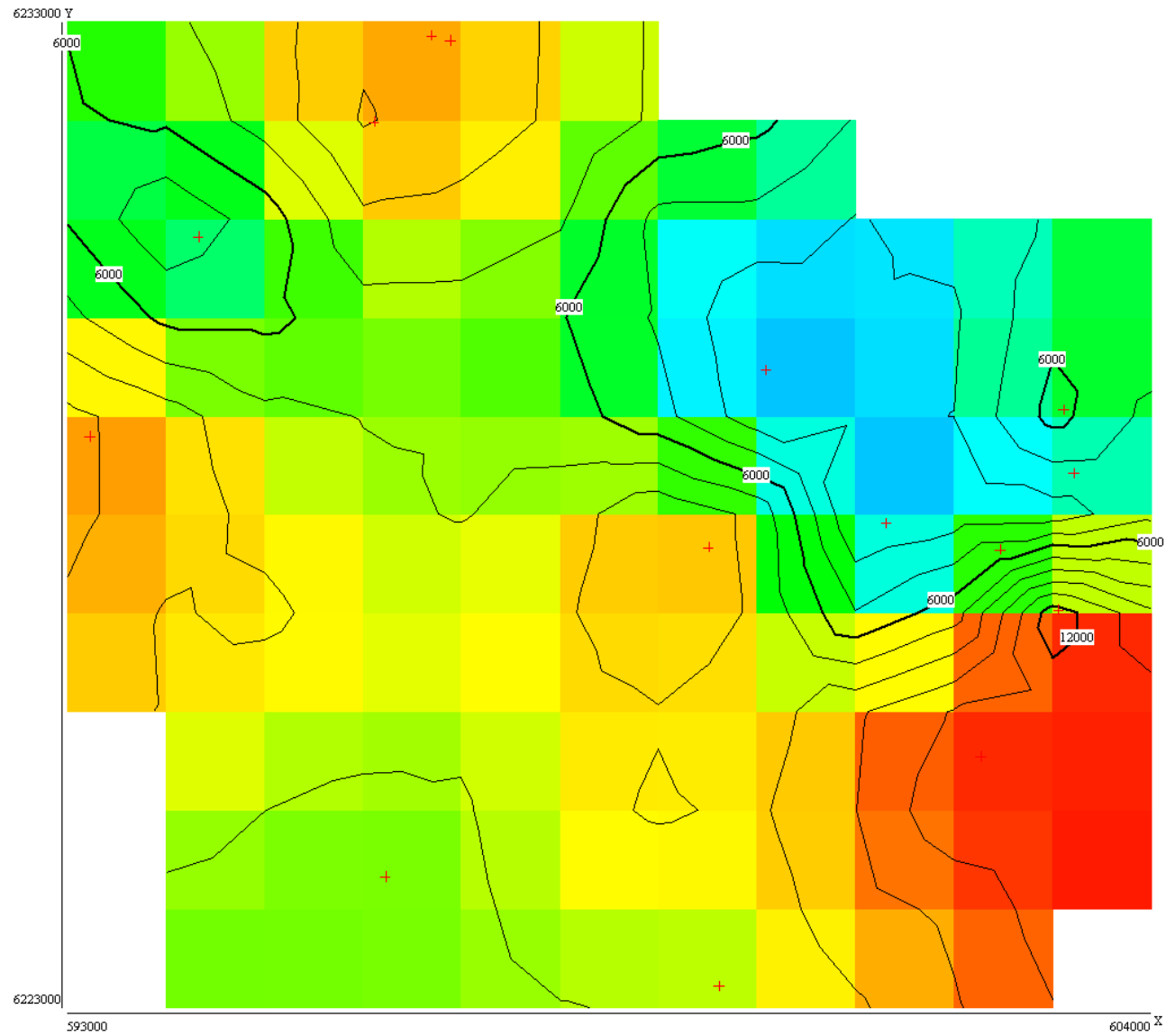
6230000 Y



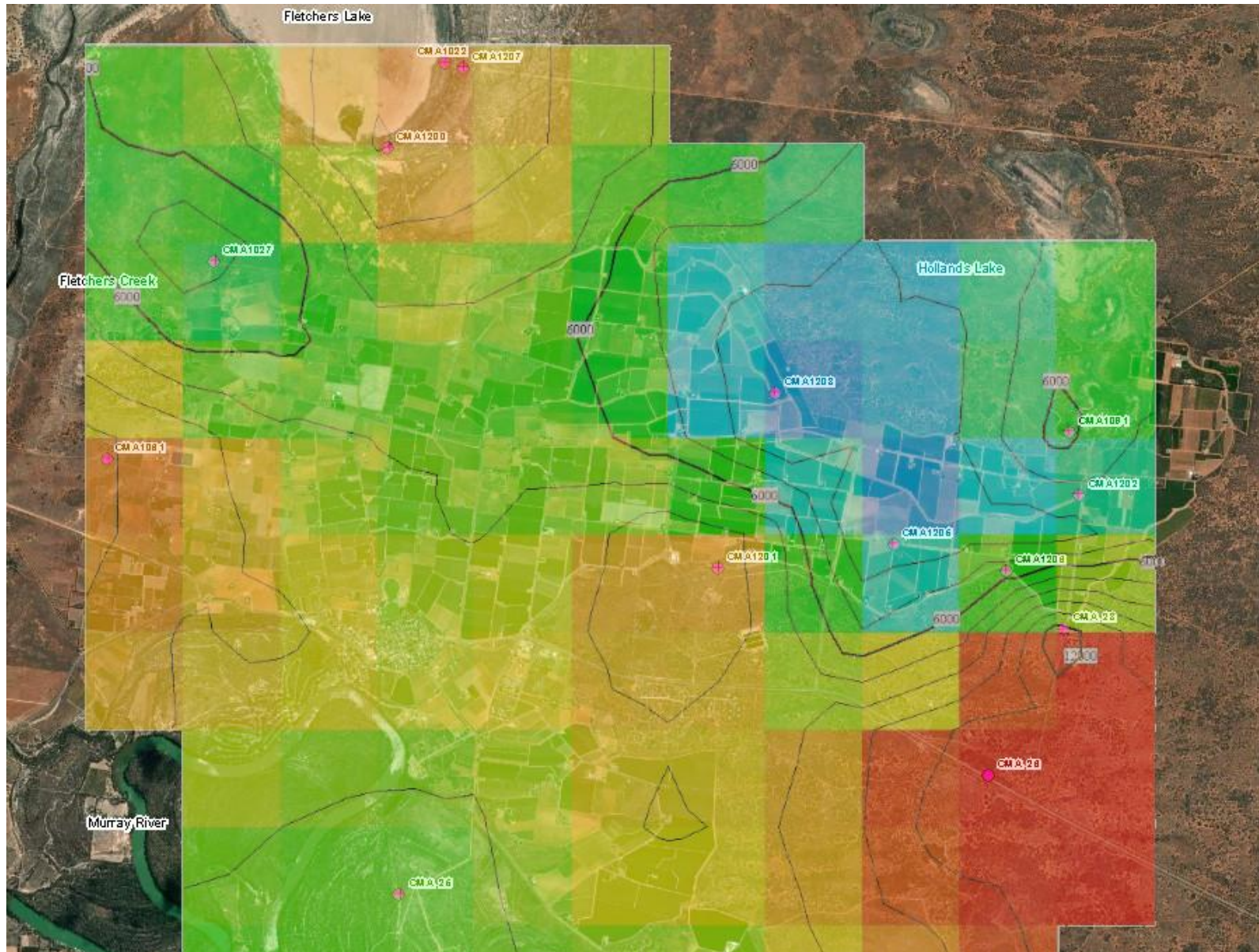
Buronga Salt Contours – Combined Image:



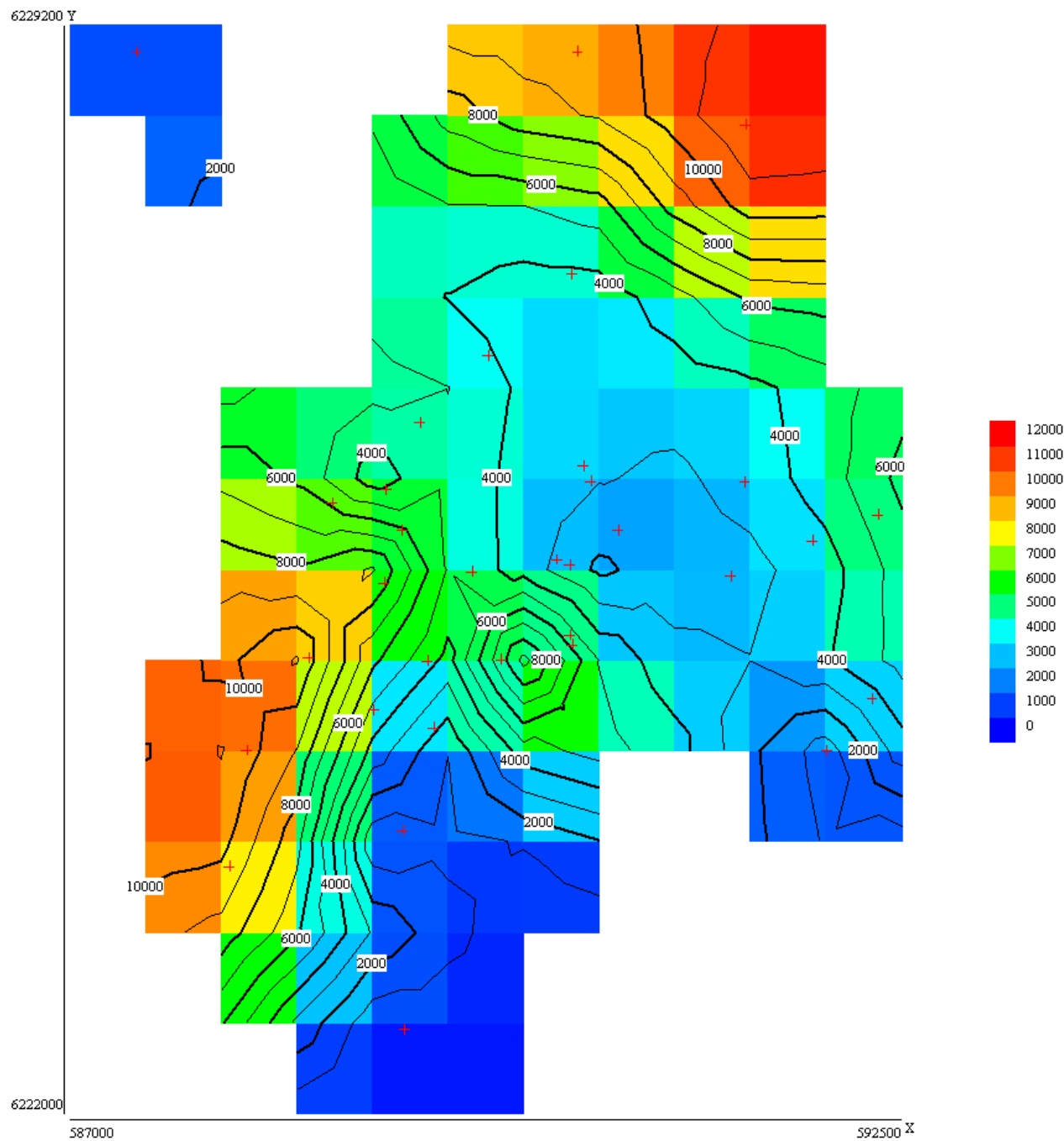
Coomealla Salinity Contours:



Coomealla Salt Contours – Combined Image:



Curlwaa Salinity Contours:



Tabulated approximate salinity (microSiemens/cm) interval areas, within areas of operations boundary, relative to the previous and historical reference year:

Approximate areas at different EC of groundwater (ha)

2021/22							
	0-2000	-5000	-10000	-20,000	-30,000	-40,000	Total op. area
Buronga	0	90	190	377	0	0	657
Coomealla	0	600	2881	700	0	0	4,181
Curlwaa	0	1100	401	140	0	0	1,641
2020/21							
	0-2000	-5000	-10000	-20,000	-30,000	-40,000	Total op. area
Buronga	0	90	210	357	0	0	657
Coomealla	0	1200	2231	750	0	0	4,181
Curlwaa	0	525	1046	70	0	0	1,641
2019/20							
	0-2000	-5000	-10000	-20,000	-30,000	-40,000	Total op. area
Buronga	0	90	297	270	0	0	657
Coomealla	0	900	1400	1881	0	0	4,181
Curlwaa	315	560	556	210	0	0	1,641
2010/11							
	0-2000	-5000	-10000	-20,000	-30,000	-40,000	Total op. area
Buronga	7	20	154	141	148	188	657
Coomealla	123	615	984	1312	943	205	4,181
Curlwaa	43	756	194	432	130	86	1,641

2021/22 - 2020/21 difference (ha)						
	0-2000	-5000	-10000	-20,000	-30,000	-40,000
Buronga	0	0	-20	20	0	0
Coomealla	0	-600	650	-50	0	0
Curlwaa	0	575	-645	70	0	0
2020/21 - 2019/20 difference (ha)						
	0-2000	-5000	-10000	-20,000	-30,000	-40,000
Buronga	0	0	-87	87	0	0
Coomealla	0	300	831	-1131	0	0
Curlwaa	-315	-35	490	-140	0	0

2020/21 - 2010/11 difference (ha)						
	0-2000	-5000	-10000	-20,000	-30,000	-40,000
Buronga	-7	70	36	236	-148	-188
Coomealla	-123	-15	1897	-612	-943	-205
Curlwaa	-43	344	207	-292	-130	-86

Attachment 2, p.2 – Condition 6.

It is unknown whether there are alternative presentation formats approved by the minister, therefore presentation is as close as possible to requested.

Attachment 2, p.3

Groundwater Control bores (Tubewells) Details

The tubewells have been mainly inoperative due to low groundwater levels, only maintenance runs have been carried out, Knipes tubewell has been inoperative 2021/22, this has been fixed in 2022/23 :

District Work/Site Identifier Name Representing discharge										Location Details Coordinates (WGS84)				Type Dimensions		Submersible Pumps 100mm X- Section = 0.01m ² 2 ML/D		
Curlwaa CWA 1 Tubewell Pump Station Discharge to Fletchers Creek										E N				Capacity				
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site Visits	
Volume (ML)	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0 ML	0.0	0.0	0.0	Flow	No Flow
Salt Load (T)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0 T	0.0	0.0	0.0		
Average EC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0		0	0	NA	0	52
O:\DO Files\001 Drainage\000 Drainage Figures\Drainage 2021-22\WML Drainage Curlwaa 2021-22.xls\JEPa B3-13 James Hwy No4																		49

District Work/Site Identifier Name Representing discharge										Location Details Coordinates (WGS84)				Type Dimensions		Submersible Pump 100mm X- Section = 0.01m ² 0.5 ML/D		
Curlwaa CW 2 Tubewell Pump No.1 - Knipes Discharges to James' Highway										E N				Capacity				
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site Visits	
Volume (ML)	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Flow	No Flow
Salt Load (T)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 T	0.0	0.0	0.0		
Average EC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		0	0	NA	0	0
O:\DO Files\001 Drainage\000 Drainage Figures\Drainage 2021-22\WML Drainage Curlw aa 2021-22.xls\Tubew ell No1-Knipes																		52

District Work/Site Identifier Name Representing discharge										Location Details Coordinates (WGS84)				Type Dimensions		Submersible Pump 100mm X- Section = 0.01m ² 0.5 ML/D		
Curlwaa CW 3 Tubewell Pump No.2 - Acacia Road Discharges to Tubewell Station										E N				Capacity				
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site Visits	
Volume (ML)	0.00	0.0	0.00	0.02	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0 ML	0.0	0.0	0.0	Flow	No Flow
Salt Load (T)	0.0	0.0	0.000	0.002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00 T	0.0	0.0	0.0		
Average EC	NA	NA	NA	135	NA	NA	NA	NA	NA	NA	NA	NA		135	135	347	1	51
O:\DO Files\001 Drainage\000 Drainage Figures\Drainage 2021-22\WML Drainage Curlw aa 2021-22.xls\Tubew ell No1-Knipes																		52

District Work/Site Identifier Name Representing discharge										Location Details Coordinates (WGS84)				Type Dimensions		Submersible Pump 100mm X- Section = 0.01m ² 0.5 ML/D		
Curlwaa CW 4 Tubewell Pump No.3 - Olive Lane Discharges to Tubewell Station										E N				Capacity				
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site Visits	
Volume (ML)	0.00	0.0	0.00	0.0	0.0	0.0	0.0	0.02	0.00	0.0	0.0	0.0	0.1 ML	0.0	0.0	0.0	Flow	No Flow
Salt Load (T)	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.002	0.0	0.0	0.0	0.0	0.00 T	0.0	0.0	0.0		
Average EC	NA	NA	NA	135	NA	NA	NA	135	NA	NA	NA	NA		135	135	135	2	50
O:\DO Files\001 Drainage\000 Drainage Figures\Drainage 2021-22\WML Drainage Curlw aa 2021-22.xls\Tubew ell No1-Knipes																		52

District Work/Site Identifier Name Representing discharge										Location Details Coordinates (WGS84)				Type Dimensions		Submersible Pump 100mm X- Section = 0.01m ² 0.5 ML/D		
Curlwaa CW 5 Tubewell Pump No.4 - Rice's Discharges to Tubewell Station										590420E 6226103N				Capacity				
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site Visits	
Volume (ML)	0.00	0.0	0.00	0.02	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.1 ML	0.04	0.00	0.0	Flow	No Flow
Salt Load (T)	0.0	0.0	0.000	0.002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01 T	0.003	0.0	0.0		
Average EC	NA	NA	NA	135	NA	NA	NA	135	NA	NA	NA	NA		135	135	135	2	50
O:\DO Files\001 Drainage\000 Drainage Figures\Drainage 2021-22\WML Drainage Curlw aa 2021-22.xls\Tubew ell No1-Knipes																		52

Quality Assurance for Monitoring & Reporting

Condition 3.

All monitoring and reporting are carried out in accordance with the DPI NSW publication "Salinity Training Manual" (2014).

Presentation of Data

Condition 4.

There has been no written request from the minister for presentation of any primary monitoring data or other material.

Environment Protection and Management Requirements

Discharge of Noxious Aquatic weeds

Condition 5.

WMI did not discharge any noxious aquatic weeds.

Discharge of Blue-Green Algae

Condition 6.

WMI pumps directly from the River Murray and has a fully pipelined system. Blue green algae monitoring on the river is performed by external parties and reported to stakeholders, including WMI. No discharge of Blue-Green Algae from WMI systems.

Basin Salinity Management Strategy

Condition 7.

There were no practices undertaken to increase the salinity debit, however it is evident that WMI has improved salinity management over the long term.
