



Licence WU67 Monthly Environmental Flow Report February 2023

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1. Introduction

Icon Water holds a Licence to Take Water under the Water Resources Act 2007 – Licence Number WU67.

Under Licence Number WU67 clause C1, it is a requirement to provide the following information to the Environment Protection Authority (EPA) by the 15th day of each month.

2. Compliance Analysis and Operational Interactions

Table 1 - Notes relating to the reporting month Environmental Flow releases

Reservoir	Notes
Corin	<p>Corin Dam spilled from 1 – 17 February.</p> <p>The bi-monthly riffle release was completed on 15 February.</p> <p>Additional release above licence requirements were made through the cone valve for consumption purposes.</p> <p>There is a discrepancy between flow measured at the new outlet flow meter and the ALS gauge reading. Flow meter is assumed to be correct until works are completed at ALS measurement site.</p>
Bendora	<p>Bendora Dam did not spill through February.</p> <p>The bi-monthly riffle release was completed on 17 February.</p> <p>Releases were at licence requirements throughout February</p>
Cotter	<p>Cotter Dam spilled throughout majority of February.</p> <p>Releases were at licence requirements throughout February.</p>
Googong	<p>Googong Dam spilled throughout majority of February.</p> <p>The Googong mini-hydro generator operated intermittently throughout February.</p> <p>Releases were above licence requirements while the mini-hydro was operating.</p> <p>Releases were at licence requirements when the mini-hydro was not operating.</p>

Table 2 – Notes relating to abstraction from Murrumbidgee River

Mt MacDonald river gauge	Not applicable, natural river flows.
Murrumbidgee abstraction	There was no Murrumbidgee River abstraction for consumption in February.
Murrumbidgee To Cotter Eflow	M2C did not operate in February.
Murrumbidgee to Googong	M2G did not operate in February.
Angle Crossing river gauge	Not applicable, natural river flows.

3. Environmental Release Data

The environmental flow release requirements for the current month (a combination of requirements) are detailed in Table 3.

Table 3 – Current month Environmental Flow releases (Total for month in ML)

	Corin	Bendora	Cotter	Googong
Previous month's shortfall (-) or Excess (+) *	34.1	58.9		
Monthly 75% of the 80 th %tile ML #	341	589		
Additional release required?	No	No	No	No
Current month's release target	306.9	530.1	520	400

Note: * Excess carried forward is capped at 10% of the current month's base flow.

Shortfall carried forward is 100% of the amount of water under released.

Under stage 1 or greater water restrictions, targets flow change to a predetermined base flow.

Daily totals in Table 4 to Table 7 are reported as the 24-hour average from midnight to midnight. Operational changes to environmental flow releases occur during business hours, and therefore the value reported may be slightly different to the target flow on the day the flow is changed. This is particularly evident for large changes in flow e.g. the riffle and pool flushes as the flow is averaged for the day.

The actual daily flows, in megalitres per day (ML/d), from each reservoir are detailed in Table 4 to Table 7 together with the water produced at the water treatment plants (WTP) in Table 10.

Table 8 provides more detail with respect to environmental flows provided below Cotter Dam. The e-flows are made up of two components: water released from the Cotter Dam and water being pumped from Murrumbidgee River to below Cotter Dam. This is to satisfy the requirements set out by ACT EPA and Federal Department of the Environment for the operation of the Enlarged Cotter Dam.

Table 9 provides flow details for the operations of the Murrumbidgee to Googong pipeline. It details daily flows through the high lift pumps station as well as daily flows in the Murrumbidgee River at Angle crossing. This is to demonstrate compliance with the requirements set out by ACT EPA, Federal Department of the Environment and NSW Department of Planning.

Table 10 also details the quantity of treated water that has been transferred to Googong reservoir from Stromlo WTP.

Table 4 - Monthly Environmental Flow release data for Corin dam

SUM	410730 Gingera		Environmental flow release below Corin Date	Daily base flow	Additional release (pool / riffle)	Planned +/- 50% release regime	Calculated Natural Flow. (Unverified)	Calculated Natural Flow. (Verified)	Adjusted daily base flow. EOM = Revised monthly target	410752 Corin D/S		EOM Excess (+) / Shortfall (-) to carry forward	EOM Correction to 410730, Verified Vs unverified	EOM Correction to 410752, Verified Vs unverified	Comments
	(unverified)	410730 Gingera (verified)								(Unverified)	(Verified)				
Previous months adjustment										-28.0					
	92.08	97.44	Wed 1-Feb-23	10.00		5.0	131.5	139.2	10.0	144.74	145.7				
	80.89	83.11	Thu 2-Feb-23	10.00		5.0	115.5	118.7	10.0	120.76	121.6				
	82.64	82.66	Fri 3-Feb-23	10.00		5.0	118.0	118.1	10.0	105.63	107.5				
	84.72	86.57	Sat 4-Feb-23	10.00		5.0	121.0	123.6	10.0	103.94	105.2				
	74.0	77.42	Sun 5-Feb-23	10.00		5.0	105.7	110.6	10.0	84.6	93.09				
	67.8	69.8	Mon 6-Feb-23	10.00		5.0	96.8	99.7	10.0	76.8	77.58				
	67.1	67.15	Tue 7-Feb-23	10.00		5.0	95.8	95.9	10.0	70.0	70.65				
	68.7	68.03	Wed 8-Feb-23	10.00		5.0	98.2	97.2	10.0	69.2	69.85				
	144.6	129.7	Thu 9-Feb-23	10.00		15.0	206.5	185.3	10.0	123.68	125.1				
	113.8	115.3	Fri 10-Feb-23	10.00		15.0	162.6	164.7	10.0	147.61	148.1				
	76.2	79.61	Sat 11-Feb-23	10.00		15.0	108.8	113.7	10.0	111.7	112.8				
	68.7	69.39	Sun 12-Feb-23	10.00		15.0	98.2	99.1	10.0	87.3	86.91				
	74.6	72.24	Mon 13-Feb-23	10.00	150	15.0	106.6	103.2	150.0	91.9	92.81				
	80.7	80.99	Tue 14-Feb-23	10.00	150	15.0	115.2	115.7	150.0	175.1	176.8				
	67.6	70.32	Wed 15-Feb-23	10.00	150	15.0	96.6	100.4	150.0	147.6	149.9				
	62.5	63.29	Thu 16-Feb-23	10.00		5.0	89.2	90.4	10.0	143.9	146				Riffle release complete; new CORD flowmeter reading difference to ALS river gauge
	59.8	60.15	Fri 17-Feb-23	10.00		5.0	85.5	85.9	10.0	146.7	148.9				
	57.0	57.91	Sat 18-Feb-23	10.00		5.0	81.4	82.7	10.0	163.36	165.5				
	54.5	54.79	Sun 19-Feb-23	10.00		5.0	77.8	78.3	10.0	162.33	165.1				
	52.2	52.76	Mon 20-Feb-23	10.00		5.0	74.6	75.4	10.0	162.15	164.4				
	56.1	54.08	Tue 21-Feb-23	10.00		5.0	80.1	77.2	10.0	162.42	164.8				
	57.6	58.42	Wed 22-Feb-23	10.00		5.0	82.3	83.4	10.0	163.47	165.5				
	55.7	56.01	Thu 23-Feb-23	10.00		15.0	79.6	80.0	10.0	146.59	149.3				
	53.4	54.04	Fri 24-Feb-23	10.00		15.0	76.3	77.2	10.0	119.45	122.4				
	51.0	51.44	Sat 25-Feb-23	10.00		15.0	72.8	73.5	10.0	119.43	122.4				
	48.8	49.18	Sun 26-Feb-23	10.00		15.0	69.6	70.2	10.0	121.04	124				
	47.7	47.92	Mon 27-Feb-23	10.00		15.0	68.1	68.4	10.0	121.62	124.6				
	47.1	47.13	Tue 28-Feb-23	10.00		15.0	67.2	67.3	10.0	121.14	124.1				
SUM	1,947.52	1956.9		280.0	450.0	270.0	2781.6	2795.0	672.0	3514.2	3570.6	34.1	0.5%	1.6%	

Table 5 - Monthly Environmental Flow release data for Bendora dam

SUM	410730 Gingera (unverified)	410730 Gingera (verified)	Environmental flow release below Bendora Date	Daily base flow	Additional release (pool / riffle)	Planned +/- 50% release regime	Calculated Natural Flow. (Unverified)	Calculated Natural Flow. (Verified)	Adjusted daily base flow. EOM = Revised monthly target	410747 Bendora D/S (Unverified)	410747 Bendora D/S (Verified)	EOM Excess (+) / Shortfall (-) to carry forward	EOM Correction to 410730 , Verified Vs unverified	EOM Correction to 410747 , Verified Vs unverified	Comments
Previous months adjustment									-44.8						
	92.08	97.44	Wed 1-Feb-23	16.00			8.0	202.6	214.4	16.0	18.16	18.16			
	80.89	83.11	Thu 2-Feb-23	16.00			8.0	178.0	182.8	16.0	8.50	8.535			
	82.64	82.66	Fri 3-Feb-23	16.00			8.0	181.8	181.9	16.0	8.89	8.466			
	84.72	86.57	Sat 4-Feb-23	16.00			8.0	186.4	190.5	16.0	8.91	8.323			
	74.0	77.42	Sun 5-Feb-23	16.00			8.0	162.8	170.3	16.0	8.3	8.304			
	67.8	69.8	Mon 6-Feb-23	16.00			8.0	149.2	153.6	16.0	7.9	8.126			
	67.1	67.15	Tue 7-Feb-23	16.00			8.0	147.6	147.7	16.0	11.2	8.034			
	68.7	68.03	Wed 8-Feb-23	16.00			24.0	151.2	149.7	16.0	23.0	19.68			
	144.6	129.7	Thu 9-Feb-23	16.00			24.0	318.1	285.3	16.0	29.21	27.88			
	113.8	115.3	Fri 10-Feb-23	16.00			24.0	250.4	253.7	16.0	28.39	27.71			
	76.2	79.61	Sat 11-Feb-23	16.00			24.0	167.6	175.1	16.0	28.1	27.85			
	68.7	69.39	Sun 12-Feb-23	16.00			24.0	151.2	152.7	16.0	28.0	27.85			
	74.6	72.24	Mon 13-Feb-23	16.00			24.0	164.2	158.9	16.0	29.3	27.81			
	80.7	80.99	Tue 14-Feb-23	16.00			24.0	177.5	178.2	16.0	29.3	27.94			
	67.6	70.32	Wed 15-Feb-23	16.00	150		8.0	148.7	154.7	150.0	109.1	101.7			Rifle release achieved
	62.5	63.29	Thu 16-Feb-23	16.00	150		8.0	137.4	139.2	150.0	171.8	157.5			
	59.8	60.15	Fri 17-Feb-23	16.00	150		8.0	131.7	132.3	150.0	168.8	155.8			
	57.0	57.91	Sat 18-Feb-23	16.00			8.0	125.4	127.4	16.0	97.80	89.41			
	54.5	54.79	Sun 19-Feb-23	16.00			8.0	119.8	120.5	16.0	7.37	7.766			
	52.2	52.76	Mon 20-Feb-23	16.00			8.0	114.9	116.1	16.0	7.48	7.792			
	56.1	54.08	Tue 21-Feb-23	16.00			8.0	123.3	119.0	16.0	7.93	7.861			
	57.6	58.42	Wed 22-Feb-23	16.00			24.0	126.8	128.5	16.0	19.37	18.45			
	55.7	56.01	Thu 23-Feb-23	16.00			24.0	122.6	123.2	16.0	26.41	24.9			
	53.4	54.04	Fri 24-Feb-23	16.00			24.0	117.5	118.9	16.0	26.81	25.93			
	51.0	51.44	Sat 25-Feb-23	16.00			24.0	112.1	113.2	16.0	26.89	26.3			
	48.8	49.18	Sun 26-Feb-23	16.00			24.0	107.3	108.2	16.0	27.14	26.3			
	47.7	47.92	Mon 27-Feb-23	16.00			24.0	104.9	105.4	16.0	26.61	26.13			
	47.1	47.13	Tue 28-Feb-23	16.00			24.0	103.6	103.7	16.0	26.92	26.2			
SUM	1,947.52	1956.9		448.0	450.0	448.0	4284.5	4305.1	805.2	1017.5	956.7	58.9	0.5%	-6.0%	

Table 6 - Monthly Environmental Flow release data for Cotter dam

SUM	Environmental flow release below Cotter Date	Daily base flow	Additional release (pool / riffle)			EOM = Revised monthly target	410700 Cotter D/S (Unverified)	410700 Cotter D/S (Verified)	EOM Excess (+) / Shortfall (-)	EOM Correction to 410700 , Verified Vs unverified	Comments
Previous months adjustment						0.0					
	Wed 1-Feb-23	15				15.0	120.73	120.7			
	Thu 2-Feb-23	15				15.0	104.24	104.2			
	Fri 3-Feb-23	15				15.0	62.5	62.51			
	Sat 4-Feb-23	15				15.0	49.3	49.33			
	Sun 5-Feb-23	15				15.0	28.0	28.02			
	Mon 6-Feb-23	15				15.0	21.0	20.99			
	Tue 7-Feb-23	15				15.0	25.7	25.74			
	Wed 8-Feb-23	15				15.0	28.9	29.0			
	Thu 9-Feb-23	15				15.0	68.7	68.7			
	Fri 10-Feb-23	15				15.0	103.3	103.3			
	Sat 11-Feb-23	15				15.0	143.2	143.2			
	Sun 12-Feb-23	15				15.0	77.2	77.2			
	Mon 13-Feb-23	15				15.0	63.1	63.1			
	Tue 14-Feb-23	15				15.0	112.1	112.1			CORD cone valve and flow meter online; flow meter reading higher than river gauge
	Wed 15-Feb-23	15				15.0	92.9	92.88			
	Thu 16-Feb-23	15				15.0	151.2	151.2			
	Fri 17-Feb-23	15				15.0	189.0	189			
	Sat 18-Feb-23	15				15.0	203.8	203.8			
	Sun 19-Feb-23	15				15.0	126.0	126			
	Mon 20-Feb-23	15				15.0	67.2	67.24			
	Tue 21-Feb-23	15				15.0	58.8	58.76			
	Wed 22-Feb-23	15				15.0	60.3	60.33			
	Thu 23-Feb-23	15				15.0	49.0	49.01			
	Fri 24-Feb-23	15				15.0	51.06	51.06			
	Sat 25-Feb-23	15				15.0	58.34	58.34			
	Sun 26-Feb-23	15				15.0	70.99	70.99			
	Mon 27-Feb-23	15				15.0	36.80	36.8			
	Tue 28-Feb-23	15				15.0	30.31	30.31			
SUM		420.0	0.0			420.0	2253.8	2253.7	1833.7	0.0%	

Table 7 - Monthly Environmental Flow release data for Googong dam

410781 Upstream Googong SUM	410781 Upstream Googong (Verified)	Environmental flow release below Googong Date	Daily base flow	Additional release (pool / riffle)	Calculated Natural Flow. (Unverified)	Calculated Natural Flow. (Verified)	EOM = Revised monthly target	410760 Wickerslack (Unverified)	410760 Wickerslac k (Verified)	EOM Excess (+) / Shortfall (-)	EOM Correction to 410781, Verified Vs unverified	EOM Correction to 410760, Verified Vs unverified	Comments
Previous months adjustment													
	259.7	289.3	Wed 1-Feb-23	10.0		332.5	370.3	10.0	329.17	313.5			
	169.3	182.4	Thu 2-Feb-23	10.0		216.7	233.5	10.0	323.45	306.4			
	130.6		Fri 3-Feb-23	10.0		167.2		10.0	243.58	230.1			
	112.3		Sat 4-Feb-23	10.0		143.7		10.0	178.5	167.5			
	102.2		Sun 5-Feb-23	10.0		130.8		10.0	147.9	136.9			
	93.6		Mon 6-Feb-23	10.0		119.8		10.0		134.2			
	87.1		Tue 7-Feb-23	10.0		111.5		10.0	138.1	138.1			
	88.9		Wed 8-Feb-23	10.0		113.8		10.0	55.6	55.62			
	97.46		Thu 9-Feb-23	10.0		124.8		10.0	75.1	75.1			
	120.21		Fri 10-Feb-23	10.0		153.9		10.0	93.9	93.87			
	114.0		Sat 11-Feb-23	10.0		146.0		10.0	34.0	34.05			
	104.3		Sun 12-Feb-23	10.0		133.5		10.0	44.0	43.88			
	97.7		Mon 13-Feb-23	10.0		125.0		10.0	93.3	92.34			
	99.4		Tue 14-Feb-23	10.0		127.3		10.0	184.6	183.1			
	95.7		Wed 15-Feb-23	10.0		122.4		10.0	169.30	168			
	91.0		Thu 16-Feb-23	10.0		116.5		10.0	149.19	147.9			
	82.9		Fri 17-Feb-23	10.0		106.1		10.0	138.69	137.5			
	77.85		Sat 18-Feb-23	10.0		99.6		10.0	39.76	39.24			
	71.59		Sun 19-Feb-23	10.0		91.6		10.0	25.95	25.54			
	70.57		Mon 20-Feb-23	10.0		90.3		10.0	21.85	21.51			
	67.37		Tue 21-Feb-23	10.0		86.2		10.0	61.63	60.91			
	69.68		Wed 22-Feb-23	10.0		89.2		10.0	143.02	141.8			
	92.52		Thu 23-Feb-23	10.0		118.4		10.0	153.41	152.1			
	88.89		Fri 24-Feb-23	10.0		113.8		10.0	139.12	137.9			
	80.63		Sat 25-Feb-23	10.0		103.2		10.0	135.33	133.3			
	72.77		Sun 26-Feb-23	10.0		93.1		10.0	134.49	132.2			
	66.93		Mon 27-Feb-23	10.0		85.7		10.0	107.71	105.4			
	62.51		Tue 28-Feb-23	10.0		80.0		10.0	72.61	69.14			
SUM	2767.8	471.7		280.0	0.0	3542.8	603.8	280.0	3433.2	3477.1	3197.1	-83.0%	1.3%

Note:

410781 Upstream Googong verified data is provided every second month.

Table 8 – Monthly flow data for Cotter River Environmental Flows

Date	Cotter River e-flows below Cotter Dam		Comments
	E-flow sourced from Murrumbidgee via M2C	E-flow sourced from Cotter Dam release/spill	
Wed 1-Feb-23	0	120.7	
Thu 2-Feb-23	0	104.2	
Fri 3-Feb-23	0	62.51	
Sat 4-Feb-23	0	49.33	
Sun 5-Feb-23	0	28.02	
Mon 6-Feb-23	0	20.99	
Tue 7-Feb-23	0	25.74	
Wed 8-Feb-23	0	29.0	
Thu 9-Feb-23	0	68.7	
Fri 10-Feb-23	0	103.3	
Sat 11-Feb-23	0	143.2	
Sun 12-Feb-23	0	77.2	
Mon 13-Feb-23	0	63.1	
Tue 14-Feb-23	0	112.1	
Wed 15-Feb-23	0	92.88	
Thu 16-Feb-23	0	151.2	
Fri 17-Feb-23	0	189	
Sat 18-Feb-23	0	203.8	
Sun 19-Feb-23	0	126	
Mon 20-Feb-23	0	67.24	
Tue 21-Feb-23	0	58.76	
Wed 22-Feb-23	0	60.33	
Thu 23-Feb-23	0	49.01	
Fri 24-Feb-23	0	51.06	
Sat 25-Feb-23	0	58.34	
Sun 26-Feb-23	0	70.99	
Mon 27-Feb-23	0	36.8	
Tue 28-Feb-23	0	30.31	
Total	0.0	2253.72	

Table 9 – Monthly flow data for Murrumbidgee to Googong

Date	M2G Flow	Comments
Wed 1-Feb-23	0.0	
Thu 2-Feb-23	0.0	
Fri 3-Feb-23	0.0	
Sat 4-Feb-23	0.0	
Sun 5-Feb-23	0.0	
Mon 6-Feb-23	0.0	
Tue 7-Feb-23	0.0	
Wed 8-Feb-23	0.0	
Thu 9-Feb-23	0.0	
Fri 10-Feb-23	0.0	
Sat 11-Feb-23	0.0	
Sun 12-Feb-23	0.0	
Mon 13-Feb-23	0.0	
Tue 14-Feb-23	0.0	
Wed 15-Feb-23	0.0	
Thu 16-Feb-23	0.0	
Fri 17-Feb-23	0.0	
Sat 18-Feb-23	0.0	
Sun 19-Feb-23	0.0	
Mon 20-Feb-23	0.0	
Tue 21-Feb-23	0.0	
Wed 22-Feb-23	0.0	
Thu 23-Feb-23	0.0	
Fri 24-Feb-23	0.0	
Sat 25-Feb-23	0.0	
Sun 26-Feb-23	0.0	
Mon 27-Feb-23	0.0	
Tue 28-Feb-23	0.0	
Total	0.0	

Table 10 – Monthly water production data and water transferred to Googong reservoir

Day	Stromlo WTP ML			Googong WTP ML	Transfer from SWTP to Googong res.
	M'bidgee	Cotter	Bendora		
1	0.0	0.0	139.0	0.0	0.0
2	0.0	0.0	135.7	0.0	0.0
3	0.0	0.0	145.8	0.0	0.0
4	0.0	0.0	151.2	0.0	0.0
5	0.0	0.0	149.4	0.0	0.0
6	0.0	0.0	156.5	0.0	0.0
7	0.0	0.0	190.4	0.0	0.0
8	0.0	0.0	199.0	0.0	0.0
9	0.0	0.0	165.3	0.0	0.0
10	0.0	0.0	144.7	0.0	0.0
11	0.0	0.0	146.3	0.0	0.0
12	0.0	0.0	151.9	0.0	0.0
13	0.0	0.0	161.4	0.0	0.0
14	0.0	0.0	172.1	0.0	0.0
15	0.0	0.0	142.5	0.0	0.0
16	0.0	0.0	184.2	0.0	0.0
17	0.0	0.0	172.8	0.0	0.0
18	0.0	0.0	189.7	0.0	0.0
19	0.0	0.0	198.9	0.0	0.0
20	0.0	0.0	180.2	0.0	0.0
21	0.0	0.0	192.2	0.0	0.0
22	0.0	0.0	122.7	0.0	0.0
23	0.0	0.0	148.4	0.0	0.0
24	0.0	0.0	137.2	0.0	0.0
25	0.0	0.0	154.4	0.0	0.0
26	0.0	0.0	165.6	0.0	0.0
27	0.0	0.0	174.1	0.0	0.0
28	0.0	24.6	171.3	0.0	0.0
29					
30					
31					
Total	0.0	24.6	4542.9	0.0	0.0

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