

# Gerangamete Groundwater Management Area

Groundwater licence: BEE032496

2018-2019 report

## Executive summary

Barwon Water has been operating under Groundwater Extraction Licence No. BEE032496 that expired on 30 June, 2019. This report covers the annual reporting requirements under this licence.

On 14 March 2019, Barwon Water withdrew its licence renewal application for the Barwon Downs borefield until remediation of historical impacts of groundwater pumping is complete under the section 78 Ministerial Notice.

This report presents a summary of the work completed by Barwon Water for the monitoring of groundwater and land levels in the Gerangamete groundwater field for the period July 1, 2018, to June 30, 2019 and includes information on:

- the extracted groundwater volume;
- groundwater and land level data recorded;
- an account of bore maintenance undertaken, and;
- an indication of any analysis completed based on the monitoring data.

The major outcomes of the 2018–2019 program were:

- No groundwater was extracted.
- Groundwater level decline and ground subsidence remain within licence trigger levels.
- Groundwater levels recorded during 2018–2019 show a recovery trend.

Due to the expiration of the existing licence, the production of an annual report will no longer be required making this the concluding report for Groundwater licence No: BEE032496.

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## 2. Introduction

Barwon Water operated the Barwon Downs Borefield to supplement surface water storages during dry periods. There are six production bores with the capacity to deliver 12.0 ML/day per bore. The bores deliver water to the Gerangamete Water Treatment Plant where it is pre-treated prior to pumping to the main transfer channel and eventual storage and full treatment at Wurdee Boluc.

The Barwon Downs licence came into operation on November 7, 2006, however on 14 March 2019, Barwon Water announced the withdrawal of the Barwon Downs borefield licence renewal application, to focus on the remediation of historical impacts of groundwater pumping and to meet the requirements of a Ministerial Notice issued under section 78 of the Water Act.

Under the terms of the licence, Barwon Water reports annually on groundwater extraction operations and provides information on groundwater levels. These are monitored through a network of observation bores, which indicate groundwater levels and rate of change in groundwater levels during pumping and recharge periods. Barwon Water also monitor and report on groundwater salinity, land subsidence and environmental observations.

This report provides details of the regional groundwater and land surface monitoring activities undertaken for the period 01 July, 2018, to 30 June, 2019, under Groundwater Licence No: BEE032496.

## 3. Regional hydrogeology and groundwater modelling

### 3.1 Regional hydrogeology

Current geological understanding indicates that the Barwon Downs Graben was developed between the uplifted Otway Block and Barongarook High during the middle cretaceous period. The Graben itself is a complex structure characterised by a series of generally northeast – southwest trending intensely developed faulting and folding of tertiary sediments. The Graben is broadly demarcated by the Bambra fault to the southeast, Birregurra fault to the north and the aquifer outcrop areas in Barongarook High to the west and Bambra region in the northwest.

The Barongarook High is the main recharge area for the Barwon Downs Graben. The various geological formation of the Graben may be summarised below.

**Table 1: Geological formation of the Barwon Downs Graben**

Formation	Group	Period	
Newer Volcanic Viaduct Moorabool	Undifferentiated	Quaternary	
Gellibrand Marl Clifton Formation	Heysterbury	Quaternary Tertiary	Aquitard Minor aquifer
Demon Bluff (Narrawaturk Marl)	Nirranda	Tertiary	Aquitard
Eastern View	Wangerrip	Tertiary	Principal aquifer
Eumeralla	Otway	Cretaceous	Basement rocks

The principal aquifer in Barwon Downs is the Eastern View Formation. This is the basal tertiary unit of alluvial or fluvial deposits containing predominantly quartz, sand, gravel, minor clay and brown coal believed to be deposited during the Palaeocene and Eocene at the start of the tertiary. Tickell et al. (1991) states the lower, middle and upper Eastern View Formations are equivalent to the Pebble Point, Dilwyn and Mepunga Formations respectively. These formations have been renamed as there are significant lithological difference between these layers and the lateral equivalent layers found in the Port Campbell Embayment. The Pebble Point, Dilwyn, Mepunga and Pember Mudstone Formations represent deposits of marine or marginal marine environments. Constant process of deposition, erosion, and reworking of the deposits resulted in interbedded, moderately to poorly sorted, unconsolidated sand gravel, silt, clay and brown coal and an absence of a single continuous layer.

### 3.2 Groundwater modelling

Between 2016 and 2018, the model was expanded, re-built and re-calibrated to support the licence renewal application. The new model built on earlier model versions and was used to assess potential impacts associated with future groundwater extraction.

**Table 2: Model layers for the Barwon Downs Graben**

Model layer	Hydrostratigraphic units	Function
Layer 1	Gellibrand Marl	Aquitard
Layer 2	Clifton Formation	Minor Aquifer
Layer 3	Narrawatuk Marl	Aquitard
Layer 4	Mepunga/Dilwyn Formation	Major Aquifer
Layer 5	Pember Mudstone	Aquitard
Layer 6	Pebble Point Formation	Major Aquifer
Layer 7	Basement	Minor Aquifer

The revised groundwater model had a much broader focus than previous work that had concentrated primarily on undertaking a resource assessment to determine the availability of groundwater. The model is well calibrated at both a regional scale and local scale, and is now a more reliable representation of the hydrogeological setting and the rivers and creeks that interact with groundwater.

The groundwater model had attained the highest ranking in confidence level classification in accordance with the Australian Groundwater Modelling Guidelines (Barnett et al., 2012). It was considered to be fit-for-purpose to assess future groundwater behaviour and impacts that may have occurred from groundwater extraction.

## 4. Regional groundwater monitoring (Clause 1)

### 4.1 Monitored area

The monitoring network for the Gerangamete groundwater management area takes in the areas of Barongarook, Yeodene, Birregurra, Gerangamete, Barwon Downs, Deans Marsh and Bamba.

The following table indicates the bores monitored in the reporting period for each formation.

**Table 3: Bore number and aquifer monitored**

Model layer	Aquifer/Aquitard	Active Monitoring Bores	Inactive Monitoring Bores
Layer 1	Gellibrand Marl		
Layer 2	Clifton Formation	G18, G19, M22	
Layer 3	Narrawatuk Marl		
Layer 4	Mepunga/Dilwyn Formation	BA54, BA56, BA57, BA58, BD3, G11, G14, G17, G20, G22, G24, G28, M25, M27, M28, M29, M30, M31, W7, W9, YYG217, YYG218, YYG221, Y40, Y41, YEO20, YEO21, YEO37, YEO39, YEO40, YEO42, YEO44	G12, G25, W4, YEO38
Layer 5	Pember Mudstone		
Layer 6	Pebble Point Formation	BK69, E68, G11, G13, G14, G21, G23, M24, YEO19, YEO22, YEO23, YEO41	
Layer 7	Basement		

### 4.2 Groundwater levels (Clause 1.3 A)

Monitoring of the regional observation bore network continued during the 2018–19 year. The locations of the observations bores have been included in the map in Appendix A. Groundwater levels have been recorded at each of the observation bores quarterly and provided in the table in Appendix B. Water levels are referenced to a level on the casing at the surface. Levels below the surface are measured using an electronic piezometer tape, while pressure gauges are used to measure artesian pressures.

### 4.3 Bore hydrographs (Clause 1.3 B)

Observation bores in close proximity to the Gerangamete production borefield have shown a quick but expected drawdown and recovery. Observation bores that are further from the borefield tend to show a slower drawdown from groundwater extraction and then take longer to recover. Hydrographs have been prepared for each bore and are presented in Appendix C. Comments have been provided for observation bores where recorded levels weren't consistent with the expected levels.

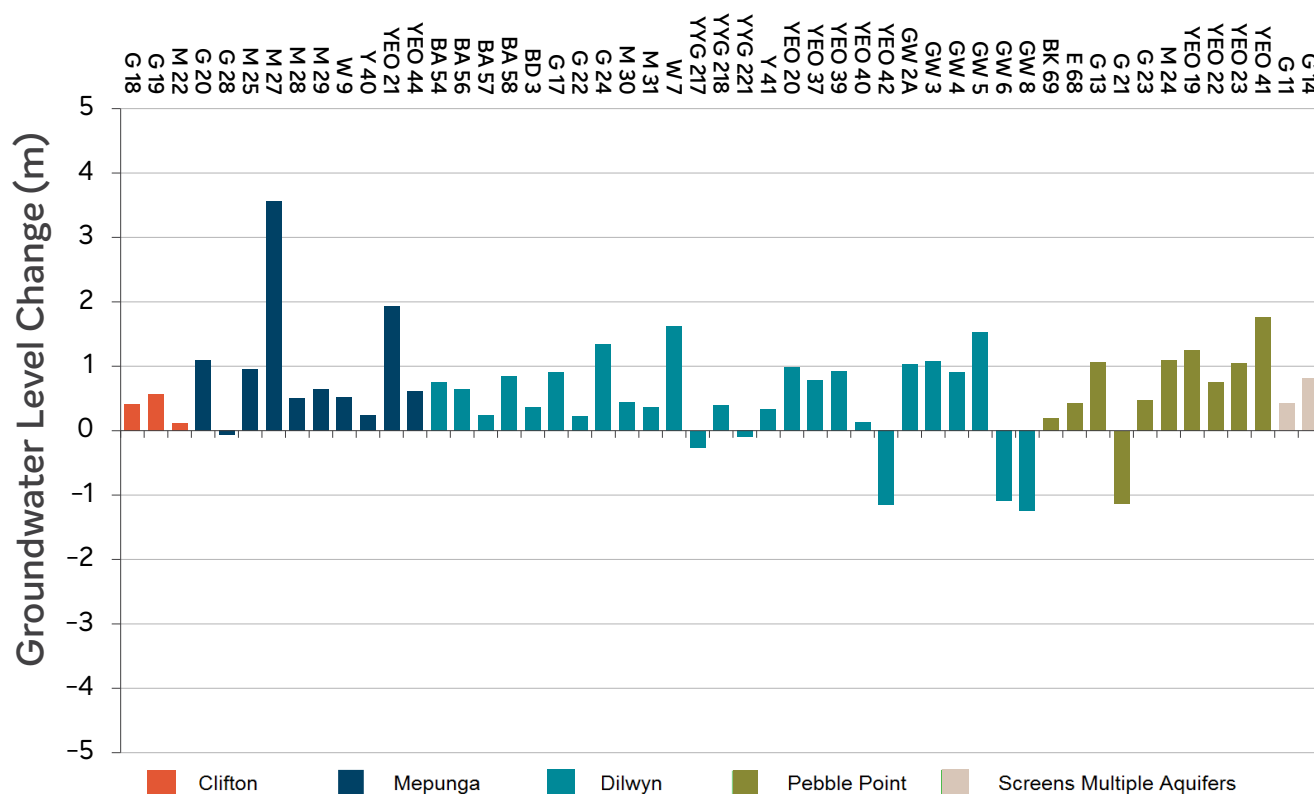
### 4.4 Residual drawdown (Clause 1.3 C)

Figure 1 below shows that groundwater levels are continuing to recover after the groundwater extraction which took place in April – December, 2016. Of the 51 observation bores in the Gerangamete Borefield, the

2018/19 year showed strong recovery with seven bores not recording positive groundwater level change. In comparison, the 2016/17 year had 17 bores with a positive change in groundwater level.

The change in groundwater levels over the past 12 months are illustrated in Figure 1 below. Readings are taken in May 2019 and compared to the June 2018 levels.

**Figure 1: 2018/19 Residual drawdown**



**Notes:**

1. GW6 & GW8 had pumps installed in June 2017 which prohibited groundwater levels from being read. Readings in the table above were taken in January 2018 for these two bores.
2. G14 became artesian in June 2017 and did not have the appropriate fittings installed to enable pressure readings at that time. The results graphed were taken in January 2018 when the bore had the correct fittings to read artesian pressure.
3. G25 has been removed from the monitoring program due to bore failure (see section 3.5 Bore Failures)

The contour maps provided in Appendix D depict the residual drawdown in groundwater levels since June, 1997. The contours are based on the difference in the groundwater levels measured in May 2018 compared to those levels recorded in 1997.

The baseline used for determining residual drawdown for this licensing period was June 1997 because it represents the end of an extended period of no groundwater extraction and because it is prior to extended periods of groundwater extraction during September 1997 – July 2001, and May 2006 – August 2010. Prior to September 1997, groundwater extraction had occurred intermittently from 1982 – 1990 with a total extraction volume during that time of 25,858 ML. The majority of groundwater extraction during that period was undertaken March 1987 – February 1990, with a total of 20,559 ML.

For this 2018–19 report, the residual drawdown contours have been plotted for each groundwater formation separately. Each aquifer has been observed to have varying rates of recovery and different cones of depression, and so plotting the contours for each aquifer individually is the most accurate method of representing the drawdown within each formation. However, the ability to accurately represent drawdown contours within each formation is highly dependent on the number and distribution of the observation bores within each formation. Evenly distributed observation bores across the whole formation would provide greater confidence in the drawdown contour map.

It should be noted that observation bores Y40 and YEO20 have again been included in the contour mapping in Appendix D as they provide representative data following refurbishment and the redrilling in 2016/17. Further commentary on these observation bores has been provided in Section 3.5.

Bore Y41 has been excluded from the residual drawdown map for the Dilwyn formation as it was only constructed in 2006 and provides no comparative data back to 1997.

#### **4.5 Bore failures (Clause 1.3 D)**

There were no bore failures in 2018–19 and no condition assessments conducted in 2018–19. However, condition assessments were conducted on 3 bores in 2015–16, with the outcomes detailed below:

- G11** Recorded a constant decline in water levels over the reporting period. A condition assessment conducted in May 2016 identified extensive corrosion in this bore casing that required it to be refurbished. It was later refurbished in 2016–17 and is now producing reliable results. This condition assessment was mistakenly omitted from the previous annual reports and has now been included.
- Y40** Recorded large spikes in groundwater levels. This prompted a condition assessment to be conducted in 2015–16. The assessment indicated that the screens were likely to be blocked causing the erroneous readings and it was recommended that the bore be refurbished to clear the screens. This bore was subsequently refurbished in 2016–17 and is now providing representative groundwater levels.
- YEO20** Recorded the same groundwater levels for an extended period of time from 2013 – 2015. This indicated that the bore was blocked or the screens were not functioning properly. A condition assessment undertaken in 2015–16 indicated that this bore was completely blocked by tree roots preventing groundwater measurements from being taken. In 2016–17, YEO20 was deemed as an important bore for the future monitoring program so the blocked bore was decommissioned and a replacement bore was redrilled in the same location, with screening across the same intervals.

Several observation bores have also displayed signs of failure and are being progressively decommissioned by DELWP. These bores are:

- YEO38** Displaying no variation in the potentiometric levels during borefield extraction and recovery periods and, as such, this bore is likely to have failed. This observation bore is no longer active as part of DELWP’s State Observation Bore Network (SOBN) and is not required as part of the expanded Barwon Downs monitoring program. Therefore, this bore will be removed from Barwon Water’s monitoring program and will be decommissioned by DELWP in due course.

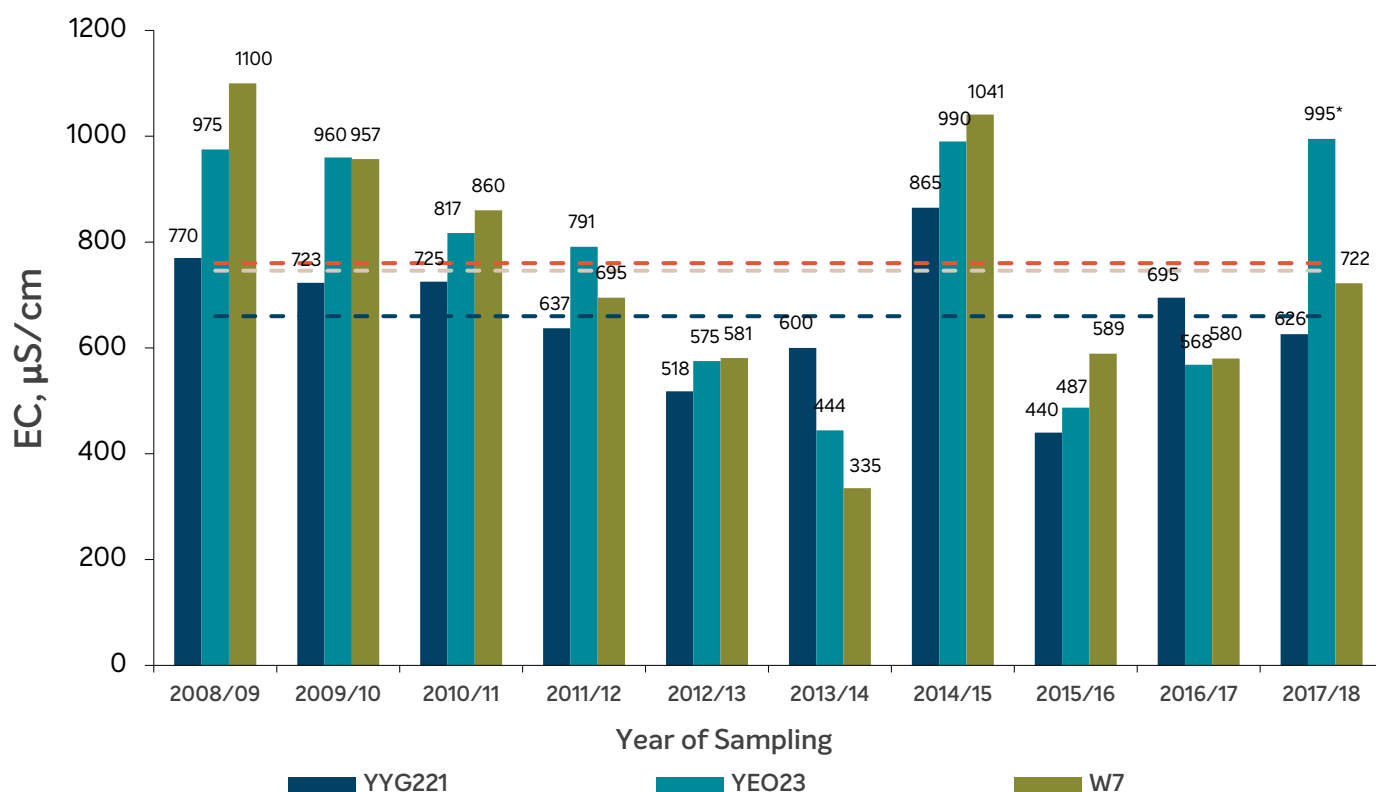


- G25** Providing erroneous data that is inconsistent with other localised bores. This bore is on DELWP’s program for decommissioning and is no longer active as part of the SOBN. Jacobs conducted a review of the existing observation bore network in 2014. This review identified that one bore from BD3 or G25 was needed for the ongoing monitoring program. Since BD3 is producing reliable results it has been prioritised over G25. This bore was removed from Barwon Water’s monitoring program in June 2017.
- W4** The Jacobs observation bore review identified that W4 is not required as part of the ongoing Barwon Water monitoring program and was removed in 2015. This bore is also not required as part of the SOBN and has been decommissioned by DELWP.
- G12** The Jacobs observation bore review identified that G12 is not required as part of the ongoing Barwon Water monitoring program and was removed in 2014. This bore is also not required as part of the SOBN and has been decommissioned by DELWP.

## 5. Groundwater salinity (Clause 2)

Groundwater salinity monitoring was not conducted in 2018–19. The Barwon Downs Licence requires groundwater salinity monitoring every fifth year. Barwon Water have been compliant with this as groundwater salinity monitoring was last conducted in 2017–18. Figure 2 below shows the ten-year average of Electrical Conductivity (EC) for each monitoring bore. This demonstrates fluctuation in EC from year-to-year with no discernible relation to groundwater extraction or low rainfall periods.

**Figure 2: Electrical conductivity ( $\mu\text{S}/\text{cm}$ ) monitoring results**



**Notes:**

- The results shown for YEO23 were taken on the 30th May 2018. Other readings taken in 2017–18 were 798  $\mu\text{S}/\text{cm}$  on 9th October 2017, 654  $\mu\text{S}/\text{cm}$  on the 3rd January 2018 and 745  $\mu\text{S}/\text{cm}$  on the 8th March 2018.
- Ten-year Average Results: YYG221 = 660  $\mu\text{S}/\text{cm}$ , YEO23 = 760  $\mu\text{S}/\text{cm}$ , W7 = 746  $\mu\text{S}/\text{cm}$

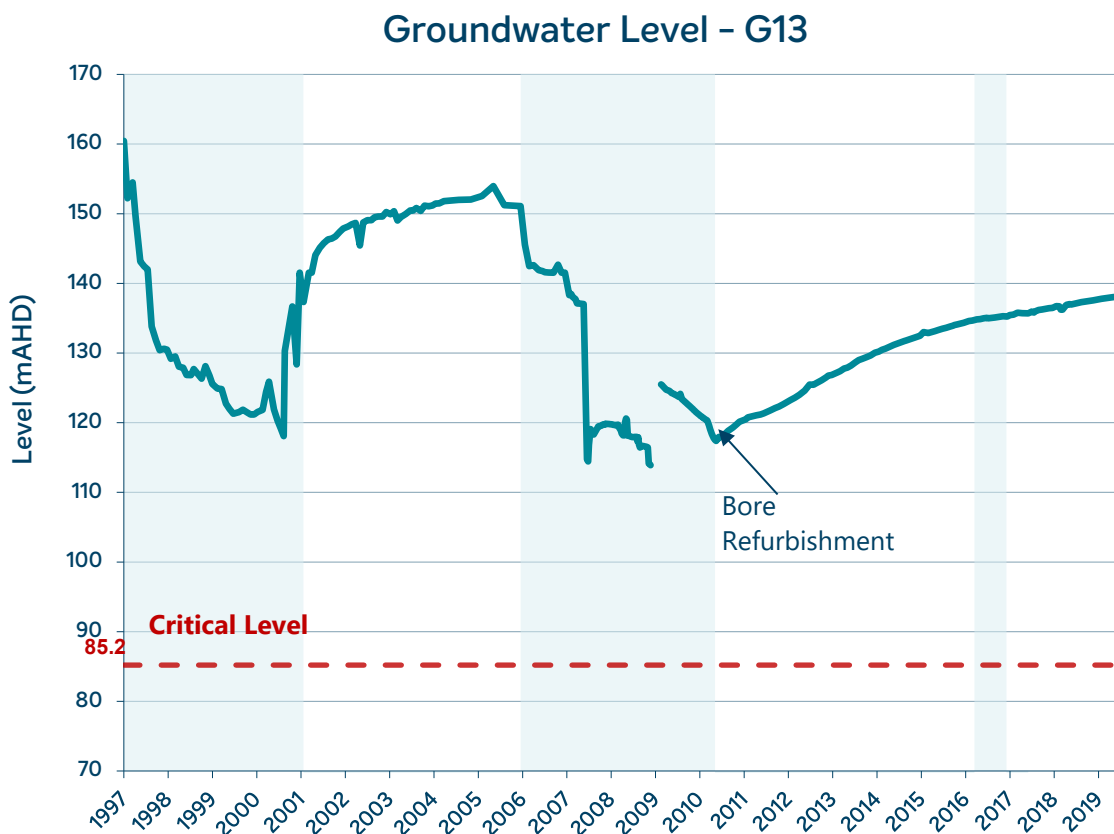
## 6. Water level decline (Clause 3)

### 6.1 Groundwater levels in critical bores (Clause 3.5A (i))

Groundwater level trends for each of the critical bores as listed in the licence are shown below. The level in each bore has remained above the critical level for the entire reporting period. If the groundwater levels in any of these four critical bores fall below the critical level, a number of key actions would need to be taken by Barwon Water. These are:

- Notify Southern Rural Water within seven days
- Limit groundwater extraction to 34.4 ML/day
- Immediately undertake subsidence monitoring and every six months thereafter
- Increase observation bore readings from quarterly to monthly
- Provide monthly reports to Southern Rural Water mapping depth to potentiometric surface and potentiometric surface relative to AHD
- Provide a report to Southern Rural Water within 90 days that reviews predicted groundwater levels, assesses Geelong's water supply situation and a plan to manage future groundwater extractions.

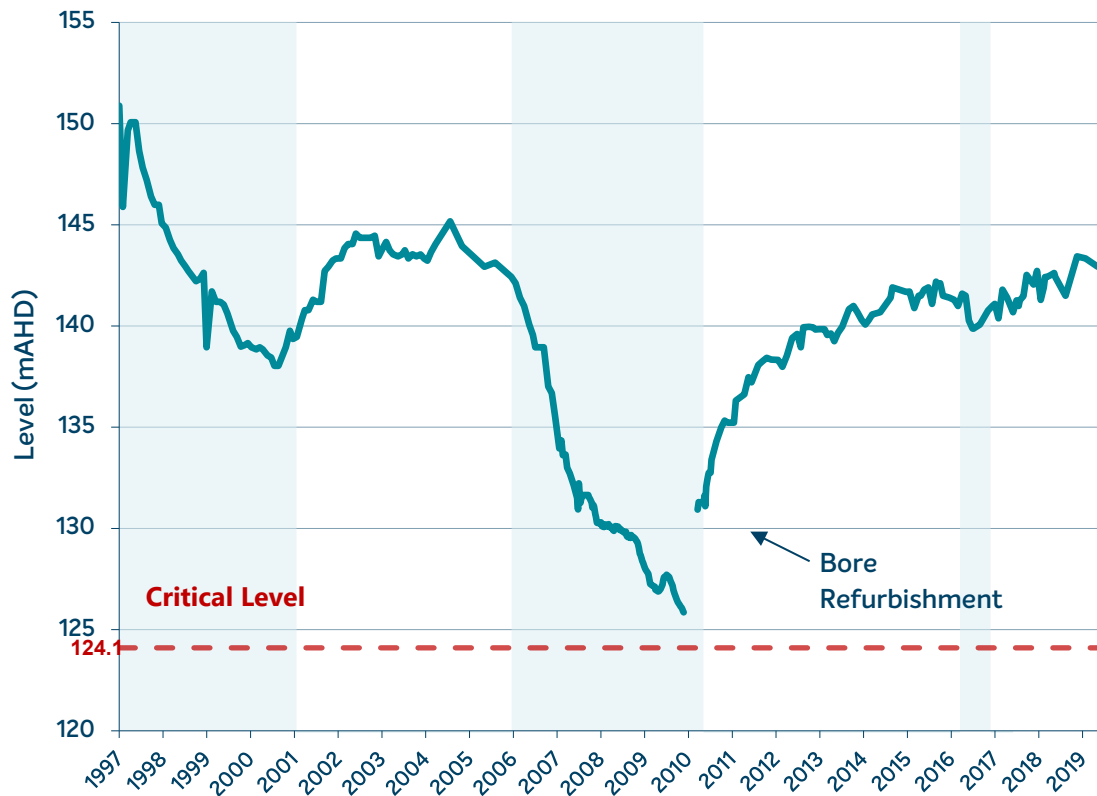
All actions are to be undertaken until the groundwater levels in all critical bores recover to above the critical level.



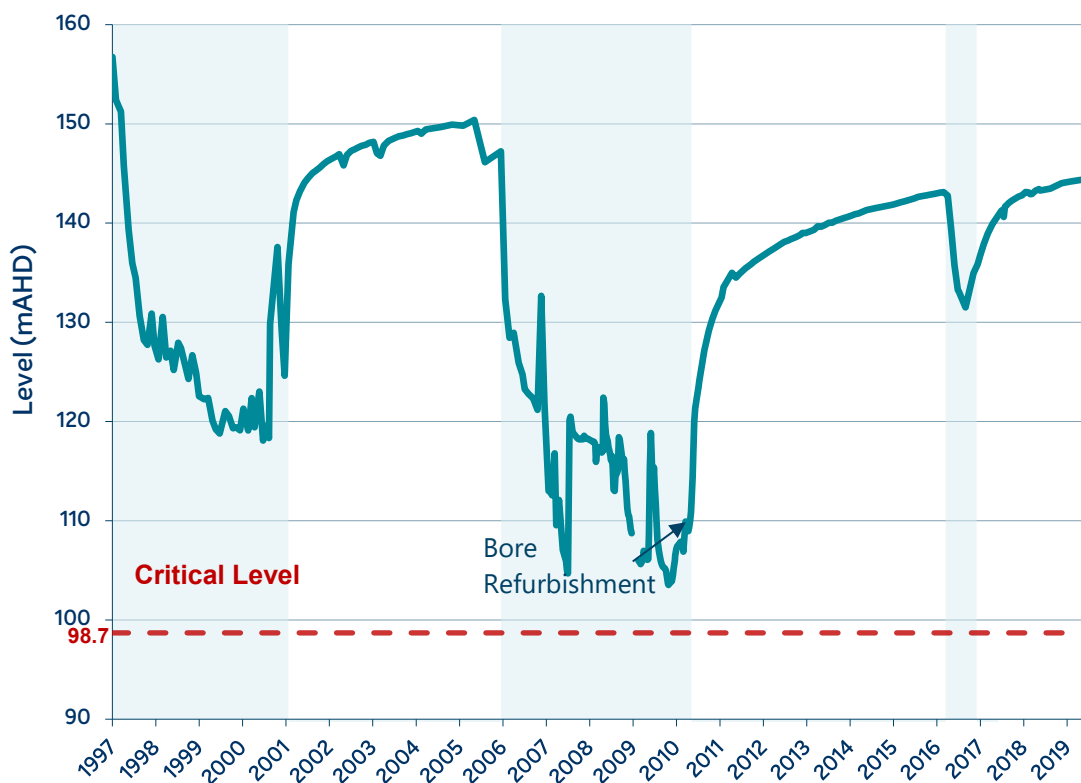
#### Notes:

1. Bore refurbishment – G13, M28 and G20 were all refurbished during 2009–2010. This refurbishment meant that for a short period of time data was unable to be collected for these observation bores.
2. Light blue shading depicts periods where groundwater extraction has occurred.

## Groundwater Level - M28



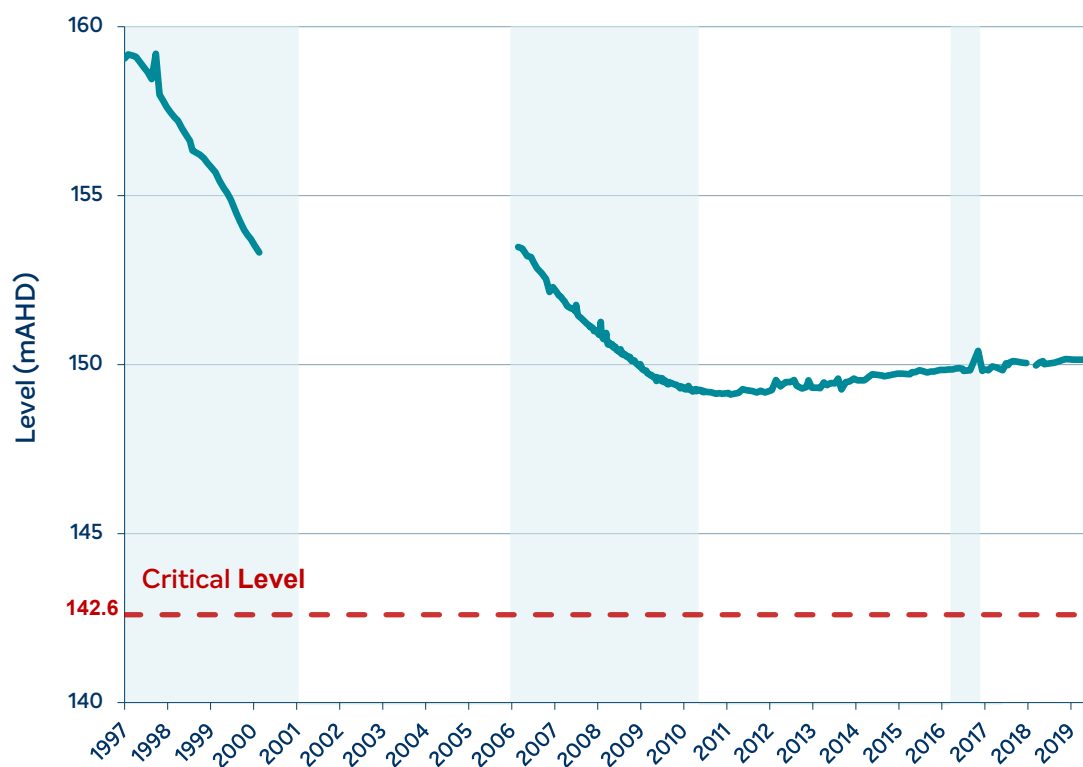
## Groundwater Level - G20



### Notes:

1. Bore refurbishment – G13, M28 and G20 have all been refurbished during 2009-10. This refurbishment meant that for a short period of time data was unable to be collected for these observation bores.
2. Light blue shading depicts periods where groundwater extraction has occurred.

## Groundwater Level - YEO40



### Notes:

1. YEO40 bore has an extended period of missing data from October, 2000, to June, 2006. YEO40 was part of the DELWP State Observation Bore Network and was decommissioned in October, 2000. A new observation bore was constructed by Barwon Water in June, 2006, to replace YEO40.
2. Light blue shading depicts periods where groundwater extraction has occurred.

## 7. Metering (Clause 4)

The Barwon Downs borefield extracted 0 ML of groundwater in 2018–2019. The bore pumps were removed in 2017–18 and the borefield has remained offline. Daily, monthly and annual extraction totals are included in Appendix E.

The ten year extracted volume total is at 29,724 ML which is well below the licence limit of 80,000 ML.

## 8. Subsidence (Clause 5)

### 8.1 Land subsidence measurement (Clause 5.5 A)

Measurements were carried out and compared to 2003 readings for the subsidence-monitoring network specified in the fourth schedule of the Gerangamete groundwater licence. Surveying was conducted by Barwon Water's spatial services team and the results are presented below. Positive values indicate an increase in ground levels compared to the readings taken in 2003, while a negative value indicates subsidence. The results indicate a slight subsidence in ground levels up until May, 2010. After 2010, the ground levels at most observation points have shown a small recovery, while some levels have been observed to stabilise. All ground levels have shown a subsidence well within the maximum allowable limit of 200 mm stipulated in the licence.

**Table 4: Land Subsidence Monitoring – Variation from 2003 Readings**

Ellipsoid Height Differences as compared to 2003 data (mm)																	
Primary Control Station ID	June 2004	May 2005	May 2006	June 2007	Dec 2007	June 2008	July 2009	May 2010	July 2011	June 2012	June 2013	June 2014	June 2015	June 2016	June 2017	June 2018	July 2019
20790040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20880024	-8	-2	-8	-18	-16	-8	-21	-25	-25	-12	-23	-20	-21	-11	-19	-19	-19
20590052	-6	0	+6	-3	-12	+7	+8	+8	+15	+8	+14	+1	+3	+13	+27	11	0
39780106	-1	0	+3	-27	-9	-15	-16	-30	-14	-16	-30	-24	-25	-11	-19	-15	-17
Monitoring Station ID																	
32390045	-6	+1	-11	-42	-42	-36	-66	-75	-47	-42	-54	-42	-42	-47	-35	-39	-30
32390046	+3	+1	-8	-20	-19	-20	-47	-50	-32	-25	-46	-32	-28	-37	-25	-27	-10
26470027	-6	+2	-2	+6	-11	-22	-37	-45	-36	-39	-43	-42	-35	-32	-37	-36	-21
26470032	-5	+5	-1	-43	-30	-36	-63	-63	-35	-40	-45	-42	-37	-42	-39	-40	-15
26470033	-8	+3	-13	-40	-35	-36	-65	-76	-38	-39	-44	-38	-35	-46	-39	-36	-21
26470036	+5	+10	+1	-32	-23	-30	-48	-63	-42	-38	-39	-33	-23	-33	-33	-24	-12
39870025	-1	-4	-5	-15	-11	-17	-23	-34	-37	-31	-25	-29	-33	-27	-27	-21	-17
39870026	-3	0	+2	-9	-6	-15	-22	-38	-37	-33	-31	-31	-35	-21	-28	-23	-10
38090024	-4	-3	+12	+8	NA	0	-26	-25	-18	-30	-15	-36	-36	-45	-38	-53	-65
38090025	-5	-5	+9	-12	NA	-5	-30	-33	-28	-48	-23	-33	-35	-27	0	0	-18
38090026	-5	0	+6	-15	NA	-6	-33	-31	-30	-41	-30	-33	-28	-31	-31	-33	-19

## 9. Flow in Boundary Creek (Clause 6)

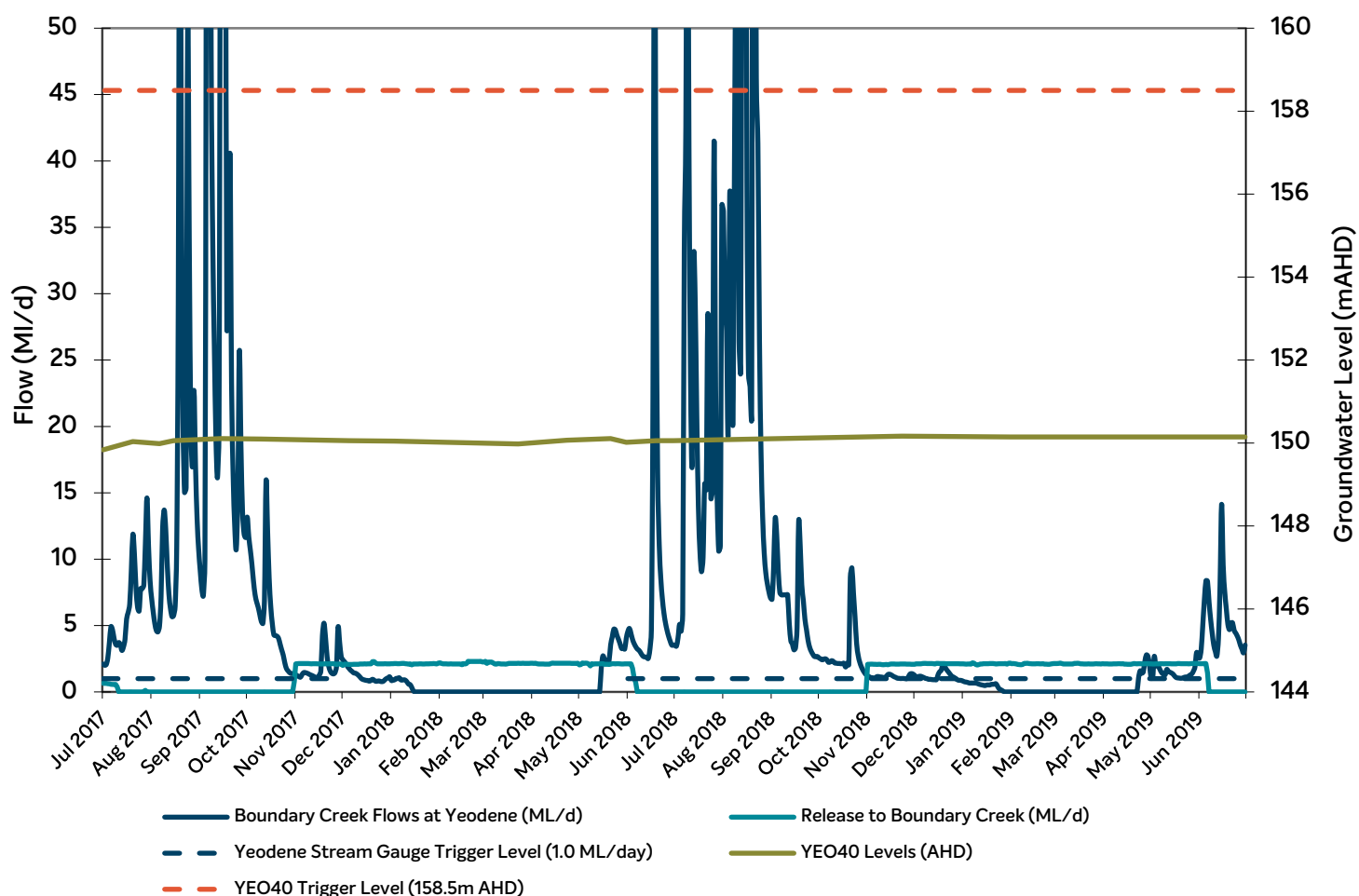
### 9.1 Discharge to Boundary Creek

Approximately 460 ML of water was released into Boundary Creek during the 2018–2019 year. The chart in figure 3 below shows the daily releases along with daily stream gauging on Boundary Creek (at the Yeodene gauge) and groundwater levels in bore YEO40. Under the Gerangamete groundwater licence Barwon Water must provide a flow of 2 ML/day to the headwaters of Boundary Creek until one of the following occurs:

1. the groundwater level in YEO40 recovers above the trigger level of 158.5m AHD or
2. the natural flow at the Yeodene stream gauge exceeds 1 ML/day any time between June 1 and November 30.

The raw flow data is included in Appendix F.

**Figure 3: Flows and releases to Boundary Creek at Yeodene for 2017/18 and 2018/19**



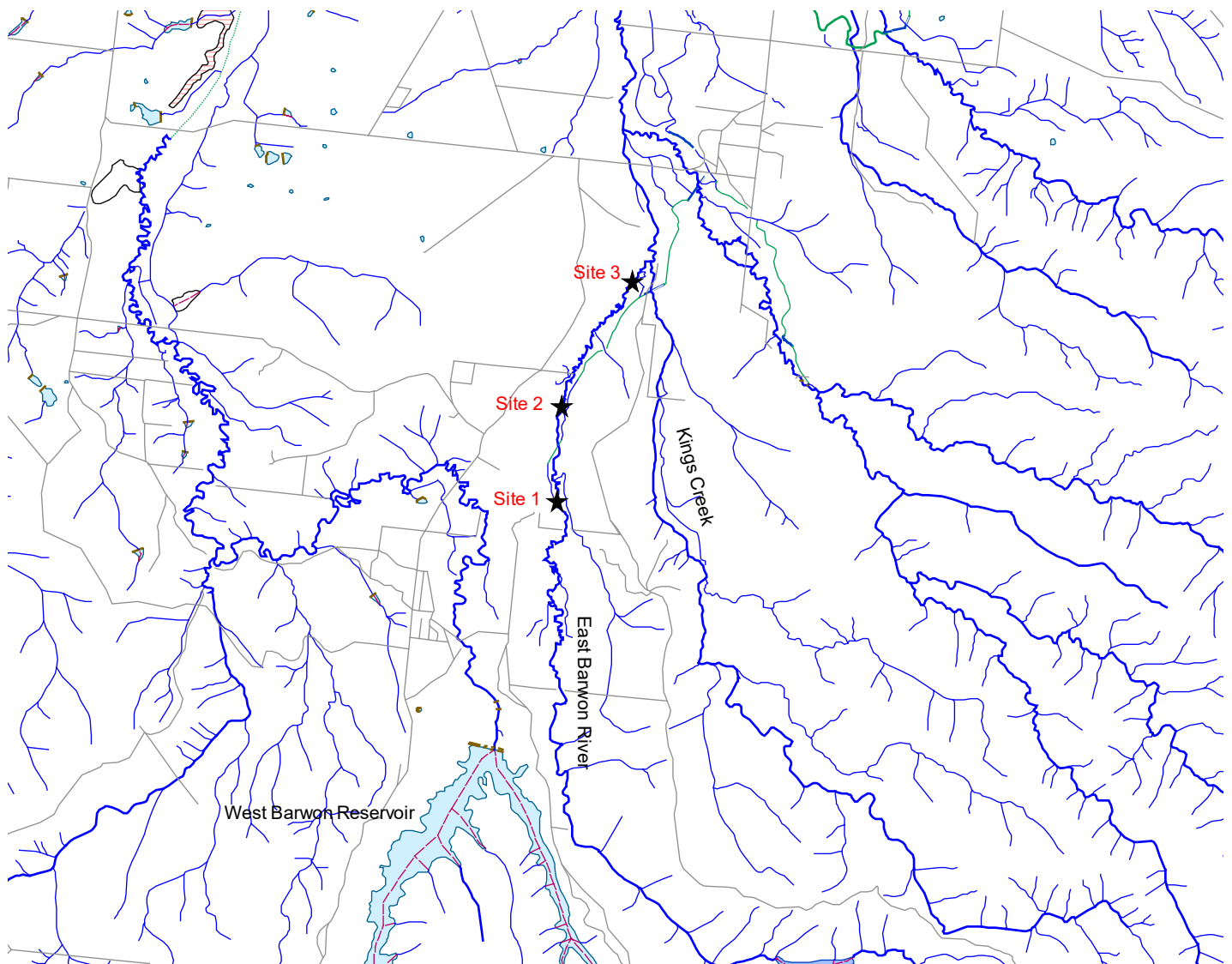
## 10. Protection of flow in the Barwon River and tributaries (Clause 9)

### 10.1 East Barwon River (Clause 9.1)

Flows in the East Barwon River are manually measured at six-monthly intervals in three locations as per the agreement with Southern Rural Water. The three locations are:

1. East Barwon gauge (Monitoring site 233253A)
2. Approximately 1km downstream of the East Barwon gauge
3. Approximately 250m upstream of the Kings Creek junction.

**Figure 4: Stream Gauge sites on the East Barwon River**



Flow gauging was conducted during the year to record the flows in the East Barwon River. Vegetation growth continues to pose issues with obtaining measurements at these sites.

The results from the 2018–2019 flow measurements obtained are shown in the table below.

**Table 5: Measured flows in East Barwon River**

Measurement No.	Date	Flow at site (ML/d)			Borefield pumping?
		1	2	3	
1	23 January 2019	0.20	0.23	0.25	No
2	23 May 2019	1.73	2.07	4.14	No

Reduced flows observed in January 2019 are reflective the below average flows observed from across the region during this time.

## 10.2 Groundwater discharge to the West Barwon River (Clause 9.4 A)

A previous survey of the river profile between bores Y40 and Y41 (near Boundary Rd, Yaugher) shows that the invert (low point) of the river at this point is at approximately 140.2 m AHD.

Y41 was specifically installed to measure the depth of groundwater on the east side of the river in this same area. As indicated in Appendix B, water levels over the past twelve months have been 15.62 metres below the ground level of 142.735 metres AHD. Due to the groundwater level being 13.09m below the river level, this indicates groundwater was unable to discharge to the West Barwon River over the past 12 months.

The bore did not experience any failure in the past year and the monitoring trend suggests no further investigation is required at this time.



## 11. Community engagement (Clause 10)

### 11.1 Information (Clause 10.1 A)

This report will be made available to the public following acceptance from Southern Rural Water.

### 11.2 Engagement (Clause 10.2)

#### **Barwon Downs Community Reference Group**

Barwon Water established a Community Reference Group (CRG) in 2013 to help scope the monitoring program and supporting technical studies to target areas of community concern which was used as an input into Barwon Water's licence application.

This group concluded when the application was submitted in late 2018.

#### **Boundary Creek and Big Swamp Remediation Working Group**

The Boundary Creek and Big Swamp remediation working group was established in May 2018, with the purpose of participating in the design of the remediation plan.

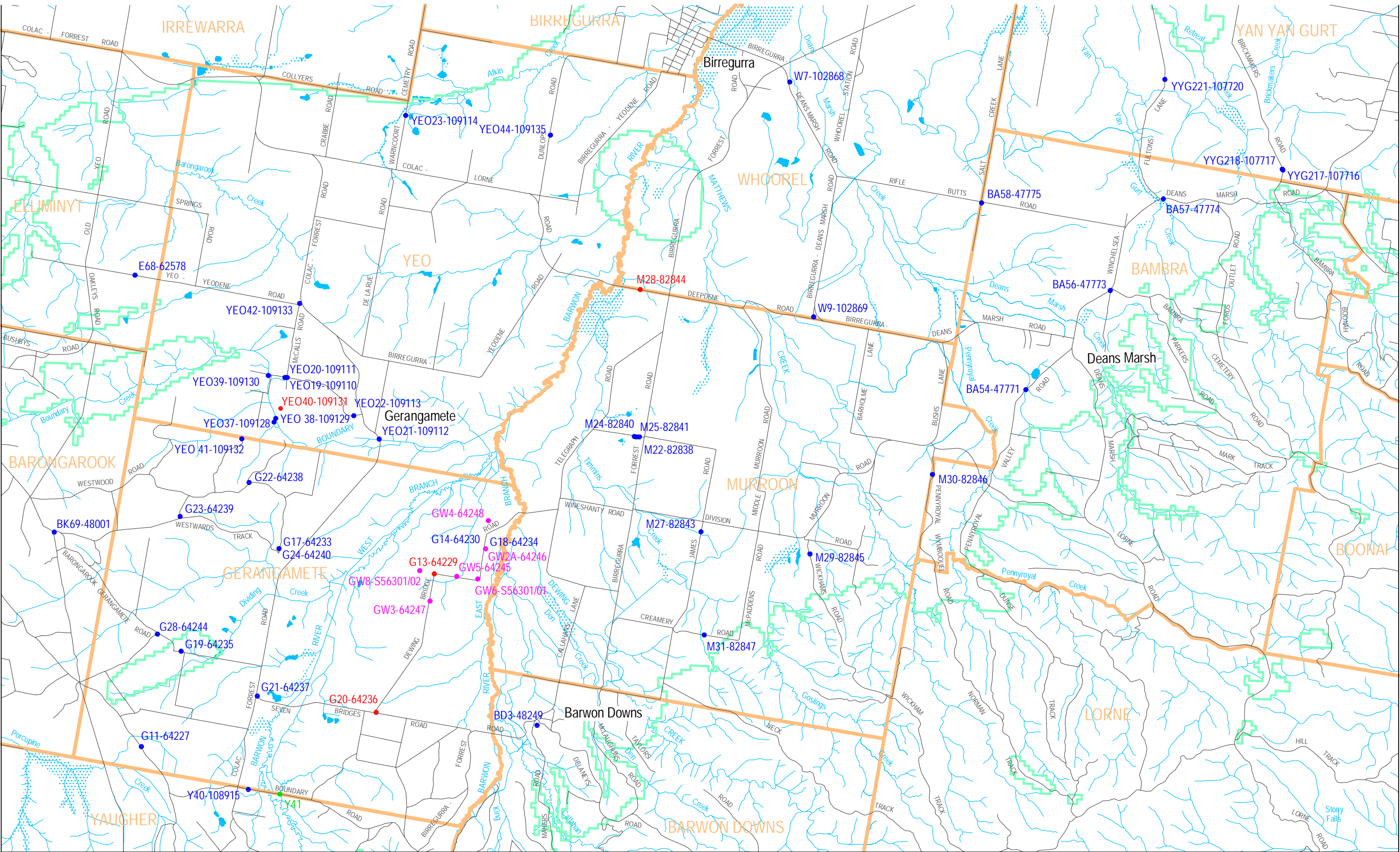
The working group is made up of representatives from the Corangamite Catchment Management Authority, Colac Otway Shire Council, Land and Water Resources Otway Catchment, Environment Victoria, Upper Barwon Landcare Group, Boundary Creek landowners, Traditional Owners and other interested community members.

The remediation working group has benefitted from three acid sulfate soils and remediation experts who they nominated to seek independent technical advice.

The remediation working group will continue in their role until the remediation plan is submitted by 20 December, 2019 as required by the section 78 Notice.

# Appendix A

## Groundwater bores location plan



<b>NOTES</b> <ul style="list-style-type: none"><li><span style="color: green;">●</span> G20-64236 BW GROUND WATER MONITORING BORE</li><li><span style="color: blue;">●</span> Y40-108915 STATE GROUND WATER MONITORING BORE</li><li><span style="color: red;">●</span> G12-64228 CRITICAL MONITORING BORE</li><li><span style="color: purple;">●</span> GW3-64247 PRODUCTION BORE</li><li><span style="color: green;">—</span> AQUIFER EXTENTS</li><li><span style="color: orange;">—</span> PARISH BOUNDARY</li></ul>		<div><b>BarwonWater</b></div> <p>TECHNICAL &amp; SPATIAL SERVICES</p> <p>55-67 RYRIE STREET GEE LONG 3220 TEL. 1300 656 007 www.barwonwater.vic.gov.au</p>		<b>GERANGAMETE GROUNDWATER BARWON DOWNS AQUIFER GROUND WATER MONITORING BORES</b>			<div><b>MGA 54</b></div>		<b>11384-05</b>		
		JOB No. 11384		DRAWN E.DELGROSSO 23/07/18		CHECKED		<b>DATUMS</b>			
		SCALE IN METRES SCALE 1 : 75 000		<div><div></div><div>7500</div><div>0</div><div>750</div><div>1500</div><div>2250</div><div>3000</div><div>3750</div><div>4500</div><div>5250</div><div>6000</div></div>				HEIGHT: AHD MAP: MGA ZONE: 54		<b>A:</b>	

# Appendix B

## Quarterly groundwater levels

# Groundwater levels relative to surface

## Clifton Formation

Date	State/WMIS ID	64234	64235	82838
	Barwon Water ID	G 18	G 19	M 22
	Point of Reference	TOV	TOC	TOC
	22-Aug-18	1.53	-28.40	-17.11
	23-Nov-18	1.63	-28.38	-17.04
	31-Jan-19	1.48	-28.43	-17.13
	10-May-19	1.63	-28.43	-17.15

## Mepunga Formation

Date	State/WMIS ID	64236	64244	82841	82843	82844	82845	102869	108915	109112	109135
	Barwon Water ID	G 20	G 28	M 25	M 27	M 28	M 29	W 9	Y 40	YEO 21	YEO 44
	Point of Reference	TOC	TOC	TOV	TOC	TOV	TOC	TOC	TOC	TOV	TOC
	22-Aug-18	-21.02	-37.69	-13.24	3.67	15.09	-26.60	-0.18	-35.99	7.04	-15.26
	23-Nov-18	-20.75	-37.68	-12.95	4.28	15.81	-26.42	-0.90	-35.90	6.34	-14.80
	31-Jan-19	-20.60	-37.77	-13.00	4.39	15.71	-26.38	-0.22	-35.93	7.24	-15.19
	10-May-19	-20.40	-37.78	-12.80	4.59	15.30	-26.21	-0.23	-35.96	7.24	-15.19

## Dilwyn Formation

Date	State/WMIS ID	47771	47773	47774	47775	48249	64227	64230	64233	64238	64240	82846
	Barwon Water ID	BA 54	BA 56	BA 57	BA 58	BD 3	G 11	G 14	G 17	G 22	G 24	M 30
	Point of Reference	TOC <sup>1</sup>	TOC	TOP <sup>2</sup>	TOP	TOC	TOP	TOV <sup>3</sup>	TOP	TOC	TOC	TOC
	22-Aug-18	-12.26	-24.94	-14.50	-13.40	-35.26	-46.91	3.37	-29.27	-86.80	-29.10	-28.64
	23-Nov-18	-12.22	-27.40	-14.90	-13.30	-35.10	-47.00	3.87	-28.90	-86.79	-28.78	-28.47
	31-Jan-19	-12.27	-24.77	-14.66	-13.22	-35.17	-47.03	3.57	-28.69	-86.80	-28.79	-28.61
	10-May-19	-12.28	-25.17	-14.66	-13.30	-35.08	-47.05	4.08	-28.54	-86.80	-28.60	-28.54

Date	State/WMIS ID	82847	102868	107716	107717	107720		109111	109128	109130	109131	109133
	Barwon Water ID	M 31	W 7	YYG 217	YYG 218	YYG 221	Y41	YEO 20	YEO 37	YEO 39	YEO 40	YEO 42
	Point of Reference	TOC	TOV	TOP	TOP	TOV	TOC	TOC	TOC	TOC	TOC	TOC
	22-Aug-18	-23.00	31.11	-52.40	-34.08	8.05	-15.66	-24.31	-9.61	-8.85	-15.52	-61.70
	23-Nov-18	-22.95	30.96	-52.43	-34.11	7.96	-15.54	-24.40	-9.33	-8.35	-15.52	-61.50
	31-Jan-19	-22.93	31.62	-52.56	-34.56	8.16	-15.62	-23.94	-9.37	-8.38	-15.54	-61.50
	10-May-19	-22.80	31.72	-52.17	-34.50	7.85	-15.62	-23.88	-9.35	-8.38	-15.54	-61.50

Date	WMIS ID	WRK040900	WRK040901	WRK040902	WRK040899	WRK040903	WRK040904
	State ID	64246	64247	64248	64245	56301/01	56301/02
	Barwon Water ID	GW2A	GW3	GW4	GW5	GW6	GW8
	Point of Reference	TOV	TOV	TOV	TOV	TOV	TOV
	22-Aug-18	3.36	-3.02	17.13	4.89	1.65	1.17
	23-Nov-18	3.36	-2.67	17.34	4.99	1.37	0.85
	31-Jan-19	3.57	-2.61	17.54	5.20	1.27	0.78
	10-May-19	3.67	-2.35	17.74	5.61	1.05	0.45

Pebble Point Formation

	State/WMIS ID	48001	62578	64229	64237	64239	82840	109110	109113	109114	109132
	Barwon Water ID	BK 69	E 68	G 13	G 21	G 23	M 24	YEO 19	YEO 22	YEO 23	YEO 41
	Point of Reference	TOC	TOC	TOV	TOV	TOC	TOV	TOC	TOC	TOC	TOC
	Date										
	22-Aug-18	-25.63	-25.16	-3.97	-2.17	-71.30	-10.34	-29.08	-33.62	-15.22	-61.70
	23-Nov-18	-25.61	-24.93	-3.72	-1.96	-71.22	-10.05	-28.70	-33.56	-14.90	-61.22
	31-Jan-19	-25.64	-24.93	-3.49	-1.76	-71.26	-9.94	-28.54	-33.30	-14.70	-61.06
	10-May-19	-25.60	-25.02	-3.25	-1.67	-71.30	-9.70	-28.30	-34.05	-14.78	-60.70

Critical Monitoring Bore Readings

	State/WMIS ID	64229	64236	82844	109131
	Barwon Water ID	G 13	G 20	M 28	YEO 40
	Point of Reference	TOV	TOC	TOV	TOC
	Date				
	14-Sep-17	-5.10	-22.77	13.85	-15.58
	10-Oct-17	-5.02	-22.53	14.89	-15.59
	5-Dec-17	-4.84	-22.11	14.42	-15.63
	3-Jan-18	-4.80	-21.99	15.10	-15.64
	2-Feb-18	-4.56	-21.64	13.66	
	26-Feb-18	-4.58	-21.69	14.28	
	9-Mar-18	-5.05	-21.85	14.79	
	23-Mar-18				-15.71
	23-Apr-18	-4.36	-21.51	14.89	-15.62
	21-May-18	-4.26	-21.36	14.99	-15.58
	31-May-18	-4.32	-21.50	14.79	-15.67
	22-Aug-18	-3.97	-21.31	13.87	-15.63
	23-Nov-18	-3.72	-20.75	15.81	-15.52
	31-Jan-19	-3.49	-20.60	15.71	-15.54
	10-May-19	-3.25	-20.40	15.30	-15.54

Notes:

- 1: TOC - Top of casing
- 2: TOP - Top of Pipe
- 3: TOV - Top of Valve

YEO20, YEO37, YEO39 & YEO40: Operations staff were unable to access these bores at times during 2017/18. This prevented groundwater levels from being recorded.

GW4 & G14: These bores were artesian in October 2017 and did not have the right fittings to enable artesian readings to be taken. Fittings were installed in 2017/18 and now artesian pressure can be read.

GW6 & GW8: These production bores had bore pumps installed from April 2016 - October 2017 for extraction of groundwater during an extended dry period in 2016. While extraction ceased in December 2016 the pumps were not removed until October 2017 when pump maintenance was completed. After the bore pumps were removed, recording of groundwater levels resumed.

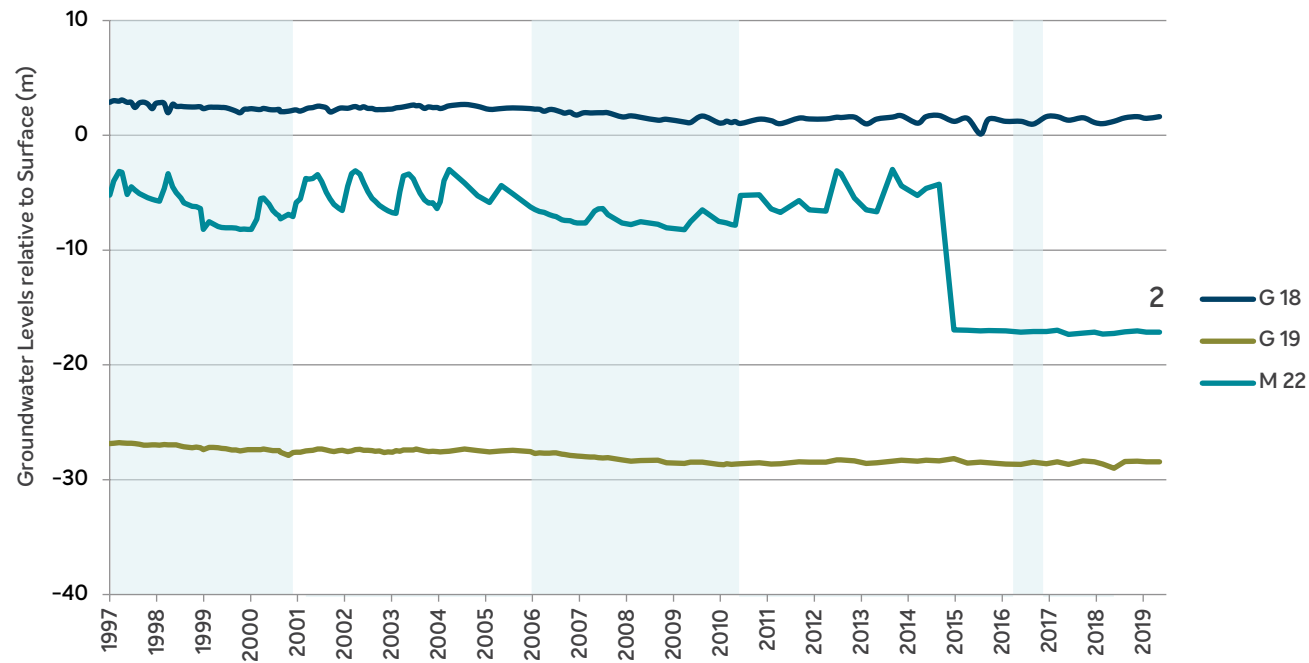
Indicates a critical monitoring bore as listed in the Licence

# Appendix C

## Bore hydrographs



# Clifton

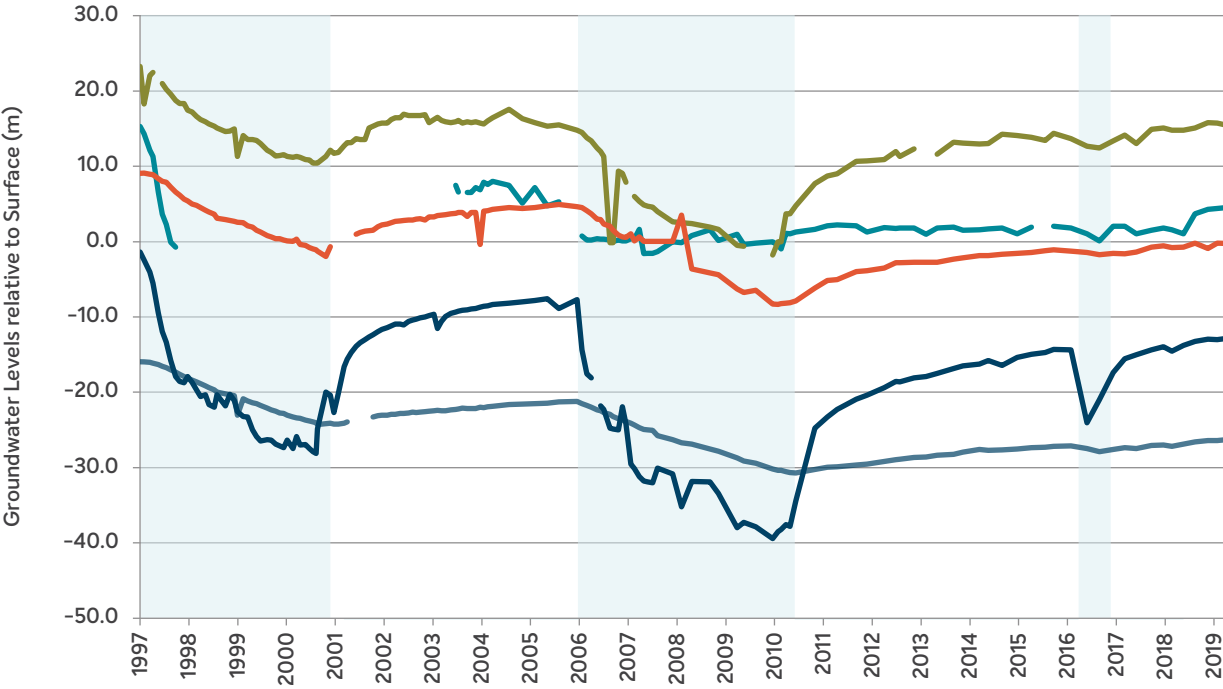
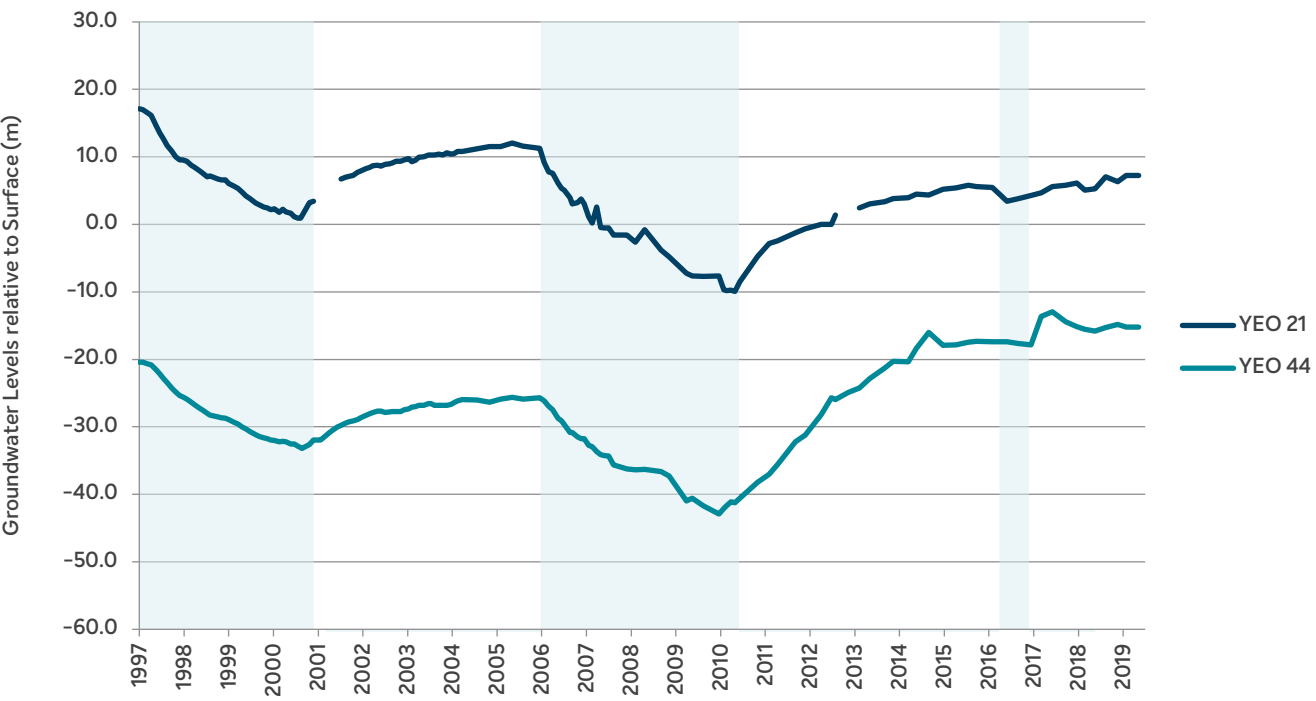
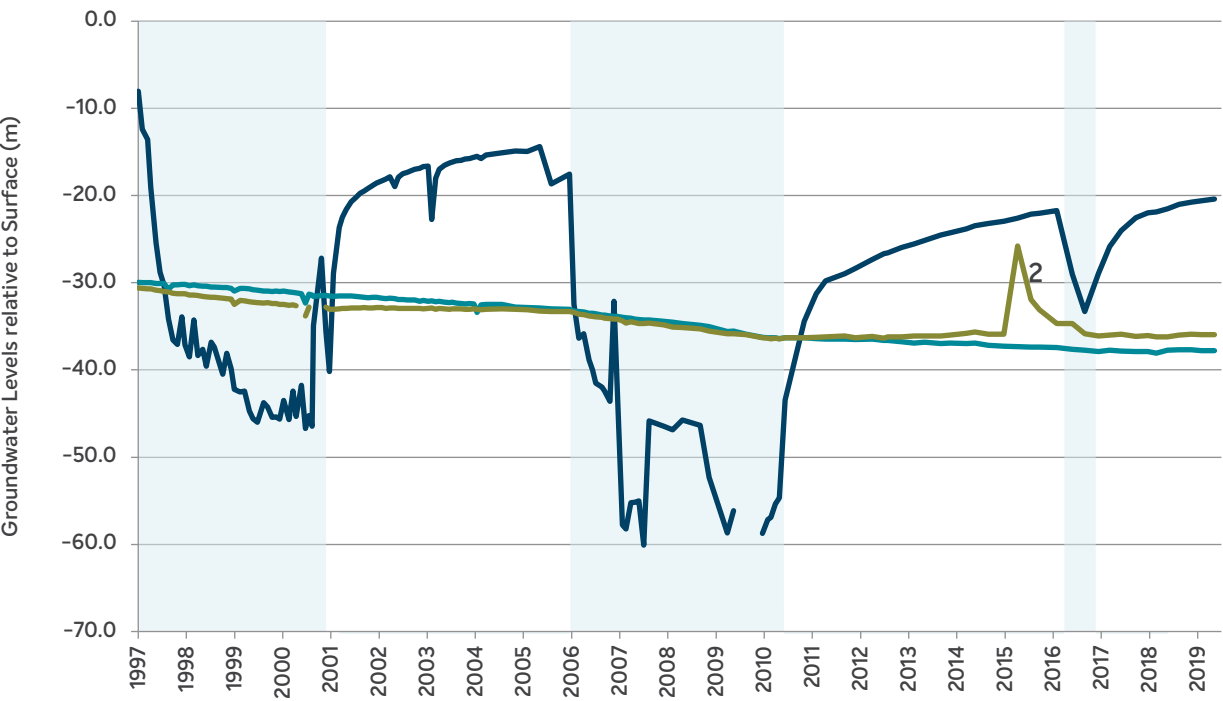


## Notes:

1. Light blue shading denotes periods of groundwater extraction
2. M22 was refurbished by DELWP in 2014-2015. The drop in groundwater levels observed in 2014-2015 are due to the refurbishment and this bore is now recording accurate levels.

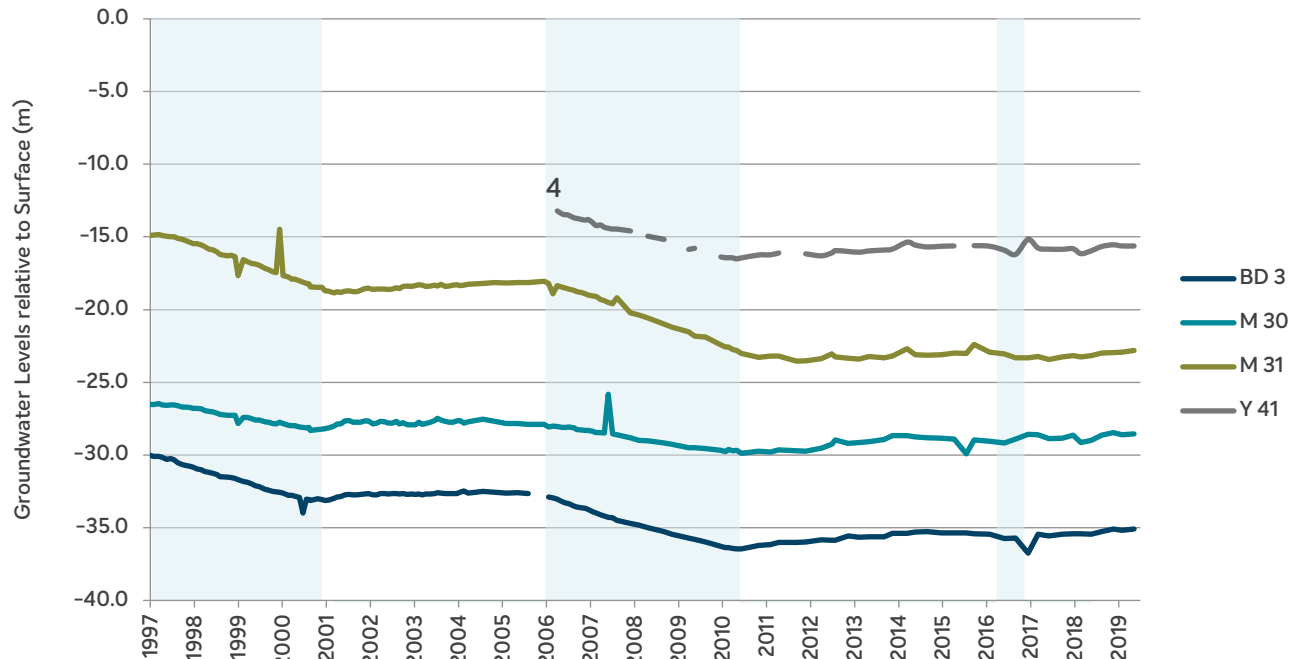
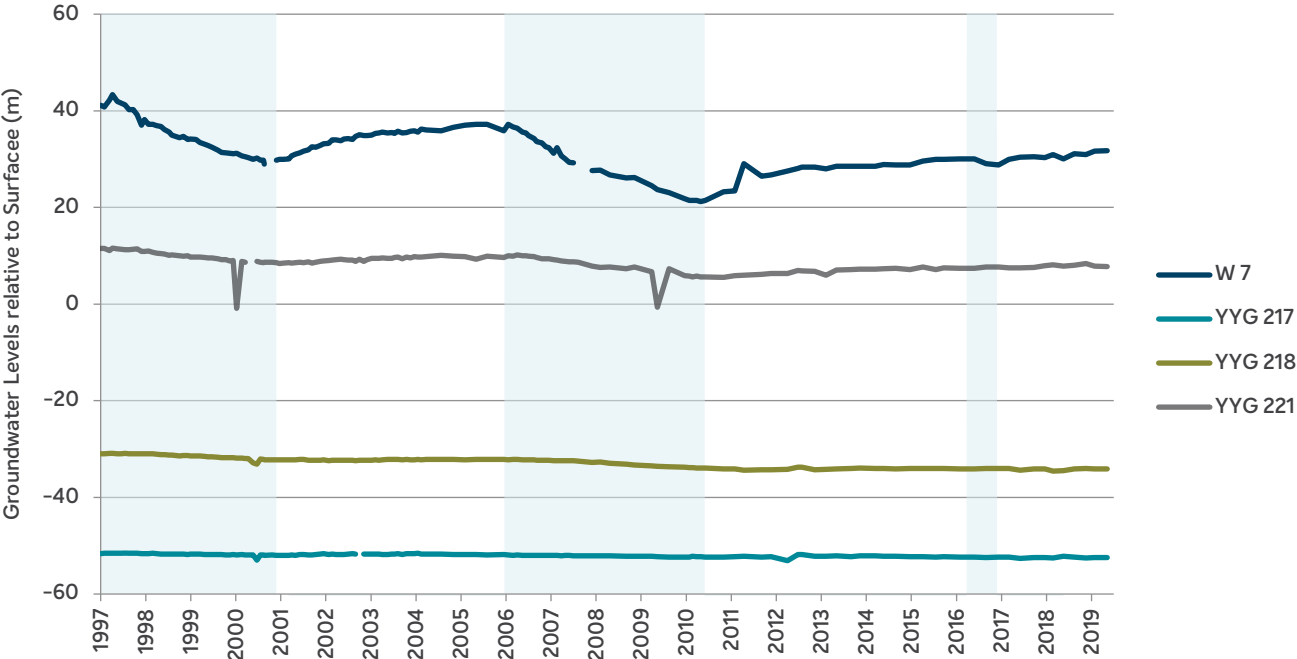
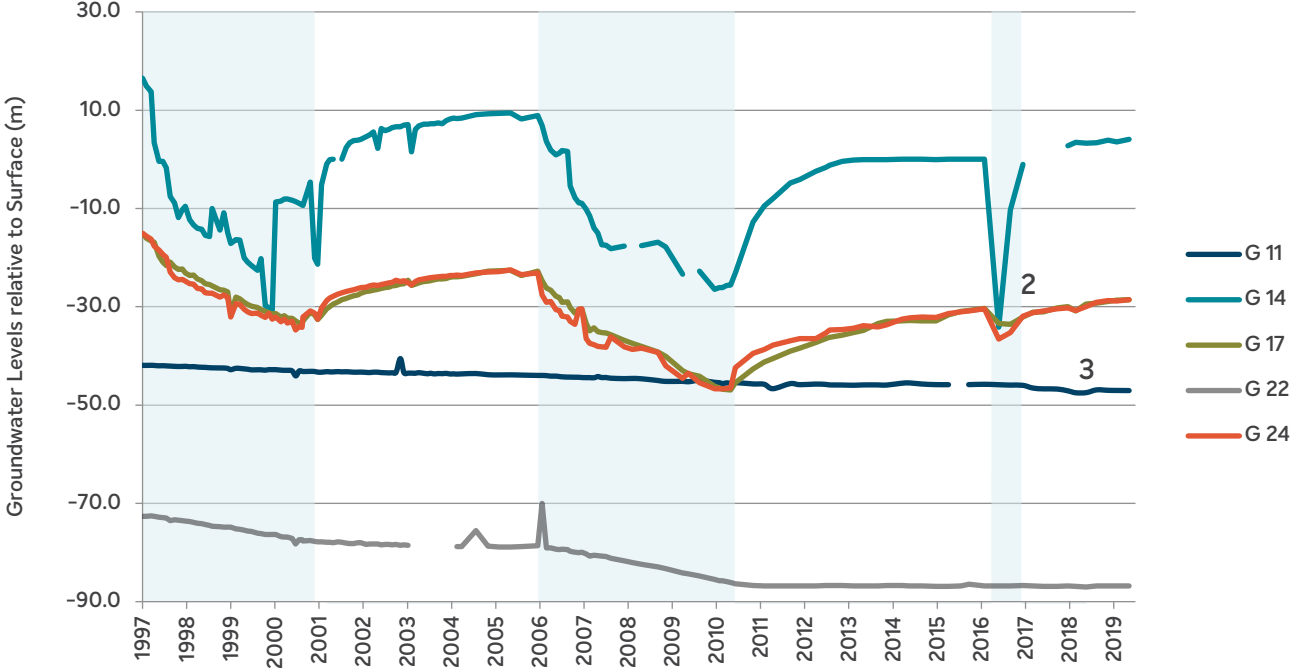
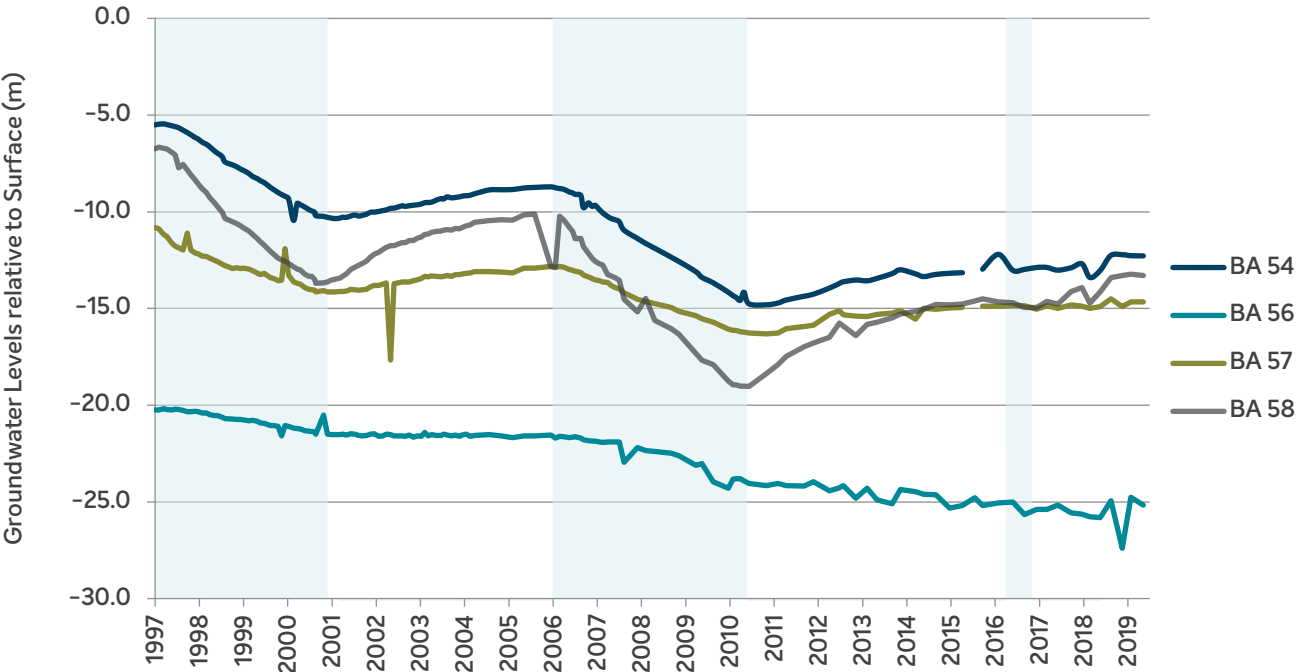


# Mepunga

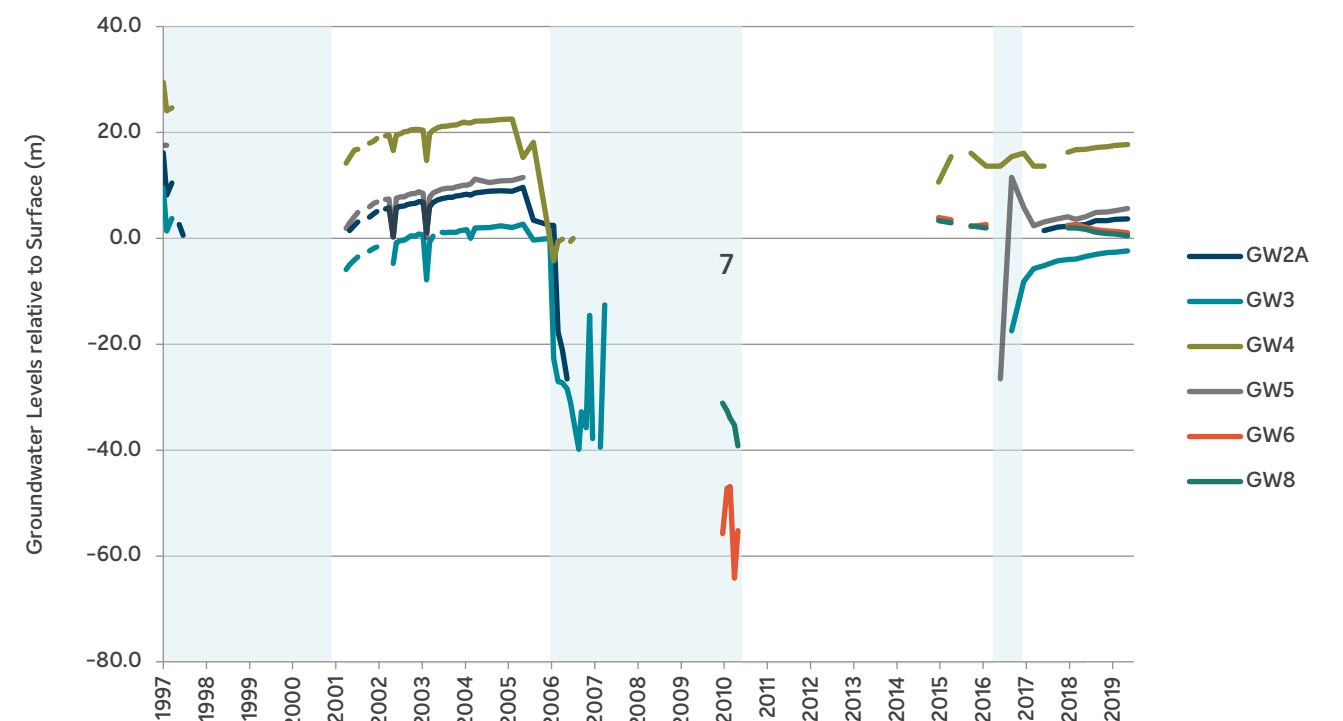
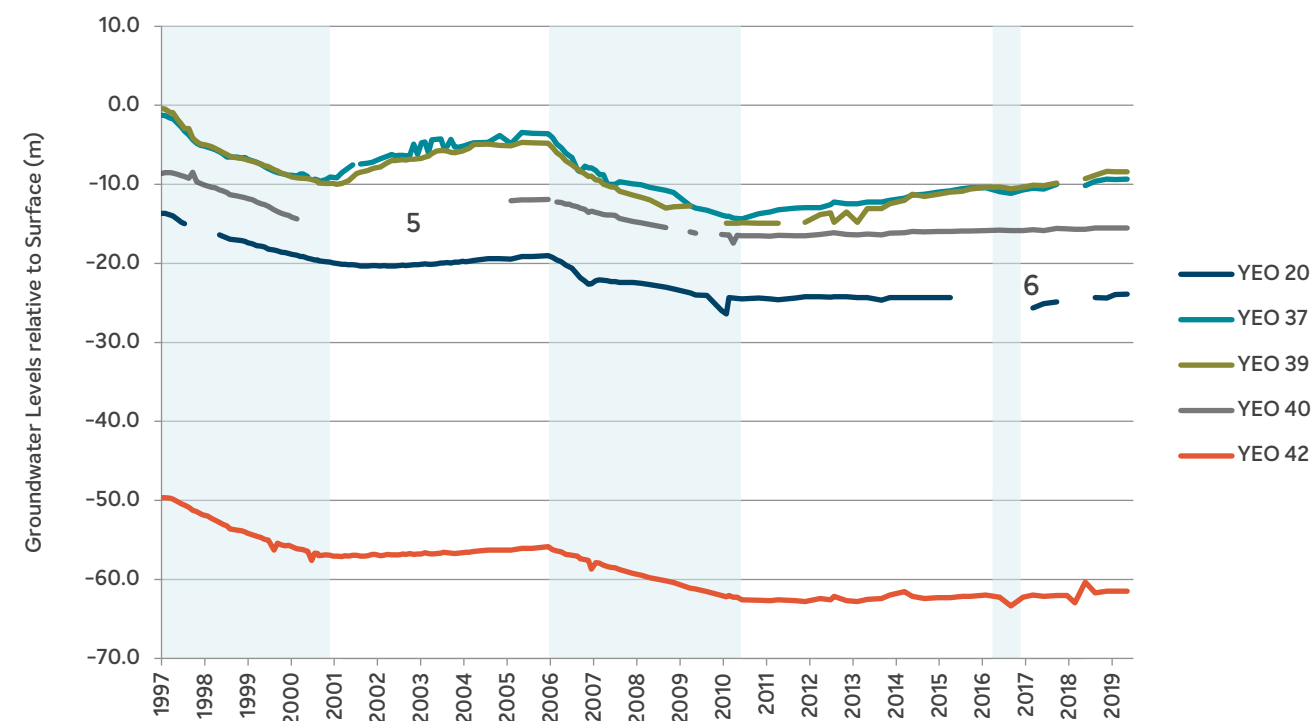


- Notes:
- 1. Light blue shading denotes periods of groundwater extraction
  - 2. A condition assessment was conducted on Y40 in 2015/16. This indicated that the screens are blocked causing erroneous readings. Y40 was refurbished in 2016/17 and is now providing representative results.

# Dilwyn

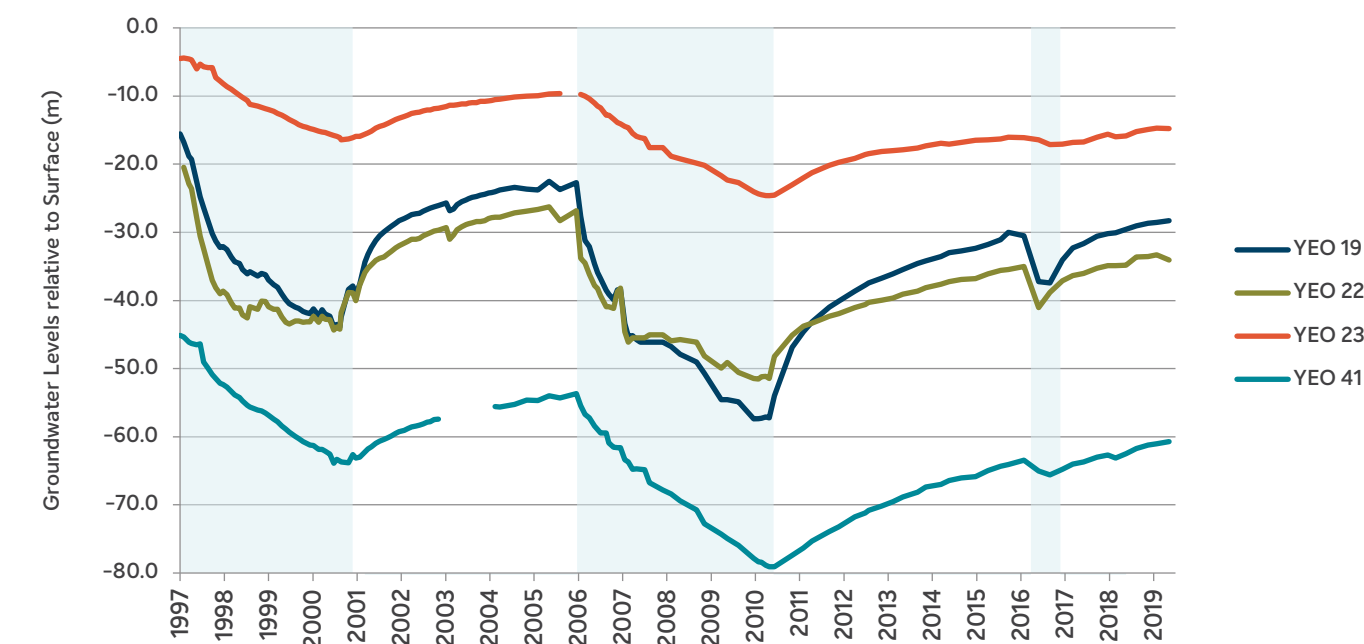
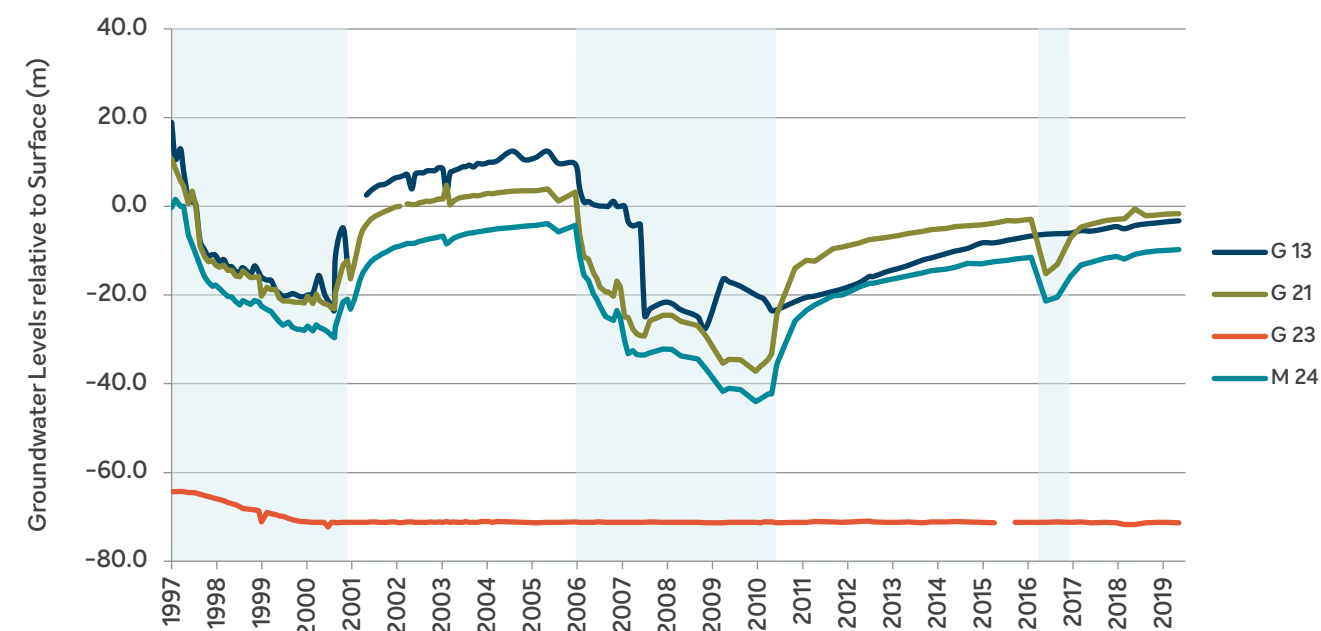
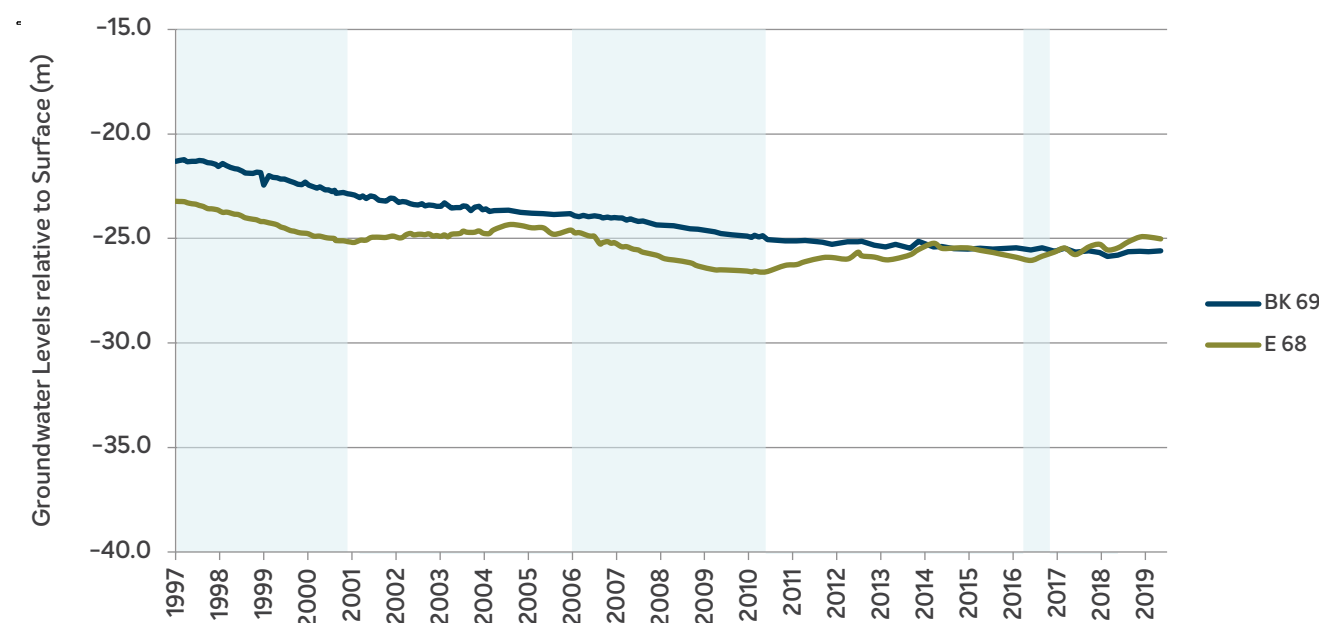


# Dilwyn



- Notes:
- 1. Light blue shading denotes periods of groundwater extraction
  - 2. G14 was artesian for a period of time in 2017 and did not have the correct fittings to enable pressure readings to be taken. Fittings have now been installed to enable pressure readings to be taken.
  - 3. G11 has recorded a consistent decline in the groundwater levels over the whole reporting period. A condition assessment was conducted on this bore in 2015–2016 which indicated that it needed refurbishment. The refurbishment on G11 was completed in 2016–2017 and it is now providing reliable data.
  - 4. Y41 was constructed in 2006 and therefore no data exists for this bore prior to then.
  - 5. YEO40 has an extended period of missing data from October 2000 – June 2006. YEO40 was part of the DELWP State Observation Bore Network and was decommissioned in October 2000. A new observation bore was constructed by Barwon Water in June 2006 to replace YEO40.
  - 6. YEO20 had a condition assessment conducted in 2015–2016 that showed it was completely blocked by tree roots. This bore has been decommissioned and a new bore has been redrilled in the same location. Readings on the new YEO20 bore commenced in June 2017. Site access prohibited some readings from being taken during 2017–2018 as operations staff were denied access to the landowners property.
  - 7. Data collected for the groundwater production bores varies with well head access, infrastructure arrangements and extraction. Groundwater levels are now being recorded at all production bores.

# Pebble Point



## Notes:

1. Light blue shading denotes periods of groundwater extraction
2. BK69 has demonstrated a declining trend in groundwater levels. A condition assessment was conducted on this bore in 2015–2016 that confirmed that these readings were representative of the actual groundwater levels.

# Appendix D

Relative residual drawdown  
1997 to June 2019



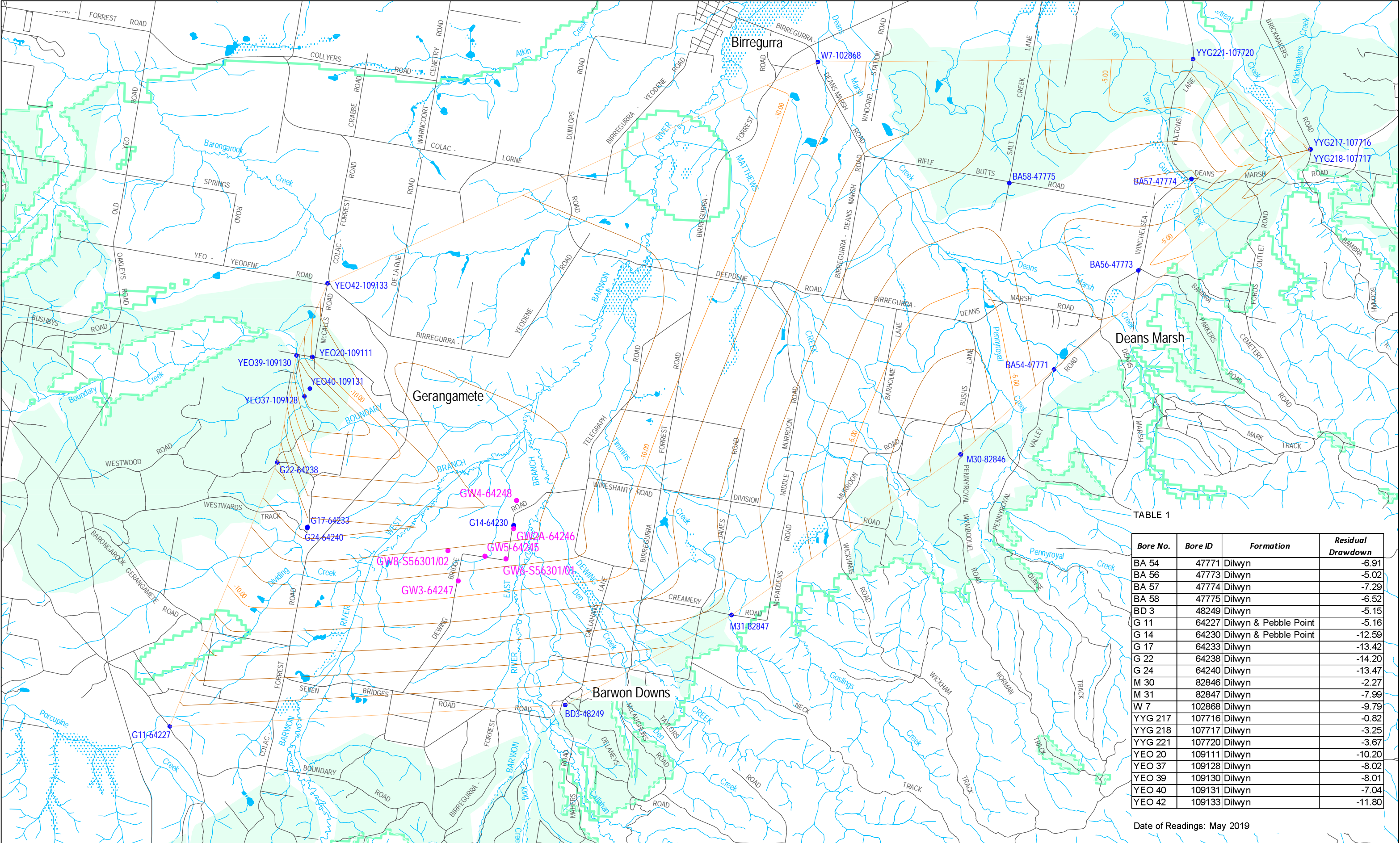


TABLE 1

Bore No.	Bore ID	Formation	Residual Drawdown
BA 54	47771	Dilwyn	-6.91
BA 56	47773	Dilwyn	-5.02
BA 57	47774	Dilwyn	-7.29
BA 58	47775	Dilwyn	-6.52
BD 3	48249	Dilwyn	-5.15
G 11	64227	Dilwyn & Pebble Point	-5.16
G 14	64230	Dilwyn & Pebble Point	-12.59
G 17	64233	Dilwyn	-13.42
G 22	64238	Dilwyn	-14.20
G 24	64240	Dilwyn	-13.47
M 30	82846	Dilwyn	-2.27
M 31	82847	Dilwyn	-7.99
W 7	102868	Dilwyn	-9.79
YYG 217	107716	Dilwyn	-0.82
YYG 218	107717	Dilwyn	-3.25
YYG 221	107720	Dilwyn	-3.67
YEO 20	109111	Dilwyn	-10.20
YEO 37	109128	Dilwyn	-8.02
YEO 39	109130	Dilwyn	-8.01
YEO 40	109131	Dilwyn	-7.04
YEO 42	109133	Dilwyn	-11.80

Date of Readings: May 2019

NOTES

RELATIVE RESIDUAL DRAWDOWN CONTOURS 1m

RELATIVE RESIDUAL DRAWDOWN INDEX CONTOURS 5m

AQUIFER EXTENTS

NOT ALL BORES SHOWN ON PLAN WERE USED IN MODEL - SEE TABLE 1 FOR DATA USED. RELATIVE RESIDUAL DRAWDOWN TO PRE 1997 LEVELS.

PUMPING OCCURRED DURING 1997 - 2001 AND 2006 - 2010. PUMPING RECOMMENCED APRIL 2016.

THE RESIDUAL DRAWDOWN MAPS REPRESENT THE DRAWDOWN IN DEEP, CONFINED AQUIFERS. THIS IS NOT THE LOCAL WATER TABLE LEVEL.



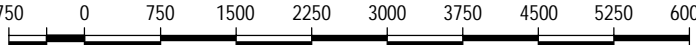
SPATIAL INFORMATION SERVICES


55-67 RYRIE STREET  
GEELONG 3220  
TEL. 1300 656 007  
www.barwonwater.vic.gov.au

GERANGAMETE GROUNDWATER MONITORING BORES  
BARWON DOWNS AQUIFER - DILWYN FORMATION  
RELATIVE RESIDUAL DRAWDOWN - 2019 COMPARED TO PRE-PUMPING (1997)

JOB No. 11642	DRAWN E.DELGROSSO 13/08/19	CHECKED
---------------	----------------------------------	---------

SCALE IN METRES  
SCALE 1 : 75 000





DATUMS

HEIGHT: AHD  
MAP: MGA  
ZONE: 54

11642-01

A3



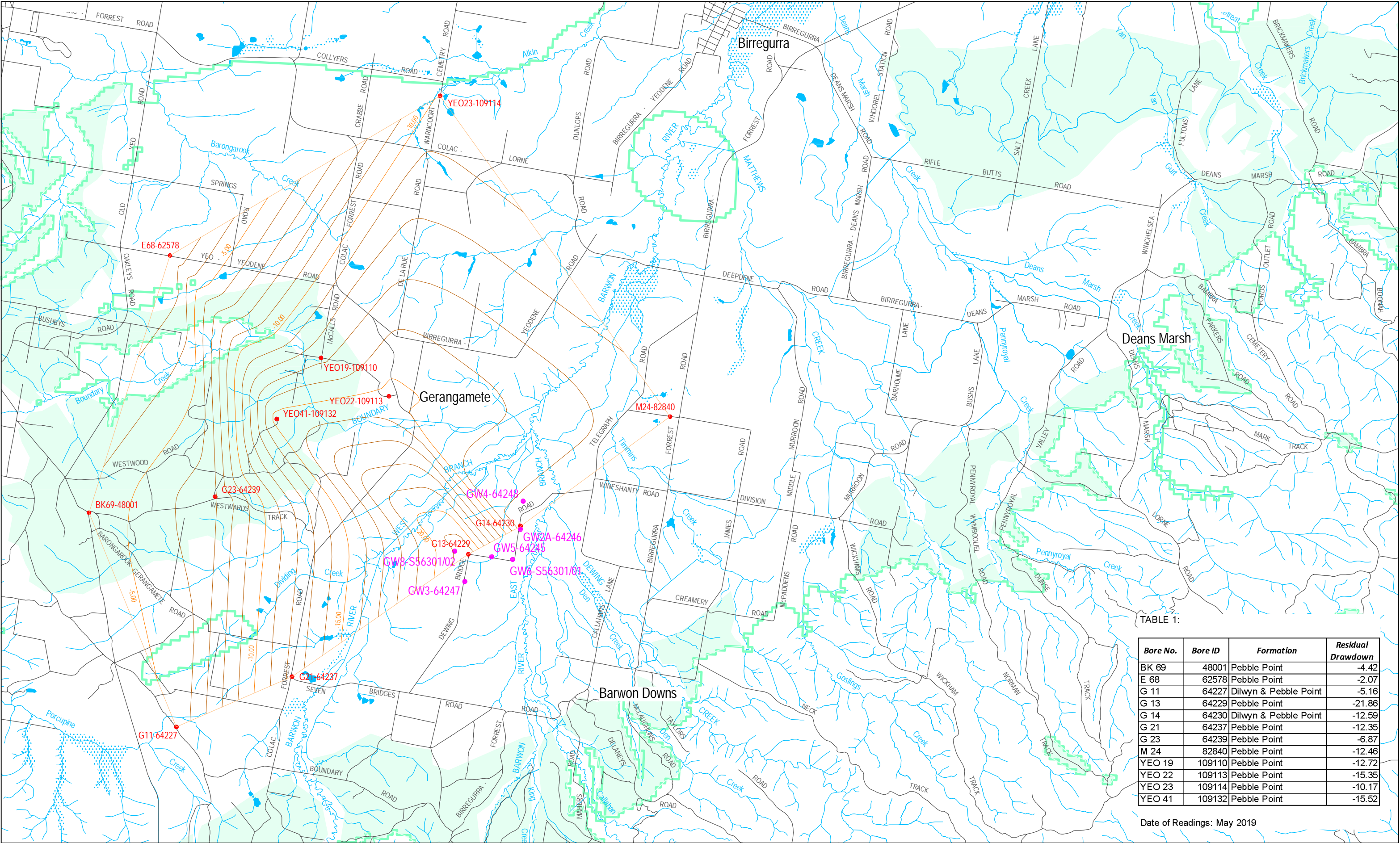


TABLE 1:

Bore No.	Bore ID	Formation	Residual Drawdown
BK 69	48001	Pebble Point	-4.42
E 68	62578	Pebble Point	-2.07
G 11	64227	Dilwyn & Pebble Point	-5.16
G 13	64229	Pebble Point	-21.86
G 14	64230	Dilwyn & Pebble Point	-12.59
G 21	64237	Pebble Point	-12.35
G 23	64239	Pebble Point	-6.87
M 24	82840	Pebble Point	-12.46
YEO 19	109110	Pebble Point	-12.72
YEO 22	109113	Pebble Point	-15.35
YEO 23	109114	Pebble Point	-10.17
YEO 41	109132	Pebble Point	-15.52

Date of Readings: May 2019

NOTES

RELATIVE RESIDUAL DRAWDOWN CONTOURS 1m

RELATIVE RESIDUAL DRAWDOWN INDEX CONTOURS 5m

AQUIFER EXTENTS

NOT ALL BORES SHOWN ON PLAN WERE USED IN MODEL - SEE TABLE 1 FOR DATA USED. RELATIVE RESIDUAL DRAWDOWN TO PRE 1997 LEVELS.

PUMPING OCCURRED DURING 1997 - 2001 AND 2006 - 2010. PUMPING RECOMMENCED APRIL 2016.

THE RESIDUAL DRAWDOWN MAPS REPRESENT THE DRAWDOWN IN DEEP, CONFINED AQUIFERS. THIS IS NOT THE LOCAL WATER TABLE LEVEL.



SPATIAL INFORMATION SERVICES

55-67 RYRIE STREET  
GEELONG 3220  
TEL. 1300 656 007  
www.barwonwater.vic.gov.au

GERANGAMETE GROUNDWATER MONITORING BORES  
BARWON DOWNS AQUIFER - PEBBLE POINT FORMATION  
RELATIVE RESIDUAL DRAWDOWN - 2019 COMPARED TO PRE-PUMPING (1997)

JOB No. 11642

SCALE IN METRES  
SCALE 1 : 75 000

DRAWN  
E.DELGROSSO  
13/08/19

CHECKED

7500

0

750

1500

2250


3000

3750

4500

5250

6000



DATUMS

HEIGHT: AHD  
MAP: MGA  
ZONE: 54

11642-02

A3



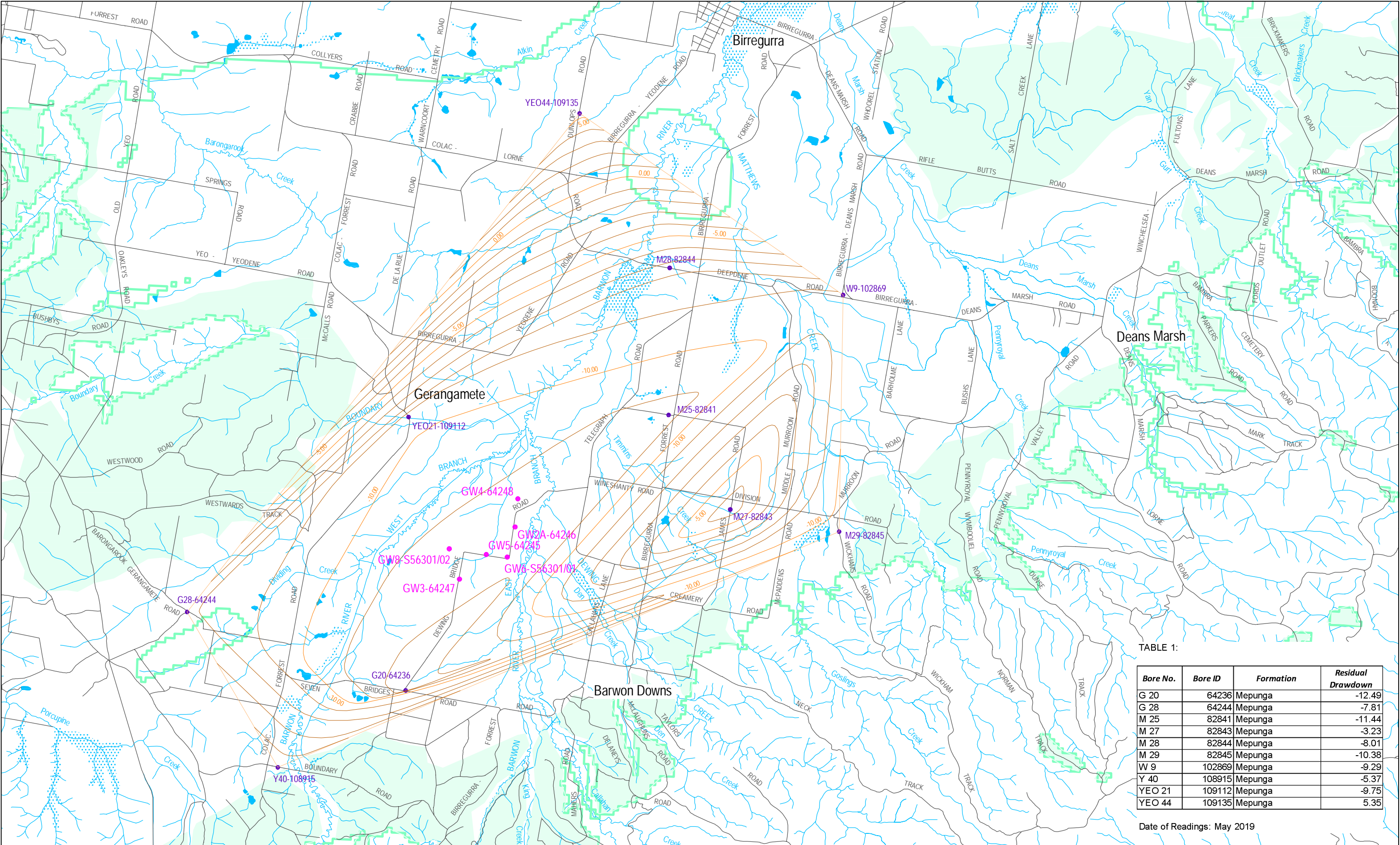


TABLE 1:

Bore No.	Bore ID	Formation	Residual Drawdown
G 20	64236	Mepunga	-12.49
G 28	64244	Mepunga	-7.81
M 25	82841	Mepunga	-11.44
M 27	82843	Mepunga	-3.23
M 28	82844	Mepunga	-8.01
M 29	82845	Mepunga	-10.38
W 9	102869	Mepunga	-9.29
Y 40	108915	Mepunga	-5.37
YEO 21	109112	Mepunga	-9.75
YEO 44	109135	Mepunga	5.35

Date of Readings: May 2019

NOTES

RELATIVE RESIDUAL DRAWDOWN CONTOURS 1m

RELATIVE RESIDUAL DRAWDOWN INDEX CONTOURS 5m

AQUIFER EXTENTS

NOT ALL BORES SHOWN ON PLAN WERE USED IN MODEL - SEE TABLE 1 FOR DATA USED. RELATIVE RESIDUAL DRAWDOWN TO PRE 1997 LEVELS.

PUMPING OCCURRED DURING 1997 - 2001 AND 2006 - 2010. PUMPING RECOMMENCED APRIL 2016.

THE RESIDUAL DRAWDOWN MAPS REPRESENT THE DRAWDOWN IN DEEP, CONFINED AQUIFERS. THIS IS NOT THE LOCAL WATER TABLE LEVEL.



BarwonWater

Spatial Information Services

55-67 RYRIE STREET  
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GERANGAMETE GROUNDWATER MONITORING BORES  
BARWON DOWNS AQUIFER - MEPUNGA FORMATION  
RELATIVE RESIDUAL DRAWDOWN - 2019 COMPARED TO PRE-PUMPING (1997)


JOB No. 11642

SCALE IN METRES  
SCALE 1 : 75 000

DRAWN  
E.DELGROSSO  
13/08/19

CHECKED





DATUMS

HEIGHT: AHD  
MAP: MGA  
ZONE: 54

11642-03

A3

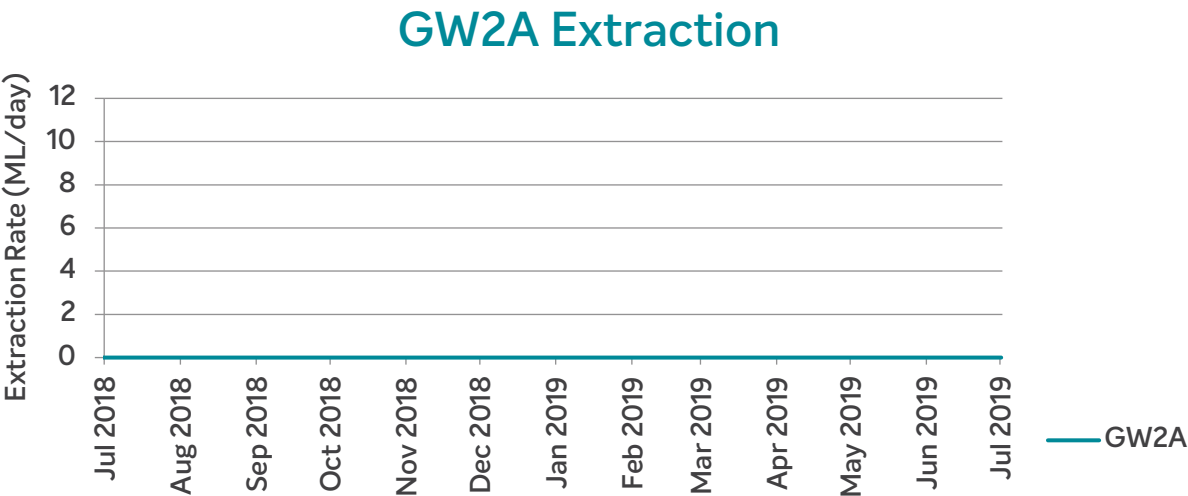


# Appendix E

## Groundwater extractions

## Groundwater Bore GW2A - Extraction Rate 2018-2019

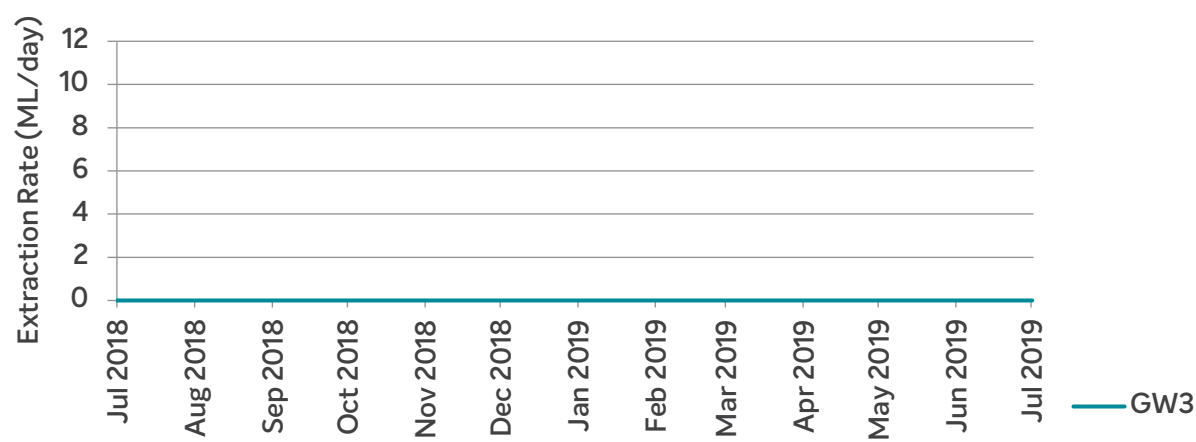
Date	Flow for month (ML)											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
31	0.00	0.00		0.00		0.00	0.00		0.00		0.00	
MONTHLY TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ANNUAL TOTAL												0.0
MAX. FLOW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MIN. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AVE. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



## Groundwater Bore GW3 – Extraction Rate 2018–2019

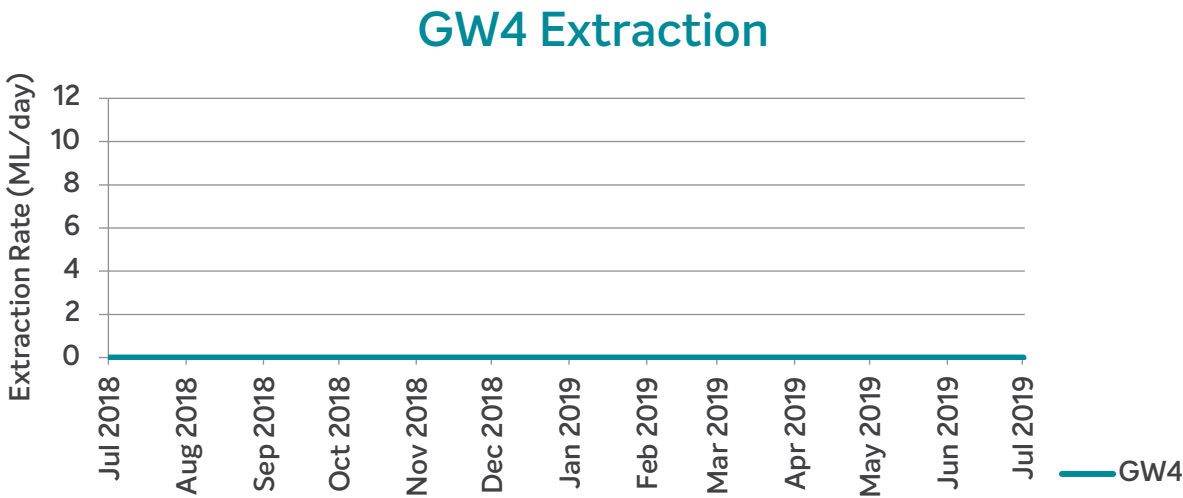
Date	Flow for month (ML)											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
31	0.00	0.00		0.00		0.00	0.00		0.00		0.00	
MONTHLY TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ANNUAL TOTAL												0.0
MAX. FLOW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MIN. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AVE. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

### GW3 Extraction



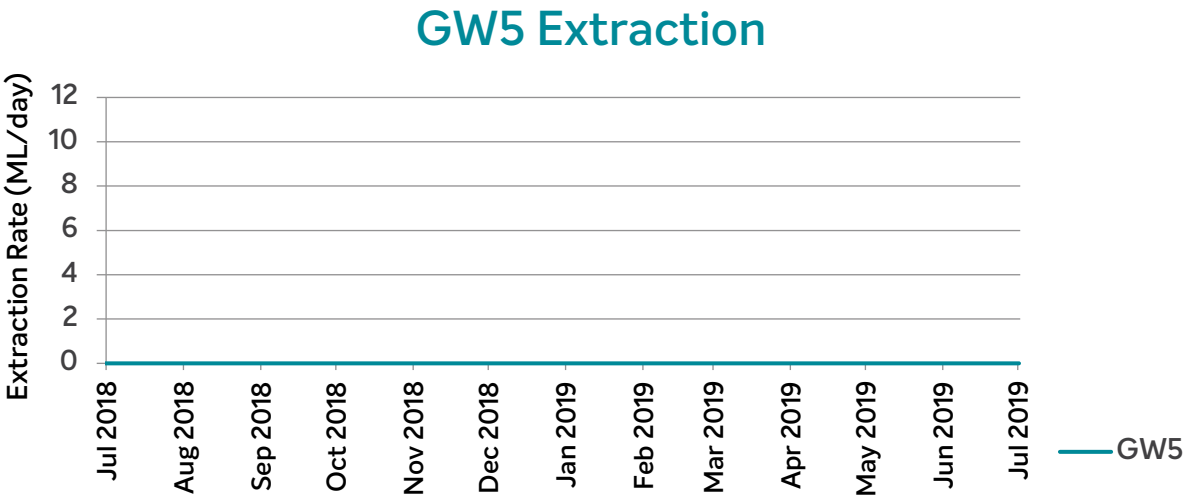
# Groundwater Bore GW4 – Extraction Rate 2018–2019

Date	Flow for Month (ML)											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
31	0.00	0.00		0.00		0.00	0.00		0.00		0.00	
MONTHLY TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ANNUAL TOTAL												0.0
MAX. FLOW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MIN. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AVE. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



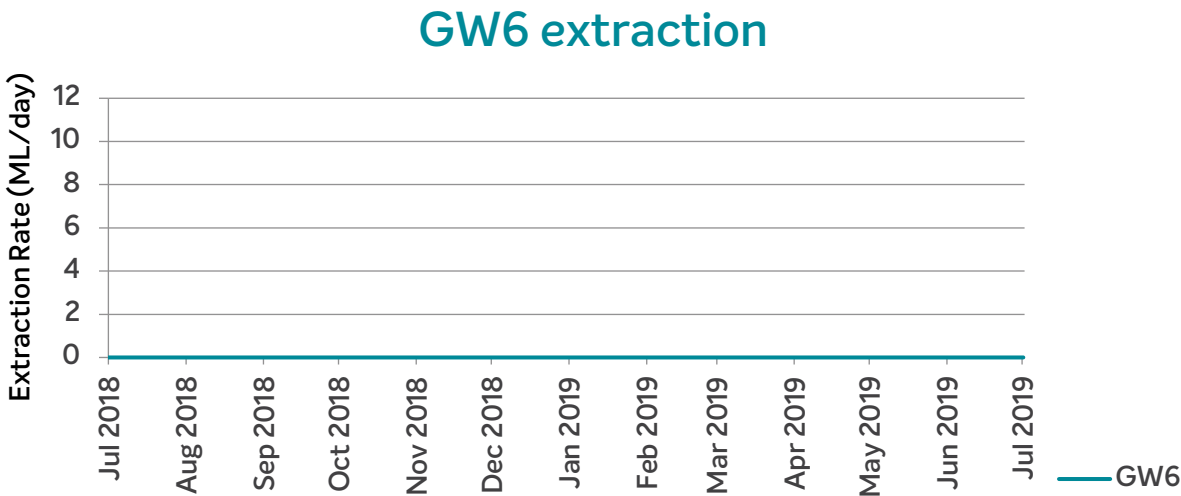
# Groundwater Bore GW5 - Extraction Rate 2018-2019

Date	Flow for month (ML)											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
31	0.00	0.00		0.00		0.00	0.00		0.00		0.00	
MONTHLY TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ANNUAL TOTAL												0.0
MAX. FLOW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MIN. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AVE. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



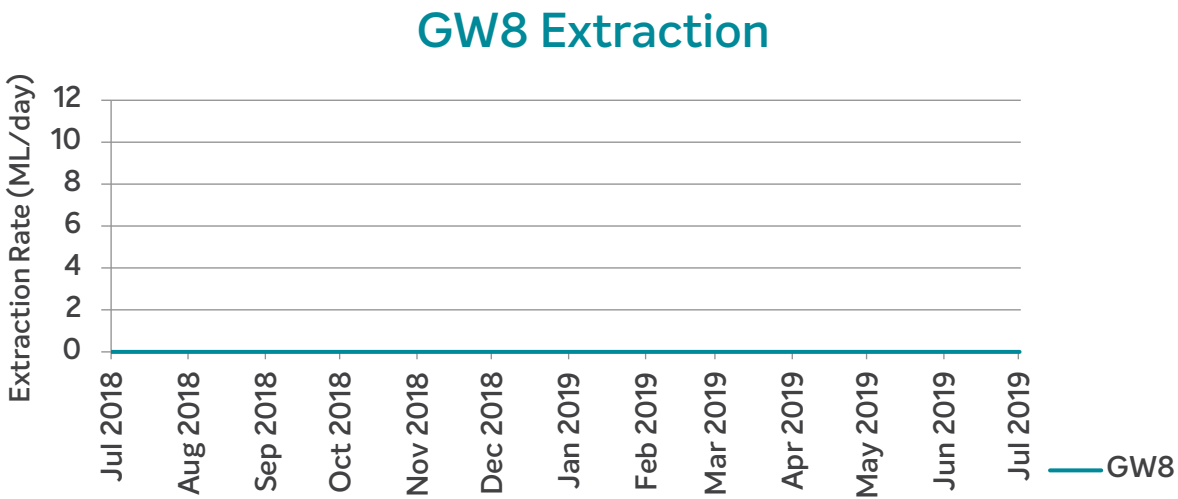
# Groundwater Bore GW6 – Extraction Rate 2018–2019

Date	Flow for month (ML)											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
31	0.00	0.00		0.00		0.00	0.00		0.00		0.00	
MONTHLY TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ANNUAL TOTAL												0.00
MAX. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIN. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AVE. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



# Groundwater Bore GW8 - Extraction Rate 2018-2019

Date	Flow for month (ML)											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
31	0.00	0.00		0.00		0.00	0.00		0.00		0.00	
MONTHLY TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ANNUAL TOTAL												0.00
MAX. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIN. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AVE. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



# Appendix F

## Releases to Boundary Creek



Flows in Boundary Creek at Yeodene Stream Gauge 233228 (ML/day)

Date	Jul 2018	Aug 2018	Sep 2018	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019	Mar 2019	Apr 2019	May 2019	Jun 2019
1	3.53	36.22	6.98	2.56	1.21	1.25	0.81	0.00	0.00	0.00	1.05	2.56
2	3.45	28.62	9.23	2.49	1.15	1.15	0.76	0.00	0.00	0.00	1.04	3.24
3	4.07	27.21	13.06	2.41	1.09	1.15	0.74	0.00	0.00	0.00	2.67	5.05
4	5.09	19.47	11.85	2.46	1.07	1.18	0.71	0.00	0.00	0.00	1.97	6.94
5	4.58	37.36	9.17	2.50	1.05	1.18	0.67	0.00	0.00	0.00	2.05	8.37
6	5.88	33.68	7.49	2.42	1.08	1.13	0.67	0.00	0.00	0.00	1.85	8.33
7	33.32	20.07	7.31	2.23	1.15	1.08	0.67	0.00	0.00	0.00	1.60	6.76
8	42.57	38.99	7.31	2.25	1.16	1.02	0.67	0.00	0.00	0.00	1.41	5.48
9	70.08	56.48	7.31	2.35	1.13	1.00	0.66	0.00	0.00	0.00	1.33	4.42
10	41.11	51.10	7.31	2.31	1.12	0.95	0.64	0.00	0.00	0.00	1.30	3.53
11	23.47	26.39	7.31	2.18	1.09	0.95	0.59	0.00	0.00	0.00	1.70	3.05
12	17.08	24.21	5.19	2.16	1.08	0.93	0.55	0.00	0.00	0.00	1.56	2.72
13	32.73	69.90	3.86	2.14	1.18	0.92	0.53	0.00	0.00	0.00	1.49	4.05
14	29.33	92.80	3.61	2.14	1.31	0.92	0.50	0.00	0.00	0.00	1.43	8.02
15	20.76	81.95	3.17	2.12	1.33	0.93	0.48	0.00	0.00	0.00	1.34	14.14
16	14.00	38.37	3.32	2.14	1.29	1.29	0.52	0.00	0.00	0.00	1.20	9.56
17	10.59	23.99	4.83	2.15	1.21	1.52	0.53	0.00	0.00	0.00	1.09	7.56
18	9.05	22.99	12.78	1.87	1.14	1.63	0.52	0.00	0.00	0.00	1.06	6.28
19	10.12	20.63	11.02	2.17	1.10	2.04	0.57	0.00	0.00	0.00	1.04	5.10
20	15.69	93.07	8.08	2.04	1.03	1.96	0.58	0.00	0.00	0.00	1.03	4.69
21	15.23	77.39	6.90	8.65	1.02	1.76	0.59	0.00	0.00	0.00	1.04	5.17
22	28.33	46.32	5.50	9.35	1.01	1.60	0.61	0.00	0.00	0.00	1.09	5.20
23	22.61	41.31	4.70	7.45	1.01	1.45	0.42	0.00	0.00	1.06	1.12	4.64
24	14.54	26.45	3.90	5.64	1.01	1.29	0.24	0.00	0.00	1.59	1.13	4.44
25	15.25	18.02	3.38	3.67	1.00	1.17	0.17	0.00	0.00	1.40	1.20	4.21
26	41.50	13.27	3.07	2.75	1.00	1.11	0.10	0.00	0.00	1.51	1.28	3.92
27	22.76	10.53	2.85	2.25	1.12	1.02	0.03	0.00	0.00	2.29	1.36	3.52
28	14.46	9.01	2.68	1.91	1.33	0.94	0.00	0.00	0.00	2.79	1.56	3.22
29	10.60	8.17	2.66	1.65	1.38	0.88	0.00		0.00	2.67	1.88	2.95
30	11.01	7.56	2.67	1.46	1.35	0.88	0.00		0.00	2.01	2.96	3.53
31	36.68	7.09		1.30		0.86	0.00		0.00		2.76	
Total	629.46	1108.62	188.49	91.20	34.21	37.11	14.52	0.00	0.00	15.32	46.57	160.62

Release to Boundary Creek (ML/day)

Date	Jul 2018	Aug 2018	Sep 2018	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019	Mar 2019	Apr 2019	May 2019	Jun 2019
1	0.00	0.00	0.00	0.00	2.08	2.08	2.11	2.12	2.13	2.11	2.12	2.12
2	0.00	0.00	0.00	0.00	2.08	2.12	2.11	2.14	2.13	2.11	2.10	2.13
3	0.00	0.00	0.00	0.00	2.09	2.11	2.10	2.13	2.15	2.12	2.11	2.13
4	0.00	0.00	0.00	0.00	2.09	2.12	2.11	2.10	2.18	2.10	2.12	2.14
5	0.00	0.00	0.00	0.00	2.08	2.12	2.11	2.07	2.14	2.11	2.11	2.14
6	0.00	0.00	0.00	0.00	2.08	2.14	2.09	2.06	2.10	2.11	2.11	1.44
7	0.00	0.00	0.00	0.00	2.07	2.14	2.19	2.05	2.11	2.11	2.12	0.00
8	0.00	0.00	0.00	0.00	2.09	2.14	2.16	2.08	2.10	2.12	2.12	0.00
9	0.00	0.00	0.00	0.00	2.09	2.14	2.07	2.14	2.10	2.11	2.12	0.00
10	0.00	0.00	0.00	0.00	2.06	2.14	2.02	2.14	2.10	2.13	2.12	0.00
11	0.00	0.00	0.00	0.00	2.05	2.14	2.06	2.16	2.10	2.12	2.13	0.00
12	0.00	0.00	0.00	0.00	2.06	2.14	2.11	2.14	2.10	2.12	2.13	0.00
13	0.00	0.00	0.00	0.00	2.07	2.13	2.10	2.13	2.15	2.13	2.12	0.00
14	0.00	0.00	0.00	0.00	2.05	2.11	2.13	2.12	2.15	2.09	2.12	0.00
15	0.00	0.00	0.00	0.00	2.08	2.15	2.13	2.11	2.16	2.09	2.12	0.00
16	0.00	0.00	0.00	0.00	2.10	2.15	2.12	2.12	2.14	2.09	2.12	0.00
17	0.00	0.00	0.00	0.00	2.10	2.13	2.13	2.12	2.12	2.08	2.12	0.00
18	0.00	0.00	0.00	0.00	2.10	2.13	2.14	2.12	2.11	2.08	2.14	0.00
19	0.00	0.00	0.00	0.00	2.10	2.14	2.14	2.11	2.11	2.10	2.14	0.00
20	0.00	0.00	0.00	0.00	2.09	2.13	2.14	2.12	2.10	2.14	2.13	0.00
21	0.00	0.00	0.00	0.00	2.09	2.13	2.13	2.12	2.11	2.12	2.12	0.00
22	0.00	0.00	0.00	0.00	2.10	2.12	2.11	2.09	2.11	2.11	2.13	0.00
23	0.00	0.00	0.00	0.00	2.10	2.13	2.12	2.09	2.11	2.12	2.13	0.00
24	0.00	0.00	0.00	0.00	2.10	2.13	2.13	2.08	2.11	2.13	2.13	0.00
25	0.00	0.00	0.00	0.00	2.10	2.13	2.13	2.08	2.10	2.11	2.12	0.00
26	0.00	0.00	0.00	0.00	2.09	2.13	2.13	2.10	2.12	2.11	2.13	0.00
27	0.00	0.00	0.00	0.00	2.09	2.13	2.13	2.13	2.12	2.12	2.14	0.00
28	0.00	0.00	0.00	0.00	2.09	2.13	2.14	2.14	2.11	2.13	2.15	0.00
29	0.00	0.00	0.00	0.00	2.09	2.12	2.09		2.12	2.12	2.14	0.00
30	0.00	0.00	0.00	0.00	2.09	2.12	2.16		2.11	2.12	2.15	0.00
31	0.00	0.00		0.00		2.12	2.17		2.13		2.14	
Total	0.00	0.00	0.00	0.00	62.55	65.97	65.70	59.12	65.73	63.37	65.88	12.09