



Gerangamete groundwater management area

Groundwater licence no: BEE032496
2015-2016 report

Executive summary

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 01 July, 2015, to 30 June, 2016. This report has been prepared to meet the requirements of Groundwater Extraction Licence No: BEE032496 under which Barwon Water operates.

The report provides 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 2015-2016 program were:

- a total of 1903 ML of groundwater was extracted in response to the dry conditions
- water level decline and subsidence remain within licence trigger levels
- groundwater salinity levels have returned to levels recorded during 2013-2014.

Construction and installation of monitoring assets to support the Barwon Downs licence renewal application was complete in 2015. Data is being collected to inform the update of the groundwater model.

Contents

Executive summary.....	2
1. Introduction	4
2. Regional hydrogeology and groundwater modelling.....	4
2.1 Regional hydrogeology	4
2.2 Groundwater modelling	5
3. Regional groundwater monitoring (Clause 1)	5
3.1 Monitored area.....	5
3.2 Groundwater levels (Clause 1.3 A).....	6
3.3 Bore hydrographs (Clause 1.3 B)	6
3.4 Residual drawdown (Clause 1.3 C)	6
3.5 Bore failures (Clause 1.3 D).....	7
3.6 Condition assessment of production bores	7
4. Groundwater salinity (Clause 2)	8
5. Water level decline (Clause 3)	9
5.1 Groundwater levels in critical bores (Clause 3.5 A (i))	9
6. Metering (Clause 4).....	12
7. Subsidence (Clause 5).....	13
7.1 Land subsidence measurement (Clause 5.5 A).....	13
8. Flow in Boundary Creek (Clause 6)	14
8.1 Discharge to Boundary Creek.....	14
9. Protection of flow in the Barwon River and tributaries (Clause 9).....	15
9.1 East Barwon River (Clause 9.1)	15
9.2 West Barwon River (Clause 9.4 A)	16
10. Community engagement (Clause 10)	17
10.1 Information (Clause 10.1 A).....	17
10.2 Engagement (Clause 10.2).....	17
Appendix A	18
Appendix B	20
Appendix C	23
Appendix D	29
Appendix E	33
Appendix F	41

1. Introduction

Barwon Water operates the Gerangamete Groundwater Field to supplement surface water storages in the event of a drought. There are currently six production bores licensed 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 licence came into operation on November 7, 2006 and is valid until June 30, 2019.

Under the terms of the licence, Barwon Water is required to report at yearly intervals on groundwater extraction operations and provide 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. It is also a requirement to monitor and report on groundwater salinity, land subsidence and environmental observations.

The purpose of this report is to provide details of the regional groundwater and land surface monitoring activities for the period 01 July, 2015, to 30 June, 2016, to meet the requirements of Groundwater Licence No: BEE032496.

2. Regional hydrogeology and groundwater modelling

2.1 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 Bamba fault to the southeast, Birregurra fault to the north and the aquifer outcrop areas in Barongarook High to the west and Bamba 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	Minor aquifer Aquitard
Demon Bluff (Narrawaturk Marl)	Nirranda	Tertiary	Aquitard
Eastern View	Wangerrip	Tertiary	Principal aquifer
Eumeralla	Otway	Cretaceous	Impervious

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.

2.2 Groundwater modelling

The groundwater model has been developed using the internationally recognised modular, finite difference, three-dimensional model; USGS MODFLOW. Visual Modflow pre and post processing interface was used to construct the model and execute processes.

The objectives of the model are to determine the long-term yield of the aquifer and to predict potential impacts of pumping. The model also indicates potential behaviour of the aquifer system in response to pumping. The hydrostratigraphy of the Barwon Downs graben has been simplified into a five layer system for the numerical model as summarised below.

Table 2: Model layers for the Barwon Downs Graben

Model layer	Model layer name	Hydrostratigraphic units included
Layer1	Gellibrand Marl	Gellibrand Marl Newer Volcanic Viaduct Moorabool Quaternary
Layer2	Clifton Formation	Clifton Formation
Layer3	Narrawatuk Marl	Narrawatuk Marl
Layer4	Dilwyn Formation	Mepunga Dilwyn Formation, Pember Mudstone
Layer5	Pebble Point Formation	Pebble Point Formation

During 2015-16, Barwon Water commissioned hydrogeological experts; Jacobs (formerly SKM) to update and recalibrate the Barwon Downs groundwater model in preparation for the upcoming BEE032496 licence renewal. Field data taken from new monitoring equipment had resulted in changes to the conceptual understanding of the groundwater system, which subsequently led to update of the groundwater model to better represent interactions within the system.

The groundwater model was previously updated in 2006-07.

3. Regional groundwater monitoring (Clause 1)

3.1 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	Monitoring bores
Layer1	Gellibrand Marl	
Layer2	Clifton Formation	G18, G19, M22
Layer3	Narrawatuk Marl	
Layer4	Mepunga, Dilwyn Formation, Pember Mudstone	BA54, BA56, BA57, BA58, BD3, G11, G13, G14, G17, G20, G22, G24, G25, G28, M25, M27, M28, M29, M30, M31, W7, W9, YYG217, YYG218, YYG221, Y40, Y41, YEO20, YEO21, YEO37, YEO38, YEO39, YEO40, YEO42, YEO44
Layer5	Pebble Point Formation	BK69, E68, G11, G13, G14, G21, G23, M24, YEO19, YEO22, YEO23, YEO41

3.2 Groundwater levels (Clause 1.3 A)

Monitoring of the regional observation bore network continued during the 2015-2016 year. The locations of the observation 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 included 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 gauges are used to measure artesian pressures.

3.3 Bore hydrographs (Clause 1.3 B)

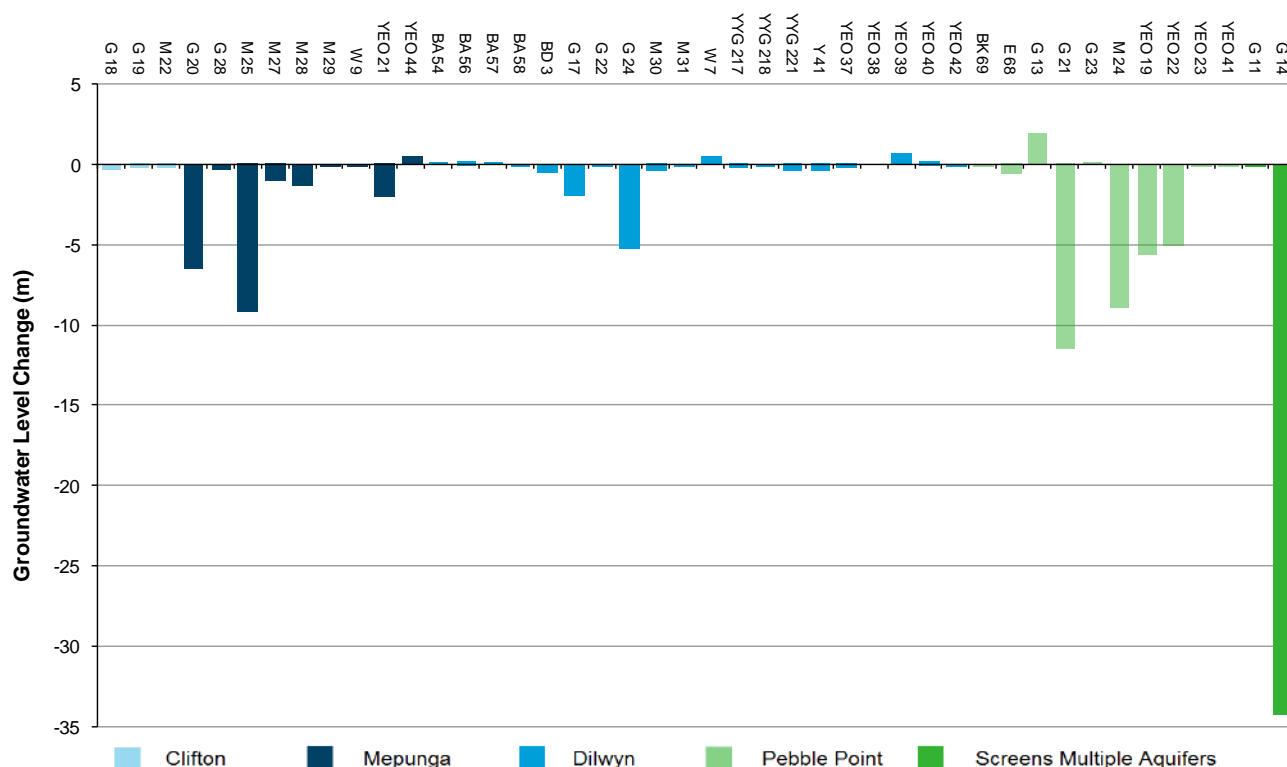
Hydrographs have been prepared for each bore and are located in appendix C. A steady recovery of groundwater levels has been recorded up until groundwater extraction recommenced in April 2016. Since April, the observation bores in close proximity to the Gerangamete production borefield have displayed a quick but expected response to the groundwater extraction. Other, more remote bores will have a more subdued response to the extraction. Comments have been provided in appendix C for observation bores that recorded levels that weren't consistent with the expected levels.

3.4 Residual drawdown (Clause 1.3 C)

In April 2016, the borefield was activated due to extremely dry conditions which severely affected catchment inflows. Groundwater from Barwon Downs was used to boost storage levels of surface water supplies. The pumping saw a rapid drawdown of water levels in observation bore G14, which drew down 34 metres. This response was expected due to the bore being only 80 metres away from the production bores. This initial drawdown response is expected to slow down as water levels stabilise. The observation bores up to 5000 metres from the production bores displayed a moderate drawdown in water levels of up to 10m. While the observation bores greater than 5000 metres from the production field showed little or no response to the groundwater extraction.

Groundwater drawdown levels over the past 12 months are illustrated in Fig 1 below. Negative values indicate a lower groundwater level measured in June 2016 as compared to those levels observed in May 2015.

Figure 1: 2015-2016 Residual drawdown



Notes:

1. Due to inconsistent readings in Y40 during 2014-2015, a condition assessment was undertaken in 2015-2016. This revealed that Y40 is likely to have blocked screens resulting in erroneous readings, therefore it has been left out of the drawdown chart due to this unreliable data. Y40 will be refurbished in due course.
2. G25 is no longer active as part of the State Observation Bore Network. This bore is due to be decommissioned by DELWP due to its condition and has therefore been left off this residual drawdown chart.
3. G14 has showed a large drawdown in the last year. This bore is located less than 100 metres from the production field and is expected to respond quickly to groundwater extraction.
4. Groundwater measurements were not able to be recorded at the production bores. Data collected for the groundwater production bores varies with well head access, infrastructure arrangements and extraction. Options will continue to be investigated in order to allow these measurements to be taken.

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 June 2016 compared to those levels recorded in 1997.

June 1997 has been used as the baseline for determining residual drawdown for this licensing period because it is situated at the end of an extended period of no groundwater extraction and 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 25,858ML. The majority of groundwater extracted during that time was done so from March 1987 – February 1990 with a total of 20,559ML.

For the 2015-2016 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. Plotting the contour maps separately for each aquifer is the most accurate method of representing the drawdown within these formations.

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 will provide greater confidence in the drawdown contour map. Through a review of the observation bores, M30 has now been confirmed to screen the Dilwyn formation, as opposed to the Pebble Point formation. Removing this bore from the Pebble Point contour map has resulted in a large area of uncertainty in the drawdown to the east of the production bores.

It should be noted that observation bores G25, Y40, YEO20 and YEO38 have been removed from the contour maps provided in appendix D due to erroneous data that results in a misrepresentation of the groundwater drawdown contours.

Bore Y41 is also excluded from the residual drawdown map as there is no record of groundwater levels for this bore back to 1997 because it was only constructed in 2006.

3.5 Bore failures (Clause 1.3 D)

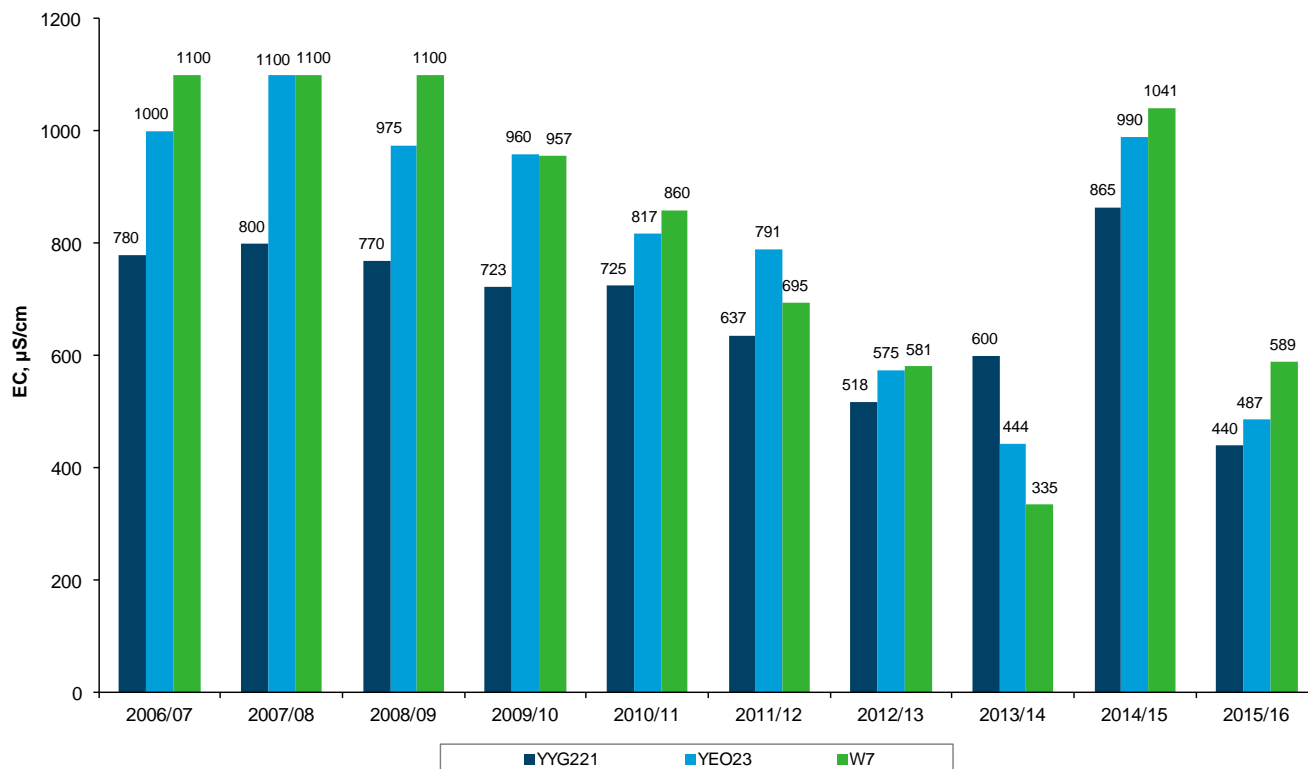
There were no production bore failures in 2015-2016. As proposed in the 2014-2015 Gerangamete Groundwater Annual Report, condition assessments were conducted on 4 observation bores during 2015-2016 that were recording abnormal groundwater levels:

- Y40 recorded large spikes in groundwater levels. This prompted a condition assessment to be conducted in 2015-2016. The assessment indicated that the screens are likely blocked causing the erroneous readings and recommended that the bore be refurbished to clear the screens.
- YEO40 was demonstrating a very slow recovery to the extraction periods, this warranted a condition assessment on this bore. The condition assessment indicated that this bore is in good condition and groundwater readings are likely to be accurate.
- YEO20 recorded the same groundwater levels for the past 2 years. This indicated that the bore was blocked or the screens were not functioning properly. The 2015-2016 condition assessment indicated that this bore is completely blocked by tree roots preventing groundwater measurements from being taken. The importance of this bore for the ongoing monitoring program will be assessed, and if required it will be re-drilled in due course.
- BK69 showed a gradual decline in groundwater levels even during recovery periods. This trend was questioned and later confirmed to be representative of the aquifer at this location through the 2015-2016 condition assessment.
- YEO38 is displaying no variation in the potentiometric levels during borefield extraction and recovery periods and as such this bore is likely to have also failed. This observation bore is no longer active as part of DELWP's State Observation Bore Network and has been deemed as 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.

4. Groundwater salinity (Clause 2)

Groundwater salinity was analysed in June, 2016 through Electrical Conductivity (EC) measurements of 3 observation bores. EC readings were taken by Barwon Water's Operations staff. An EC probe was lowered into the sub-artesian bore YEO23 to take the reading onsite. While groundwater samples for the artesian bores, YYG221 and W7 were taken by opening the valve and releasing the sampling into a testing jar before using the EC probe to test the sample.

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



The 2015-2016 groundwater salinity readings were lower than the 2014-2015 readings. After higher readings were recorded in 2014-2015, the EC probe was recalibrated and the salinity retested to confirm the elevated readings. This retesting yielded comparable results to the initial 2014-2015 readings. The salinity readings for 2015-2016 are comparable to the lower readings experienced in 2012-2013 and 2013-2014.

Due to fluctuations in the salinity readings, Barwon Water will monitor EC on an annual basis which is above the required five-yearly condition as set out in the groundwater licence.

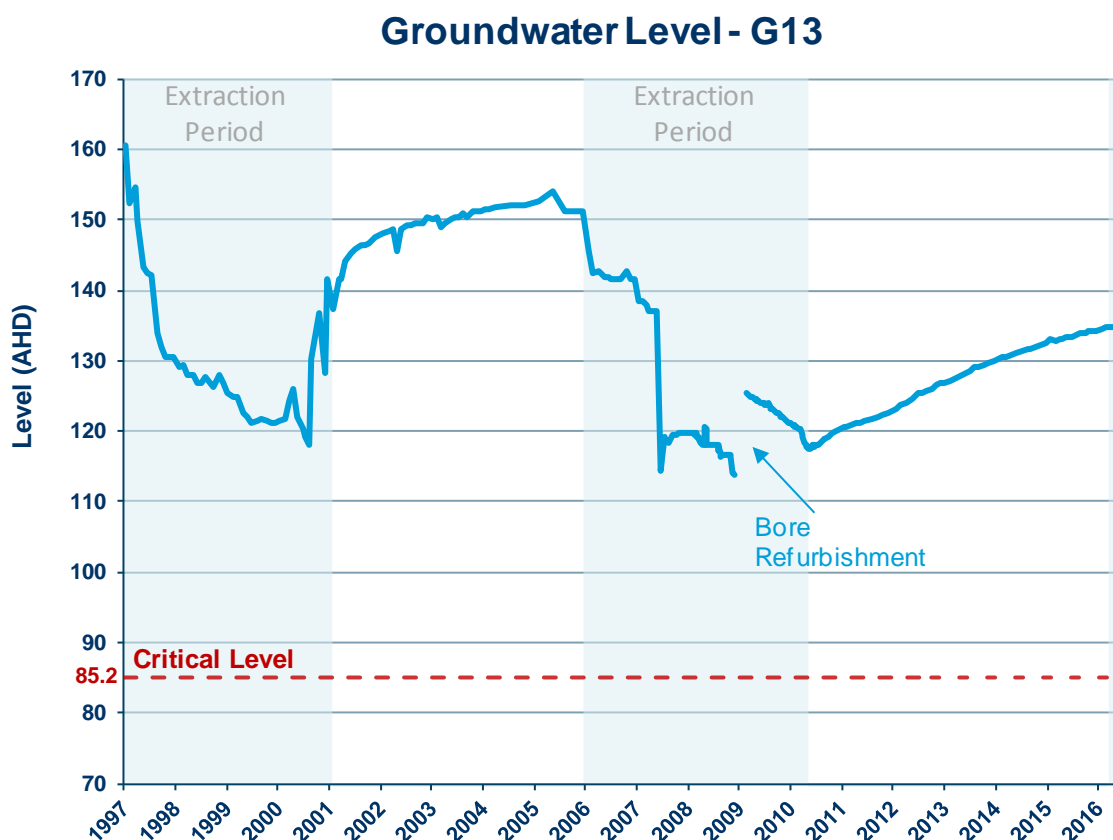
5. Water level decline (Clause 3)

5.1 Groundwater levels in critical bores (Clause 3.5 A (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 level in any of these four critical bores falls below the critical level, a number of key actions 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.

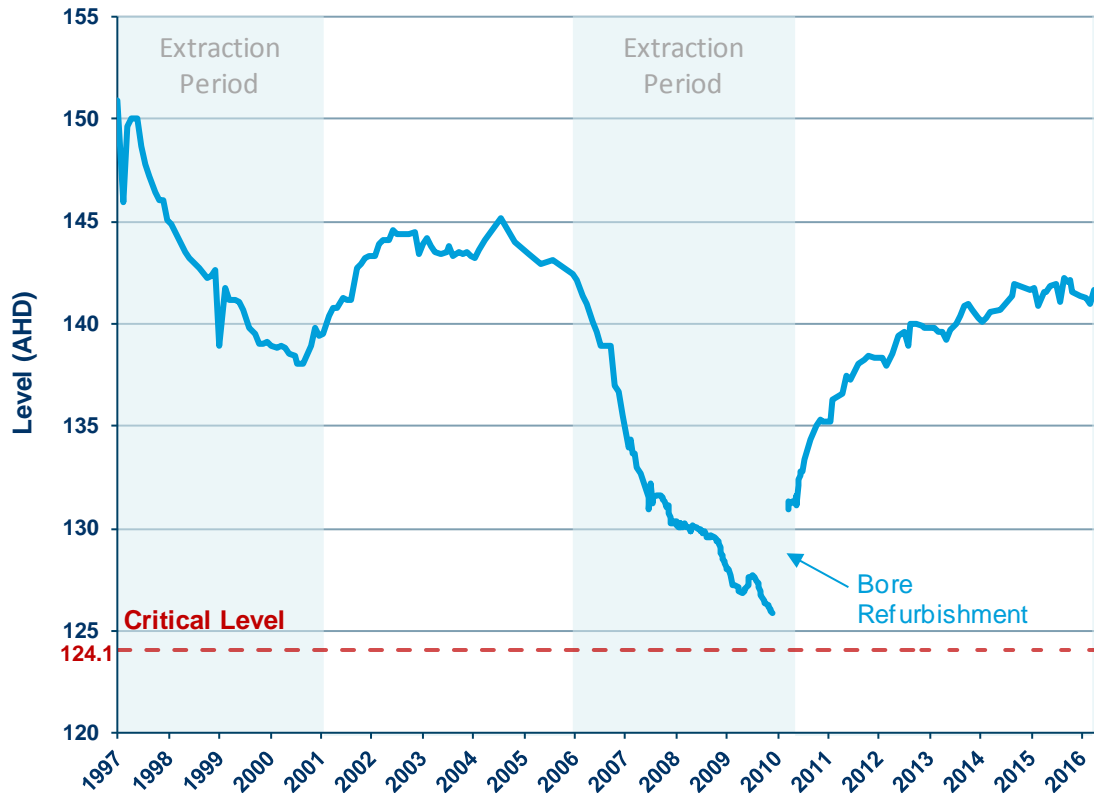
All actions are to be undertaken until the groundwater levels in all critical bores recover to above the critical level.



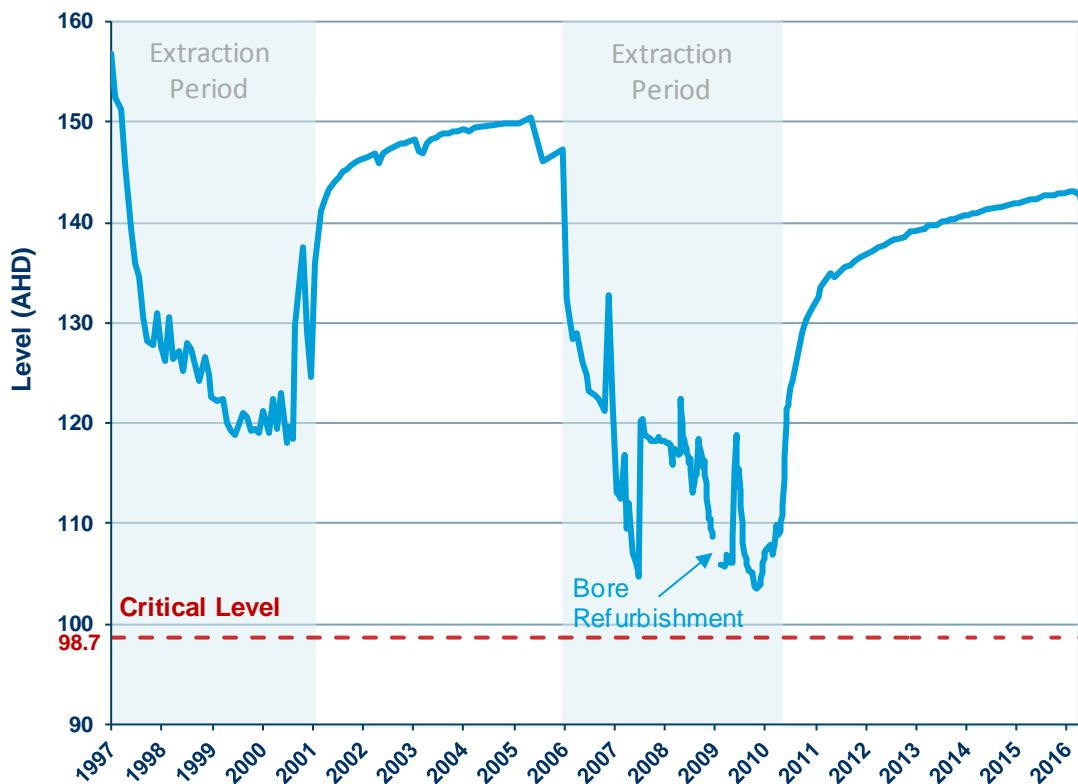
Notes:

Bore refurbishment – G13, M28 and G20 have all been refurbished during the reporting period 1997-2016. This refurbishment meant that for a short period of time data was unable to be collected for these observation bores.

Groundwater Level - M28



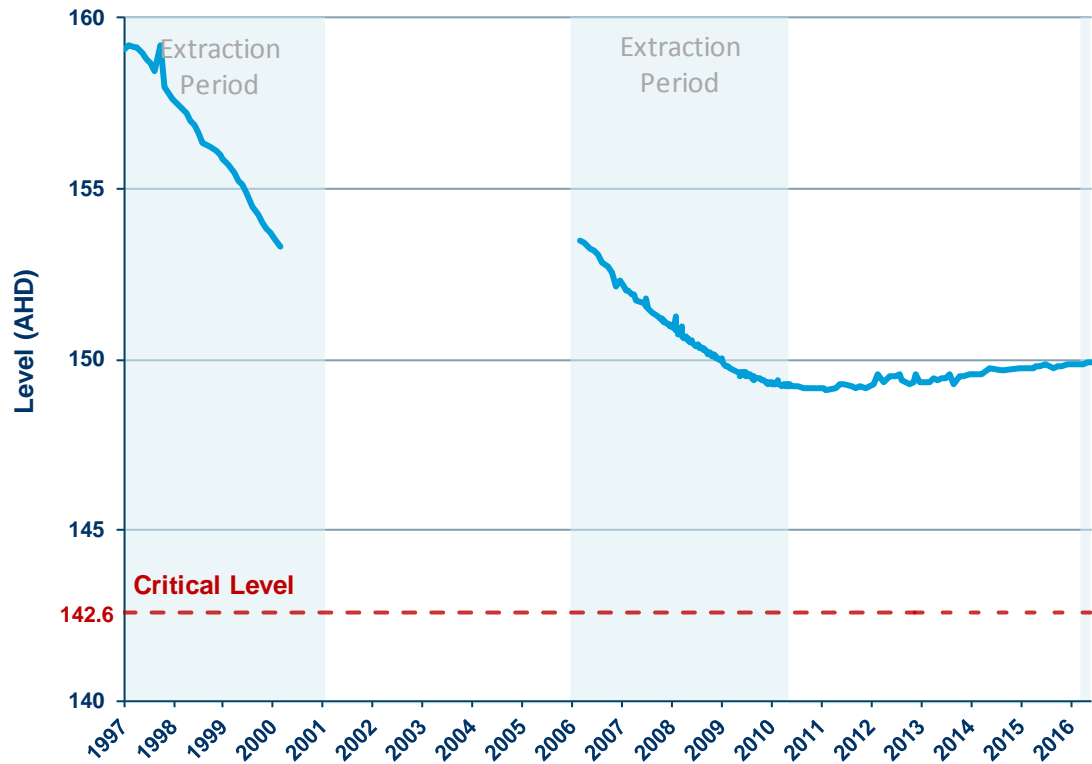
Groundwater Level - G20



Notes:

Bore refurbishment – G13, M28 and G20 have all been refurbished during the reporting period 1997-2016. This refurbishment meant that for a short period of time data was unable to be collected for these observation bores.

Groundwater Level - YEO40



Notes:
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.

6. Metering (Clause 4)

The borefield recommenced operation on the 22nd of April 2016 and extracted 1,903 ML of groundwater during 2015-2016. Daily, monthly and annual extraction totals are included in appendix E.

The ten year total is at 52,589 ML which is well below the licence limit of 80,000 ML.

7. Subsidence (Clause 5)

7.1 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. Readings were conducted by the spatial information services section of Barwon Water and are presented below. Positive values indicate an increase in ground levels compared to the readings taken in 2003, while a negative value indicates a 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 200mm 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
20790040	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	-12
20590052	-6	0	+6	-3	-12	+7	+8	+8	+15	+8	+14	+1	+3	+12
39780106	-1	0	+3	-27	-9	-15	-16	-30	-14	-16	-30	-24	-25	-13
Monitoring Station ID														
32390045	-6	+1	-11	-42	-42	-36	-66	-75	-47	-42	-54	-42	-42	-47
32390046	+3	+1	-8	-20	-19	-20	-47	-50	-32	-25	-46	-32	-28	-37
26470027	-6	+2	-2	+6	-11	-22	-37	-45	-36	-39	-43	-42	-35	-32
26470032	-5	+5	-1	-43	-30	-36	-63	-63	-35	-40	-45	-42	-37	-42
26470033	-8	+3	-13	-40	-35	-36	-65	-76	-38	-39	-44	-38	-35	-46
26470036	+5	+10	+1	-32	-23	-30	-48	-63	-42	-38	-39	-33	-23	-33
39870025	-1	-4	-5	-15	-11	-17	-23	-34	-37	-31	-25	-29	-33	-27
39870026	-3	0	+2	-9	-6	-15	-22	-38	-37	-33	-31	-31	-35	-21
38090024	-4	-3	+12	+8	NA	0	-26	-25	-18	-30	-15	-36	-	-45
38090025	-5	-5	+9	-12	NA	-5	-30	-33	-28	-48	-23	-33	-35	-27
38090026	-5	0	+6	-15	NA	-6	-33	-31	-30	-41	-30	-33	-28	-31

8. Flow in Boundary Creek (Clause 6)

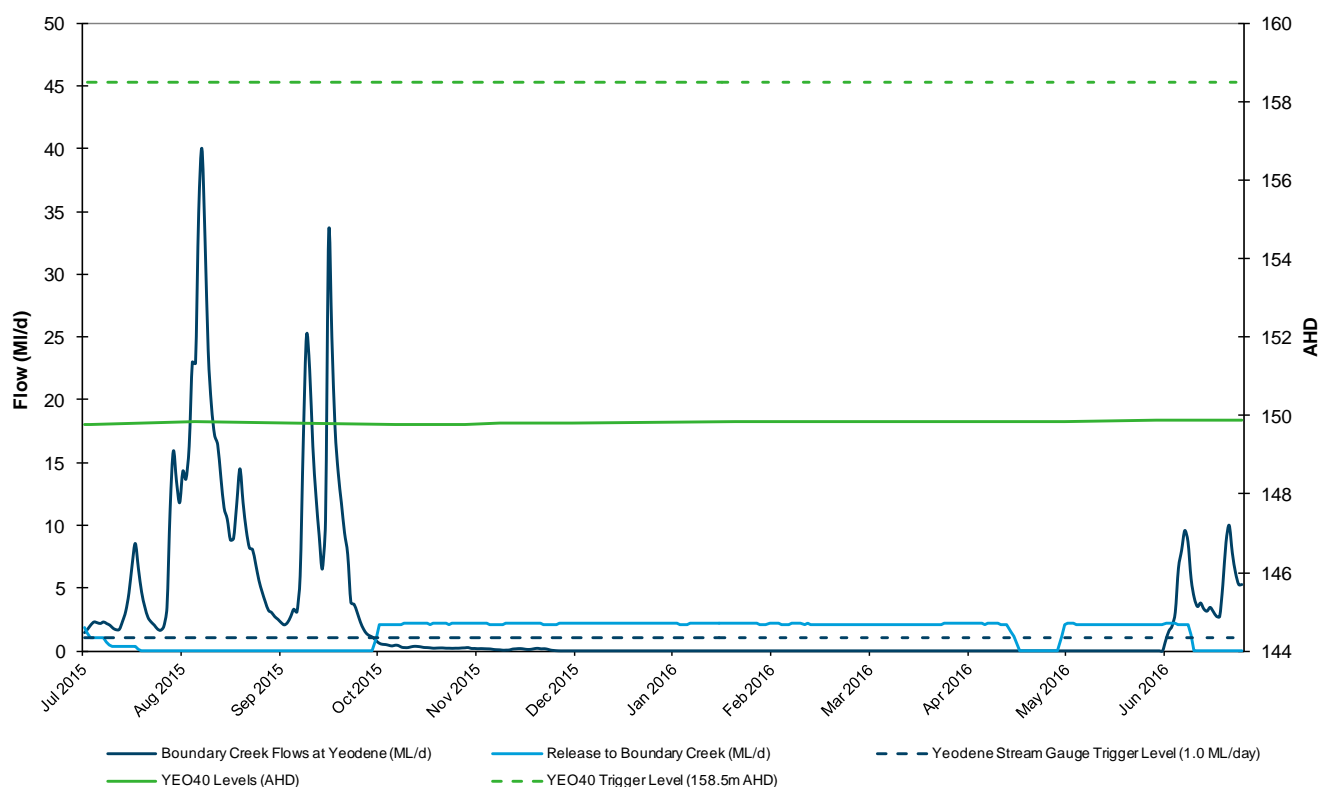
8.1 Discharge to Boundary Creek

Approximately 533 ML was discharged into Boundary Creek during the 2015-2016 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. Barwon Water's Gerangamete groundwater licence states that 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



Notes:

Due to a sudden degradation of the water quality in West Gellibrand reservoir, Barwon Water ceased discharging to Boundary Creek from the 18th April, 2016 to 4th May, 2016. Barwon Water notified SRW as soon as the water quality issues arose and received approval from SRW, stating that at the time it was prudent to cease releasing.

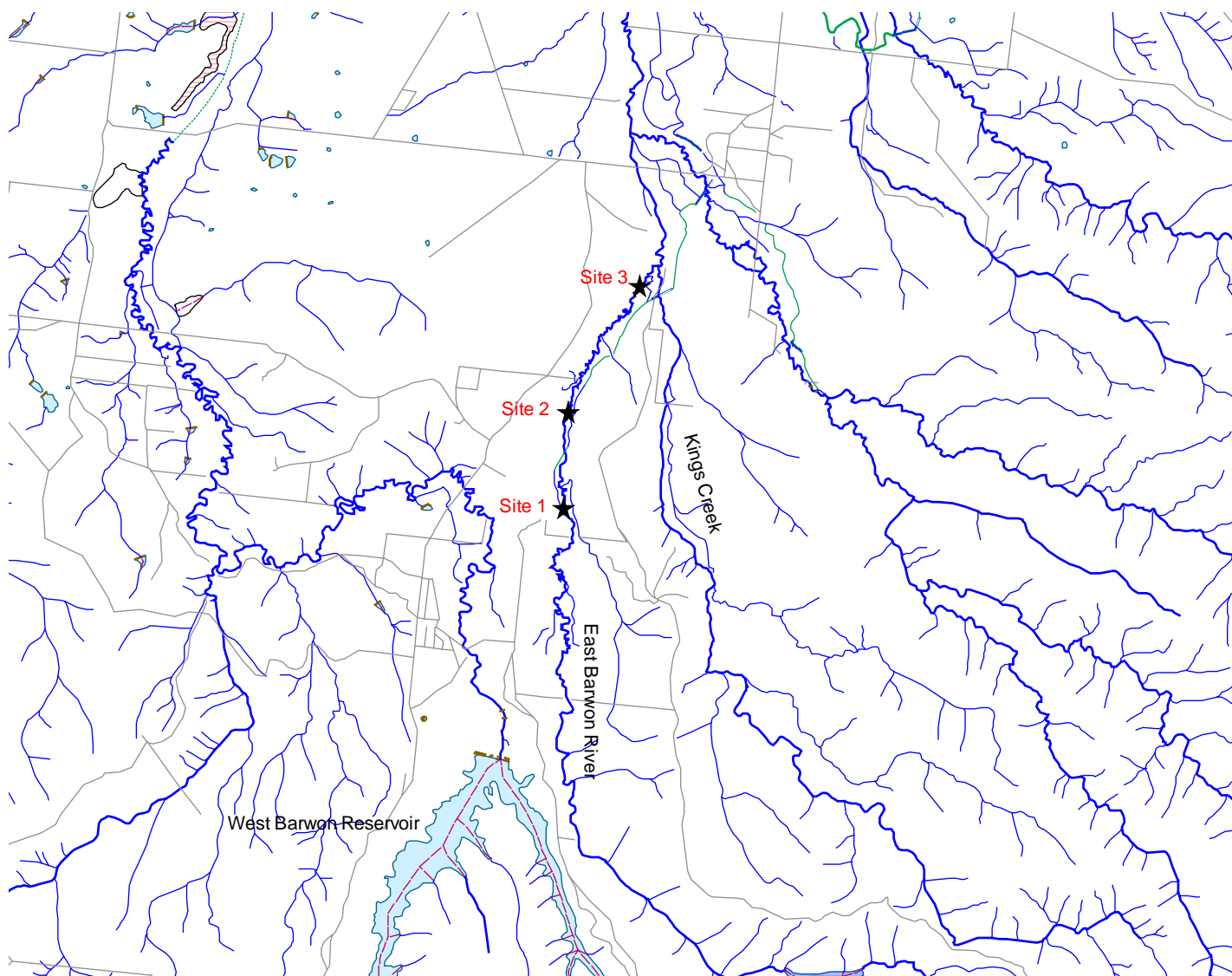
9. Protection of flow in the Barwon River and tributaries (Clause 9)

9.1 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 being monitoring site 233253A
2. approximately one kilometre downstream of the East Barwon gauge
3. approximately 250 metres 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. Flows had ceased during the December gauging so therefore no flow was recorded. Vegetation growth continues to pose issues with obtaining measurements at these sites. The results obtained are shown below:

Table 5: Measured flows in East Barwon River

Measurement no.	Date	Flow at site (ML/d)			Borefield pumping?
		1	2	3	
1	December, 2015	0	0	0	No
2	July, 2016	1.05	0.70	2.67	Yes

The latest gauging results show a similar trend to previous monitoring results, which indicate that there is no loss of flow to the aquifer.

9.2 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 15.91 metres below the ground level of 142.735 metres AHD. 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 there is no monitoring trend that requires investigation.

10. Community engagement (Clause 10)

10.1 Information (Clause 10.1 A)

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

10.2 Engagement (Clause 10.2)

Inland Acid Sulphate Soils

One of the challenges with inland acid sulphate soils is that no single agency in Victoria is responsible for managing inland acid sulphate soils. As a result, a multi-agency Steering Committee was formed in 2009 to improve understanding of inland acid sulphate soils within the Corangamite region and develop a risk-based management response to the issue. Representatives include the Colac Otway Shire, Southern Rural Water, Corangamite Catchment Management Authority, Barwon Water and Department of Environment, Land, Water and Planning.

In order to better understand inland acid sulphate soils in the region, the steering committee engaged La Trobe University through a research partnership to complete a PhD project that focused on identifying and mapping inland acid sulphate soils within the boundaries of the Corangamite CMA. The PhD is now in the final stages of examination and is publicly available through La Trobe University.

Barwon Downs Groundwater Community Reference Group

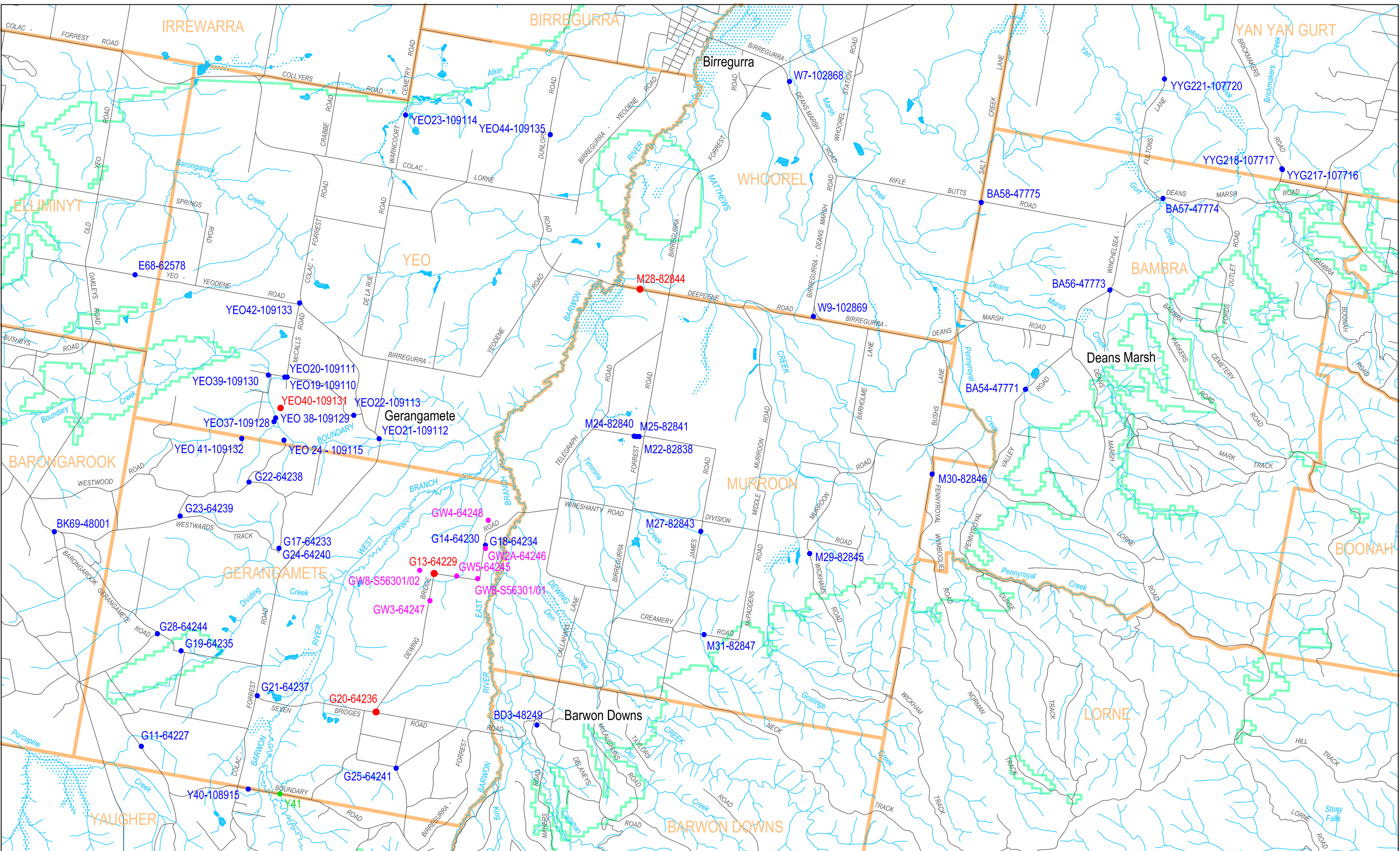
The Barwon Downs Groundwater Community Reference Group (BDGCRG) was formed by Barwon Water in October, 2013 which continues to meet with the objective of providing advice on the technical works monitoring program. The BDGCRG acts as a conduit for the broader community to that the revised monitoring program was inclusive of capturing key community concerns.

The BDGCRG endorsed the technical works monitoring program based on scope changes that targeted specific community concerns. Satisfied that the scope would address community issues, Barwon Water completed the construction and installation of additional monitoring equipment.

In 2015, the monitoring program transitioned into a data collection phase, resulting in a reduced meeting frequency of the BDGCRG. The monitoring data and the significant number of supporting scientific studies that have been undertaken to date will now be used to inform the update of the groundwater model. This groundwater model will be used to improve the understanding of the relationship between groundwater extraction and potential environmental impacts, including areas of concern raised by the CRG. The CRG will reconvene later this year once outputs from the model are available.

Appendix A

Groundwater bores location plan



NOTES		<div><p>BarwonWater</p><p>TECHNICAL & SPATIAL SERVICES</p><p>PO BOX 659 GEELONG 3220 TEL. 1300 656 007 www.barwonwater.vic.gov.au</p></div>	GERANGAMETE GROUNDWATER BARWON DOWNS AQUIFER GROUND WATER MONITORING BORES				10989-05
<div><div><div></div><div></div><div></div><div></div></div><div><div>G20-64236</div><div>Y40-108915</div><div>G12-64228</div><div>GW3-64247</div></div></div> <div><div>BW GROUND WATER MONITORING BORE</div><div>STATE GROUND WATER MONITORING BORE</div><div>CRITICAL MONITORING BORE</div><div>PRODUCTION BORE</div></div>			JOB No. 10989	DRAWN E.DELGROSSO 1/08/16	CHECKED	DATUMS	
<div><div></div><div></div></div> <div><div>AQUIFER EXTENTS</div><div>PARISH BOUNDARY</div></div>			SCALE IN METRES SCALE 1 : 75 000			HEIGHT: AHD MAP: MGA ZONE: 54	

Appendix B

Quarterly groundwater levels

Groundwater levels relative to surface

Clifton Formation

	State/WMIS ID	64234	64235	82838
	Barwon Water ID	G 18	G 19	M 22
	Point of Reference	TOV	TOC	TOC
	Date			
	27-Aug-15	0.11	-28.48	-17.04
	28-Oct-15	1.42	-28.52	-17.00
	3-Mar-16	1.22	-28.63	-17.03
	27-Jun-16	1.22	-28.67	-17.15

Mepunga Formation

	State/WMIS ID	64236	64241	64244	82841	82843	82844	82845	82846	102869	108915	109112	109135
	Barwon Water ID	G 20	G 25	G 28	M 25	M 27	M 28	M 29	M 30	W 9	Y 40	YEO 21	YEO 44
	Point of Reference	TOC	TOC	TOC	TOV	TOC	TOV	TOC	TOC	TOC	TOC	TOV	TOC
	Date												
	27-Aug-15	-22.15	-24.95	-37.37	-14.71		13.46	-27.27	-29.92	-1.20	-31.90	5.82	-17.44
	28-Oct-15	-22.02	-25.19	-37.40	-14.30	2.04	14.38	-27.20	-28.96	-1.06	-33.07	5.61	-17.34
	3-Mar-16	-21.71	-24.39	-37.42	-14.48	1.83	13.66	-27.11	-29.04	-1.29	-34.69	5.50	-17.38
	27-Jun-16	-29.02	-24.36	-37.61	-24.04	1.02	12.64	-27.45	-29.18	-1.41	-34.69	3.46	-17.37

Dilwyn Formation

	State/WMIS ID	47771	47773	47774	47775	48249	64227	64230	64233	64238	64240	82847
	Barwon Water ID	BA 54	BA 56	BA 57	BA 58	BD 3	G 11	G 14	G 17	G 22	G 24	M 31
	Point of Reference	TOC ¹	TOC	TOP ²	TOP	TOC	TOP	TOV ³	TOP	TOC	TOC	TOC
	Date											
	27-Aug-15		-24.78		-14.62	-35.37		0.00	-30.96	-86.83	-31.00	-23.02
	28-Oct-15	-12.97	-25.20	-14.89	-14.51	-35.41	-45.84	0.00	-30.59	-86.81	-30.71	-22.40
	3-Mar-16	-12.20	-25.06	-14.88	-14.66	-35.44	-45.77	0.00	-30.31	-86.79	-30.45	-22.92
	27-Jun-16	-13.03	-25.00	-14.86	-14.70	-35.74	-45.86	-34.16	-33.41	-86.78	-36.59	-23.04

	State/WMIS ID	102868	107716	107717	107720		109111	109128	109129	109130	109131	109133
	Barwon Water ID	W 7	YYG 217	YYG 218	YYG 221	Y41	YEO 20	YEO 37	YEO 38	YEO 39	YEO 40	YEO 42
	Point of Reference	TOV	TOP	TOP	TOV	TOC	TOC	TOC	TOC	TOC	TOC	TOC
	Date											
	27-Aug-15	29.97	-52.35	-34.06	7.18			-10.55		-10.85	-15.88	-62.12
	28-Oct-15	29.98	-52.30	-34.06	7.54	-15.60		-10.43	-11.67	-10.62	-15.90	-62.12
	3-Mar-16	30.09	-52.32	-34.08	7.39	-15.64		-10.43	-11.67	-10.36	-15.84	-62.00
	27-Jun-16	30.09	-52.40	-34.11	7.39	-15.91		-10.92	-11.67	-10.34	-15.79	-62.23

	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
	27-Aug-15						
	28-Oct-15			16.11		2.19	2.35
	3-Mar-16			13.66		2.58	1.93
	27-Jun-16			13.66	-26.55		

Pebble Point Formation

Date	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
	27-Aug-15	-25.50	-25.67	-7.65	-3.17		-12.17	-31.11	-35.59	-16.28	-64.35
	28-Oct-15	-25.48	-25.75	-7.35	-3.27	-71.23	-11.90	-30.00	-35.44	-16.06	-63.89
	3-Mar-16	-25.45	-25.90	-6.68	-2.87	-71.20	-11.54	-30.51	-35.01	-16.09	-63.46
	27-Jun-16	-25.54	-26.05	-6.29	-15.17	-71.21	-21.33	-37.26	-41.04	-16.45	-65.05

Critical Monitoring Bore Readings

Date	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
	3-Jul-15	-7.98	-22.41	14.17	-15.91
	5-Aug-15	-7.80	-22.29	14.28	-15.85
	4-Sep-15	-7.65	-22.15	13.46	-15.88
	7-Oct-15	-7.46	-22.07	14.56	-15.92
	29-Oct-15	-7.35	-22.02	14.38	-15.90
	9-Nov-15	-7.27	-22.00	14.48	-15.89
	2-Dec-15	-7.17	-21.93	13.87	-15.89
	22-Jan-16	-6.94	-21.82	13.77	-15.84
	3-Mar-16	-6.68	-21.71	13.66	-15.84
	1-Apr-16	-6.62	-21.66	13.36	-15.83
	5-May-16	-6.45	-22.02	13.97	-15.83
	3-Jun-16	-6.40	-25.50	13.87	-15.80
	29-Jun-16	-6.29	-29.02	12.64	-15.79

Notes:

1: TOC - Top of casing

2: TOP - Top of Pipe

3: TOV - Top of Valve

G25: This bore is no longer active as part of the State Observation Bore Network. This bore is due to be decommissioned by DELWP.

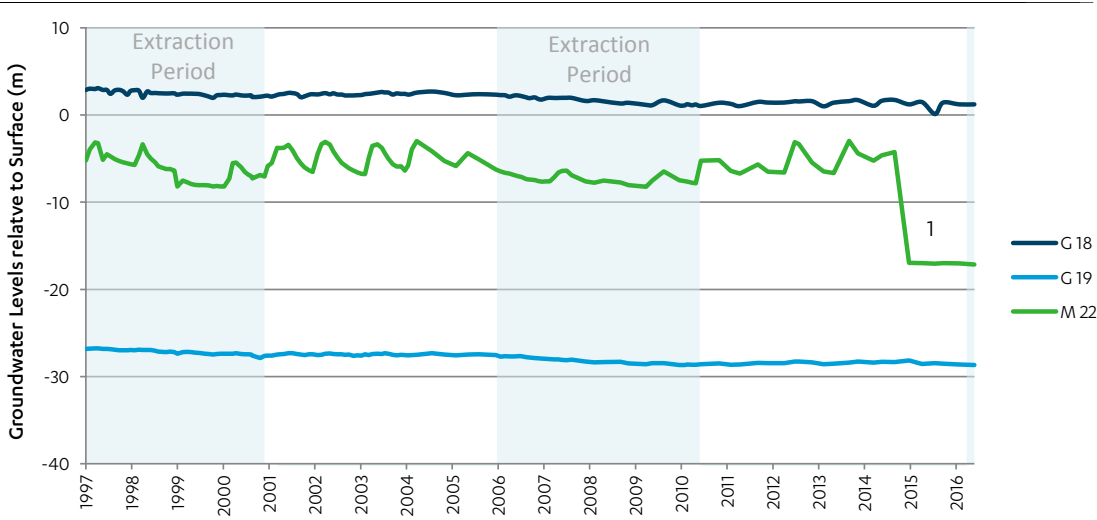
Y40: A condition assessment conducted in 2015/16 indicated that the screens are likely blocked. This bore will be refurbished in due course.

YEO20: A condition assessment conducted in 2015/16 showed that this bore is completely blocked by tree roots. This blockage is preventing groundwater levels from being recorded.

Indicates a critical monitoring bore

Appendix C

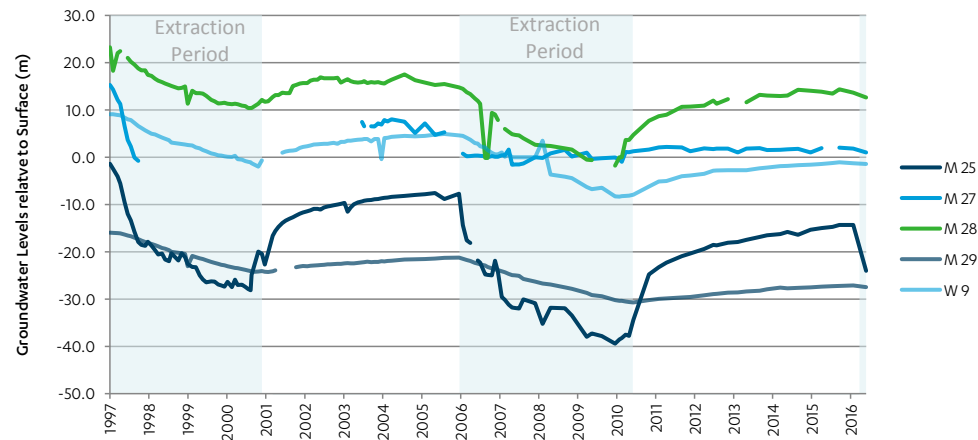
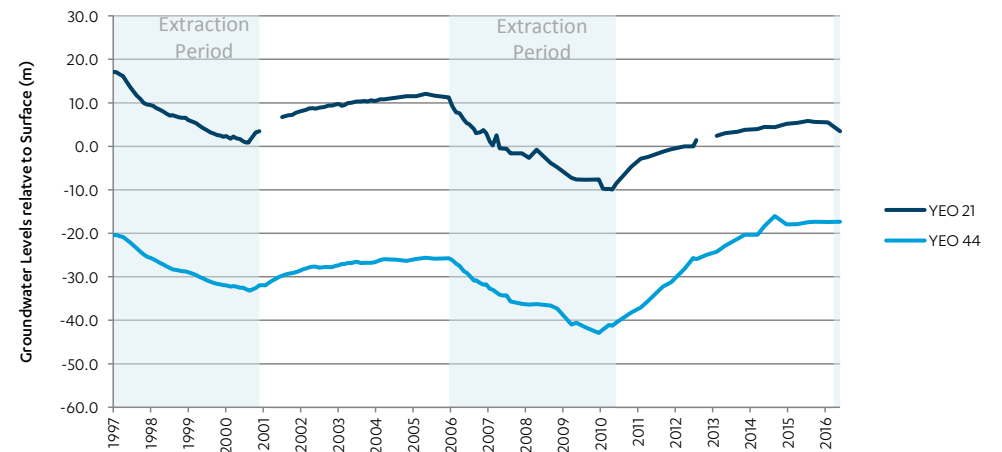
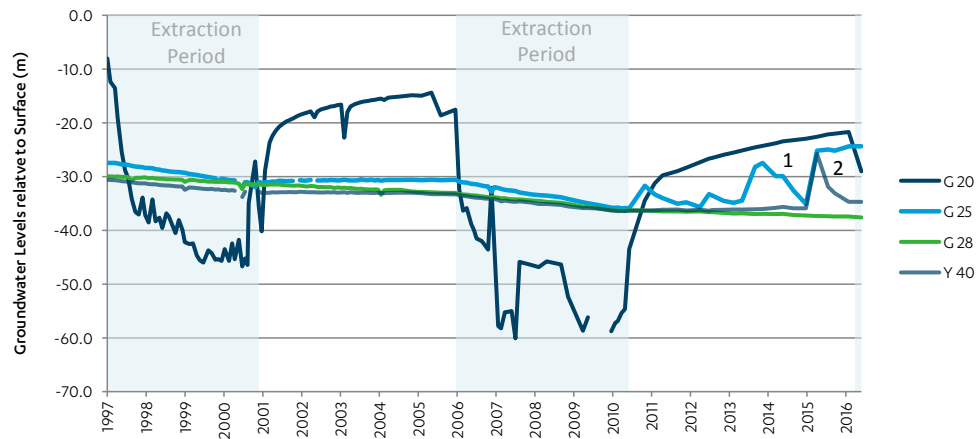
Bore hydrographs



Notes:

1. M22 was refurbished by DELWP in 2014-2015. Readings taken prior to the refurbishment are questionable due to the bore failure and as such an exaggerated drawdown relative to 2014 has been observed.

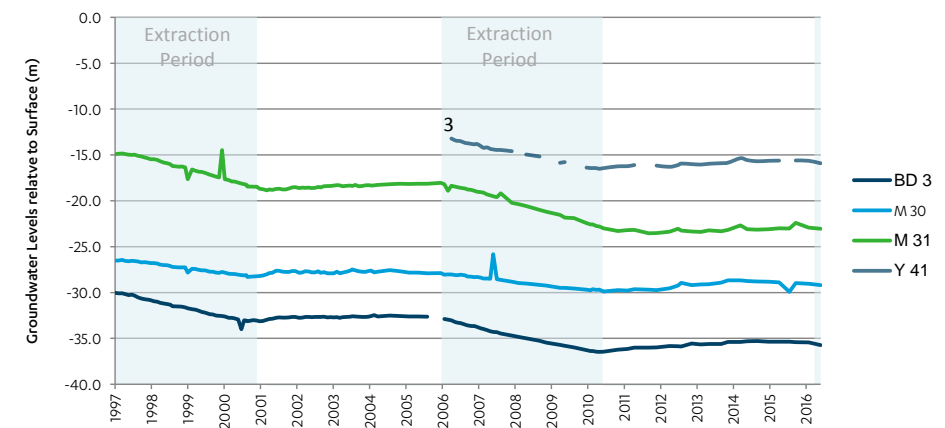
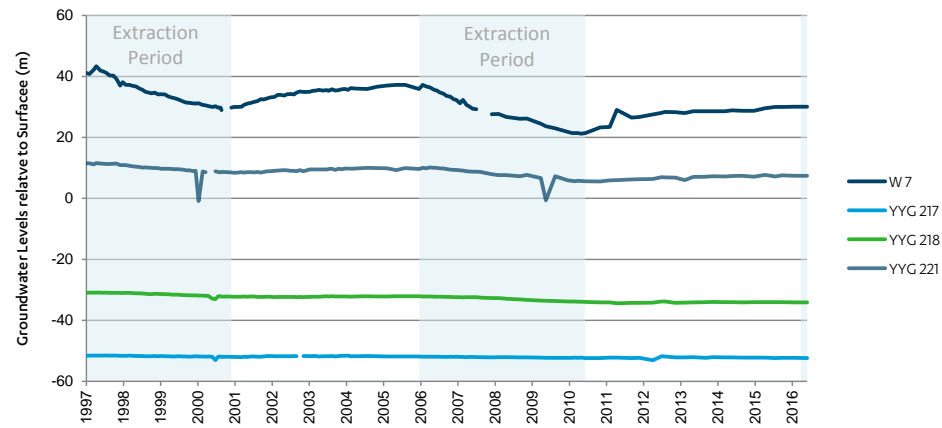
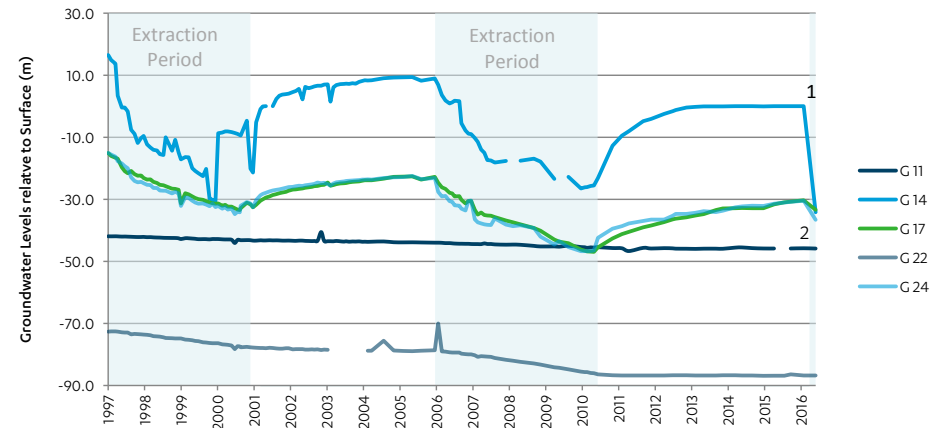
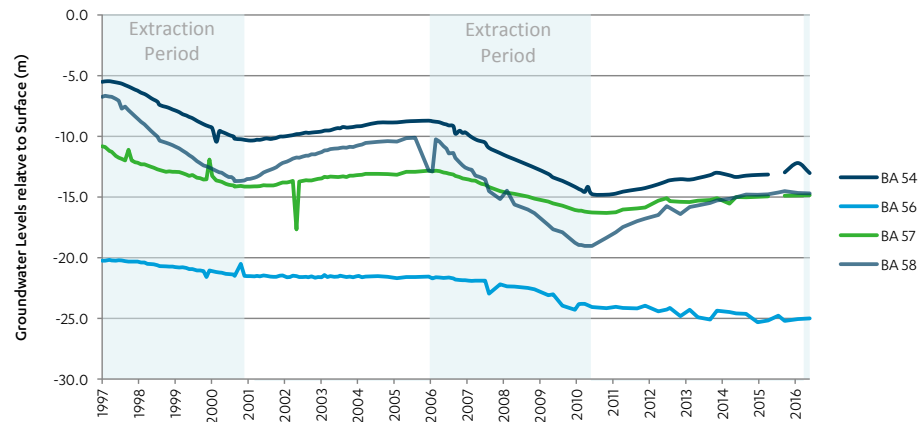
Mepunga

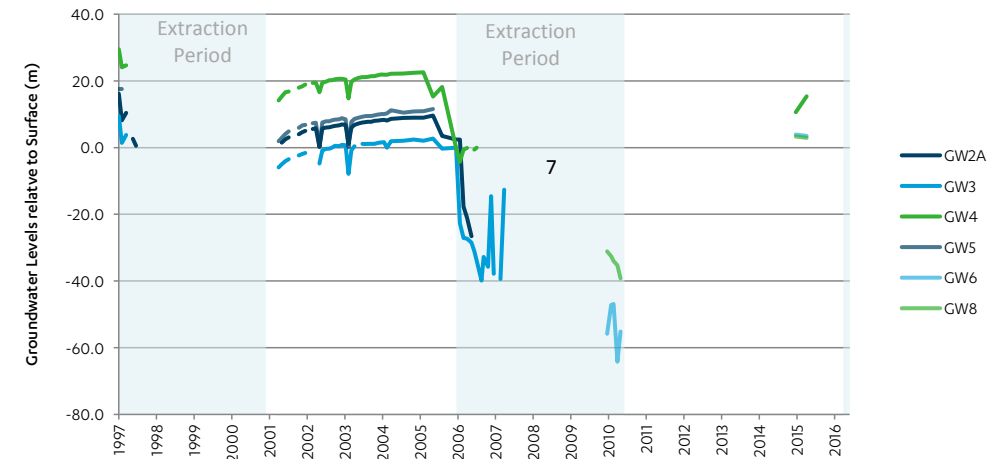
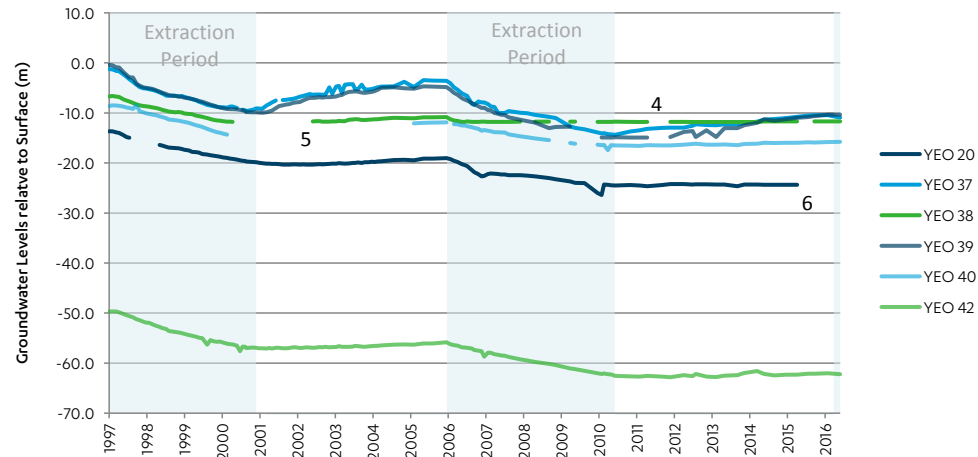


Notes:

1. G25 is 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. However, in the meantime this bore will continue to be monitored by Barwon Water.
2. A condition assessment was conducted on Y40 in 2015/16. This indicated that the screens are blocked causing erroneous readings. Y40 will be refurbished in due course.

Dilwyn

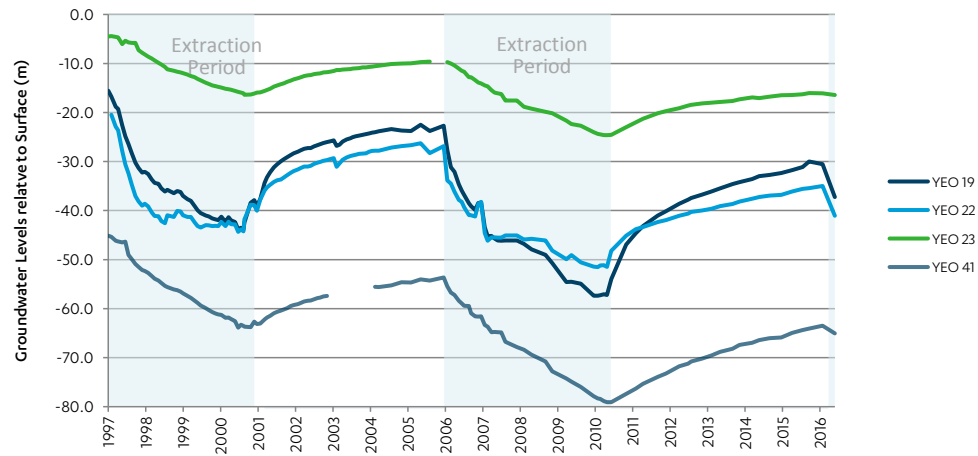
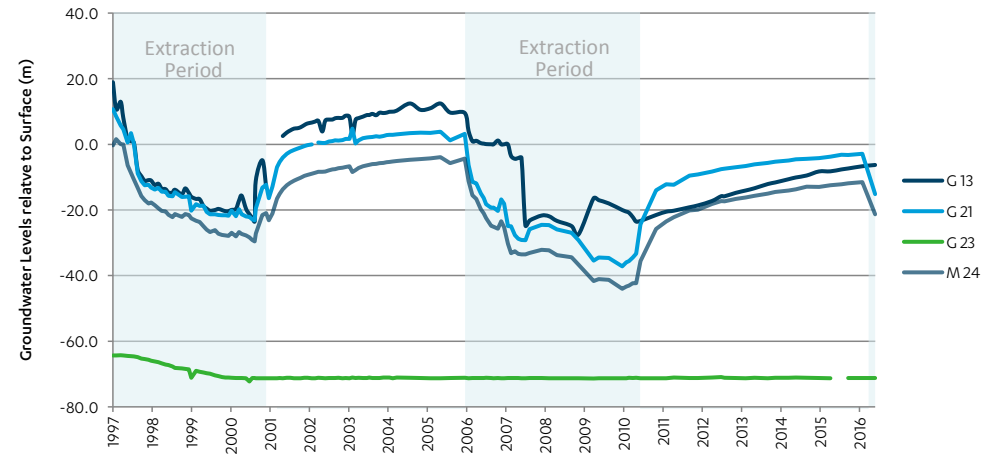
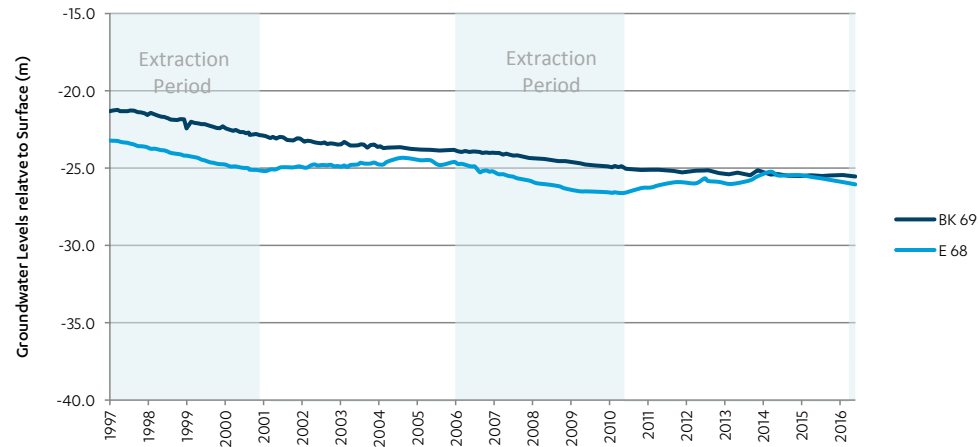




Notes:

1. G14 has recorded constant readings during the recovery period which is not indicative of other local bores. A condition assessment conducted by DELWP in April 2014 indicated that due to the condition of the bore, it should be decommissioned.
2. G11 has recorded a constant decline in the groundwater levels over the whole reporting period. This trend is not consistent with other local observation bores and may indicate this bore has failed. A condition assessment was conducted by DELWP in April 2014 that advised that due to the condition of this bore it should either be refurbished or decommissioned.
3. Y41 was constructed in 2006 and therefore no data exists for this bore prior to then.
4. YEO38 has shown no response to extraction and recovery periods and as such has likely failed. This bore is no longer part of DELWP's State Observation Bore Network and will be decommissioned by DELWP in due course.
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 is blocked by tree roots above that are preventing groundwater measurements from being taken.
7. Data collected for the groundwater production bores varies with well head access, infrastructure arrangements and extraction. Infrastructure arrangements that enable readings to be taken at these production bores will be investigated.

Pebble Point



Appendix D

Relative residual drawdown
1997 to June 2016

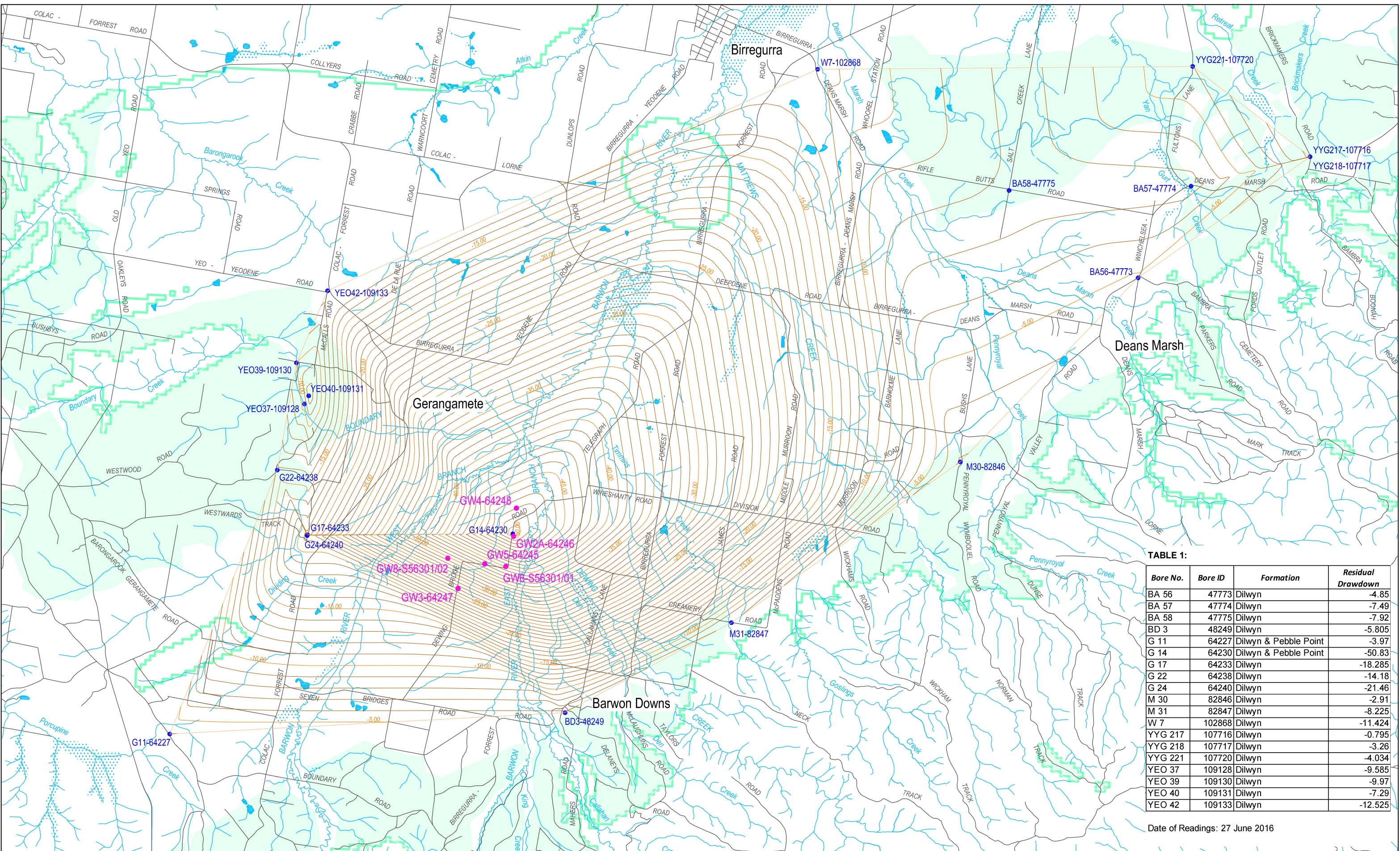


TABLE 1:			
Bore No.	Bore ID	Formation	Residual Drawdown
BA 56	47773	Dilwyn	-4.85
BA 57	47774	Dilwyn	-7.49
BA 58	47775	Dilwyn	-7.92
BD 3	48249	Dilwyn	-5.805
G 11	64227	Dilwyn & Pebble Point	-3.97
G 14	64230	Dilwyn & Pebble Point	-50.83
G 17	64233	Dilwyn	-18.285
G 22	64238	Dilwyn	-14.18
G 24	64240	Dilwyn	-21.46
M 30	82846	Dilwyn	-2.91
M 31	82847	Dilwyn	-8.225
W 7	102868	Dilwyn	-11.424
YYG 217	107716	Dilwyn	-0.795
YYG 218	107717	Dilwyn	-3.26
YYG 221	107720	Dilwyn	-4.034
YEO 37	109128	Dilwyn	-9.585
YEO 39	109130	Dilwyn	-9.97
YEO 40	109131	Dilwyn	-7.29
YEO 42	109133	Dilwyn	-12.525

Date of Readings: 27 June 2016

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.

GROUND WATER MONITORING BORE

PRODUCTION BORE

AQUIFER AT SURFACE

Y40-108915

GW3-64247

TECHNICAL & SPATIAL SERVICES

PO BOX 659
GEELONG 3220
TEL. 1300 656 007
www.barwonwater.vic.gov.au

GERANGAMETE GROUNDWATER MONITORING BORES

BARWON DOWNS AQUIFER - DILWYN FORMATION

RELATIVE RESIDUAL DRAWDOWN - 2016 COMPARED TO PRE-PUMPING (1997)

JOB No. 10989

SCALE IN METRES
SCALE 1 : 75 000

DRAWN
E.DELGROSSO
1/08/16

CHECKED

7500
0
750
1500
2250
3000
3750
4500
5250
6000

DATUMS

HEIGHT: AHD
MAP: MGA
ZONE: 54

10989-01

A3

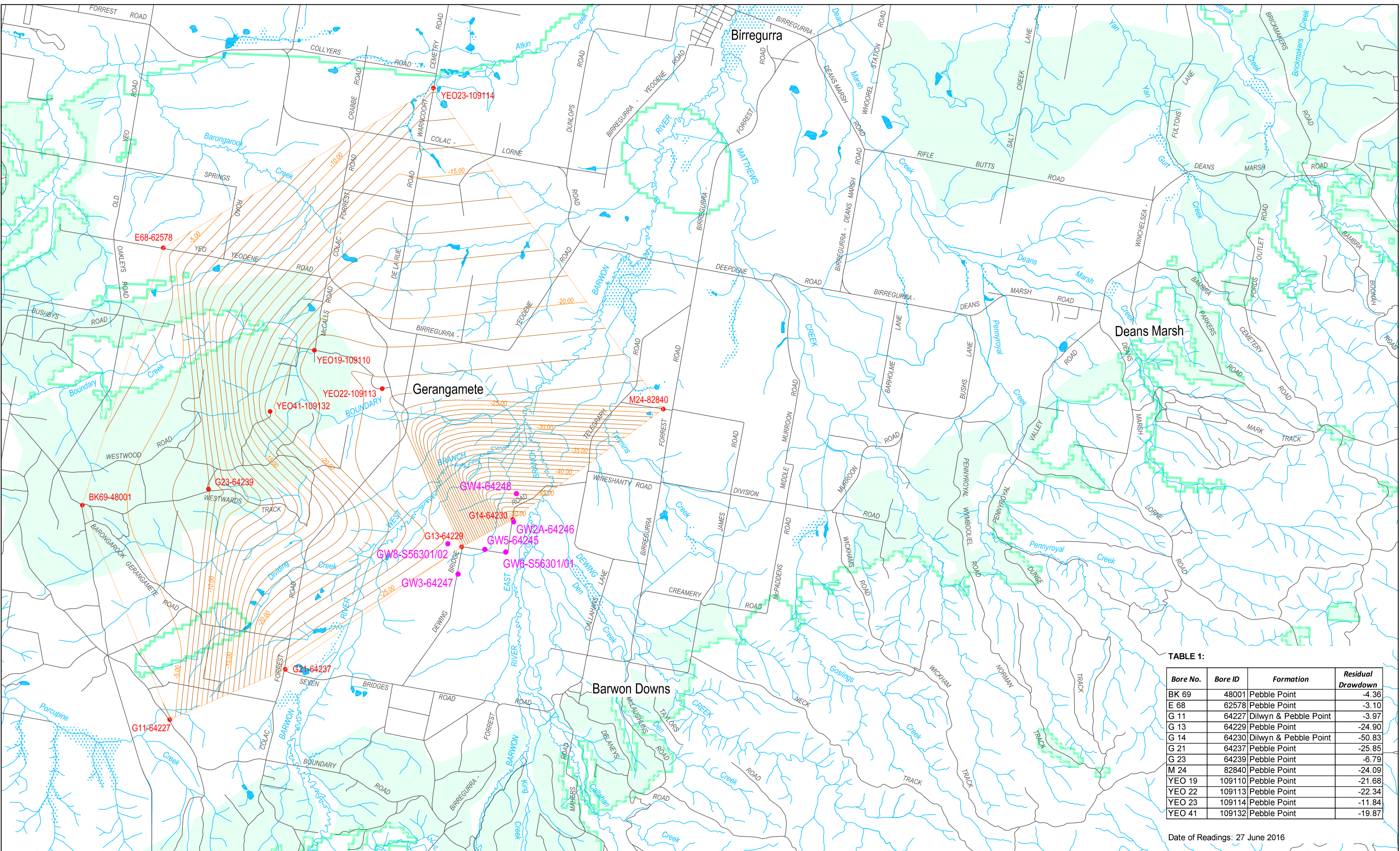


TABLE 1:

Bore No.	Bore ID	Formation	Residual Drawdown
BK 69	48001	Pebble Point	-4.36
E 68	62578	Pebble Point	-3.10
G 11	64227	Dilwyn & Pebble Point	-3.97
G 13	64229	Pebble Point	-24.90
G 14	64230	Dilwyn & Pebble Point	-50.83
G 21	64237	Pebble Point	-25.85
G 23	64239	Pebble Point	-6.79
M 24	82840	Pebble Point	-24.09
YEO 19	109110	Pebble Point	-21.68
YEO 22	109113	Pebble Point	-22.34
YEO 23	109114	Pebble Point	-11.84
YEO 41	109132	Pebble Point	-19.87

Date of Readings: 27 June 2016

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

TECHNICAL & SPATIAL SERVICES

PO BOX 659
GEELONG 3220
TEL. 1300 656 007
www.barwonwater.vic.gov.au

GERANGAMETE GROUNDWATER MONITORING BORES
BARWON DOWNS AQUIFER - PEBBLE POINT FORMATION
RELATIVE RESIDUAL DRAWDOWN - 2016 COMPARED TO PRE-PUMPING (1997)


JOB No. 10989


SCALE IN METRES
SCALE 1 : 75 000

DRAWN
E.DELGROSSO
1/08/16

CHECKED

750 0 750 1500 2250 3000 3750 4500 5250 6000





MGA
54

DATUMS

HEIGHT: AHD
MAP: MGA
ZONE: 54

10989-02

A3

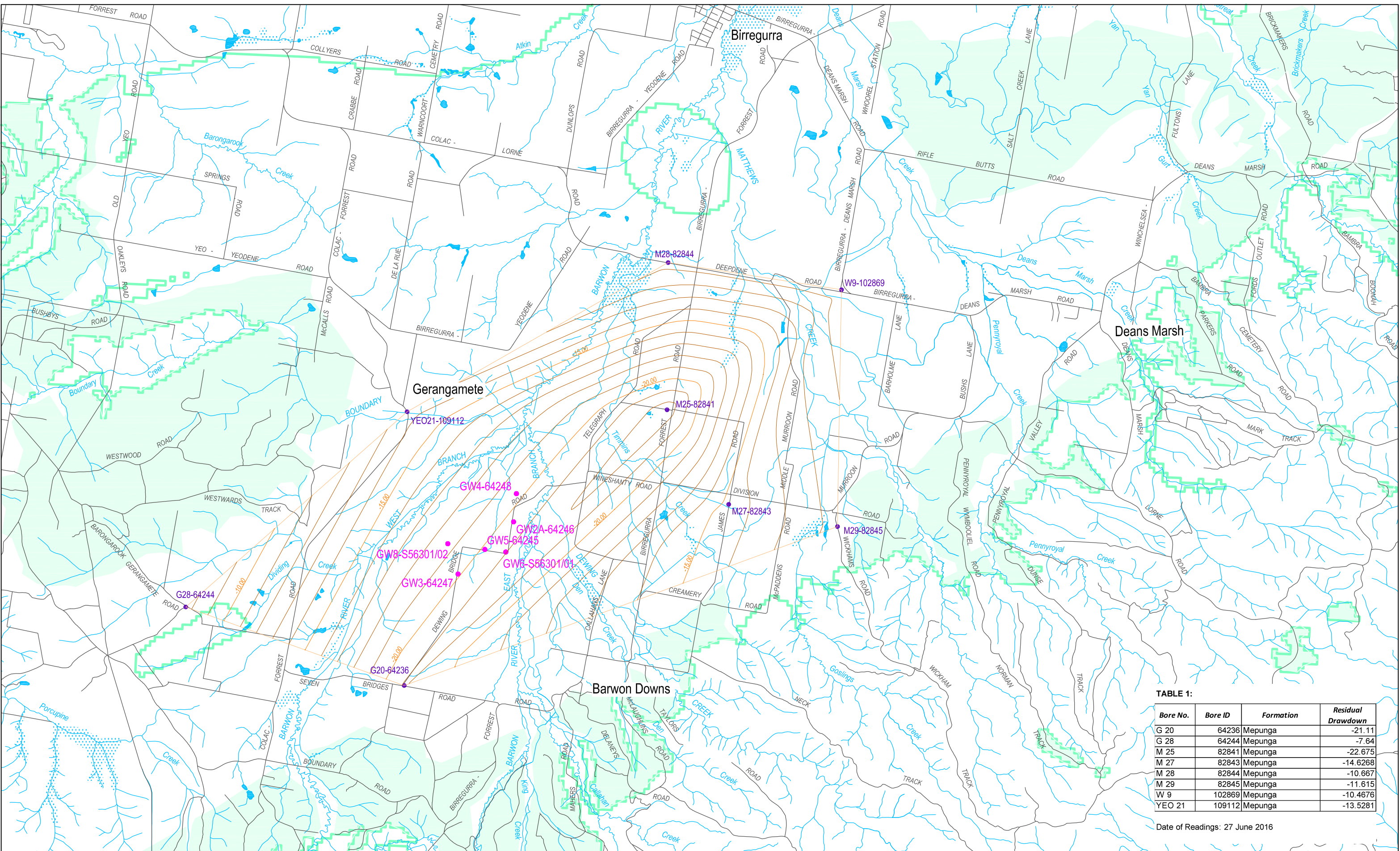


TABLE 1:

Bore No.	Bore ID	Formation	Residual Drawdown
G 20	64236	Mepunga	-21.11
G 28	64244	Mepunga	-7.64
M 25	82841	Mepunga	-22.675
M 27	82843	Mepunga	-14.6268
M 28	82844	Mepunga	-10.667
M 29	82845	Mepunga	-11.615
W 9	102869	Mepunga	-10.4676
YEO 21	109112	Mepunga	-13.5281

Date of Readings: 27 June 2016

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

TECHNICAL & SPATIAL SERVICES

PO BOX 659
GEELONG 3220
TEL. 1300 656 007
www.barwonwater.vic.gov.au

GERANGAMETE GROUNDWATER MONITORING BORES
BARWON DOWNS AQUIFER - MEPUNGA FORMATION
RELATIVE RESIDUAL DRAWDOWN - 2016 COMPARED TO PRE-PUMPING (1997)

JOB No. 10989


SCALE IN METRES
SCALE 1 : 75 000

DRAWN
E.DELGROSSO
1/08/16

CHECKED

7500
0
750
1500
2250
3000
3750
4500
5250
6000





10989-03

DATUMS

HEIGHT: AHD
MAP: MGA
ZONE: 54

A3

Appendix E

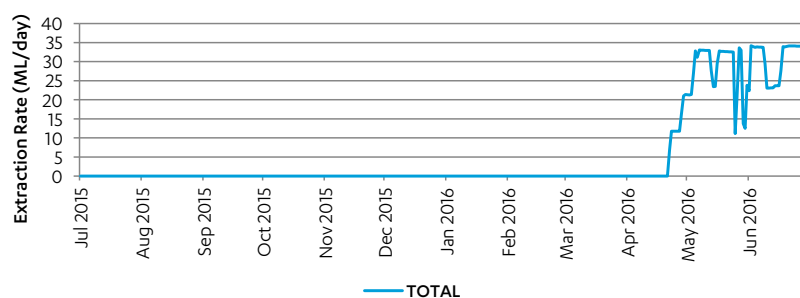
Groundwater extractions

Gerangamete Borefield - Groundwater Extraction 2015-2016

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	21.34	22.37
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.29	34.18
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.41	33.97
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.04	33.75
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.81	33.85
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.18	33.83
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.07	33.79
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.04	33.75
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.00	29.47
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.97	23.05
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.95	23.08
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.93	23.11
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.59	23.12
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.47	23.71
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.50	23.71
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.45	23.72
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.81	27.58
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.73	33.91
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.68	33.86
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.65	34.03
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.62	34.16
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.85	32.57	34.13
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.79	32.55	34.11
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.77	32.52	34.10
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.78	11.17	34.09
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.77	21.07	34.07
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.78	33.60	34.06
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.23	33.01	34.05
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	21.05	13.76	34.04
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	21.42	12.50	22.55
31	0.00	0.00		0.00		0.00	0.00		0.00		23.79	
MONTHLY TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	124.4	867.1	911.2
ANNUAL TOTAL												1902.7
MAX. FLOW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.4	33.6	34.2
MIN. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.85	11.17	22.37
AVE. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.15	27.97	30.37

Year	Total annual	Progressive total
2006/07	11,807	11,807
2007/08	12,604	24,412
2008/09	12,438	36,849
2009/10	12,692	49,542
2010/11	1,144	50,686
2011/12	0	50,686
2012/13	0	50,686
2013/14	0	50,686
2014/15	0	50,686
2015/16	1,903	52,589
Ten year total		52,589
Licence cap total		80,000
Total amount left on licence cap		27,411

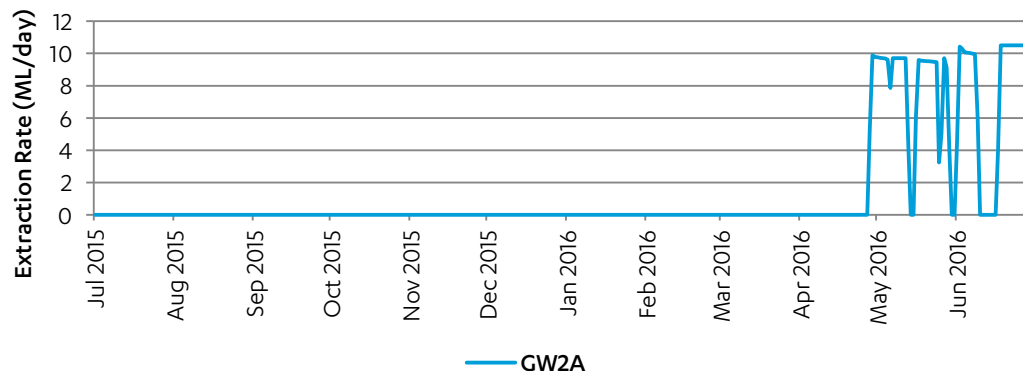
Total Extraction



Groundwater Bore GW2A - Extraction Rate 2015-2016

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	9.75	4.38
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.73	10.41
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.71	10.28
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.68	10.07
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.61	10.05
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.86	10.02
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.70	9.98
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.70	9.96
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.70	5.99
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.70	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.70	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.70	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.28	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	6.07	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.59	3.97
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.56	10.50
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.53	10.50
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.53	10.50
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.51	10.50
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.49	10.50
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.48	10.50
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.47	10.50
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.25	10.50
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.03	10.50
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.71	10.50
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.16	9.13	10.50
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.89	3.97	10.50
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	9.79	0.00	3.62
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	24.8	232.2	214.7
ANNUAL TOTAL												471.7
MAX. FLOW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9	9.8	10.5
MIN. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.25	3.62
AVE. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	7.49	7.16

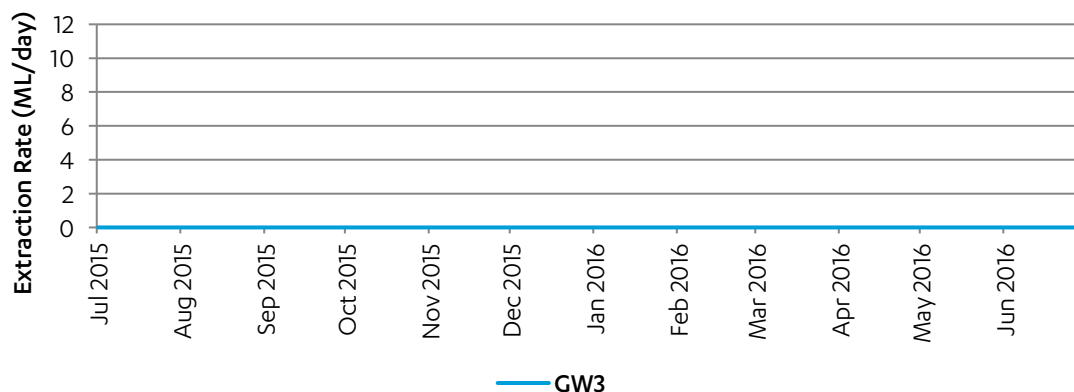
GW2A Extraction



Groundwater Bore GW3 - Extraction Rate 2015-2016

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	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 2015-2016

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	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

GW4 Extraction



Groundwater Bore GW5 - Extraction Rate 2015-2016

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	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

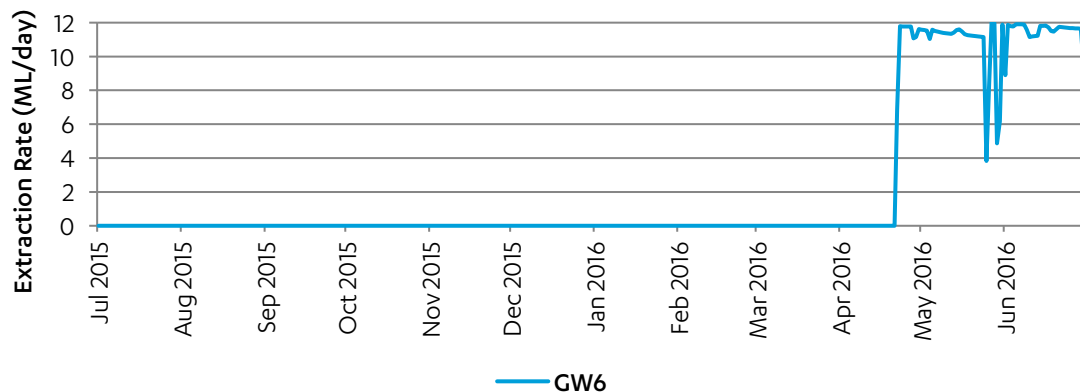
GW5 Extraction



Groundwater Bore GW6 - Extraction Rate 2015-2016

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	11.58	8.90
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.56	11.87
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.53	11.79
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.04	11.77
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.58	11.91
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.52	11.91
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.47	11.90
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.44	11.89
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.40	11.58
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.38	11.16
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.36	11.18
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.33	11.21
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.41	11.22
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.57	11.81
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.60	11.81
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.48	11.82
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.32	11.71
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.27	11.51
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.24	11.47
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.22	11.63
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.21	11.76
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.85	11.18	11.73
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.79	11.17	11.72
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.77	11.15	11.70
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.78	3.83	11.69
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.77	8.15	11.67
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.78	11.99	11.66
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.07	11.98	11.65
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.16	4.87	11.65
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	11.63	6.18	9.50
31	0.00	0.00		0.00		0.00	0.00		0.00		11.89	
MONTHLY TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	99.6	331.9	344.8
ANNUAL TOTAL												776.3
MAX. FLOW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.8	12.0	11.9
MIN. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.85	3.83	8.90
AVE. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.32	10.71	11.49

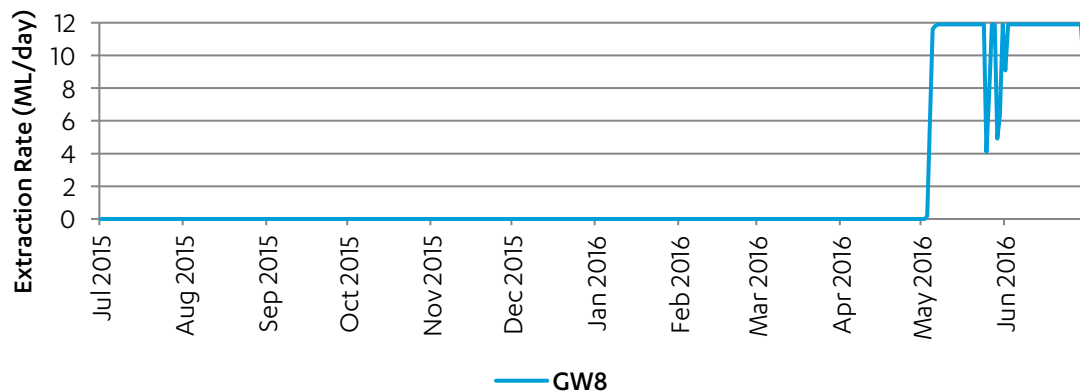
GW6 extraction



Groundwater Bore GW8 - Extraction Rate 2015-2016

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	9.09
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.32	11.90
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.62	11.90
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.80	11.90
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.09	11.90
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.89	11.90
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.90
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.92	11.90
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	6.32	9.42
31	0.00	0.00		0.00		0.00	0.00		0.00		11.90	
MONTHLY TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	303.0	351.7
ANNUAL TOTAL												654.7
MAX. FLOW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.9	11.9
MIN. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	9.09
AVE. FLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.77	11.72

GW8 Extraction



Appendix F

Releases to Boundary Creek

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

Date	Jul 2015	Aug 2015	Sep 2015	Oct 2015	Nov 2015	Dec 2015	Jan 2016	Feb 2016	Mar 2016	Apr 2016	May 2016	Jun 2016
1	1.58	14.3	2.07	0.48	0.13	0	0	0	0	0	0	0
2	1.88	13.7	1.9	0.39	0.12	0	0	0	0	0	0	0
3	2.22	16.3	2.06	0.34	0.13	0	0	0	0	0	0	0
4	2.45	23	2.55	0.3	0.12	0	0	0	0	0	0	0
5	2.4	22.9	3.17	0.24	0.12	0	0	0	0	0	0	0
6	2.35	34.9	2.92	0.22	0.1	0	0	0	0	0	0	0.84
7	2.44	40	5.96	0.23	0.07	0	0	0	0	0	0	1.62
8	2.32	32.8	16.8	0.27	0.05	0	0	0	0	0	0	2.03
9	2.18	23.9	25.1	0.26	0.04	0	0	0	0	0	0	3.14
10	2.04	19.6	22.4	0.23	0.05	0	0	0	0	0	0	6.69
11	1.9	17.2	16.3	0.23	0.07	0	0	0	0	0	0	8.1
12	1.94	16.4	12.3	0.28	0.07	0	0	0	0	0	0	9.72
13	2.6	13.8	9.17	0.32	0.15	0	0	0	0	0	0	8.75
14	3.57	11.4	6.52	0.3	0.15	0	0	0	0	0	0	5.74
15	4.93	10.5	10.2	0.28	0.18	0	0	0	0	0	0	4.21
16	6.82	8.83	32.9	0.26	0.16	0	0	0	0	0	0	3.53
17	8.55	8.96	24.3	0.25	0.11	0	0	0	0	0	0	3.81
18	6.53	11.7	17.2	0.23	0.11	0	0	0	0	0	0	3.34
19	4.91	14.5	13.7	0.21	0.12	0	0	0	0	0	0	3.16
20	3.71	11.8	11.2	0.22	0.16	0	0	0	0	0	0	3.46
21	2.86	9.62	8.73	0.23	0.17	0	0	0	0	0	0	3.12
22	2.45	8.21	6.93	0.22	0.13	0	0	0	0	0	0	2.75
23	2.21	8.06	3.45	0.21	0.14	0	0	0	0	0	0	2.73
24	1.85	6.88	3.25	0.2	0.1	0	0	0	0	0	0	5.24
25	1.7	5.47	2.59	0.18	0.04	0	0	0	0	0	0	8.63
26	2.06	4.56	1.79	0.17	0.02	0	0	0	0	0	0	10
27	3.64	3.76	1.25	0.16	0	0	0	0	0	0	0	7.79
28	11.3	3.1	0.9	0.14	0	0	0	0	0	0	0	6.23
29	15.9	2.86	0.71	0.13	0	0	0	0	0	0	0	5.29
30	13.5	2.53	0.59	0.11	0	0	0	0	0	0	0	5.28
31	11.8	2.31		0.11		0	0		0		0	
Total	136.59	423.85	268.91	7.40	2.81	0.00	0.00	0.00	0.00	0.00	0.00	125.20

* Note: Flow data provided for the period 14/06/2016 until 30/06/2016 is operational data and has not yet undergone quality checking by Ventia

Release to Boundary Creek (ML/day)

Date	Jul 2015	Aug 2015	Sep 2015	Oct 2015	Nov 2015	Dec 2015	Jan 2016	Feb 2016	Mar 2016	Apr 2016	May 2016	Jun 2016
1	1.9	0.0	0.0	1.0	2.2	2.2	2.2	2.1	2.1	2.2	0.0	2.1
2	1.4	0.0	0.0	2.1	2.2	2.2	2.2	2.2	2.1	2.2	0.0	2.1
3	1.0	0.0	0.0	2.1	2.2	2.2	2.2	2.2	2.1	2.2	0.0	2.1
4	1.0	0.0	0.0	2.1	2.2	2.2	2.2	2.2	2.1	2.2	1.2	2.0
5	1.0	0.0	0.0	2.1	2.2	2.2	2.1	2.2	2.1	2.2	2.1	2.1
6	1.0	0.0	0.0	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.2
7	1.0	0.0	0.0	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.2
8	0.7	0.0	0.0	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.2
9	0.4	0.0	0.0	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.1	2.2
10	0.4	0.0	0.0	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1
11	0.4	0.0	0.0	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1
12	0.4	0.0	0.0	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1
13	0.4	0.0	0.0	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1
14	0.4	0.0	0.0	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	1.3
15	0.4	0.0	0.0	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	0.0
16	0.4	0.0	0.0	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	0.0
17	0.4	0.0	0.0	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	0.0
18	0.1	0.0	0.0	2.1	2.2	2.2	2.2	2.1	2.1	1.5	2.1	0.0
19	0.0	0.0	0.0	2.2	2.2	2.2	2.2	2.1	2.1	1.1	2.1	0.0
20	0.0	0.0	0.0	2.2	2.2	2.2	2.2	2.1	2.1	0.5	2.1	0.0
21	0.0	0.0	0.0	2.2	2.2	2.2	2.2	2.1	2.1	0.0	2.1	0.0
22	0.0	0.0	0.0	2.2	2.2	2.2	2.2	2.1	2.1	0.0	2.1	0.0
23	0.0	0.0	0.0	2.2	2.1	2.2	2.2	2.1	2.1	0.0	2.1	0.0
24	0.0	0.0	0.0	2.1	2.1	2.2	2.2	2.1	2.1	0.0	2.1	0.0
25	0.0	0.0	0.0	2.2	2.1	2.2	2.2	2.1	2.1	0.0	2.1	0.0
26	0.0	0.0	0.0	2.2	2.1	2.2	2.2	2.1	2.1	0.0	2.1	0.0
27	0.0	0.0	0.0	2.2	2.1	2.2	2.2	2.1	2.1	0.0	2.1	0.0
28	0.0	0.0	0.0	2.2	2.2	2.2	2.2	2.1	2.2	0.0	2.1	0.0
29	0.0	0.0	0.0	2.2	2.2	2.2	2.2	2.1	2.2	0.0	2.1	0.0
30	0.0	0.0	0.0	2.2	2.2	2.2	2.1		2.2	0.0	2.1	0.0
31	0.0	0.0		2.2		2.2	2.1		2.2		2.1	
Total	12.73	0.00	0.00	65.46	64.64	67.56	67.02	62.02	65.80	39.95	58.96	29.28

Turned off due to Water Quality

Due to a sudden degradation of the water quality in West Gellibrand reservoir, Barwon Water ceased discharging to Boundary Creek from the April 18, 2016, to May 4, 2016.

Barwon Water notified SRW as soon as the water quality issues arose and received approval from SRW, stating that at the time it was prudent to cease releasing.