

Barwon Downs Borefield

Criteria for assessment under the Water Act 1989

November 2018

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1. Introduction

This application for renewal is made under section 58 of the *Water Act 1989 (the Act)*. Barwon Water's (BW's) licence is valid until 30 June 2019. BW requests that Southern Rural Water (SRW) consider this application for renewal and provide a decision for renewal prior to 30 June 2019.

BW is seeking the renewal of its licence on certain conditions with a reduction of approximately 40% in maximum daily, annual, ten year and fifteen-year extraction rates. The proposed volumetric entitlements are described in Section 2 at Table 1.

2. Volumetric Entitlements

2.1. Proposed Volumetric Entitlements

BW's application for renewal is seeking the proposed volumetric entitlements listed below.

Table 1: Proposed volumetric entitlements

1. Type of use for which water is taken	Urban Supply
2. Groundwater Management Area from which the water is to be taken	Gerangamete
3. Maximum daily rate at which the water may be taken	45ML/day
4. Maximum volume of water that may be taken in any year (ending June 30)	12,000ML
5. Maximum volume of water that may be taken in any period of 15 years (ending June 30)	60,000ML

2.2. Why is reduction acceptable

The proposed reductions in volumetric entitlements compared to the existing borefield licence are described in table 2 below.

Table 2: Proposed volumetric entitlements

Condition	Current	Proposed	BW Comment
Maximum daily rate	72	45	As a result of the work undertaken by BW, it is apparent that the existing Barwon Downs Borefield infrastructure is not capable of extracting in excess of 45ML/d without significant augmentation. BW can manage with 45ML/d and the proposed daily maximum has been amended to reflect this.
Maximum annual rate	20,000	12,000	At no stage in the last 15 year licence period has BW extracted 20,000ML/year. The maximum annual rate has been reduced to

			reflect a volume which has typically been extracted in the past during drought conditions, while also providing for water security in accordance with Barwon Water's Urban Water Strategy.
Maximum 10-year rate	80,000	N/A	Barwon Water has removed the 10-year maximum rate and replaced it with a 15-year maximum rate to ensure it is contained and aligned within the groundwater licence period. The maximum amount of 60,000 ML over 15 years is 33% lower than the estimated historical recharge rate of the Lower Tertiary Aquifer (LTA) over the past 30 years. The 15-year maximum rate of 60,000ML is consistent with a long term 100-year average of 4,000ML/year.
Maximum 15-year rate	N/A	60,000	
Long term (100 year) extraction	400,000	N/A	Extraction over a 100-year period is not in alignment with a 15 year licence, therefore been removed. The 400,000 ML over 100 years results in an average of 4,000 ML/y over 100 years. The proposed maximum extraction of 60,000 ML over 15 years results in the same average of 4,000 ML/y over 15 years.

Due to the particular characteristics of the Geelong water supply system, the maximum demand/population that can be reliably served by the Geelong water supply is more sensitive to the amount of water that is able to be extracted from the Barwon Downs borefield over the duration of a multi-year drought period than the amount that can be extracted in a one-year period.

The critical multi-year period is in the order of 5 years - similar in duration to the worst period of the millennium drought. This is when water availability from the BW's surface waters sources (Barwon, Moorabool River and Yarra-Thomson water sources) is at its minimum. Supplementing these surface water sources with groundwater for the duration of the multi-year drought events will give maximum system yield benefit. This maximises the time before the next potential major water source upgrade (e.g. Seawater desalination) is required and minimises the economic costs for the region associated with water source upgrades.

BW has modelled the proposed volumetric entitlements as outlined in section 2.1 and found that a reduction in volumetric entitlements, when coupled with the regions other water sources, is sufficient to meet the long term water resource needs of the Geelong region. BW is of the view that the proposed volumetric entitlements meet the long term needs of the region.

BW's Urban Water Strategy (2017) details how BW plans to continue to deliver secure water supplies to the region over the next 50 years, supporting resilient and liveable communities under a range of climate scenarios. As set out in the Urban Water Strategy, the Barwon Downs

Borefield is a critical resource for the region, intended to be called upon during drought conditions when traditional surface water catchments decline.

The long-term scientific data concerning the sustainability of the LTA demonstrates that the LTA will not be adversely affected by the taking of water pursuant to the proposed licence.

BW is also confident about the likely effect on other environmental features and proposes, in respect of those environmental features, an adaptive approach based upon trigger levels to ensure that other adverse environmental consequences are avoided, or if they are unavoidable, they are minimised and managed.

3. Water Act

3.1. Legal Context for Renewal

In order to ensure that BW addressed all matters required of it in its application for renewal of the licence, BW has undertaken a review of the relevant legislative requirements. BW's assessment is set out below.

In considering this application for renewal, by reason of section 58(3) of the Act, SRW must have regard to the matters mentioned in section 53 of the Act. Section 53 requires that SRW *"must renew the licence unless, in the opinion of the Minister, there are good reasons not to do so"*.

There are no good reasons for SRW to decide not to not renew the licence. There is no likely adverse effect of the taking of water pursuant to the licence on any environmental, social or economic value. BW asks that a renewed licence is drawn in a way which ensures that any residual risks are appropriately managed.

This is an application to renew an existing licence. As such, the status quo is the starting point for assessment of the future entitlement. To the extent that the previous pumping regime has had effects on the environment, the scientific data now known (effects and cause) enables BW to better manage those risks in the future, informed by the requirements of the Section 78 Notice.

To the extent that section 53(1) (a) and (ab) of the Act directs SRW to consider the report of any panel it appoints, and the comments of others, these are matters which BW cannot address.

As a result of section 53(1)(e) of the Act SRW must give effect to any other matter it thinks fit. In the context of this application being made by BW for and on behalf of the customers it serves and securing access to water supply resources to ensure safe, secure, affordable and reliable water supply to the people of the Greater Geelong region, BW suggests that the following matters are relevant for SRW's consideration as follows:

- Barwon Water's *Urban Water Strategy (2017)*, prepared in accordance with the *Statement of Obligations* issued by the Water Minister, identifies the importance of the Barwon Down's

groundwater licence to the long-term water security in the greater Geelong water supply system, contributing more than 20% of the region’s water supply system yield.

- Without the renewal of the licence, a significant investment in a major new water resource such as seawater desalination would need to be brought forward by 15 to 20 years (depending on climate change scenario assumed). The net present economic cost of this to the Geelong region would be in the order of \$140 million under a median climate change scenario and \$210 million under a high climate change scenario. This investment would need to be made as early as 2032 under a high climate change scenario.
- Barwon Water’s *Statement of Obligations* issued by the Minister pursuant to the *Water Industry Act 1994* requires that Barwon Water operate as efficiently as possible consistent with sound commercial practice.
- The Minister for Water’s 2017/18 Ministerial Expectations and Corporate Plan Guidelines for Water Corporations states that Barwon Water should continue to focus on efficiency and innovation in order to improve water services delivery while maintaining a downward pressure on costs.
- The Treasurer of Victoria’s response to Barwon Water’s 2018-19 to 2022-23 Corporate Plan states “.... Over the forecast period, I expect the water corporations to address these challenges and additional obligations while also focusing on maintaining financial sustainability by undertaking actions and pursuing targets at the lowest possible cost and providing cost effective services to customers.”

We also refer to comments below in respect of Section 40 (j).

By reason of section 53(2)(b) of the Act SRW must give effect to—

Matter	BW Comment
(2a) Any relevant Order under section 52A of the Act	These Orders relate to registration licences and licences issued under section 51(1)(ba) of the Act, in respect of a spring or soak or dam. Any Orders made under this section are not relevant to this application.
(2b) Any relevant Order made by the Governor in Council under section 49A of the Groundwater Act 1969 specifying an annual reserve volume of groundwater	BW is not aware of any relevant Orders made by the Governor in Council under section 49A of the Groundwater Act 1969 specifying an annual reserve volume of groundwater
(2c) Any relevant prescription made under section 62(1) of the Groundwater Act 1969 in respect of a groundwater conservation area declared under section 61 of that Act	BW is not aware of any relevant prescriptions made under section 62(1) of the Groundwater Act 1969 in respect of groundwater conservation area declared under section 61 of that Act
(2e) An approved management plan for any relevant water supply protection area	BW is not aware of any relevant water supply protection area.

By reason of section 53(1)(b) of the Act SRW must have regard to the matters set out in subsections 40(b)-(m). BW's position in respect of those matters is set out below. In considering these matters, BW's submission is informed by the requirements of the section 78 Notice that directs BW to remediate the adverse effects on Boundary Creek before drawing water pursuant to this licence, other than for emergency and maintenance. Any reference to the proposed licence includes the conditions set out in Section 4 below.

Matter	BW Comment
(b) The existing and projected availability of water in the area	<p>BW has undertaken a decade long program of technical works with the key objective of assessing the sustainability of the LTA and projected water availability.</p> <p>The historical impacts of the borefield have been assessed using a groundwater model calibrated over the period 1981 to 2016. This model was then used over a 50-year timeframe to assess the sustainability of the proposed extraction regime and to quantify the effects. Consistent with climate change guidelines (<i>Guidelines for Assessing the Impact of Climate Change on Water Supplies in Victoria</i>, DELWP, 2016), four different climate change scenarios were applied to each pumping regime to understand the range of potential impacts.</p> <p>The estimated recharge to the LTA over the last 35 years is 5,835 ML/year. The recharge is generally expected to decline in the future, ranging between 4,145 to 6,336 ML/year depending on the climate scenario.</p> <p>Results indicate that the proposed extraction regime (an average of 4,000 ML/year over 15 years) will generate drawdown in the LTA. The amount of drawdown is considered to allow for an acceptable level of stress on the environment whilst ensuring the protection of economic, social and environmental values. More detail on the sustainability of the proposed extraction, the groundwater resource and the assessment approach is provided in the Groundwater Assessment Report.</p>
(ba) The permissible consumptive volume (PCV), if any, for the area;	<p>The Barwon Downs borefield is within the Gerangamete Groundwater Management Area. By the Permissible Consumptive Volume Groundwater Order 2011, which applies to "all formations below 60 metres", the PCV is "In any one year 20,000ML. In any consecutive period of ten years 80,000ML".</p> <p>This application for renewal seeks an entitlement to extract up to 12,000ML in any one year and is 60% of the annual extraction rate set by the PCV. This application for</p>

	renewal seeks an entitlement to extract up to 60,000ML over a 15-year period and does not exceed the PCV.
(c) The existing and projected quality of water in the area;	<p>The existing salinity of water in the LTA is less than 1,000 mg/L TDS. No adverse impact on groundwater quality is predicted to occur as a result of groundwater pumping.</p> <p>Pursuant to the proposed licence there are no likely adverse impacts on any surface water quality sources</p> <p>Surface water quality of Big Swamp has been historically affected, and these historical impacts will be remediated by the s. 78 Notice. No further adverse impacts on groundwater or surface water are likely to occur. More detail is provided in the Groundwater Assessment Report.</p>
(d) Any adverse effect that the allocation or use of water under the entitlement is likely to have on—	
(i) existing authorised uses of water; or	<p>BW is not aware of any adverse effect on existing authorised uses by the allocation or use of water pursuant to the renewal of the licence.</p> <p>Existing authorised uses of groundwater or surface water include public water supply, stock and domestic, irrigation and commercial. Licensed uses are described in more detail in the Groundwater Assessment Report.</p>
(ii) a waterway or an aquifer; or	<p>Subject to the management measures set out in the Groundwater Assessment Report, it is not likely that there will be any adverse effect on a waterway or an aquifer, and any potential adverse effect will be identified and managed. This matter is more fully addressed in the Groundwater Assessment Report.</p> <p>There are three aquifers in the Gerangamete GMA:</p> <ul style="list-style-type: none"> • Lower Tertiary Aquifer (LTA) • The Lower-Mid Tertiary Aquifer (LMTA) – (i.e. Clifton Formation) • Local Quaternary Alluvial aquifers (QA) <p>There are no likely adverse impacts expected to occur to any of these aquifers.</p> <p>Pumping will induce drawdown in the LTA, however the predicted drawdown effects allow for acceptable levels of stress and can be managed with trigger levels and offsets where required, in accordance with sustainable groundwater use. Significant drawdown as a result of</p>

	<p>pumping is not likely in the Clifton Formation aquifer or the local alluvial aquifers.</p> <p>Pumping is not likely to cause adverse impacts to groundwater quality in the LTA or overlying aquifers.</p> <p>Drawdown as a result of pumping has the potential to induce land subsidence. Land subsidence has been monitored as a condition of the current licence and measured subsidence is within acceptable levels.</p>
(iii) the drainage regime within the meaning of section 12(1);	Based on the information available to BW, subject to the management measures set out in the Groundwater Assessment Report, there will be no adverse effect on a drainage regime.
(iv) The maintenance of the environmental water reserve in accordance with the environmental water reserve objective;	Subject to the management measures set out in the Groundwater Assessment Report, there will be no effect on the maintenance of the environmental water reserve. This matter is more fully addressed in the Groundwater Assessment Report.
(e) Any water to which the applicant is already entitled.	<p>Bulk Entitlements relevant to the area serviced by the LTA within the Greater Geelong system are described below.</p> <p>Bulk Entitlement – volumes</p> <ul style="list-style-type: none"> • Barwon – up to 127,400 ML over 3 years • West Moorabool – up to 6,000 ML over 3 years at She Oaks; up to 17,775 ML over 3 years at Lal Lal • East Moorabool – up to 9,000 ML/y • Anglesea borefield – up to 7,000 ML/y • Greater Yarra System – Thomson River Pool – 16,000 ML/y via the Melbourne to Geelong Pipeline (MGP). <p>The Statement of Obligations, under clause 6-1, requires BW prepare an Urban Water Strategy every five years which describes how BW will continue to deliver secure water supplies to the region over the next 50 years.</p> <p>The right to take and use water from the Borefield forms an essential part of a number of diverse water sources, all of which are required to meet BW's supply obligations.</p> <p>This is further described in the Urban Water Strategy 2017, (Box 10, page 85), <i>"The importance of our Barwon Downs groundwater licence to long term water security in the greater Geelong system"</i>. Section 1 of the licence submission also contain further justification.</p>

(g) The need to protect the environment, including the riverine and riparian environment.

The allocation of water under the renewed licence will protect the environment including the riverine and riparian environment.

A numerical groundwater model was used to quantify the impacts to rivers, riparian environment and other groundwater dependent ecosystems (GDEs). The groundwater model was used to predict the drawdown in areas where the water table is shallow and change in flux to and from the rivers and creeks. The risk assessment framework outlined in the Ministerial Guidelines for High Value GDEs was applied to understand areas of high, medium and low risk.

The risk assessment also included the physical mitigation constraints within the study area that restrict groundwater flow (and therefore drawdown impacts) present in real world, that are not represented well in the model. These include the presence of alluvial aquifers, aquitards and the Bamba Fault.

The predicted risk to individual rivers in accordance with the framework of the Ministerial Guidelines for High Value GDEs is summarized below and considers the physical mitigating factors that are known to buffer the effects of pumping.

Overall the level of risk is variable throughout the catchment depending on the connectivity between the LTA and receptor.

- The Barwon River is classified as potential medium risk where the East Branch flows over the aquifer and aquitard south east of the Bamba Fault. The model has highlighted there could be a potentially significant impact to surface flows in the East Branch during low flow periods and further work is required to confirm this.
- The risk to the West Barwon River is considered low where it flows over the aquifer and aquitard due to the presence of alluvial aquifers.
- Downstream of the confluence, the risk to the Barwon River is considered to be low as alluvial aquifers are present.
- Risk classification for Dividing Creek is medium because although there is a low likelihood that the stream is connected to the regional aquifer, more than 2 m of drawdown is predicted.
- The risk to the Gellibrand River is considered to be medium given the presence of an alluvial aquifer. However, some small areas of high risk where the alluvial aquifer may not be present and the Lower Tertiary Aquifer outcrops.

	<ul style="list-style-type: none"> • The risk to Porcupine Creek is considered to be low. • There is a medium risk to Ten Mile Creek, where it flows over LTA outcrop and a low risk to other reaches in the creek. • There is a low risk to the majority of Yahoo Creek however small areas of medium risk were identified where the creek flows over the LTA outcrop area. • The risk is considered to be low for Loves Creek as a result of low connectivity with the regional aquifer. • There is a medium risk in the upper reaches of Barongarook Creek and a low risk for the lower reaches. <p>The risk to groundwater dependent vegetation across 98% of the study area is classified as low and 2% is classified as high risk. Vegetation dependent on groundwater in the regional aquifer in the areas of high risk has the potential to be impacted by drawdown from the borefield.</p> <p>There are no known groundwater dependent wetlands in the study area.</p> <p>The Groundwater Assessment Report outlines the Environmental Protection Program developed for this licence application. The program will involve groundwater and surface water monitoring, defined triggers at sensitive receptors and response actions to manage and mitigate adverse impacts.</p> <p>More detail on the predicted impacts to rivers and GDEs and the monitoring program are provided in the Groundwater Assessment Report.</p>
(i) The conservation policy of the government	<p>BW is aware of:</p> <ul style="list-style-type: none"> • Ministerial Guidelines for Protection of Groundwater Dependent Ecosystems, 13 April, 2015 <p>In line with Section 3A of this document, Barwon Water has prepared a Groundwater Assessment Report which is attached to this application.</p> <ul style="list-style-type: none"> • Policies for Managing Take and Use Licences, 2 February 2014 <p>The proposed licence renewal is consistent with these policies. There is no matter in the June 2014 Policy which indicates against the Licence renewal.</p>

- Ministerial Guidelines for Groundwater Licencing and the Protection of High Value Groundwater Dependent Ecosystems. April 2015

Technical reports including the Groundwater Assessment Report have regard to this policy. The risk assessment tools outlined in this document are central to the assessment used to support this application.

- Resource Share Guidance: Planning the take of Victoria's Groundwater Resources. Oct 2015

BW's licence application and the process to developing this document give regard to this policy.

- SEPP Groundwater's of Victoria

BW's licence application and the process to developing this document have regard to this policy.

- Corangamite Waterway Strategy 2014-22 (CCMA 2014)

This strategy provides a framework for the CCMA in collaboration with other agencies and stakeholders to improve the condition of rivers estuaries and wetlands. Boundary Creek is identified as a priority water way. The goal is to maintain or improve the resilience of other threatened waterway dependent species. The target is to ensure species of Otway Cray are secured. The work undertaken as part of the s.78 Notice will ensure Boundary Creek and Big Swamp are remediated which will improve the environment for this and other species. The Boundary Creek Aquatic Ecology Investigation (Jacobs 2017) provides additional detail on the assessments.

- Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site Management Plan (DELWP 2018)

The taking of water pursuant to the licence will have no effect on the RAMSAR sites identified in this document.

Other policies relevant to developing this application are listed below. BW has considered these policies in developing this application and is of the view that the granting of the renewal is consistent with these policies.

- Water for Victoria (DELWP 2016)
- Victorian Waterway Management Strategy (DSE 2013)

	<ul style="list-style-type: none"> • Corangamite Regional Catchment Strategy 2013-19 (CCMA 2013) • Seasonal Watering Plan 2018-19, chapter 3.7 Barwon system (VEWH 2018)
<p>(j) Government policies concerning the preferred allocation or use of water resources.</p>	<p>BW is aware of:</p> <ul style="list-style-type: none"> • DELWP, <i>Resource Share Guidance, Planning the Take of Victorian Groundwater Resources</i>. <p>The proposed licence renewal is consistent with this Guidance Note. It enables the take and use of water by BW to supply the greater Geelong region.</p> <ul style="list-style-type: none"> • <i>Statement of Obligations (SoO)</i> issued by the Minister pursuant to the <i>Water Industry Act 1994</i>. <p>BW's licence renewal application is consistent the SoO. The proposed allocation and use of water has regard to the Guiding Principles (1-6), Modelling for Climate Change and Supply Forecasting (6-A) and Urban Water Strategy (6-1).</p> <ul style="list-style-type: none"> • <i>Central Region Sustainable Water Strategy (2006)</i> <p>BW's licence renewal application is consistent with the Central Region Sustainable Water Strategy, the objectives of which include ensuring reliable and safe water supplies for all uses into the future, understanding the implications of climate change, maximising overall community benefits and making the best use of water resources locally and throughout the region.</p> <ul style="list-style-type: none"> • <i>Western Region Sustainable Water Strategy (2011)</i> <p>BW's licence renewal application is consistent with the Western Region Sustainable Water Strategy, including promoting sustainable water management and making the best use of the region's groundwater resources.</p> <ul style="list-style-type: none"> • <i>Water for Victoria (2016)</i> <p>BW's licence renewal application is consistent with Water for Victoria. It recognises that water is fundamental to our communities and is essential for people, jobs and a thriving economy. The vision for sharing Victoria's water is "Water is fundamental to our communities. We will manage water to support a healthy environment, a prosperous economy and thriving communities, now and into the future."</p> <ul style="list-style-type: none"> • Water Industry Regulatory Order (2014)

	BW's licence renewal is consistent with the provision of prudent and efficient water services to customers.
(ja) Whether the proposed source of water is within a heritage river area or natural catchment area within the meaning of the Heritage Rivers Act 1992. and whether there is any restriction on the use of the area under that Act ;	The proposed source of water, namely the LTA, is not within a heritage river area or natural catchment area within the meaning of the Heritage Rivers Act 1992.
(k) If appropriate, the proper management of the waterway and its surrounds or of the aquifer;	<p>The taking of water pursuant to the licence will have no effect on the proper management of any aquifer.</p> <p>Subject to the management measures set out in the Groundwater Assessment Report, there will be no adverse effect on a the proper management of any waterway or their surrounds.</p>
(l) The purposes for which the water is to be used;	<p>BW seeks to use the water in the public interest for urban water supply for Geelong and the surrounding region including the Bellarine Peninsula and Colac.</p> <p>Section 1 of the submission outlines the purposes for which the water will be used.</p>
(m) The needs of other potential applicants;	<p>To our knowledge there are no current users or proposed applicants within the Gerangamete GMA.</p> <p>This application preserves the interests of other potential applicants as BW is not proposing to take 100% of the PCV.</p>

For the reasons set out above, BW is of the view that its application demonstrates that there is no reason for SRW to not renew the licence.

4. Proposed Licence Conditions

BW proposes the following conditions to ensure that there is no likely adverse effect from the taking of water pursuant to the licence on the quality of water in the area, existing authorised uses, the LTA or waterways.

4.1. Section 78

A condition reflecting the requirements of the Section 78 Notice, and in particular section 2.1 which states – *“Barwon Water must not extract from the works for any purpose other than maintenance or emergency access until this notice is rescinded.”*

4.2. Existing conditions to retain

Second schedule:

- Clause 4 Metering
- Clause 5 Subsidence
- Clause 10 Community engagement

BW would support an expansion of the conditions in the proposed licence to reflect the BW commitments to the community in section 7.3 and 7.4 of this Background and Submission document.

4.3. Proposed new and amended conditions (Groundwater Assessment Report)

First Schedule – To be amended in accordance with the proposals set out in the Groundwater Assessment Report.

Second Schedule – Conditions arising from the Groundwater Assessment Report, should be included as conditions in this licence.

BW proposes the following additional conditions:

- Provide a stock water pipeline to existing affected landholders on the lower Boundary Creek